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An evaluation of the Suspect Target Management Plan

Steve Yeong

AIM

First, to determine whether STMP-II reduces violent and property crime. Second, to determine whether DV-STMP reduces Domestic Violence (DV) related crime. Third, to determine whether these programs operate through deterrence or incapacitation. Finally, to determine whether STMP-II has a differential impact on juveniles versus adults and Aboriginal Australians versus non-Aboriginal Australians.

METHOD

I use court outcome data in conjunction with the complete list of individuals subject to either program between May 2005 and September 2018. Using these data, I compare rates of offending and imprisonment in the 12 months before and after an individual becomes subject to either program. In my analysis of STMP-II, I focus on specific violent and property offences to avoid reporting/detection bias from contaminating the estimates. In my analysis of DV-STMP, I also examine DV offences as they are the focus of the program. In order to determine whether either program operates through deterrence or incapacitation, I divide the sample into cohorts based on how much time each individual spent in custody during their follow up. Using these cohorts, I then estimate how much of the total crime reduction associated with either program can be explained by each cohort. I then apply these approaches to Aboriginal Australians and juveniles to explore whether these effects differ for both subgroups.

RESULTS

STMP-II is associated with large, practically and statistically significant reductions in property crime, but not violent crime. This crime reduction is also, however, accompanied by an increase in the risk of imprisonment. Although STMP-II increases the risk of imprisonment, the vast majority of the crime reduction benefit occurs through deterrence. DV-STMP is associated with large, practically and statistically significant reductions in DV crime, but not other types of crime. DV-STMP has no association with the risk of imprisonment. When compared to adults, STMP-II is associated with a larger crime reduction benefit for juveniles. STMP-II has no discernible impact on the risk of imprisonment for juveniles. When compared to non-Aboriginal people, STMP-II is associated with a smaller crime reduction benefit, and a smaller increase in the risk of imprisonment for Aboriginal Australians. The crime reduction benefit for both groups occurs predominately through deterrence.

CONCLUSION

Both STMP-II and DV-STMP are effective in reducing crime. Both programs predominately reduce crime through deterrence. These claims also hold for juveniles and Aboriginal Australians.

KEYWORDS

recidivism

incarceration

policing

focussed deterrence

incapacitation

INTRODUCTION

Twenty-first century police employ a variety of tactics to maintain law and order. Arguably the most popular class of tactics employed by police are those rooted in focused deterrence. Focused deterrence, or “pulling levers” police programs typically involve the reallocation of existing police resources toward specific targets (e.g., physical spaces, individuals, gangs, types of crime) where police can get the greatest “bang for their buck”. While there is a considerable body of research supporting the effectiveness of such tactics internationally, we know very little about whether and how such programs work in Australia.¹

In New South Wales (NSW), the largest person-focused policing program is the Suspect Target Management Plan (STMP). STMP was introduced in 2002 with the objective of reducing crime by proactively policing individuals deemed to be at a high risk of offending. Following the release of a study by the NSW Youth Justice Coalition (Sentas & Pandolfini, 2017), STMP has received considerable negative media attention.² Much of this criticism surrounding STMP has centred on the targeting of vulnerable groups (i.e., juveniles and Aboriginal Australians). Despite this criticism, STMP continues to be one of the key elements of the NSW Police Force’s strategy to reduce crime. The purpose of this study is to: determine whether STMP reduces crime; how STMP reduces crime; and finally, to examine if the effect of STMP is more pronounced for Aboriginal Australians and juveniles.

The Suspect Target Management Plan (STMP)

The Suspect Target Management Plan (STMP) is a NSW Police Force program that has been in operation since February 2002. The objective of STMP is to reduce crime by identifying individuals at a high risk of offending, notifying them that they are now subject to enhanced supervision and then proactively policing such individuals. In the context of STMP, proactive policing typically involves officers from the corresponding Police Area Command (PAC)³ regularly conducting person and vehicle searches, bail compliance checks and issuing move-on directives.

There have been three iterations of STMP. STMP-I was introduced in February 2002, and then replaced by STMP-II in May 2005. The difference between STMP-I and STMP-II is the process an individual undergoes prior to being placed on STMP. Information regarding the selection process for STMP-I is unavailable. The selection mechanism for STMP-II is described shortly. DV-STMP is the third iteration of STMP. DV-STMP was introduced in October 2015 and sits alongside STMP-II. DV-STMP involves modifying elements of STMP-II in order to address the dynamics of Domestic Violence (DV).

STMP-II: May 2005 – present

The process begins when a member of the NSW Police Force nominates a Person of Interest (POI) for STMP. Any member of the NSW Police Force can nominate an individual for STMP and each PAC has its own unique STMP list. Once nominated, the corresponding PAC conducts a risk assessment. The risk assessment takes two factors into consideration: first, information regarding the POI’s offending risk⁴; and second, the PAC’s priority crimes.⁵ Based on this assessment, a risk rating is generated for each candidate. Candidates can be of extreme, high, moderate or low risk. Following the risk assessment, candidates are then reviewed during the PAC’s next Tasking and Deployment (T&D) meeting. It is at this meeting that the final decision regarding whether a candidate will go on STMP is made.⁶ Candidates from all four-risk categories can be placed on STMP. The risk assessment is designed only to inform the discussion at each T&D meeting. Should a candidate be deemed suitable for STMP, an information report is generated for the “target”. This information report is then allocated to a team of officers within the PAC. The team

¹ Braga, Weisburd and Turchan (2018) and Weisburd et al. (2019) provide an overview of this literature.

² See for example Blanco (2018), McGowan (2017), O’Mallon (2017) or Shoebridge (2018).

³ A PAC is the name given to geographically defined police jurisdictions in NSW.

⁴ These factors include: prior offending; whether the use of violence and/or a weapon was involved in such offences; prior sentences of imprisonment; prior community based orders; whether the POI has addiction issues; whether the POI has known criminal associations; and finally, whether the POI was involved in crime from a young age.

⁵ Each PAC has its own list of priority crimes (e.g., domestic assault, break and enter), which can differ both between PACs and over time. I do not have information regarding each PAC’s list of priority crimes.

⁶ I am not able to observe information relating to cases where an individual is considered for STMP at a T&D meeting and deemed unsuitable.

leader is responsible for designing a Target Action Plan (TAP) to deal with the target.⁷ Targets currently on STMP are reviewed at each T&D meeting. Targets are removed from an STMP list if they have died, been incarcerated⁸ or if their criminal behaviour appears to have ceased.⁹

DV-STMP: October 2015 – present

DV-STMP involves four modifications to STMP-II. First, if an individual has been identified in multiple DV incidents, police are encouraged to nominate the POI for DV-STMP. Second, additional information is considered during a T&D meeting for DV-STMP candidates (e.g., whether children are involved). Third, the TAP involves contacting the victim to inform them that the corresponding POI has been placed on STMP. And finally, police also contact the local prosecutor and inform them that the POI has been placed on STMP.

Literature

A question of first order importance to policymakers is whether police reduce crime. More than two decades of empirical research indicate that the answer to this question is yes. An increase in police numbers generates a reduction in crime.¹⁰ Although the magnitude and precision of estimates differ between jurisdictions, Chalfin and McCrary (2017) suggest that, in general, a one per cent increase in police numbers generates a 0.4 and 0.2 per cent reduction in violent and property crime, respectively. A question of second order importance to policymakers is how police reduce crime. There are two channels through which police may reduce crime (Becker, 1968). The first is referred to as incapacitation: the crime reduction that occurs when offenders are unable to offend due to their imprisonment.¹¹ The second is referred to as deterrence, of which there are two types. General deterrence refers to the idea that police reduce crime by lowering an individual's proclivity to offend through fear of apprehension and punishment. Specific deterrence refers to the idea that individuals who are arrested, sanctioned or subjected to supervision will be deterred from further offending. Focused deterrence is one of the various measures that criminologists consider to lie within the specific deterrence category.

Focused deterrence refers to the relocation of police resources toward a relatively small number of offenders responsible for a disproportionately large fraction of crime. Focused deterrence programs typically involve three elements. The first of which is to communicate an explicit message of deterrence to those targeted by the intervention. The purpose of the message is to convey the idea that the certainty, severity and swiftness of apprehension and sanctions have now increased. This message is often conveyed by members of the local community working in conjunction with law enforcement. The second and third elements refer to intensive police supervision and the increased availability of social services (e.g., social housing, job training and education programs).

Arguably the most famous focused deterrence policing deployment was the 1990s Boston Operation Ceasefire (BOC). Like many large U.S. cities, Boston experienced a sharp increase in youth homicide in the late 80s and early 90s. A working group of police, youth workers and academics determined that one per cent of the city's youth (many of whom were active gang members) were responsible for more than 60 per cent of youth homicides. The BOC was designed as a response to this problem. The BOC involved police, youth workers, churches, probation and parole officers working together to communicate an explicit message to gang members that violent crime will not be tolerated. All parties involved made it clear that participation in violent crime would generate an immediate and aggressive response from police. Participation in non-violent crime, however, would entail a "business-as-usual" response. Simultaneously,

7 A TAP typically involves notifying the target that they are now subject to enhanced supervision and making regular contact through move along directives and person and vehicle searches. I do not have information regarding specific TAPs.

8 In practice, police often do not take individuals off STMP after they are imprisoned. This is one of the reasons I limit the analysis to the first 12 months an individual becomes subject to STMP.

9 If a target moves to the jurisdiction of another PAC, the case is transferred to the new PAC.

10 Studies within this field of research typically leverage exogenous city or state level variation in police numbers to identify this causal relationship. Researchers have applied Instrumental Variables strategies (Evans & Owens 2007; Levitt, 1997; Owens, 2013; Yeong, 2019), Difference-in-Differences (Di Tella & Schargrodsky, 2004; Machin & Marie, 2011), high frequency time series (Corman & Mocan, 2000; Chalfin & McCrary, 2018; Marvell & Moody, 1996) and other approaches (DeAngelo & Hansen, 2014; Klick & Tabarrok, 2005; Shi, 2009), and consistently found that increasing the number of police reduces crime.

11 To the best of my knowledge there are only two quasi-experimental studies examining how an increase in aggregate police numbers generates a reduction in crime (Owens, 2013; Yeong, 2019), both of which support the idea that police reduce crime through deterrence rather than incapacitation.

these groups also offered increased levels of social services (e.g., employment training and education programs) to gang members. While the magnitude of the BOC's effect has been the subject of much debate (Braga et al., 2001; Braga et al., 2014; Rosenfeld et al., 2005), the general consensus is that the BOC generated a sizable, significant reduction in youth homicides.

The success of BOC set the tone for a variety of focused deterrence interventions. Braga et al. (2018) divide such interventions into three groups.¹² The first two groups focus on addressing gang-related violent crime and drug market activity. Like BOC, these interventions typically involve expressing a clear threat of punishment to selected high-risk offenders, while simultaneously working to increase access to social services. Messages of deterrence and access to social services are communicated through members of the community working in conjunction with law enforcement. Evaluating such programs presents two challenges, the first of which is reporting bias and the second is selection bias.

Reporting bias refers to crime that goes unreported to or detected by police. To address this issue, criminologists investigating the effect of gang related violent crime interventions limit their analysis to serious violent crime (e.g., homicide, assault resulting in serious injury, shootings and stabbings) that rarely go undetected by police. Unfortunately, addressing issues regarding detection bias for interventions targeting drug market operations is less straightforward as drug offences (e.g., use/possess/supply drugs) are heavily influenced by the level of police activity.

Selection bias, in the current context, refers to the idea that gangs become subject to an intervention precisely because of an ex-ante crime problem. This makes finding a valid counterfactual difficult because targeted gangs are, by construction, at a higher offending risk than non-targeted gangs. Much of the early research examining violent gang interventions (Braga, 2008; Braga et al., 2008; Boyle et al., 2010; Engel et al., 2013; McGarrell et al., 2006) and drug market interventions (Corsaro et al., 2010a) relied principally on time series variation.¹³ Criminologists have, however, quickly adopted more sophisticated panel data approaches to examine the effect of both violent crime interventions (Braga et al., 2013; Circo et al., 2020; Papachristos et al., 2007; Grunwald & Papachristos, 2017) and drug market interventions (Corsaro et al., 2012; Corsaro et al., 2013; Saunders et al., 2015). Such approaches address the selection bias problem by taking pre-existing differences between treatment and control groups into account, and then comparing offending rates, net of this adjustment, before and after the intervention. The consensus in this literature is that both types of interventions are effective in generating moderate reductions in crime (Weisburd et al., 2019).

There is, however, very little rigorous empirical evidence with regard to the third type of focused deterrence intervention: those targeting specific individuals. This is likely due to the lack of available (individual level) micro data. In fact, to the best of my knowledge, the Community Initiative to Reduce Violence (CIRV) in Glasgow is the only individual focused deterrence program to have been rigorously evaluated.

The CIRV was introduced in 2002 to reduce knife related crime. Under the CIRV, offenders residing in Glasgow's "east end" were identified by police using operational intelligence. Police targeted young, male gang members with a history of violent offending. These individuals were then provided with a phone number they, or any member of their gang could use to contact a "street worker". Following contact, the street worker would obtain a written commitment from the individual to abstain from violence and not carry a weapon. The incentive to participate lay in the provision of additional social services offered through the program (e.g., employment training, education programs, public housing). Detected breaches of their written commitment would result in an immediate freeze on any service they were receiving.

¹² Weisburd et al. (2019) divide focused deterrence programs into four groups, based on their operational characteristics. Hot spot policing refers to interventions that direct police resources toward geographical areas abundant with crime (e.g., a particular neighborhood or street). Problem-solving strategies involve augmenting existing policy settings to address factors associated with particular types of crime (e.g., closing bars early to avoid alcohol related violence). Community-based strategies center around involving the local community in the crime prevention effort (e.g., through the use of neighborhood watch). And finally, offender-focused policing refers to the reallocation of police resources toward individuals responsible for a disproportionately large fraction of crime.

¹³ Although these studies also use time series approaches to look for a structural break in areas not subject to an intervention, they do not concatenate such information into a single Difference-in-Differences style model.

To examine the effectiveness of the CIRV, Williams et al. (2014) compared the behaviour of individuals participating in the CIRV, to a matched control group of individuals residing in Glasgow's "south side". These individuals were matched using the same criteria the police used to identify individuals subject to the CIRV. Williams et al. (2014) then compared the offending of individuals within each group in the 12 months immediately before and after the program. Williams et al. (2014) found that the CIRV generated significant reductions in both violent crime and the probability of carrying a knife.

In contrast to the CIRV, and the vast majority of programs referenced in this section, neither STMP-II nor DV-STMP involve increasing access to social services. Similarly, neither program involves members of the local community working with police to communicate an explicit message of deterrence. These departures from the conventional focused deterrence approach beg the question of whether STMP is likely to be as effective as the programs described in this section. The purpose of this study is to shed light on this important question.

The current study

The current study is concerned with answering the following three research questions: (1) Is STMP-II or DV-STMP associated with a reduction in crime? (2) Is the crime reduction benefit associated with each program achieved through deterrence or incapacitation? (3) Do the answers to questions (1) and (2) differ for juveniles or Aboriginal Australians?

METHOD

Data

I utilise two datasets in this study. The first is an extract from the NSW Bureau of Crime Statistics and Research's Reoffending Database (ROD). The ROD extract contains information relating to all legal proceedings finalised in a NSW criminal court over the period 1 January 1996 to 30 September 2019.¹⁴ For each individual in ROD, I am able to observe their date of birth (and death if they died); gender; CNI¹⁵; Aboriginality¹⁶; a complete history of custodial episodes (i.e., I can observe dates that they entered and exited custody for both remand and sentences of imprisonment); and finally, information relating to any finalised court appearance. For each finalised court appearance, I am able to observe the nature of each charge (e.g., assault, motor vehicle theft¹⁷); the PAC responsible for charging the POI; the date that the offence was alleged to have taken place; and the outcome of the charge (i.e., guilty or not guilty).

The second dataset is an extract from the NSW Police Force's Computerised Operational Policing System (COPS). The COPS extract contains information relating to all individuals placed on either STMP-II or DV-STMP between 1 May 2005 and 1 September 2019. For each individual placed on STMP, I am able to observe their CNI; date of birth; PAC responsible for placing them on STMP as well as the date they were placed on and taken off STMP.¹⁸

After merging these data together, I limit the sample to individuals placed on STMP between 1 May 2005 and 30 September 2018. This allows me to observe the offending behaviour of each individual on

¹⁴ Criminal proceedings begin when a member of the NSW Police Force charges an individual with one or more offences. After this occurs, the charge(s) must be finalised in a criminal court. If the defendant is found "not guilty", then finalisation occurs on the day this determination is made. If the defendant is found "guilty", then finalisation occurs on the day that the sentence (i.e., the penalty) is handed down.

¹⁵ The CNI or Central Names Index is an individual level identifier given to individuals associated with an alleged offence.

¹⁶ That is, a binary variable equal to one if the individual has ever identified as Aboriginal to police, zero otherwise.

¹⁷ With one exception, the nature of each charge is determined using the Australian and New Zealand Offence Classification (ANZSOC) codes. Interested readers are directed to ABS (2011) for further information regarding ANZSOC codes. The exception is DV related charges. DV related charges are identified using the law part code associated with each charge. Law part codes are used in NSW to identify specific types of charges. Interested readers are directed to the Judicial Commission of NSW (2020) for more information pertaining to law part codes.

¹⁸ Some individuals are placed on STMP for an unreasonably long period of time (14 years in some instances). This is likely to be due to the police failing to take such individuals off STMP after their imprisonment. For this reason, I limit my analysis of offending to the year immediately before and after an individual is placed on STMP.

STMP for at least 12 months. In total, 10,667 individuals have been placed on STMP-II and 1,534 have been placed on DV-STMP over the study period. Of these 12,509 individuals, I was unable to match 98 to individuals in ROD. This could be due to either incorrect information in at least one of the datasets or because the individual has never been formally charged by police.

Descriptive statistics

Table 1 provides descriptive information for individuals placed on STMP-II (in Panel A) and DV-STMP (in Panel B) at two points in time: 365 days prior to being placed on STMP, and the first (free)¹⁹ day the individual is subject to STMP.

Table 1. Individuals placed on STMP between May 2005 and September 2018

	One year before STMP			First day on STMP			Difference	
	N (1)	Mean (2)	Std. Dev. (3)	N (4)	Mean (5)	Std. Dev. (6)	Estimate (7)	Std. Err (8)
Panel A. STMP-II								
Age	10,100	24.944	10.219	10,100	25.961	10.223	1.017***	(0.144)
Age at first CJS contact	10,080	17.941	7.001	10,080	17.941	7.001	-	-
Male	10,103	0.915	0.279	10,103	0.915	0.279	-	-
Aboriginal	10,085	0.458	0.498	10,085	0.458	0.498	-	-
Prior court appearances	10,103	8.210	7.626	10,103	9.703	7.639	1.493***	(0.107)
Prior violent offences	10,100	3.617	4.878	10,100	4.500	5.157	0.883***	(0.071)
Prior weapon offences	10,100	0.396	1.161	10,100	0.544	1.383	0.148***	(0.018)
Prior drug offences	10,100	1.309	2.44	10,100	1.661	2.768	0.352***	(0.037)
Prior community orders	10,103	2.409	2.781	10,103	2.928	2.842	0.519***	(0.040)
Prior cautions and YJCs	10,103	0.526	1.055	10,103	0.692	1.180	0.166***	(0.016)
Prior prison sentences	10,103	1.452	2.763	10,103	1.643	2.948	0.192***	(0.040)
Panel B. DV-STMP								
Age	1,028	34.031	10.392	1,028	35.048	10.385	1.017*	(0.458)
Age at first CJS contact	1,027	22.003	9.344	1,027	22.003	9.344	-	-
Male	1,028	0.914	0.28	1,028	0.914	0.280	-	-
Aboriginal	1,026	0.371	0.483	1,026	0.371	0.483	-	-
Prior court appearances	1,028	9.529	8.372	1,028	10.924	8.540	1.395***	(0.373)
Prior violent offences	1,028	6.675	7.469	1,028	8.894	7.621	2.219***	(0.333)
Prior weapon offences	1,028	0.408	1.162	1,028	0.505	1.297	0.097	(0.054)
Prior drug offences	1,028	1.278	2.149	1,028	1.523	2.379	0.245*	(0.10)
Prior community orders	1,028	3.149	2.905	1,028	3.679	2.969	0.530***	(0.130)
Prior cautions and YJCs	1,028	0.403	0.979	1,028	0.420	0.998	0.018	(0.044)
Prior prison sentences	1,028	1.484	2.937	1,028	1.763	3.103	0.278*	(0.133)

Note. N = Observations, DV = Domestic Violence, YJC = youth justice conference, CJS = criminal justice system, robust standard errors in parentheses,

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

From Table 1 we can see that individuals subject to STMP-II (DV-STMP) are, on average, about 18 (22) years old at first contact with the CJS, predominately male and (disproportionately) Aboriginal in 45.8 (37.1) per cent of cases. By the time that the typical individual is placed on either form of STMP, he has almost 10 prior court appearances, half of which relate to the use of violence, one relating to the use of weapons and two relating to the use of drugs. He has also had a sentence of imprisonment and five community orders, all by age 26 (35 for DV-STMP). It is also worth mentioning that 26.9 (2.87) per cent of individuals placed on STMP-II (DV-STMP) were below the age of 18 when placed the program.

¹⁹ That is, the first day after being placed on STMP that the individual was not in custody and therefore able to offend in the community. 422 individuals started STMP-II during a custodial episode shortly before being released into the community.

From Table 1 we can also see significant increases in the number of court appearances (involving violence, drugs or the use of a weapon), prison sentences and community orders in the year leading up to being placed on STMP. While Table 1 suggests that the police are identifying high-risk individuals for STMP, it does make finding a valid counterfactual difficult. That is, finding a suitable control group for individuals placed on STMP is difficult because an individual's offending risk increases so sharply in the year before being placed on STMP. This is discussed at length in the preceding section.

Empirical approach

Estimating the causal relationship between STMP and crime is confounded by two factors.

1. **Detection bias:** Holding the actual level of offending constant, once an individual is placed on STMP they are more likely to be caught offending.
2. **Selection bias:** When compared with individuals not on STMP, individuals on STMP are likely to be at a higher risk of offending, irrespective of whether STMP has any impact on offending.

In order to deal with the detection bias problem, I limit the analysis to specific types of violent and property crime least likely to be influenced by policing or surveillance.²⁰ These violent crimes include homicide, assault occasioning grievous bodily harm and robbery. The property crimes include theft, motor vehicle theft and break and enter. Although DV offences may be influenced by detection bias, I also investigate these offences as they are the focus of DV-STMP. In order to deal with the selection bias problem, I limit the estimation sample to individuals (that will eventually be) subject to STMP, and then employ the approach described below.²¹

Without loss of generality, suppose that we're interested in estimating the effect of STMP on the probability of at least one proven offence within a POI's first 12 months of STMP. I begin by restricting the estimation sample to individuals who will (at some point) be subject to STMP. Then, for each individual, I further restrict the estimation sample to the year immediately before and after they begin STMP (i.e., two years per individual). Finally, I then compare the offending behaviour of (treated) individuals subject to STMP in period t , with (control) individuals who will be subject to STMP in period $t+1$.

This approach, which can be generalised to other outcome measures used in this study (e.g., the probability of being incarcerated or the number of offences within 12 months) is summarised in Equation 1.

$$y_{ipt} = \beta_0 + \beta_1 Post_{ipt} + \gamma X'_{it} + \lambda_{pt} + u_{ipt} \quad (1)$$

In Equation 1, i indexes an individual, p indexes the PAC responsible for placing the individual on STMP and t indexes a month-year combination. y_{ipt} is a binary variable equal to one if an individual offends within 12 months of STMP, zero otherwise. $Post_{ipt}$ is a binary variable equal to one for periods after an individual becomes subject to STMP, zero otherwise. Importantly, individuals become subject to STMP at different points in time. Therefore, $Post_{ipt}$ varies both within and between individuals subject to STMP. This is discussed in more detail shortly. The set of control variables, represented by X'_{it} , includes the individual characteristics from Table 1. These control variables directly relate to the selection criteria for STMP outlined earlier. Recall, however, that selection for STMP is also a function of each PAC's priority crimes (which are unobservable). For this reason, I also include a set of PAC-by-year fixed effects denoted by λ_{pt} . These fixed effects render the estimates robust to PAC-specific considerations such as their priority crimes, annual budgeting allocations, variation in the application of STMP, local labour market conditions and the demographic characteristics of civilians living within the jurisdiction of each PAC. The error term is represented by u_{ipt} , and all other terms are coefficients to be estimated.

20 These crimes are least likely to be influenced by reporting and detection biases for two reasons. First, they are not discovered or experienced by police (like drug possession and offensive behavior for example) and second, victims have a clear incentive to report such crimes to police. Limiting the analysis to these offences is also consistent with prior research, described in the literature review.

21 The fact that individuals exert no influence over whether they are placed on STMP (other than through their offending behaviour) lends itself to a matching strategy. This idea is thoroughly investigated in the Appendix. Interestingly, I was not able to find a credible match for individuals subject to STMP using the entire Reoffending Database (which contains information for every person charged by the NSW Police Force since 1996). This suggests that the people the police select for STMP are truly distinct from other offenders they interact with.

The coefficient of interest, β_1 , is identified through variation in the timing of when individuals become subject to STMP. In order for β_1 to have a causal interpretation, an individual's risk of offending must be conditionally unrelated to this timing.²² Given that the timing of when an individual becomes subject to STMP is a direct function of their offending behaviour, there is no reason we should expect this condition to hold.

This problem is illustrated in Figures 1a and 1b. Figure 1a plots the daily probability of at least one selected violent or property crime for individuals subject to STMP-II, and Figure 1b plots the daily probability of at least one DV offence. Both figures report this information over the 365 calendar days before and after an individual is placed on STMP.²³ If β_1 were to have a causal interpretation, we would expect to see no trend in offending prior to STMP, followed by a sharp (downward) trend after placement on STMP.

However, from Figures 1a and 1b we can see sizable upward trends in the year leading up to STMP, followed by sharp downward trends immediately after being placed on STMP. This finding has two implications for the analysis. First, my estimates do not have a causal interpretation. Instead, they must be interpreted as the association between STMP and offending. And second, this would suggest that the police are both correctly identifying individuals at a high risk of offending for STMP, and that once placed on STMP, an individual's risk of offending drops dramatically.

The fact that an individual's offending risk is increasing in the lead up to STMP suggests that β_1 may actually be underestimating the true causal effect of STMP on crime. This is contingent upon the assumption that an individual's offending risk would have not decreased in the absence of STMP. One could argue that this is not likely to hold because standard CJS responses (e.g., imprisonment or other sanctions) would have generated a reduction in crime absent STMP. However, I do not believe this to be the case since these standard responses were in effect in the year prior to an individual's placement on STMP. From Table 1 we know that in the year leading up to STMP, individuals were indeed subject to imprisonment and other sanctions while their offending continued to rise nonetheless. We can also rule out systematic (state-wide) changes to the CJS as individuals in our sample are placed on STMP at different points in time. As such, the estimates reported in this study are likely to be conservative. That is, they underestimate the true impact of STMP's crime reduction benefit.

If STMP is generating a reduction in crime, the question is how? In order to work toward answering this question, Figures 2a and 2b plot the daily probability of a custodial episode (remand or sentenced) in the 365 calendar days before and after an individual becomes subject to STMP. From Figure 2a we can see that about 20 per cent of individuals subject to STMP-II experience a custodial episode in the lead up to STMP-II, with this number falling as individuals begin STMP-II. After placement on STMP-II, we can see a sharp increase to almost 25 per cent.²⁴ This suggests that many individuals are placed on STMP-II following a custodial episode before returning to custody after placement on STMP-II. Taken together, this indicates that at least some of the crime reduction benefit observed in Figure 1a is driven by incapacitation.

²² Interested readers are directed to Cobb-Clark et al. (2018) and Hoynes and Schanzenbach (2009) for an introduction to identification in a "rolling" Difference-in-Differences setup.

²³ Figure A2 in the Appendix reports this information over the 730 days before and after the individual is subject to STMP. The general pattern observed in Figures 1a and 1b remains unchanged.

²⁴ Approximately three per cent of individuals are placed on STMP during a custodial episode shortly before being released into the community. For some individuals this occurs following an arrest while they are held on remand, and for others this occurs shortly before being released from a prison sentence. In either case, I only begin tracking their offending behaviour (in the regressions) after they've been released into the community.

Figure 1a. Daily rates of violent and property crime for STMP-II

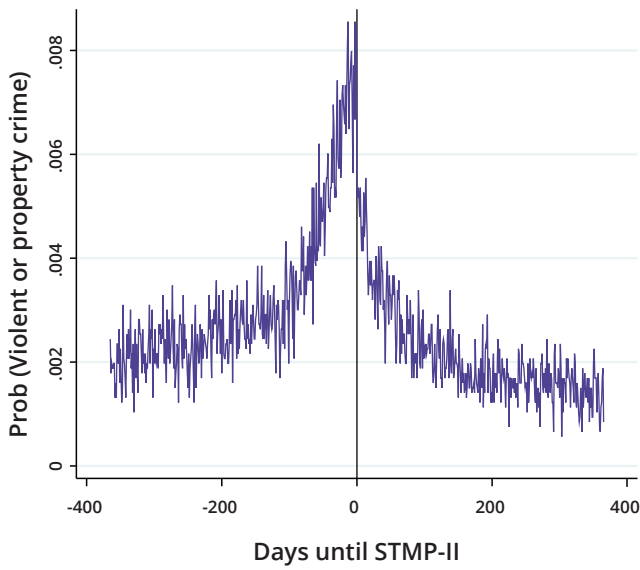


Figure 1b. Daily rates of DV crime for DV-STMP

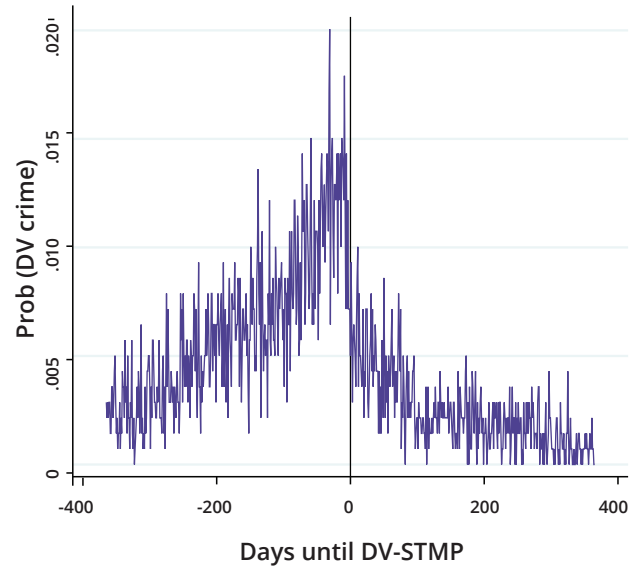


Figure 2a. Daily rates of time spent in custody for STMP-II

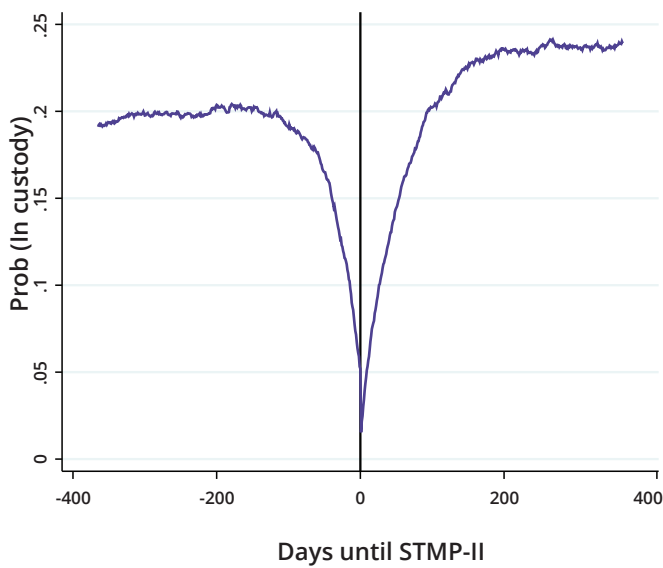
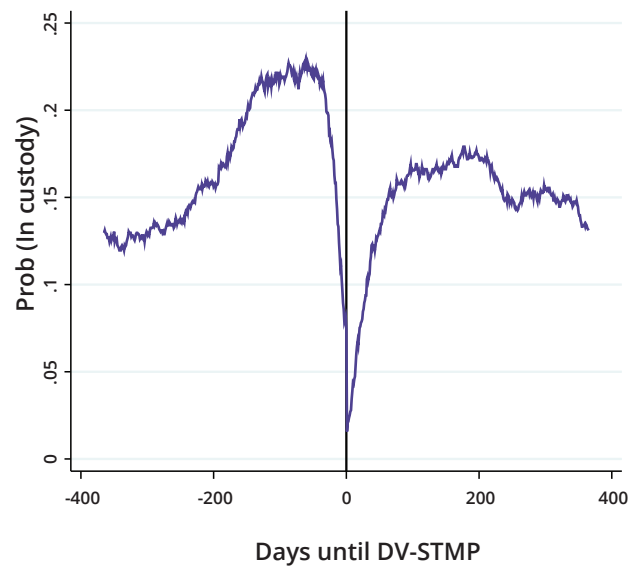


Figure 2b. Daily rates of time spent in custody for DV-STMP



From Figure 2b we can see a similar, although more volatile, pattern prior to placement on DV-STMP. Following placement on DV-STMP, however, we can see a lower rate of custodial episodes. When interpreted in conjunction with Figure 1b, this indicates that DV-STMP is working predominately through deterrence. In the next section, I report estimates that quantify this graphical analysis.

RESULTS

STMP-II

Table 2 reports Ordinarily Least Squares (OLS) estimates with robust standard errors clustered at the PAC-by-year level for STMP-II.²⁵ Columns 1, 2 and 3 report estimates from an OLS regression of Equation 1 that includes: no controls or fixed effects; control variables; control variables and PAC-by-year fixed effects, respectively. Columns 4 and 5 then limit the estimation sample to individuals that were below the age of 18 when placed on STMP-II, and have identified as Aboriginal, respectively.

From Panel A we can see that STMP is associated with a large, statistically and practically significant reduction in the likelihood of at least one violent or property offence within 12 months. Although inclusion of the control variables and fixed effects decreases the magnitude of the estimates, the complete model (in column 3) suggests that STMP-II is associated with a 6.8 percentage point (pp) reduction in the probability of at least one violent or property crime within 12 months. In relative terms, expressed as a fraction of the rate at which offenders one year away from STMP-II offend, this equates to a decrease of about 16.4 per cent.²⁶ From columns 4 and 5, we can see that the effect of STMP-II is heterogeneous. The association is more pronounced for juveniles (a reduction of 15.7 pps or 24.0%) and is less pronounced for Aboriginal people (a reduction of 4.8 pps or 10.3%).²⁷

Panels B and C examine violent and property offences, respectively. From Panel B we can see that prior to placement on STMP-II, only five per cent of individuals committed a selected violent crime in the 12 months prior to STMP-II. This is likely due to the severity of such crimes (i.e., homicide, assault occasioning grievous bodily harm and robbery). We can also see that there is no significant relationship between STMP-II and offending for these crimes when averaged across all participants. This is not the case for juveniles in our sample. Prior to placement on STMP-II, 13 per cent of juveniles had committed at least one of these violent crimes. After placement on STMP-II, this decreases by three percentage points (22.6% in relative terms). Interestingly, there appears to be an increase in violent crime among Aboriginal people placed on STMP-II. One explanation for this increase is that Aboriginal people on STMP-II become frustrated by their interactions with police and react violently. Another explanation is that this is the result of a Type I error (i.e., a false positive). After all, given that Table 2 reports estimates from 20 separate regressions, we would expect to have precisely one false positive at the five per cent significance level. I am, unfortunately, unable to determine which of these competing mechanisms is responsible for this result.

The estimates reported in Panel C are largely consistent with their counterparts in Panel A. This suggests that the bulk of the reduction in crime associated with STMP is driven by a reduction in property crime.

Finally Panel D examines the likelihood of a prison sentence within 12 months of STMP-II.²⁸ From column 3 we can see STMP-II is associated with a 6.7 percentage point increase in the likelihood of a prison sentence. In relative terms, this increases the probability of a prison sentence by 46.5 per cent. This estimate is slightly smaller for Aboriginal people on STMP-II. There is, however, no practically or statistically significant relationship between STMP-II and the probability of a prison sentence among juveniles.

²⁵ I employ an OLS regression instead of a Probit or Logit regression because imprisonment is an extremely rare event for juveniles. As such, in a regression with PAC fixed effects, the 75 per cent of PACs that have never imprisoned a juvenile are dropped from the regression. In Table A6 of the Appendix I report average marginal effects from a Probit regression of Equation 1 for the full sample of observations (i.e., a Probit regression analogous to column 3 in Tables 2 and 3). This generates no meaningful change to the main results. This is not surprising given that OLS estimators have an interpretation robust to non-linearities induced by binary dependent variables. As outlined by Angrist and Krueger (2001), the main advantages presented by competing non-linear models are incurred when the objective is prediction not causal inference.

²⁶ The pre-STMP rate of offending is given by the row labeled "control group mean" in Tables 2 and 3. A complete set of descriptive statistics for all outcome variables examined in this study is available for interested readers in Table A4 of the Appendix.

²⁷ Figure A4 in the Appendix reports figures analogous to Figures 1 and 2 for these subgroups.

²⁸ It is worth pointing out that a prison sentence, which I refer to as "imprisonment", differs from a custodial episode. A custodial episode also includes time spent in custody when an individual is refused bail and therefore held on remand.

Table 2. The relationship between STMP-II and the probability of offending and imprisonment

	(1) Naive	(2) Controls	(3) PAC fixed effects	(4) Juviles	(5) Aboriginal
Panel A. Selected violent or property crime	-0.083*** (0.006)	-0.068*** (0.006)	-0.068*** (0.006)	-0.157*** (0.015)	-0.048*** (0.010)
Control group mean	0.415	0.415	0.415	0.653	0.466
Observations	20,200	20,120	20,120	5,460	9,192
Adjusted R-squared	0.007	0.091	0.091	0.042	0.092
Panel B. Selected violent crime	-0.004 (0.003)	0.001 (0.003)	0.001 (0.003)	-0.030** (0.010)	0.009* (0.005)
Control group mean	0.050	0.050	0.050	0.133	0.052
Observations	20,200	20,120	20,120	5,460	9,192
Adjusted R-squared	0.000	0.032	0.031	0.003	0.020
Panel C. Selected property crime	-0.082*** (0.006)	-0.069*** (0.006)	-0.069*** (0.006)	-0.136*** (0.014)	-0.051*** (0.009)
Control group mean	0.392	0.393	0.394	0.593	0.443
Observations	20,200	20,120	20,120	5,460	9,192
Adjusted R-squared	0.007	0.082	0.081	0.049	0.085
Panel D. Imprisonment	0.090*** (0.005)	0.067*** (0.005)	0.067*** (0.005)	0.005 (0.003)	0.062*** (0.008)
Control group mean	0.144	0.144	0.144	0.002	0.153
Observations	20,206	20,120	20,120	5,460	9,192
Adjusted R-squared	0.013	0.127	0.127	0.033	0.151
Full sample	Y	Y	Y	N	N
Controls	N	Y	Y	Y	Y
PAC-by-year fixed effects	N	N	Y	Y	Y

Note. PAC = Police Area Command, robust standard errors clustered at the PAC-by-year level in parentheses, *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

DV-STMP

I examine the relationship between DV-STMP and crime and imprisonment in Table 3. Table 3 examines the probability of a DV crime in Panel A, a property or violent crime in Panel B, a violent crime in Panel C, a property crime in Panel D, and finally imprisonment in Panel E. I do not report estimates among the subset of juveniles or Aboriginal Australians on DV-STMP as there are too few observations to draw any reasonable conclusions. From Panel A we can see that DV-STMP is associated with a 30.7 percentage point reduction in the probability of a DV crime within 12 months (42.6% in relative terms). Unfortunately, I am unable to determine whether this reduction is the result of DV-STMP or reporting bias. Given that the offender is explicitly notified that he has been placed on STMP, it is reasonable to assume that he may now more closely monitor the reporting behaviour of the victim. As such, these results should be interpreted with caution.

Table 3. The relationship between DV-STMP and the probability offending and imprisonment

	(1) Naive	(2) Controls	(3) PAC fixed effects
Panel A.			
DV crime	-0.303*** (0.019)	-0.306*** (0.021)	-0.307*** (0.021)
Control group mean	0.721	0.721	0.721
Observations	2,056	2,050	2,050
Adjusted R-squared	0.093	0.110	0.108
Panel B.			
Selected violent or property crime	-0.013 (0.012)	-0.003 (0.012)	-0.003 (0.012)
Control group mean	0.088	0.089	0.090
Observations	2,056	2,050	2,050
Adjusted R-squared	0.001	0.041	0.038
Panel C.			
Selected violent crime	-0.002 (0.003)	-0.001 (0.003)	-0.000 (0.003)
Control group mean	0.007	0.007	0.007
Observations	2,056	2,050	2,050
Adjusted R-squared	0.000	0.011	0.008
Panel D.			
Selected property crime	-0.012 (0.011)	-0.003 (0.011)	-0.003 (0.011)
Control group mean	0.083	0.084	0.085
Observations	2,056	2,050	2,050
Adjusted R-squared	0.000	0.040	0.038
Panel E.			
Imprisonment	0.046* (0.019)	-0.000 (0.019)	0.000 (0.019)
Control group mean	0.217	0.217	0.217
Observations	2,056	2,050	2,050
Adjusted R-squared	0.003	0.093	0.092
Controls	N	Y	Y
PAC-by-year fixed effects	N	N	Y

Note. PAC = Police Area Command, robust standard errors clustered at the PAC-by-year level in parentheses, *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

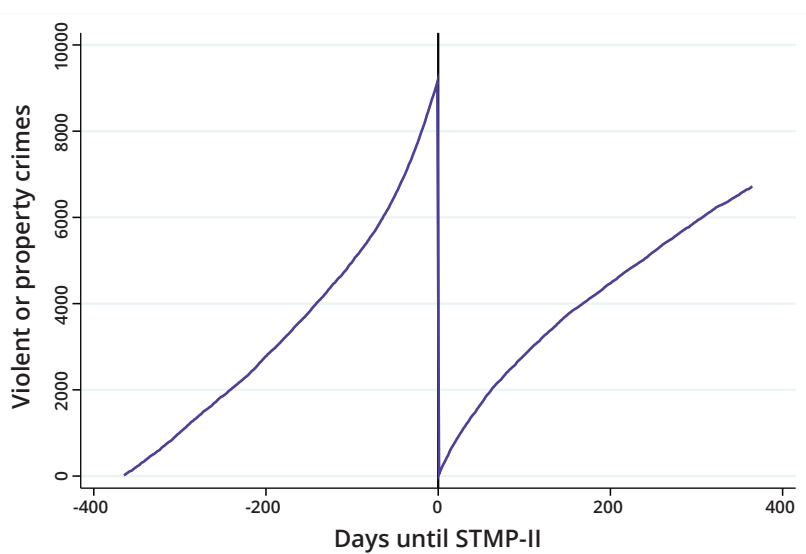
In either case, the fact that DV-STMP generates such a large reduction in DV crime begs the question of where this reduction is coming from. From Panels B, C and D we know that the reduction is not being generated through the selected violent and property crimes outlined earlier. To answer this question, in Table A3 of the Appendix, I divide DV offences into four categories. These categories are assault, sexual offences, property crime and offences against justice procedures (e.g., breaching an apprehended DV order). Worth mentioning is that these categories include all types of DV offences, including those which may be subject to reporting/detection bias. This analysis suggests that the reduction in DV crime is driven by reductions in assault, property crime and breaches of court orders.

The final outcome examined in Panel D of Table 3 is the probability of imprisonment. Here we can see that, net of controls and fixed effects, DV-STMP has no significant relation to the probability of being incarcerated.

Deterrence vs. incapacitation

From Table 2 we know that STMP-II is associated with both a lower probability of offending and an increased probability of incarceration. The question I address in this section is whether STMP-II generates a reduction in crime through deterrence or incapacitation. To answer this question, instead of examining the relationship between STMP-II and the *probability* of at least one selected violent or property crime, I focus on the *number* of selected violent and property crimes committed within 12 months of placement on STMP-II. This idea is illustrated in Figure 3, which plots the cumulative count of these crimes committed by individuals in the 365 days before and after they become subject to STMP-II.

Figure 3. Cumulative count of crime before vs. after STMP-II



From Figure 3 we can see that in the 12 months prior to STMP-II, individuals in our sample collectively committed about 9,000 selected violent and property crimes.²⁹ In the year following placement on STMP-II, these individuals collectively committed about 7,000 crimes (a reduction of roughly 2,000 crimes). To determine whether this reduction is driven by deterrence or incapacitation, I divide the sample into cohorts based on how much time each individual spent in custody during their follow up (i.e., both sentenced and remand episodes). I then examine how much of the total reduction can be attributed to each cohort. If STMP-II is working through deterrence, we would expect the bulk of the reduction to come from individuals with little to no time in custody during their follow up. Alternatively, if STMP-II is working through incapacitation, we would expect the bulk of the reduction to come from individuals that spent most of their follow up in custody.

²⁹ Figure A8 replicates Figure 3 for DV-STMP.

Table 4 defines the six (mutually exclusive) cohorts I use for this analysis.³⁰ The first cohort refers to individuals that spent no time in custody during their first 12 months on STMP-II. The second cohort refers to individuals that spent between 1 and 30 days in custody during their follow up. The third refers to individuals that spent between 31 and 90 days in custody. The fourth refers to individuals that spent between 91 and 180 days in custody. The fifth refers to individuals that spent between 181 and 270 days in custody. And the final cohort refers to individuals that spent between 271 and 364 days in custody during their follow up.

Table 4. Individuals subject to STMP-II divided into cohorts based on how much time they spent in custody during their 12 month follow up

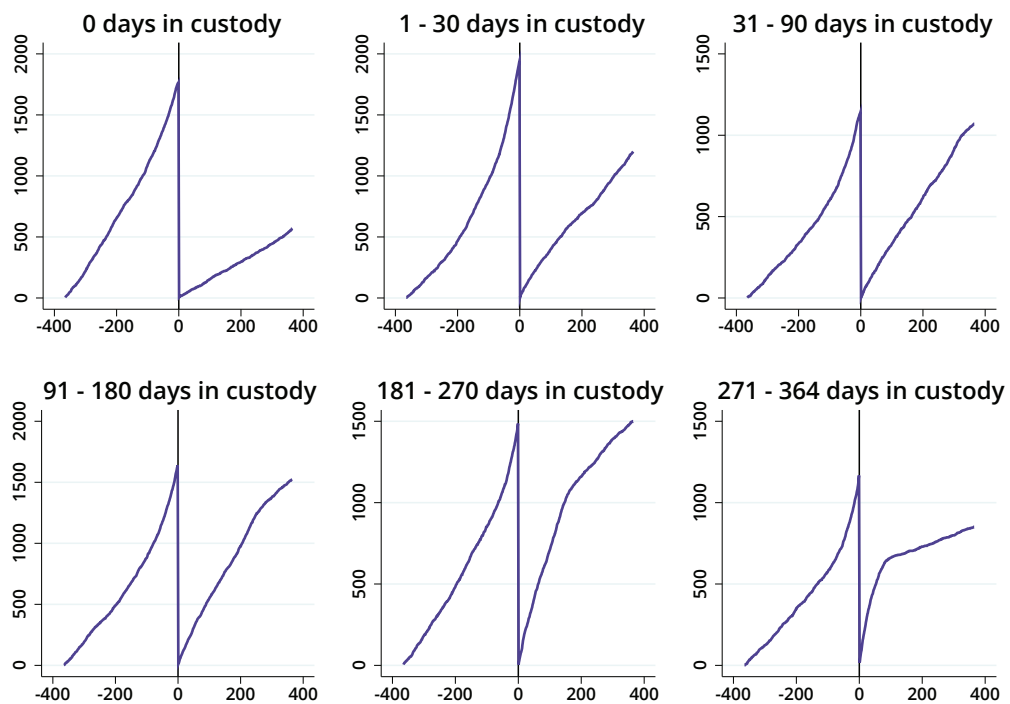
	STMP-II		Juveniles		Aboriginal	
	Proportion (1)	Count (2)	Proportion (3)	Count (4)	Proportion (5)	Count (6)
Cohort 1: No time in custody	0.376	3,806	0.293	804	0.312	1,439
Cohort 2: Between 1 and 30 days in custody	0.193	1,950	0.300	825	0.189	873
Cohort 3: Between 31 and 90 days in custody	0.104	1,049	0.147	403	0.119	550
Cohort 4: Between 91 and 180 days in custody	0.131	1,330	0.130	358	0.147	678
Cohort 5: Between 181 and 270 days in custody	0.111	1,122	0.084	232	0.131	603
Cohort 6: Between 271 and 364 days in custody	0.085	865	0.045	124	0.103	474

Figure 4 replicates Figure 3 for each cohort in Table 4.³¹ From Figure 4 we can see a sharp reduction in the cumulative volume of crime committed after placement on STMP-II for individuals not placed in custody during their follow up (i.e., cohort 1). The size of the reduction appears to be in the order of about 1,200 crimes. Another 600 crimes appear to be attributable to individuals in custody for less than one month during their follow up (i.e., cohort 2). As such, taken together cohorts 1 and 2 appear to be responsible for the vast majority of the reduction observed in Figure 3. This indicates that STMP-II primarily reduces crime through deterrence. For cohorts 3 – 5, there does not appear to be any reduction in crime after placement on STMP-II. Given that individuals in these cohorts are incarcerated for anywhere between one and nine months, this suggests that such individuals offend at an extremely high rate when not in custody. This idea is further illustrated for individuals that spent at least nine months in custody during their follow up (i.e., cohort 6). Here we can see a sharp rise in the cumulative count of offences after placement on STMP-II, followed by a flattening of the curve after about 30 days. This suggests that individuals in cohort 6 offend rapidly after placement on STMP-II, before being imprisoned for the remainder of their follow up.

³⁰ Figures analogous to Figures 1a and 1b for these cohorts are available for interested readers in Figure A4 of the Appendix. Such readers may also be interested in Figure A7, which plots the probability of being in custody on a given day in the 365 days before and after STMP-II.

³¹ Interested readers are directed to Figures A5 and A6 in the Appendix for a graphical analysis analogous to Figures 3 and 4 for Aboriginal individuals and juveniles on STMP-II, respectively. Such readers may also be interested in Figure A9, which replicates Figure 4 for individuals subject to DV-STMP using the cohorts from Table 4.

Figure 4. Cumulative count of crime before vs. after STMP-II, by cohort



In order to formalise this analysis, I take each individual’s count of selected violent and property crimes as the outcome, and then estimate an OLS regression of Equation 1.³² These estimates, reported in Table 5, can be interpreted as the per-person reduction in selected violent and property crime after placement on STMP-II. Table 5 contains three panels. Panel A reports estimates for all participants on STMP-II. Panel B reports estimates for juveniles on STMP-II, and finally, Panel C reports estimates for Aboriginal people on STMP-II.³³

Let’s begin by focusing on Panel A. The first column reports the association between STMP-II and the total number of offences for all cohorts combined (i.e., a quantitative estimate for the reduction observed in Figure 3). We can see that in the year after placement on STMP-II, the number of crimes per-person reduces by 0.228. When aggregated across the total number of individuals subject to STMP-II, this equates to 2,294 fewer offences, which is broadly consistent with Figure 3. Now that we know STMP-II is associated with 2,294 fewer offences in total, we can re-estimate the model for each cohort to quantify how much of the reduction each cohort is responsible for.

Before proceeding it is important to make clear that the sum of the (estimated) crime reduction for each cohort (i.e., columns 2 – 7) may not equal the total crime reduction for all of the cohorts combined (i.e., column 1). This is because the coefficients reported in each column are estimated using different samples. As such, although the sum of the coefficients in columns 2 – 7 should converge on the estimate given by column 1, they may slightly over or underestimate the overall effect. In any event, the estimates from columns 2 – 7 are largely consistent with their counterparts in Figure 4 and provide us with an indication as to how STMP impacts crime.

In column 2 I restrict the estimation sample to individuals that did not spend any time in custody during their follow up (i.e., cohort 1). Here we can see that STMP-II is associated with 0.334 fewer offences per person. When aggregated across the number of people in cohort 1, this equates to about 1,258 fewer offences. This indicates that just over 50 per cent of the total reduction can be attributed purely to deterrence. Column 3 restricts the estimation sample to individuals that spent between 1 and 30 days

32 Interested readers are directed to Table A6 in the Appendix for analogous estimates obtained using a Negative Binomial regression.

33 Table A5 repeats this cohort analysis for individuals subject to DV-STMP.

in custody during their follow up (i.e., cohort 2). Here we can see that STMP-II is associated with 0.364 fewer offences per-person (707 in aggregate). Hence, together cohorts 1 and 2 account for about 85 per cent of the total reduction in offending associated with placement on STMP-II. Given that offenders in cohort 2 spend such a short duration in custody, the bulk of their reduction can likely be attributed to deterrence. Consistent with Figure 4, there is no significant relationship between STMP-II and offending for cohorts 3 – 5. Column 6 restricts the estimation sample to individuals that spent at least nine months in custody during their follow up (i.e., cohort 6). Here we can see that after placement on STMP-II, the number of offences per-person drops by 0.267 (a reduction of 230 offences). Given that individuals in this cohort spend, at minimum, three quarters of their follow up in custody, the estimate for this cohort can be attributed to incapacitation. Taken together, Panel A suggest that the crime reduction associated with STMP-II is roughly 85 per cent deterrence, 15 per cent incapacitation.

Table 5. The relationship between STMP-II and counts of selected violent and property crimes, by cohort

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Full sample	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5	Cohort 6
Panel A. Everyone on STMP-II	-0.228*** (0.024)	-0.334*** (0.023)	-0.364*** (0.049)	-0.003 (0.072)	0.026 (0.097)	0.132 (0.096)	-0.267** (0.093)
Implied crime reduction	-2293.680	-1257.844	-707.252	-	-	-	-230.154
Observations	20,120	7,532	3,886	2,092	2,650	2,236	1,724
Adjusted R-squared	0.0583	0.064	0.084	0.078	0.061	0.087	0.073
Panel B. Juveniles	-0.534*** (0.074)	-0.824*** (0.081)	-0.631*** (0.117)	-0.042 (0.171)	0.242 (0.282)	0.566 (0.449)	-0.779 (0.743)
Implied crime reduction	-1457.820	-659.200	-517.420	-	-	-	-
Observations	5,460	1,600	1,640	804	710	460	246
Adjusted R-squared	0.029	0.086	0.051	0.019	0.021	0.018	0.010
Panel C. Aboriginal Australians	-0.156*** (0.039)	-0.378*** (0.040)	-0.327*** (0.086)	0.064 (0.094)	0.293* (0.125)	0.221 (0.145)	-0.194 (0.140)
Implied crime reduction	-716.976	-542.052	-283.836	-	197.482	-	-
Observations	9,192	2,868	1,736	1,096	1,348	1,200	944
Adjusted R-squared	0.062	0.070	0.074	0.093	0.074	0.114	0.070

Note. PAC = Police Area Command, robust standard errors clustered at the PAC-by-year level in parentheses,

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

Panel B repeats the analysis for juveniles. From column 1 we can see that STMP-II is associated with a per-person reduction of 0.534 (1,458 fewer offences in total) for juveniles in the sample. From column 2 we can see that just under half of this reduction can be purely attributed to deterrence. From column 3 we can see that juveniles that spent between 1 and 30 days in custody are responsible for another one-third of the crime reduction (i.e., 0.631 fewer offences per-person, or 517 overall). There does not appear to be any significant relationship between offending and STMP-II for any of the other juvenile cohorts. Taken together, these estimates indicate that STMP-II is operating through deterrence for juveniles.

Finally, Panel C examines Aboriginal Australians on STMP-II. From column 1 we can see that STMP is associated with a per-person reduction of 0.156 (716 offences in total) across Aboriginal people in the sample. From columns 2 and 3, we can see decreases in per-person crime in the order of 0.378 and 0.327, respectively. Interestingly, in aggregate, these reductions exceed the total reduction in Aboriginal crime associated with STMP-II. One explanation is that this is the result of sampling variation. Another explanation, however, is given by the estimate in column 5. From column 5 we can see that STMP-II is associated with a per-person *increase* in offending of 0.293 (197 crimes in aggregate) for Aboriginal people in cohort 4.³⁴ This suggests that although in net terms STMP-II is associated with a decrease in offending, some Aboriginal people may be at a higher offending risk after placement on STMP-II. This is consistent with the argument made earlier in relation to Table 3. That is, that Aboriginal people may react negatively to STMP-II interactions with police which results in increased offending. In any event, STMP-II is still associated with a large (net) reduction in crime committed by Aboriginal people, and the bulk of this reduction occurs through deterrence.

DISCUSSION

The Suspect Target Management Plan (STMP) is the largest and longest running offender focused policing program in NSW. At present, there are two STMP programs in operation: STMP-II, which aims to reduce general offending; and DV-STMP, which aims to reduce DV offending. This paper set out to answer three questions: first, do these programs reduce crime; second, how do these programs reduce crime; and finally, do these effects differ with regard to juveniles or Aboriginal Australians.³⁵ The findings from this study indicate that the answer to the first question is yes. Both programs are associated with sizable, robust, practically and statistically significant reductions in crime. With regard to the second question, while STMP-II is associated with an increased risk of imprisonment, the vast majority of the crime reduction benefit occurs through deterrence, not incapacitation. DV-STMP is not associated with an increased risk of imprisonment. Therefore, DV-STMP also operates predominately through deterrence. With regard to the final question, I found that the crime reduction benefit associated with STMP-II is stronger for juveniles (when compared to adults) and weaker for Aboriginal people (when compared to non-Aboriginal people). The transmission mechanism through which STMP-II affects both groups is predominately deterrence.

The present study is not, however, without its caveats. The most important of which is that the estimates do not have a causal interpretation. That is, because I am simply comparing the behaviour of individuals before and after placement on STMP, I have no way of establishing what would have happened in the absence of STMP. That said, given the increasing rate of offending prior to placement on STMP, I am, if anything, likely underestimating the true crime reduction benefit associated with STMP. This is because there is no reason to expect that the offending of individuals placed on STMP would have declined absent the program. After all, individuals placed on STMP were already subject to the standard set of criminal justice system responses prior to placement on STMP (e.g., imprisonment, supervised orders and other sanctions) while their offending continued to rise nonetheless. With regard to STMP-II, another reason to expect that I may be underestimating the true crime reduction benefit is that I only examined a small subset of violent and property crimes (least likely to be influenced by reporting/detection bias). There is no reason to expect that STMP-II only impacts these crimes. It is, therefore, likely that STMP-II is reducing other types of crime in addition to those examined in this paper.

On the other side of this argument, however, is the fact that I examined DV offending in my analysis of DV-STMP. Individuals subject to DV-STMP are explicitly notified by police following placement on the program. As such, it is possible that the reduction in (recorded) DV crime may be due to a decrease in reporting

³⁴ The increase in offending for this cohort is investigated in Table A7 of the Appendix. The increase appears to be driven by an increase in break and enter offences.

³⁵ I did not investigate whether the effect of DV-STMP differed for juveniles or Aboriginal Australians as the sample was too small to draw any reasonable conclusions.

rather than offending (e.g., the perpetrator could pressure the victim not to report future instances of violence). In this case, I may be overestimating the crime reduction benefit associated with DV-STMP.

Another important caveat relates to how well the results from this study generalise to other settings. Rates of property crime have continued to fall in NSW since the early 2000s (Goh & Holmes, 2020). While STMP-II has likely contributed to this reduction, whether STMP-II will continue to be able to generate this benefit into the future is questionable. While the results presented in this study are largely consistent with prior work on offender-focused policing programs (Braga et al., 2018) for property crime, they depart from prior work in that STMP-II does not appear to reduce violent crime for adults. The most likely explanation for this result is that the violent crimes examined in this study occur at much lower rates than in other jurisdictions (e.g., Boston or Chicago during the 1990s).

The present study makes four novel contributions to the existing body of evidence, each of which has implications for policy makers and researchers. The first is to illustrate that offender-focused policing programs work in Australia. This is an interesting finding given that STMP differs markedly from most focused deterrence programs overseas. Focused deterrence programs typically involve working with community organisations to communicate an explicit message of deterrence. Focused deterrence programs also generally involve increasing access to social services as an adjunct to intensive policing. The fact that STMP appears to be able to reduce crime without these features begs the question of whether such features could further enhance the crime reduction benefit if introduced. Alternatively, it could also be the case that such features are unnecessary from a crime reduction standpoint, serving only to improve the public's perception around the equity of such programs. Exploring this question further by, for example, randomising the "carrot" as an adjunct to the "stick" in particular police jurisdictions would enable us to answer this question with minimal interruption to ongoing operations.

My second contribution is to provide evidence that the mechanism through which such programs reduce crime is predominately deterrence. This suggests that such programs are likely to be a cost-effective way to reduce crime. My third contribution is to explore how effective focused deterrence programs are in reducing DV. While the estimates reported in this paper are promising, more research is needed to answer this question definitively. As discussed earlier, the fact DV-STMP targets are notified following placement on the program raises serious concerns around whether they are likely to retaliate against the victim, or similarly, pressure the victim to not report future violence. In this regard, careful monitoring and ideally a process evaluation of DV-STMP is certainly warranted.

My final contribution is to examine how such programs affect vulnerable groups. Although STMP is effective in reducing crime committed by Aboriginal Australians, the relationship appears to be weaker for Aboriginal people when compared to non-Aboriginal people. There is also the possibility that STMP is increasing crime for a subset of Aboriginal people, although the net effect is still an overall reduction. This suggests that the program may need to be modified for Aboriginal people to reduce the risk of any adverse outcomes. Consultation with Aboriginal elders in both the selection for, and application of the program may be one possible area for improvement. The inclusion of Aboriginal elders in the sentencing process has, for example, worked to reduce rates of recidivism and imprisonment for Aboriginal offenders (Yeong & Moore, 2020). With regard to juveniles, although I found that STMP-II has no impact on their risk of a prison sentence, it is important to bear in mind that this is a short-term outcome. Early engagement with and surveillance by police whilst subject to STMP-II may also influence other outcomes relevant to a young person's development (e.g., attitudes toward authority, educational achievement and mental health). Increased access to social services (e.g., a dedicated caseworker, mentoring, tutoring or counselling) coupled with police supervision may generate a broader benefit than police supervision alone.

A final consideration for policy makers is how police intelligence can be better utilised. An interesting finding from this study was that individuals subject to STMP were both: truly distinct from other offenders in NSW, and at an extremely high risk of offending. This suggests that police intelligence may be capable of identifying individuals most in need of government assistance. Such intelligence could be used, for example, to identify people for DV behavioural change programs, or alternatively, juveniles at risk of dropping out of school for education support services. If used responsibly, such information may support government in generating a safer, more equitable and prosperous society.

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APPENDIX

An interesting feature of STMP is the fact that an individual exerts no influence over whether they are placed on STMP (other than through their offending behaviour). This lends credibility to the use of a matching strategy, which often fail in settings where individuals have a clear incentive to opt-into the program (e.g., in job training programs). The question, therefore, is whether there exists a subset of individuals in ROD, who resemble individuals on STMP, that were not subject to STMP for reasons unrelated to their risk of offending. Such individuals could, for example, include offenders prone to drug crime that reside within the jurisdiction of a PAC focusing on violent crime. The identifying assumption is that if this individual instead resided within the jurisdiction of a PAC focusing on drug crime, he would be subject to STMP.

In order to investigate this idea, I reorganise the data into a quarterly individual level panel (i.e., one row per individual per quarter-year), and then for each observation, calculate the values of the control variables (from Table 1) as of the first day of each quarter.³⁶ I then match individuals who were observably similar on the first day of the quarter that the treated unit began STMP. For example, if an individual begins STMP on 15 February 2010, I match this individual to one who was observably similar on 1 January 2010 (i.e., the first day of 2010-Q1) using the controls in Table 1.

The matching algorithm used to generate these estimates involves the following six steps:

1. Limit the sample to a given quarter-year (e.g., 2010-Q1).
2. Retain observations that either: began STMP within the given quarter-year or were never subject to STMP.³⁷
3. Use Coarsened Exact Matching (CEM) to further limit the sample to the subset of treatment-control observations within the area of common support.
4. Use Propensity Score Matching (PSM) to obtain the best possible (1:1) match between each treatment and control unit.
5. Recalculate all variables to the day that the treated unit began STMP.³⁸
6. Repeat steps 1 – 5 for each quarter-year between 2005-Q2 and 2018-Q3.

This matching algorithm has several advantages over using CEM or PSM alone. As outlined in King (2009) the use of CEM before PSM safeguards against extrapolations made in PSM that can lead to model dependant inferences. King (2009) also argues that PSM, used in conjunction with CEM, is potentially better than CEM alone in situations with a large degree of imbalance between groups. Said differently, PSM (after CEM) works well in circumstances where causal inferences are least likely because the treatment and control groups are so different. Another advantage to pre-processing the data using CEM is that CEM is computationally efficient, which is of practical importance given that I have, for each quarter-year, over 1.3 million potential control units.

Table A1 reports the results from a balance test between groups for STMP-II and DV-STMP, in Panels A and B, respectively.

³⁶ For example, each individual's age on 1 January 2010 for 2010-Q1, 1 April 2010 for 2010-Q2 and so on.

³⁷ Potential control units that were in custody in the first day of the quarter are excluded from donor pool.

³⁸ That is, because of variables are indexed to the first day of a given quarter-year, I need to re-index these variables to the day that the treated unit began STMP. For example, within a given pair, if the treated unit began STMP on 1 February 2010, then I recalculate both the treated and control unit's control variables (e.g., number of prior offences) as of 1 February 2010 (instead of the first day of 2010-Q1). I also index my outcome variables (e.g., reoffend within 12 months) to the first day that the treated unit began STMP within each pair.

Table A1. Comparison of matched treatment and control groups, STMP-II and DV-STMP

	Matched control group			Treatment group			Difference	
	N (1)	Mean (2)	Std. Dev. (3)	N (4)	Mean (5)	Std. Dev. (6)	Estimate (7)	Std. Err (8)
Panel A. STMP-II								
Age	9,113	26.661	10.152	9,437	26.254	10.201	-0.407***	(0.149)
Age at first CJS contact	9,113	17.862	6.377	9,437	17.852	6.848	-0.010	(0.097)
Aboriginal	9,113	0.496	0.500	9,437	0.459	0.498	-0.037***	(0.007)
Male	9,113	0.920	0.271	9,437	0.920	0.272	-0.001	(0.004)
Prior court appearances	9,113	10.564	8.529	9,437	10.124	7.561	-0.440***	(0.118)
Prior DV offences	9,113	0.842	2.432	9,437	0.790	2.567	-0.052	(0.037)
Prior court violent offences	9,113	4.792	5.434	9,437	4.689	5.211	-0.103	(0.078)
Prior court weapon offences	9,113	0.540	1.598	9,437	0.554	1.400	0.015	(0.022)
Prior court drug offences	9,113	1.729	3.063	9,437	1.717	2.803	-0.012	(0.043)
Prior prison sentences	9,113	1.812	3.287	9,437	1.717	3.007	-0.094**	(0.046)
Prior community orders	9,113	3.151	2.885	9,437	3.065	2.832	-0.086**	(0.042)
Prior cautions/YJCs	9,113	0.713	1.230	9,437	0.719	1.195	0.005	(0.018)
Panel B. DV-STMP								
Age	873	36.009	9.346	1,014	35.225	10.358	-0.784*	(0.454)
Age at first CJS contact	873	22.102	7.951	1,014	21.568	8.972	-0.534	(0.390)
Aboriginal	873	0.412	0.493	1,014	0.388	0.487	-0.025	(0.023)
Male	873	0.926	0.263	1,014	0.927	0.260	0.001	(0.012)
Prior court appearances	873	11.473	8.827	1,014	11.822	8.722	0.349	(0.405)
Prior DV offences	873	7.003	10.556	1,014	8.659	7.311	1.655***	(0.425)
Prior court violent offences	873	8.501	7.357	1,014	9.547	7.816	1.047***	(0.350)
Prior court weapon offences	873	0.598	2.587	1,014	0.538	1.363	-0.059	(0.097)
Prior court drug offences	873	1.769	3.798	1,014	1.631	2.405	-0.137	(0.149)
Prior prison sentences	873	1.859	3.208	1,014	1.937	3.284	0.078	(0.150)
Prior community orders	873	3.877	2.765	1,014	3.986	2.970	0.109	(0.132)
Prior cautions/YJCs	873	0.332	0.875	1,014	0.463	1.070	0.130***	(0.045)

Note. N = Observations, YJC = youth justice conference, CJS = criminal justice system, robust standard errors in parentheses, *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

From Table A1 we can see that, despite the extremely large donor pool of potential controls (over 1.3 million for each quarter-year), the matched groups are not statistically or practically equivalent to their respective treatment groups. Individuals subject to STMP are, on average, younger, less likely to be Aboriginal (for STMP-II), have fewer court appearances, violent offences, offences involving the use of a weapon and prison sentences. This would suggest that the control group is of a higher risk than individuals subject to STMP.

However, in Table A2 I report estimates from several regressions comparing the recidivism rates between these groups. Interestingly, these regressions indicate that the reverse is actually true: individuals subject to STMP offend at much higher rates than their matched counterparts.³⁹ One explanation for this finding is that there is some form of unobserved heterogeneity that matching cannot address. For example, known criminal associations, addiction issues and police intelligence are important unobserved factors likely to influence program participation.

Table A2. Matched regressions

	(1) Naive	(2) Controls	(3) PAC fixed effects
Panel A. STMP-II on selected violent or property crime	0.177*** (0.011)	0.183*** (0.010)	0.177*** (0.013)
Observations	18,455	18,455	18,455
Adjusted R-squared	0.0425	0.106	0.106
Panel B. DV-STMP on DV crime	0.279*** (0.022)	0.277*** (0.022)	0.272*** (0.033)
Observations	1,879	1,879	1,879
Adjusted R-squared	0.095	0.129	0.129

Note. PAC = Police Area Command, FE = fixed effects, robust standard errors clustered at the PAC-by-year level in parentheses, *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Table A3. DV-STMP and specific types of DV offences

	Assault	Assault excl stalking	Sexual offences	Property offences	Justice proce- dures	Serious assault, injury	Serious assault, no injury	Common assault	Stalking
DV-STMP	-0.310*** (0.018)	-0.240*** (0.016)	-0.003 (0.002)	-0.110*** (0.011)	-0.221*** (0.017)	-0.091*** (0.011)	-0.002 (0.001)	-0.176*** (0.014)	-0.176*** (0.016)
Observations	2782	2,782	2782	2782	2782	2,782	2,782	2,782	2,782
Adjusted R-squared	0.126	0.098	0.004	0.060	0.060	0.034	0.011	0.069	0.069

Note. PAC = Police Area Command, FE = fixed effects, robust standard errors clustered at the PAC-by-year level in parentheses, *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

39 Interested readers are directed to Figure A1 for figures that plot the daily probability of crime and a custodial episode for the matched control group.

Table A4. Descriptive statistics for outcome variables

	365 days before STMP		First day on STMP		Difference	
	Mean (1)	Std Dev (2)	Mean (3)	Std Dev (4)	Estimate (5)	Std. Err (6)
Panel A. STMP-II, everyone						
At least one DV crime within past 12 months	0.076	0.264	0.073	0.261	-0.002	(0.004)
At least one selected violent or property crime within past 12 months	0.418	0.493	0.335	0.472	-0.083***	(0.007)
At least one selected violent crime within past 12 months	0.050	0.218	0.046	0.209	-0.004	(0.003)
At least one selected property crime within past 12 months	0.393	0.489	0.312	0.463	-0.082***	(0.007)
At least one prison sentence within past 12 months	0.144	0.351	0.234	0.423	0.090***	(0.005)
Count of DV crimes within last 12 months	0.181	0.996	0.157	0.741	-0.023	(0.012)
Count of selected violent and property crimes within past 12 months	1.083	2.115	0.795	1.765	-0.288***	(0.027)
Count of selected violent crimes within past 12 months	0.071	0.367	0.064	0.364	-0.007	(0.005)
Count of selected property crimes within past 12 months	1.012	2.073	0.731	1.702	-0.281***	(0.027)
Panel B. STMP-II, Aboriginal						
At least one DV crime within past 12 months	0.080	0.271	0.090	0.286	0.010	(0.006)
At least one selected violent or property crime within past 12 months	0.468	0.499	0.405	0.491	-0.063***	(0.010)
At least one selected violent crime within past 12 months	0.052	0.223	0.058	0.234	0.006	(0.005)
At least one selected property crime within past 12 months	0.445	0.497	0.379	0.485	-0.066***	(0.010)
At least one prison sentence within past 12 months	0.153	0.360	0.241	0.428	0.088***	(0.008)
Count of DV crimes within last 12 months	0.180	1.132	0.198	0.816	0.019	(0.021)
Count of selected violent and property crimes within past 12 months	1.245	2.079	1.023	2.056	-0.222***	(0.043)
Count of selected violent crimes within past 12 months	0.072	0.346	0.086	0.424	0.014	(0.008)
Count of selected property crimes within past 12 months	1.173	2.035	0.937	1.982	-0.236***	(0.042)
Panel C. STMP-II, Juveniles						
At least one DV crime within past 12 months	0.063	0.244	0.074	0.261	0.010	(0.007)
At least one selected violent or property crime within past 12 months	0.654	0.476	0.498	0.500	-0.156***	(0.013)
At least one selected violent crime within past 12 months	0.133	0.339	0.097	0.295	-0.036***	(0.009)
At least one selected property crime within past 12 months	0.594	0.491	0.459	0.498	-0.135***	(0.013)
At least one prison sentence within past 12 months	0.002	0.043	0.020	0.139	0.018***	(0.003)
Count of DV crimes within last 12 months	0.137	0.699	0.150	0.692	0.013	(0.019)
Count of selected violent and property crimes within past 12 months	1.991	2.701	1.362	2.438	-0.629***	(0.069)
Count of selected violent crimes within past 12 months	0.191	0.571	0.131	0.484	-0.060***	(0.014)
Count of selected property crimes within past 12 months	1.800	2.659	1.231	2.351	-0.570***	(0.068)
Panel D. DV-STMP, everyone						
At least one DV crime within past 12 months	0.721	0.449	0.418	0.494	-0.303***	(0.021)
At least one selected violent or property crime within past 12 months	0.091	0.288	0.079	0.270	-0.013	(0.012)
At least one selected violent crime within past 12 months	0.007	0.082	0.005	0.070	-0.002	(0.003)
At least one selected property crime within past 12 months	0.087	0.281	0.075	0.263	-0.012	(0.012)
At least one prison sentence within past 12 months	0.217	0.412	0.263	0.440	0.046*	(0.019)
Count of DV crimes within last 12 months	2.482	3.361	1.076	1.799	-1.407***	(0.119)
Count of selected violent and property crimes within past 12 months	0.127	0.484	0.126	0.563	-0.001	(0.023)
Count of selected violent crimes within past 12 months	0.007	0.082	0.005	0.070	-0.002	(0.003)
Count of selected property crimes within past 12 months	0.121	0.468	0.122	0.556	0.001	(0.023)

Note. Robust standard errors in parentheses, *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Table A5. Change in counts of DV crime after DV-STMP, by cohorts described in Table 4

	(1) All	(2) Cohort 1	(3) Cohort 2	(4) Cohort 3	(5) Cohort 4	(6) Cohort 5	(7) Cohort 6
DV crime	-1.371*** (0.091)	-1.609*** (0.090)	-0.950*** (0.164)	-0.609* (0.299)	-0.229 (0.424)	-0.668* (0.324)	-1.622 (0.845)
Implied crime reduction	-1907.061	-975.050	-258.400	-94.395	-	-71.476	-
Observations	2782	1212	544	310	416	214	86
Adjusted R-squared	0.075	0.207	0.136	0.071	0.001	0.061	0.000

Note. PAC = Police Area Command, FE = fixed effects, robust standard errors clustered at the PAC-by-year level in parentheses, *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Table A6. Maximum likelihood robustness checks

	(1) Prob (Crime)	(2) Prob (Imprisonment)	(3) Count of crime	(4) Count of Aboriginal crime	(5) Counts of juvenile crime
STMP-II	-0.067*** -0.006	0.072*** -0.005	-0.244*** -0.025	-0.176*** -0.039	-0.707*** -0.068
Observations	19784	19066	20120	9192	5460
Specification	Probit	Probit	Negative binomial	Negative binomial	Negative binomial
Pseudo R-squared	0.134	0.173	0.0783	0.0845	0.0794
AUC	0.738	0.788			
DV-STMP	-0.317*** -0.021	0.007 -0.02	-1.490*** -0.12		
Observations	1986	1824	2050		
Specification	Probit	Probit	Negative binomial		
Pseudo R-squared	0.157	0.139	0.06		
AUC	0.756	0.752			

Note. This table reports average marginal effects from various Maximum Likelihood regressions, standard errors obtained using the Delta method in parentheses, *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Table A7. Counts of offences per-person for Aboriginal people in cohort 4

	(1) GBH	(2) Homicide	(3) Robbery	(4) Break and enter	(5) Theft (incl motor vehicle)
STMP-II	0.006 (0.006)	-0.001 (0.001)	0.029 (0.022)	0.141* (0.068)	0.117 (0.084)
Observations	1,348	1,348	1,348	1,348	1,348
Adjusted R-squared	0.005	0.001	0.025	0.064	0.036

Note. GBH = assault occasioning grievous bodily harm, robust standard errors clustered at the PAC-by-year level in parentheses, *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Figure A1. Daily rates of offending and custody for the matched control group described in Table A1

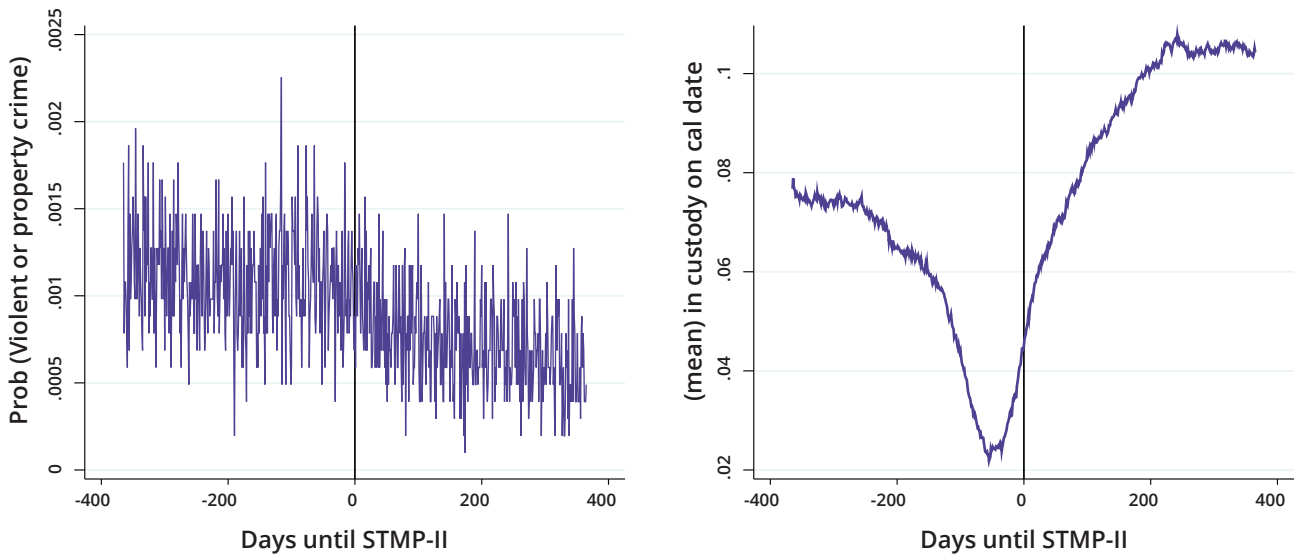


Figure A2. 730 days of offending and custody

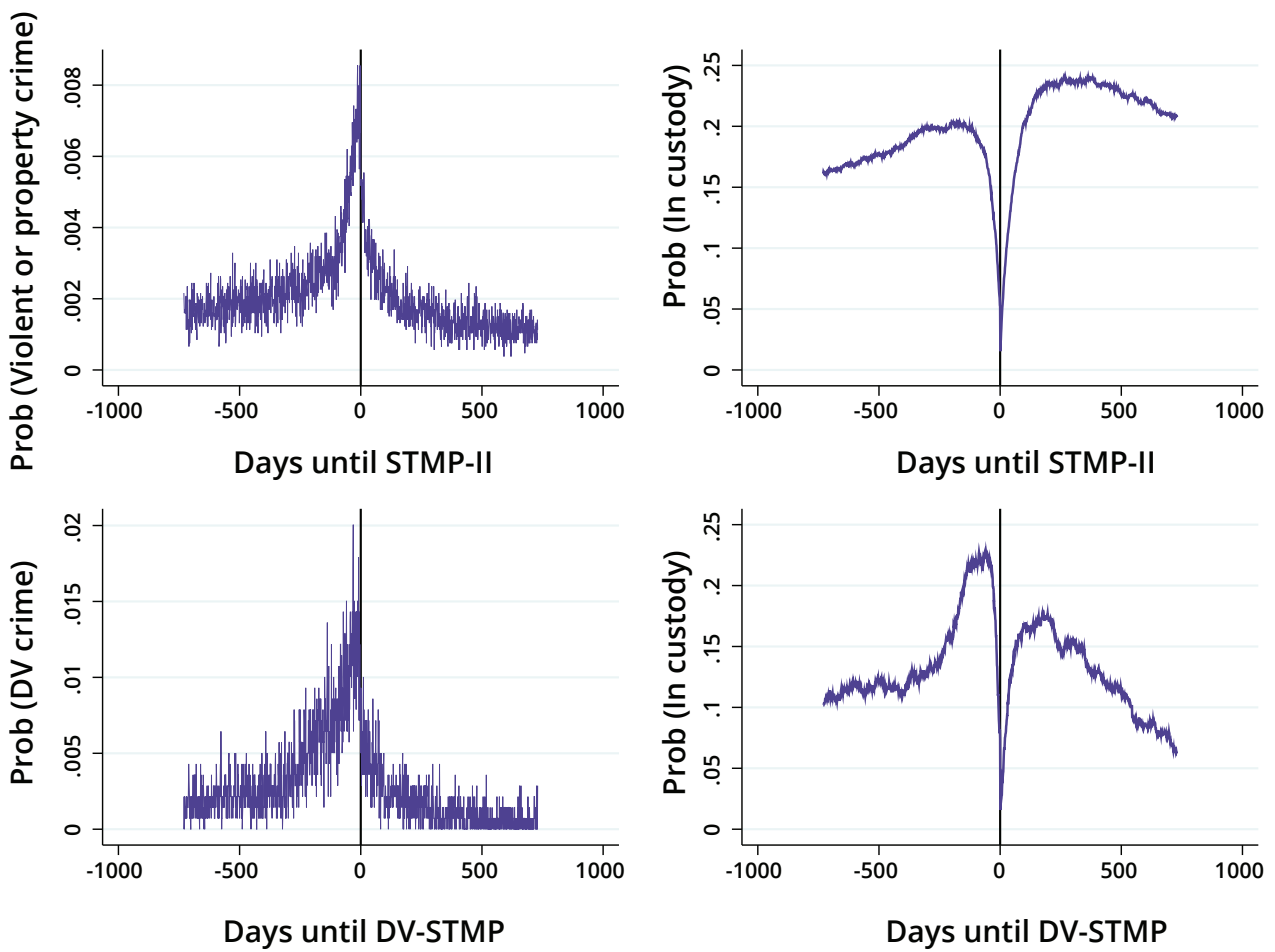


Figure A3. Daily rates of offending and custody for juveniles and Aboriginal Australians on STMP-II

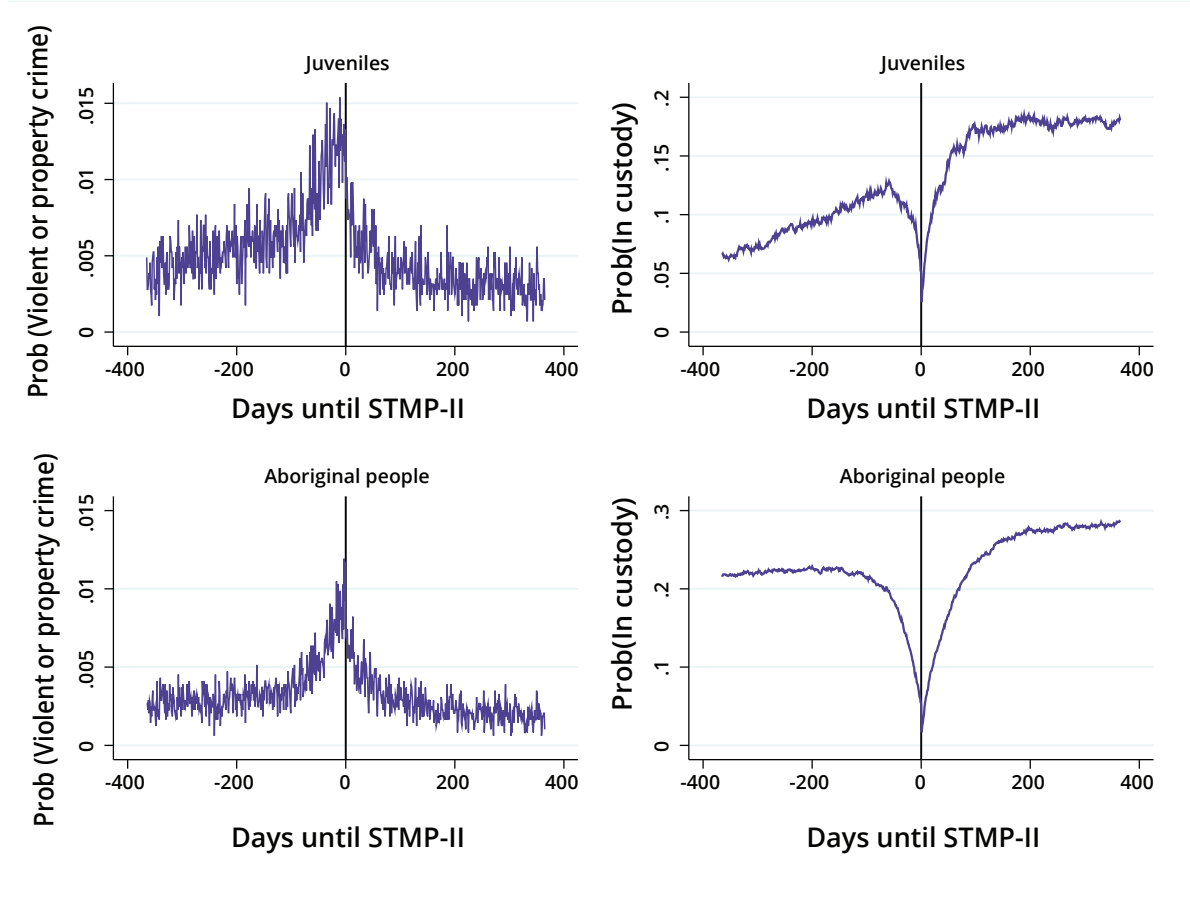


Figure A4. Daily probability of offending before and after STMP-II, by cohorts described in Table 4

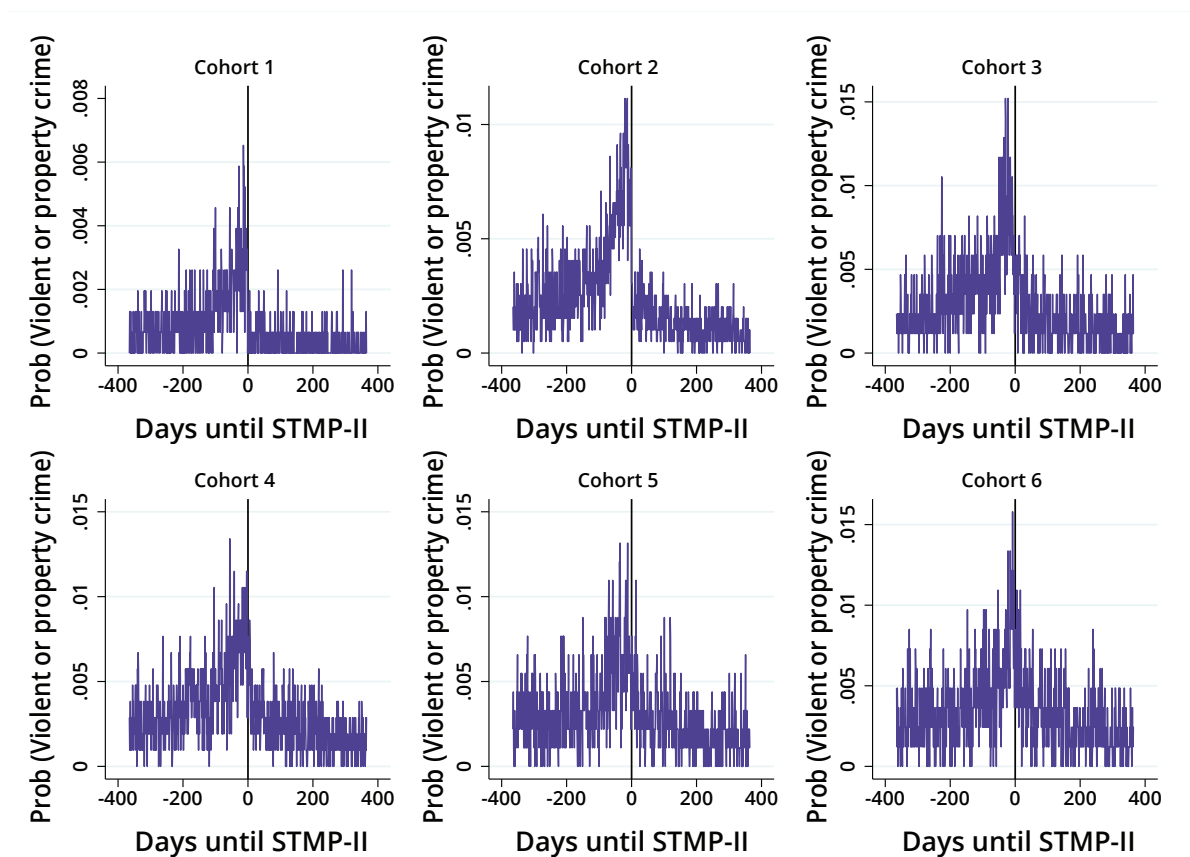


Figure A5. Counts of Aboriginal offending before and after STMP-II, by cohorts described in Table 4

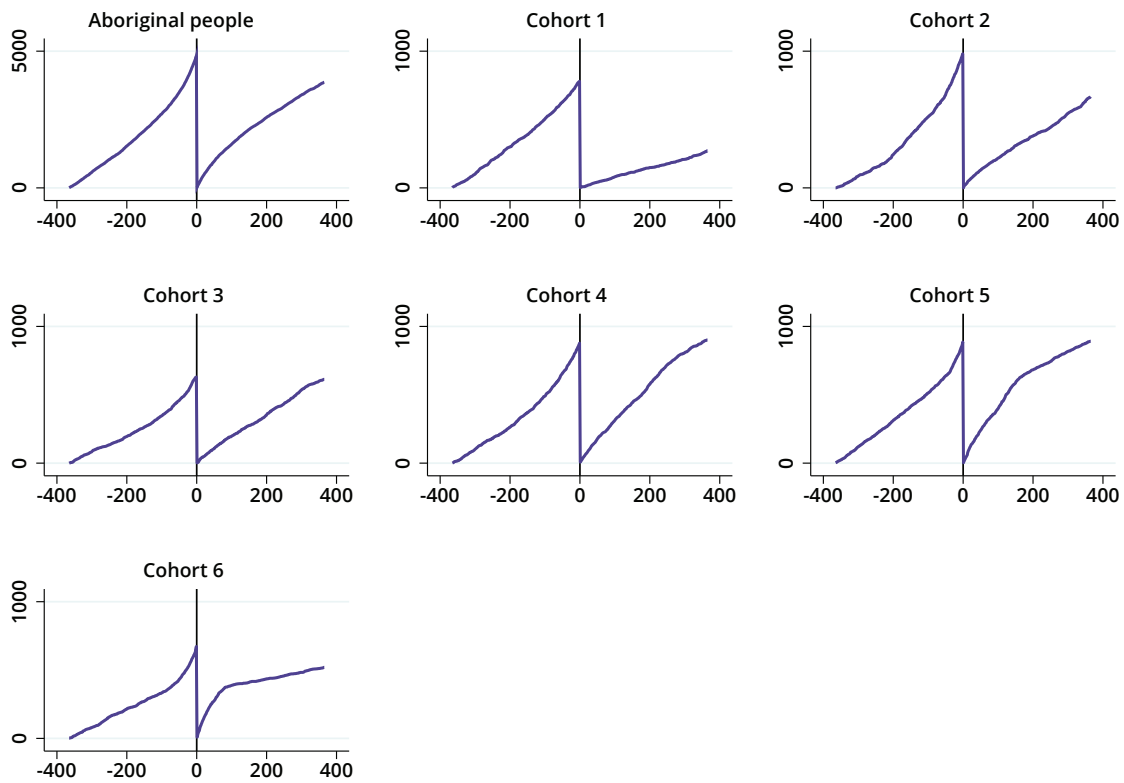


Figure A6. Counts of juvenile offending before and after STMP-II, by cohorts described in Table 4

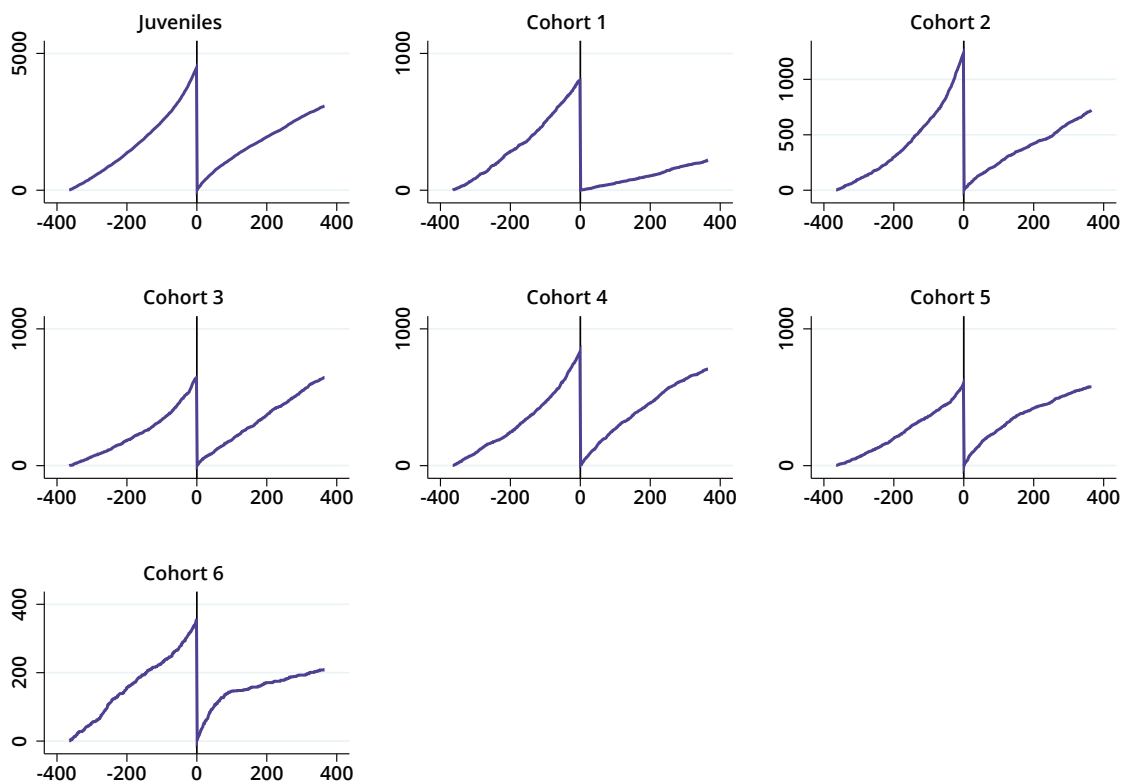


Figure A7. Daily rates of custody before and after STMP-II by cohort

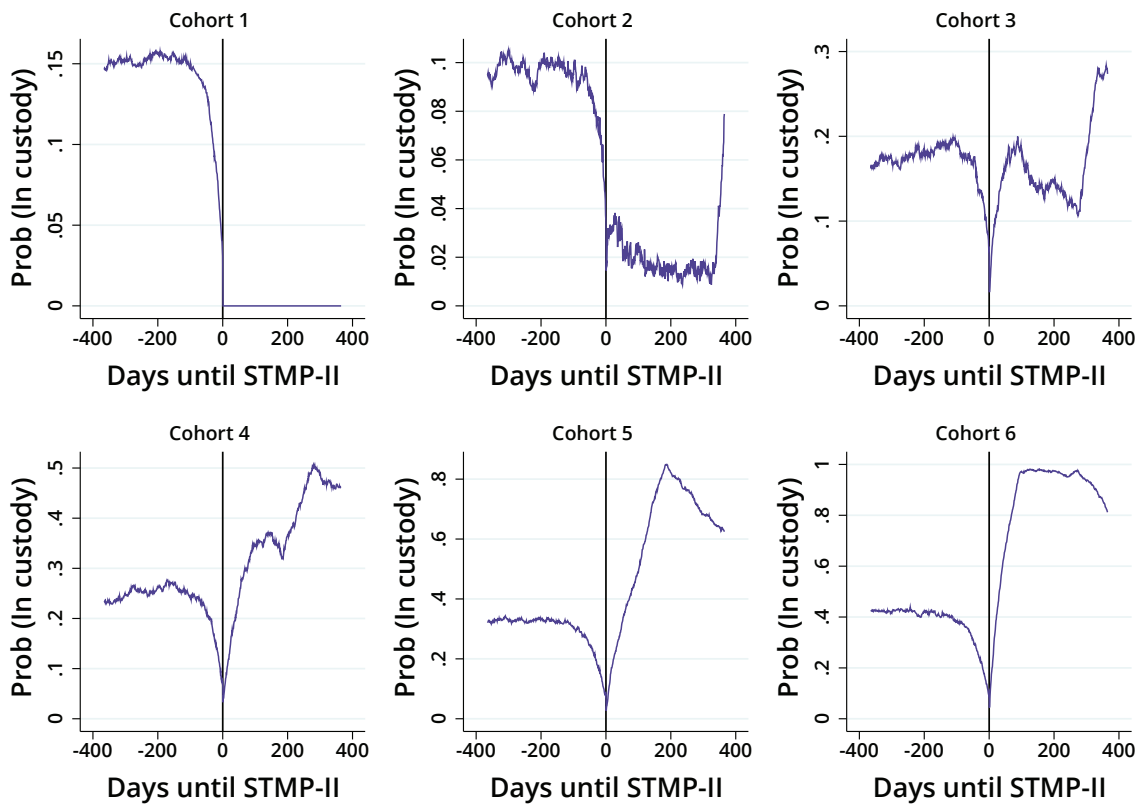


Figure A8. Counts of offences before and after DV-STMP

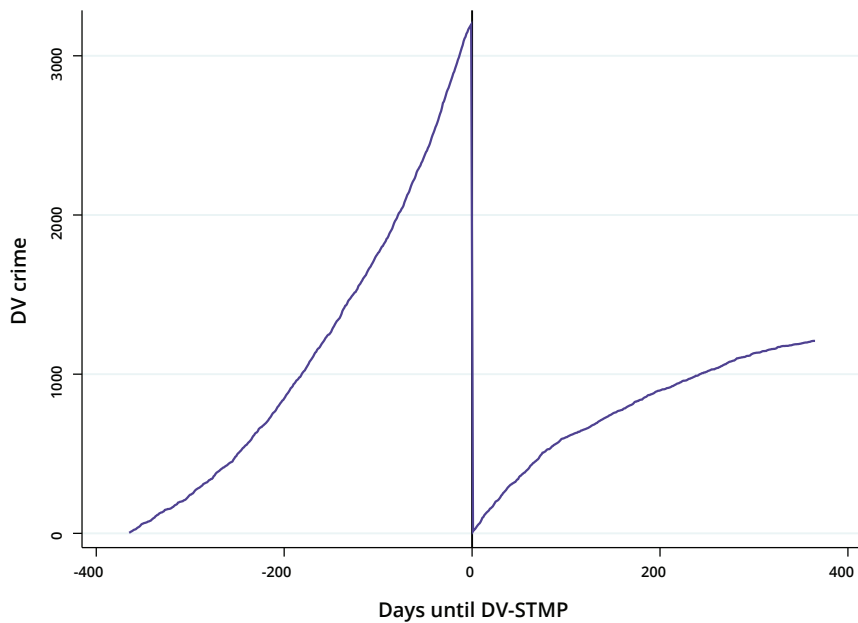


Figure A9. Counts of offences before and after DV-STMP, by cohorts described in Table 4

