

## Learning by doing

### How do criminals learn about criminal law?

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***Abstract:*** This paper investigates how criminals learn about criminal laws. It uses the case of a natural experiment in which sentences were drastically increased for a specific type of recidivism in France. In the short run, advertising the reform did not trigger any change in criminal behavior. However, people who had first-hand experience of the reform learned about it and later committed significantly fewer targeted crimes, but the same number of non-targeted crimes. Learning appears to be limited to individuals with direct experience of the law. While co-defendants also learned, other criminal peers and defendants attending the same trial for another case did not.

## 1. Introduction

How do people learn about the costs associated to illegal actions? Many papers investigate how economic agents (e.g., investors, consumers, farmers, voters) learn about the returns to a certain action in non-criminal contexts. They document how learning is affected by past experience (e.g. Foster and Rosenzweig 1995), the experience of peers (e.g. Duflo and Saez, 2003), observation (e.g. Cai et al., 2009) and media coverage (see DellaVigna and Gentzkow, 2010 for a review). However, the importance of such knowledge acquisition channels may be different in a criminal context. Events such as arrests and convictions may be too rare to

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estimate the expected sanctions. Peer-to-peer transmission may also be hindered: crimes are generally hidden by those who commit them, and sanctions may trigger a sense of shame. Learning through the media may also be limited: laws are complex, criminals are generally poorly educated (Western, 2006), and publicly released information may target voters rather than criminals (see the debate on penal populism, e.g. in Pratt, 2007 or Salas, 2005 for France).<sup>2</sup>

This paper investigates whether offenders understood a legal change: (i) after the reform was passed and publicized, (ii) after they experienced it themselves, (iii) after their peers were convicted under the new law or (iv) after they saw it applied to strangers. It assesses a French criminal reform that increased sentences for crimes committed by *recidivists* after August 11, 2007 (whatever the date of the first crime is). In its broadest sense, *recidivism* refers to a person with a criminal record who commits a new crime. The legal definition differs substantially from common understandings. Legally speaking, recidivists are defined as people who commit the *same sort of crime more than once*. People who commit two crimes that are different are called “réitérant”, translated by *repeat offenders* thereafter. This paper uses the difference between the legal and common-sense definitions of recidivism to identify whether offenders understand criminal law properly – and how they learn about it.

Using data from the French National Criminal Register, I first document that the reform significantly increased sentences for recidivists (i.e., people convicted of a crime similar to a previous one). On average, recidivists receive 3.5 additional months of prison (+67%) and 4 additional probation months (+285%) after the reform. Sentences for repeat offenders, who are not labelled recidivists, were not affected.

The reform thus markedly increased the cost of a restricted set of criminal activities. In order to identify whether criminals updated their priors about this cost, I look at the response in the conviction rate across different crimes and along past experience of the law. I first test if the law was immediately understood once implemented and publicized using difference-in-differences at the aggregate level. I measure the number of crimes per court and month committed by recidivists (treatment group), first-time offenders and repeat offenders not labeled as recidivists (two control groups) during the few months around the enforcement day. If would-be recidivists were accurately informed, changes in their behavior should be observed immediately after the implementation of the law.

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<sup>2</sup> When reaching criminals, information may also be biased. Governments could try to reduce crime through deterrence by overselling crime control policies and media may cover striking but non representative cases.

Advertisement of the reform and media coverage do not seem to have affected criminals' understanding in the short run. Overall, the number of crimes committed did not decrease after the enforcement of the reform. More precisely, the results show that the number of crimes committed by recidivists did not diminish in the few months following the reform in comparison to first-time offenders and non-recidivist repeat offenders.

In a second step, I test whether offenders learn through first-hand experience using individual-level difference-in-differences. The treatment group is now composed of recidivists convicted of a crime committed shortly before or after the reform. In this group, only recidivists who commit a crime after the law's implementation are actually treated. The treatment is twofold: (i) serving more time and (ii) getting the new law explained by the judge who has to refer to it when justifying his decision. The control group is composed solely of non-recidivist repeat offenders convicted of a crime committed shortly before or after the reform. This group controls for differential trends in criminal activity around the reform. Consistent with the null effect on the number of crimes committed around the reform, balancing checks show that the reform had no effect on the composition of those groups.

I use this setting to compare the effect of the reform on two outcomes: (i) the number of new crimes committed that were *similar* to any previous crime and (ii) the number of new crimes committed that were *different* from all previous crimes. The former crimes are targeted by the reform and are thus more severely sentenced; the latter are not targeted. Outcomes are measured within four years after release from prison. If offenders learn from their own experience, treated recidivists should understand the reform and avoid committing new targeted crimes. The advantage of comparing those two outcomes is that it allows to identify learning net of other mechanisms potentially affecting targeted and non-targeted new crimes in a relatively similar way: time spend in prison, age, change in the environment at release...

There are two main results. First, the number of new crimes targeted by the reform in the 4 years following release sharply dropped in the treatment group after the reform relative to the control group (-8% of the mean number of crimes). The second main result is that the number of new crimes *not* targeted by the reform remained the same (-0.5%, not significant). This means that treated recidivists specifically avoided committing new crimes that were targeted by the law. Furthermore, they do not compensate by committing more crimes of other types. This reaction is consistent with the hypothesis that treated offenders learn when they are directly

affected by the law's application.<sup>3</sup> An alternative explanation would be that longer time in prison particularly affect crimes offenders are expert in. I rule out this interpretation by showing that only offenders who attended their trial, and then received explanations about the law, avoid committing the same types of crime again, while those who missed it, but still get harsher sentences, did not.

In the third step of the analysis, I measure if offenders learn about the new law through peers' experience or observation. I focus on three types of offenders: (i) co-defendants convicted alongside recidivists or repeat offenders of an in-group crime around the time of the reform (attend the trial and follow it closely); (ii) former co-defendants (do not attend the trial, but may learn through discussions with convicted offenders); and (3) offenders who attended the same session of the court as recidivists or repeat offenders but were convicted for a different case (may hear the judge's explanations but may not pay attention to them). As for the study of the effect of first-hand experience, I conduct two difference-in-differences regressions and compare the evolution of the probability of committing new targeted or non-targeted crimes for treatments' or controls' peers.

Treated offenders' co-defendants also commit fewer targeted crimes and the same number of non-targeted crimes. These offenders were not originally sentenced under the new law, but they saw it applied and explained to their partners in crime. By contrast, former criminal partners and offenders who attended the same trial as treated offenders but for a different case did not react. Taken together, these results indicate that knowledge about criminal law spread very little among criminals. Only the small group of co-defendants learned about the law; offenders who simply witnessed a verdict or are connected to a criminal did not.

These results have important policy implications. They highlight the importance of raising offenders' knowledge of criminal law. Indeed, offenders do not seem to easily understand legal changes if they do not personally experience them. This learning mechanism is slow and extremely costly to society. Knowledge acquisition through peers or the media seems limited. Thus, policies designed to increase at-risk populations' understanding – in prison or during meetings with probation officers, for example – may have important effects. This paper also underlines the importance of the legal experience in criminals' understanding. Devoting time during the judicial process to explain certain aspects of criminal law, even before enforcing the most severe sentences, may also increase the efficiency of crime control policies.

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<sup>3</sup> Besides, it is not consistent with alternative explanations: the effect of serving longer prison time should equally affect targeted and non-targeted crimes.

This paper is one of the first to document how criminals learn about punishment and sentences. It contributes to the literature in three main ways. First, it expands the literature on how people update their beliefs about the risks associated with crime (for reviews see Apel, 2013; Nagin et al 2015; Pickett and Roche 2016). Two main dimensions are relevant here. First, several papers, mainly based on survey data, indicate that people’s perceptions of certainty or severity of sanctions are quite far from objective measures, even among individuals with crime and arrest experience (see for example Kleck et al., 2005; Maccoun et al, 2009). Second, an important literature document how perceptions of the probability of being arrested evolve with an individual’s previous personal experience as well as that of their peers. For example, Pogarsky et al (2004), Matsueda et al. (2006) and Lochner (2007) use panels to measure how subjective probabilities evolve criminal experience and arrests. However, as noted by Apel (2013)<sup>4</sup>, while we better understand how individual evaluate the certainty of sanctions, little is known about the way they construct their perception of severity. Few papers evaluate the effect of programs increasing sanctions together with other treatment on perception. For example, in the Project Safe Neighborhood (Papachristos et al, 2007 and Grunwald & Papachristos, 2017) increase in sentence time is associated with workshops and publicity campaign. More closely related to the present paper, Hjalmarsson (2009) shows that, in the US, young people correctly update their perceived severity of punishment at the age of majority even if the change appears substantially smaller than found in objective data and has no effect on self-reported crime. In Czech Republic, Dušek and Traxler (2020) documents that individuals tend to drive slower after receiving speeding tickets. Understanding how people evaluate sanctions could help reconcile the mixed results on the effect of an increase in sentencing times (see Chalfin and McCrary, 2017 for a review).

Second, the paper contributes to the large literature on specific deterrence and documents a new mechanism of the effect of sanctions on crime. Indeed, numerous papers have shown how punishment, especially prison, affect future criminal behavior (see for e.g. Kuziemko, 2012; Hansen 2015; or Bushway, Paternoster, 2009 for a review). Digging into the mechanisms, past research has investigated the effect on recidivism of prison conditions (Chen and Shapiro, 2007; Mastrobuoni and Terlizese, 2019), access to parole (Kuziemko, 2012), perceived harshness/legitimacy of the sanction (Bushway Owens, 2013), peers’ characteristics (Bayer et

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<sup>4</sup> “Several unanswered questions remain. First, all studies to date have considered only the experience of being arrested. Existing research is therefore silent with respect to the impact that conviction, incarceration, and sentence length have on risk perceptions. A consideration of post-arrest filtering through the criminal justice system would be a fruitful line of empirical inquiry, in spite of evidence from other research traditions suggesting that punishment severity is less salient than punishment certainty. “ (p85)

al, 2009; Ouss, 2011), difficulty of maintaining familial relations (Bedard and Helland, 2004; Drago et al., 2011), difficulty of finding a job after prison (Kling, 2006; Schnepel, 2016; Yang, 2016; Galbiati et al, 2020), and the treatment of ex-offenders after prison (Luca, 2011; Sabia et al. 2018). Less research has explored the effect of sanctions on offenders' understanding of the law.

Third, the findings contribute to the literature on peer effects in crime. While previous studies have assessed the effect of network size (Corno, 2017) or the potential transmission/influence of peers' criminal capital (Grund and Desley, 2014; Bayer et al., 2009; Ouss, 2011; Damm and Gorinas, 2016; Stevenson, 2017) and attitude (Drago and Galbiati, 2012; Philippe, 2020), to the best of our knowledge this study is the first to explore the effect of an offender's peer group on his or her understanding of the law.

The rest of the paper is organized as follows. Section 2 describes the institutional setting and the reform of interest. Section 3 describes the data used in the paper. Section 4 discusses the aggregate effect of the reform on sentences and the number of crimes committed. Section 5 presents the identification strategy for studying the effect of first-hand and peers' experiences on criminals' depth of understanding of the reform. Section 6 presents the effect of first-hand experience. Section 7 documents the effect of peers' experience.

## 2. Context and data

### 2.1. French criminal justice system

The French criminal system divides offenses into three categories: *contraventions* are minor offenses with non-custodial sentences (mainly road-related offenses and minor violence), *délits* carry a maximum prison term of 10 years or less (violent crimes, property offenses, drug-related offenses), and *crimes* are the most severe offenses (murder, rape) for which maximum prison terms are over 10 years (up to life). In this paper I focus on the second group (“*délits*”), which represents around 600,000 cases per year (compared to around 2,500 “*crimes*” per year). These types of crimes are tried by three professional magistrates.

Possible sentences include probation (*sursis avec mise à l'épreuve*: failure to adhere to the obligations results in a prison sentence), suspended prison (*prison avec sursis*: no prison sentence unless there is a new conviction) and actual prison (*prison ferme*).<sup>5</sup>

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<sup>5</sup> For clarity, I use the English terms of probation, suspended prison and prison in this paper.

The vast majority of sentences are decided at trial. A form of plea bargaining was introduced in 2004 but it is only used in around 7.5% of cases, mainly for first offenders committing minor offenses. Importantly, trials' verdicts are read to the defendant and should refer to the precise legal rules applied.

Recidivism (*récidive légale*) is a restrictive notion in the French Penal Code. It applies to all people who are convicted of identical or "related" crimes within 5 years after a trial. "Related" crimes group together all robberies, all road-related crimes, all violence, and all drug crimes. For example, a person who commits a burglary after a shoplifting is a recidivist, as is one who is convicted of drug consumption after drug dealing. By contrast, offenders convicted of drug consumption after a burglary are not considered recidivists (see Appendix Table A1 for more examples).

In the rest of the paper I use the terms *recidivist* for offenders who committed the same type of crime and *repeat offenders* for those who committed different crimes. Importantly, recidivism is determined by offenders' charges and criminal record; judges have no discretion to consider some offenders recidivists and others repeat offenders.

## **2.2. Law on mandatory minimum sentencing**

Then-President Sarkozy announced the mandatory sentencing bill during his 2007 presidential campaign. He was elected on 6 May, the bill was brought to the Senate for public debate on 5 July, and the law has been enforced since 11 August 2007.<sup>6</sup>

This law imposes mandatory minimum sentences for recidivists: 1 year for a new crime punished by a term of 3 years, 2 years if the term is 5 years, 3 years if the term is 7 years, and 4 years if the term is 10 years. While judges cannot choose to classify offenders as recidivists, they do have the authority to rule out minimum sentencing for extraordinary reasons but must justify their decision in the verdict in reference to the law.

Mandatory minimum sentencing guidelines only apply to recidivists, and can include probation, suspended prison or prison. The jurisdiction's president is supposed to inform offenders of the consequences of committing a new crime within 5 years of the initial trial.

The penal law is not retroactive. Thus, minimum sentencing only applies to offenders convicted as recidivists for a crime committed after 10 August 2007. People convicted after the law's

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<sup>6</sup> See the precise timing of the reform's adoption in Appendix A.

passage for crimes committed beforehand are thus not eligible. However, for an offender convicted as recidivists for a second crime of type  $t$ , the date of this second crime is the only one that matters. The first crime of type  $t$  could date back to the period before the law was passed.

The law received important coverage in the French media. However, political and media presentations were quite distorted. While concerns about limiting judges' discretion and the magnitude of the increases in sentences received significant commentary, the precise scope of the law was mainly ignored. The difference between recidivists in the common sense (offenders with a criminal record) and recidivists in the legal sense (offenders who commit the same crime twice) was rarely explained. For example, the reform was covered in 37 articles in the famous newspaper *Le Monde*, but only two clearly explained this distinction (see Appendix A, Table A2).

### 3. Criminal records data

This paper uses criminal record data from the statistics service of the French Ministry of Justice (Sous Direction de la Statistique et des Etudes). These contain the results and details of all criminal convictions each year. I use data from 2002 to 2016 (2002–2007 to reconstruct individuals' criminal careers, 2007–2008 to build the main sample, and 2008–2016 to compute the outcomes, see below for more detail).

Each individual is identified by a single ID, which is constant throughout the panel. This allows me to precisely reconstruct each offender's penal history using the ministry's data, which includes sentence descriptions, dates (crime committed and trial), and socio-demographic variables (e.g., age, sex, nationality). Although this dataset is extremely rich, it does not record acquittals, which represent 4.2% of all cases.<sup>7</sup>

Figure 1 presents the structure of the data used in the paper. I divide the sample into three groups: first-time offenders (offenders A and B in Figure 1), repeat offenders (convicted of a different type of crime within the past 5 years, C and D in Figure 1 who committed a crime of type 2, in green, before the crime of type 1, in red) and recidivists (convicted of an identical or related crime within the past 5 years, E and F in Figure 1 who committed two crimes of type

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<sup>7</sup> [http://www.justice.gouv.fr/art\\_pix/stat\\_annuaire\\_2011-2012.pdf](http://www.justice.gouv.fr/art_pix/stat_annuaire_2011-2012.pdf) (p129)



1). Variables indicating if offenders are first-time offenders or repeat offenders are constructed based on offenders' criminal history. Recidivism is explicitly recorded in the dataset.

The analyses use crimes committed in the 3-month (or 6-month) periods before and after the implementation of the mandatory sentencing bill in August 11, 2007 (the red zone in Figure 1). The sample is restricted to cases judged less than 6 months after the crime (the light green arrows in Figure 1 should not exceed 6 months).<sup>8</sup> Road-related crimes are excluded.<sup>9</sup>

I refer to the crimes and trials that are used to build the dataset – i.e., crimes committed around the time of the law's implementation – and their related trials as the “reference” crimes/trials. They are not the first for recidivists or repeat offenders. These crimes constitute what is later called the “main sample”.

I then use the individual IDs to identify subsequent criminal activity. The observation period starts with an offender's trial or release from prison (the yellow arrows in Figure 1).<sup>10</sup> Starting from this point, I record all crimes committed in the following 4 years and judged in the following 6 years (the blue arrows in Figure 1).<sup>11 12</sup>

It is important to note that 99.5% of the offenders of the main sample serve either no prison time or less than 2 years. As I have access to data until 2016, all offenders from the main sample can be observed for the same period of time after the reference trial or subsequent prison term (crimes in the next 4 years adjudicated in the next 6 years).<sup>13</sup> Therefore, there is no right truncation of the outcomes.

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<sup>8</sup> This restriction is justified by two reasons. First, I need an observation period (the next 4 years after trial or release) that is homogeneous in the sample and for that I am then obliged to cap the distance between reference crime and reference trial. Second, investigation length is correlated with the complexity of the cases and day to day crimes committed by criminals with limited information and support from lawyers are judged rapidly.

<sup>9</sup> Road-related crimes involve offenders who are quite different from those who commit other crimes. Moreover, very few road-related crimes have a maximum prison term of 3 years or more. Then they are almost not targeted by the law.

<sup>10</sup> Dates of released are reconstructed based on sentences, pre-trial detention time served, legal time credit and procedural variables.

<sup>11</sup> The Ministry of Justice records judicial decisions not crime. A crime committed, for example, in 2007 and judged in 2008 will be recorded in 2008. Then, in order to identify crimes committed in 2007 I need to take trials from 2007, 2008, 2009... and keep those concerning crimes committed in 2007. As 85% of crimes are prosecuted in the next 2 years, I need to consider trials in the next 6 years if I want to reconstruct crime rates in the next 4 years.

<sup>12</sup> I measure “crime committed in the next 4 years convicted in the next 6 years” instead of simply recording “convictions in the next 6 years” in order to avoid potential bias due to more complex cases. Indeed, more complex cases have longer investigations. Offenders who later commit more complex crimes would appear to have less crime during the observation period if I simply recorded conviction in the next 6 years. It is not the case here as I record crime in the next 4 years judged in the next 6 years.

<sup>13</sup> In the most extreme case, offenders committed the reference crime in October 2007 (last month of the sample when using 6 months before/after the reform), were prosecuted 6 month later (restriction I imposed) i.e. in April 2008 and served 2 years in prison. In this case, the observation period starts in April 2010 and it is still possible

Table 1 reports the descriptive statistics for the sample, including the 3-month periods before and after August 11, 2007 (i.e. from May 11, 2007 to November 10, 2007). The entire dataset is presented in the first two columns, while Columns 3 to 6 report the descriptive statistics for repeat offenders (control group) and recidivists (treatment group). The main dataset contains 33,340 observations: 8,809 recidivists and 24,531 repeat offenders.

Offenders are mainly male (95%) and French (83%). They are 28 years old, on average. The most common crimes are robbery (38%, over-represented among recidivists) and violence (25%). Roughly one-fifth (21%) of the sample committed a crime that could be punished by a maximum prison term of less than 3 years (not targeted by the reform); the remaining 79% faced maximum prison terms of 3 years or more. The distribution shifts upward for recidivists because the criminal code defines recidivism as an aggravating circumstance.

On average, offenders are charged for 1.79 crimes and convicted of 1.03. Sentences are quite short in France compared to those in the United States: 56% of offenders in the sample received a custodial sentence, 30% received probation and 11% received suspended prison time. Average sentences are 101 prison days, 60 probation days<sup>14</sup> and 10 suspended prison days. Sentences are harsher for recidivists.

Half of the offenders committed a new crime in the 4 years following their initial trial or subsequent prison term. 25% of the total committed a new crime targeted by the reform and 28% committed a new crime not targeted by the reform.

## **4. Aggregated effect of the reform**

### **4.1. Effect on sentences**

The reform has had a clear effect on sentences. Figure 2 presents the evolution of prison time by (a) probation time and (b) criminal history. Sentences for first-time offenders and repeat offenders remained largely flat during this period, but prison time and probation time drastically increased for recidivists after the reform.

Table 2 presents average sentences in the 3 months before/after the reform by criminal history and maximum possible sentences (defining the minimum introduced by the reform). It confirms

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to measure the number of crimes committed in the next 4 years and judged in the next 6 years (i.e. before April 2016).

<sup>14</sup> This number represents the prison time imposed if probation obligations are violated. The length of probation is not registered in the dataset, but is usually 2 years.

the pattern observed in Figure 2: prison time remained similar for first-time offenders and repeat offenders but increased considerably for recidivists. On average, recidivists received 97 additional prison days (+64%). The increase follows the constraint imposed by the law and increases with the maximum prison term: it is limited for crimes with a maximum sentence of less than 3 years (not targeted by the law), and important for crimes with a maximum sentence of 3 years or more. The same pattern is observed for probation time. A limited increase is also observed for repeat offenders, but it represents 11 additional days (+28%) compared to 119 additional days for recidivists (+267%). Suspended prison sentences are not affected. Additional results presented in Appendix Tables A4 and A5 indicate that the effect mainly comes from the intensive margin: the probability of being sentenced to some prison or probation time remains constant.

#### **4.2. General deterrence effect in the short run**

The explicit goal of the law on mandatory sentences was to decrease the incidence of crime through deterrence. As mentioned above, the law received significant media coverage. I first test whether this coverage was sufficient to disseminate information on the reform to would-be offenders. To do so I measure the evolution of the number of crimes committed by three groups of persons: (1) first-time offenders, (2) repeat offenders (offenders who committed a crime of a different type than the one for which they were previously convicted, not targeted), and (3) recidivists (offenders who committed a crime similar to the one for which they were previously convicted, targeted). If the reform was instantaneously known and understood, we would expect to find more of a decrease in group (3) than in groups (1) and (2) after the reform – i.e., we would expect a decrease in the number of targeted crimes in comparison to non-targeted crimes: repeat offenses and first offenses. If the reform was known but poorly understood, we would expect to find some decrease in repeat offenses and recidivism relative to first-time offenses or an overall decrease among the three groups.

Figure 3 presents the number of crimes committed by each group (first offenders, repeat offenders and recidivists), at the national level, in the period going from 6 months before to 6 months after the reform. The restrictions presented in the data section hold: road related crimes are excluded and the sample is restricted to cases judged less than 6 months after the crime. Crime does not seem to decrease after the law was passed either generally or more specifically among recidivists. The same absence of change is observed when numbers are normalized at the group level (see Appendix Figure A1).

In order to be more precise, I measure the number of crimes committed by each of the three groups per court ( $n = 177$ ) and month around the reform. Then, I run difference-in-difference regressions of the form:

$$Nb_{c,t,g} = \beta_0 + \beta_1 * Post_t * RepOffg + \beta_2 * Post_t * Recidg + \alpha_c + \gamma_t + \delta_g + \varepsilon_{c,t,g} \quad (1)$$

Where  $Nb_{c,t,g}$  is the number of crimes committed by group  $g$  – first offenders, repeat offenders, recidivists – in court  $c$  during month  $t$ ;  $Post_t$  is a dummy equal to one after the law was implemented;  $RepOffg$  is a dummy equal to one for repeat offenders;  $Recidg$  is a dummy equal to one for recidivists;  $\alpha_c$ ,  $\gamma_t$ ,  $\delta_g$  capture court, month and group fixed effects, respectively. Standard errors are clustered at the court level.

$\beta_1$  captures the effect of the reform on the number of crimes committed by repeat offenders. It is expected to be zero if offenders either did not hear about the reform or if they knew about it and understood it clearly. It is expected to be negative if offenders heard about the reform but did not fully understand the targeted behavior.  $\beta_2$  captures the reform's effect on the number of crimes committed by recidivists. It is expected to be negative if offenders heard about the reform and were deterred by the increase in the length of the sentences.

Table 3 reports the results of these regressions. The first four columns present the effect when the sample is restricted to the 3-month periods before and after the implementation of the reform. Columns 5–8 present the effect when using 6-month periods before and after. Columns 1 and 5 present the results when using the specification in equation (1). The results show that the enforcement of the law on mandatory minimum sentencing has had no significant effect on the number of crimes committed by recidivists (targeted crimes) *or* the number of crimes committed by repeat offenders. The coefficients are small in magnitude (0.06 for targeted crimes, less than 1% of the mean per court and month when using 3-month periods before and after) and positive.

This null result is confirmed when using a longer time window or other specifications. Columns 2 and 6 present the results when using equation (1) without measuring the effect on repeat offenders (not targeted). In this case, the evolution of the number of recidivists (targeted) is compared to that of a control group composed of both first-time offenders and repeat offenders. The effect on targeted crimes remains non-significant and small. Columns 3 and 7 present the

same results when using non-targeted repeat offenders as the control group and removing the number of first-time crimes from the sample. Lastly, Columns 4 and 8 present the results when comparing the evolution of the number of first-time crimes to the evolution of the number of recidivist and repeat offenders all together. All the coefficients are non-significant, and their magnitude is mainly negligible.<sup>15</sup>

The null effects observed in Table 3 may hide a general decrease in crime rate. Indeed, if all potential offenders – first offenders, repeat offenders and recidivists – are deterred by the new law, they may all decrease their probability to commit a crime in similar proportions and I would not observe any specific evolution among recidivists (or recidivists and repeat offenders). This hypothesis seems unlikely. Indeed, as presented in Figure 3 (and A1), the number of crimes in each group is not decreasing after the reform.

The results presented in Table 3 indicate that the media coverage of the reform and its enforcement did not trigger an immediate deterrent effect. Offenders either did not seem to be aware of the legal change or they did not take this change into account.

## **5. Individual effect: Empirical strategy**

I use individual-level observations to test whether criminals' personal experiences (or those of their peers) were more effective at disseminating information about the new sentencing law and thus changing offenders' behavior. To do so, I measure how individuals' behavior evolved after the reform when they (or their peers) have been personally affected by it. Since I did not find that the reform had an immediate deterrent effect, the groups of offenders convicted as recidivist or repeat offenders could be considered as stable (see the discussion below) and I therefore use a difference-in-differences strategy to measure the effect of the reform. The current section presents the strategy when studying own experience. The adjustment needed in order to study the effect of peers' experience are presented in section 7 below.

The structure of the difference-in-differences is visible in Figure 1 (presented above). The sample is composed of offenders who committed a crime around the time the reform was implemented in August 2007 (in the red zone). Restrictions presented in the data section hold: road related crimes are excluded and the sample is restricted to crimes adjudicated less than 6 months after the crime was committed (light green arrows in Figure 1 should not exceed 6

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<sup>15</sup> The same null results are observed when the outcome is normalized at the group level (see Appendix Table A5).

months). In addition, first offenders (type A and B in Figure 1) are excluded from the main specifications. The control group is composed of repeat offenders (those who in the past committed a crime that is different from the one recorded near the time of the reform: offenders C and D in Figure 1). The treatment group is comprised of offenders convicted as recidivists, i.e. those who committed two similar crimes (offenders E and F in Figure 1). The treatment consists of being harshly sentenced and getting information about the new law. It is applied to offenders from the treatment group who committed a crime after the enforcement of the reform (offenders F in Figure 1).

The outcomes of the difference-in-differences analysis are based on the individual's criminal behavior in the 4 years following either the date of the reference trial or the date of release from prison (the blue arrows in Figure 1). It is important to note that this entire period is after the enforcement of the reform. Thus, if offenders committed a crime during this period, the potential sentences are the same for offenders from both the control and treatment groups, and there is no additional deterrence at work. It is also important to note that the outcomes are measured after trial *or incarceration time*. Potential differences in criminal behavior between the treatment and control groups could be related to the long-term effect of harsher sentences (see the discussion below), but not to an incapacitation effect.

Formally, I consider a person  $i$  who commits a crime at time  $t$  and belongs to group  $g$  and run the following regression:

$$Outcome_{i,t,g} = \tau_t + \rho_g + \alpha_3 Post_t * T_g + \delta * X_i + \varepsilon_{i,t,g} \quad (2)$$

Where  $Outcome_{i,t,g}$  is a measure of later criminal behavior for person  $i$  who has been convicted of a reference crime belonging to group  $g$  committed at time  $t$ . I consider 10 subgroups defined as the interaction between criminal record and maximum sentences. There are two types of criminal records (repeat offenders, recidivists) and five maximum sentences (less than 3 years, 3 years, 5 years, 7 years and 10 years).<sup>16</sup>  $Post_t$  is a dummy equal to one if the offender is convicted of a crime committed after the implementation of the reform.  $T_g$  is a dummy equal to one if the offender belongs to a treatment group (6 groups containing recidivists with a maximum prison term of 3 years or more).  $X_i$  is a set of control variables for gender, age, French nationality, plea bargaining, number of charges, investigation length,

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<sup>16</sup> The control group is split into six subgroups: repeat offenders with maximum sentences of below 3 years, 3 years, 5 years, 7 years, 10 years, and recidivists with maximum sentences below 3 years (the reform only introduced minimum sentences for crimes with a maximum of 3 or more years). The treatment group is divided into four subgroups: recidivists with a maximum prison term of 3 years, 5 years, 7 years and 10 years.

calendar month of the conviction, crime fixed effects (348 dummies), and court fixed effects (177 dummies). In this model,  $\alpha_3$  measures the effect of the reform for those who experienced it on the outcome of interest.  $\tau_t$  are month-of-the-crime fixed effects and  $\rho_g$  are group fixed effects.

The reform may affect the criminal behavior of treated individuals through several channels:

- i. Learning: treated offenders may understand the reform better and avoid committing crimes that lead to harsher sentences.
- ii. Sentence length: treated offenders may commit fewer crimes because they spent a longer time in prison (see for e.g. Kuziemko, 2012) or getting older at release (see for e.g. Ganong, 2012).
- iii. Incapacitation: treated offenders may commit fewer crimes because they have been sentenced to harsher probation times and may spend more time in prison if they violate their parole. As previously mentioned, an incapacitation effect due to longer prison time is not a concern, as the observation period starts after their release from prison.

To isolate the learning effect, I distinguish between two outcomes of interest: new crimes committed after the reference trial that are targeted by the reform (i.e. new crimes that are *similar* to one previous crime) and new crimes committed after the reference trial that are not targeted by the reform (i.e. new crimes that are *different* from all preceding crimes). Both behaviors should be similarly affected by longer initial sentences (channel ii) and the potential incapacitation effect (channel iii). However, only the former – targeted crimes – should be affected if treated offenders learn about the law after having been convicted under it (channel i).

To do so, I estimate the following two equations:

$$Targeted_{i,t,g} = \alpha_g + \gamma_t + \beta_{Targeted} * Treat_{t,g} + \delta * X_i + \varepsilon_{i,t,g} \quad (3)$$

and

$$NotTargeted_{i,t,g} = \theta_g + \vartheta_t + \beta_{NotTargeted} * Treat_{t,g} + \mu * X_i + \epsilon_{i,t,g} \quad (4)$$

$Targeted_{i,t,g}$  (resp.  $NotTargeted_{i,t,g}$ ) is the number of new crimes targeted by the reform (resp. not targeted) committed by person  $i$ , who commits the reference crime at time  $t$  and belongs to group  $g$ . In all specifications I measure the outcome 4 years after the offender's release from the prison sentence decided at the reference trial.  $\alpha_g$  and  $\theta_g$  are group fixed effects

(10 groups).  $\gamma_t$  and  $\vartheta_t$  are month-of-the-crime fixed effects.  $Treat_{t,g}$  is a dummy equal to one for treated offenders – i.e., recidivists who commit a crime with a maximum prison term of at least 3 years, after the reform’s implementation.  $X_i$  is a set of control variables for gender, age, French nationality, plea bargaining, number of charges, investigation length, calendar month of the conviction, crime fixed effects (348 dummies), and court fixed effects (177 dummies).  $\varepsilon_{i,t,g}$  and  $\epsilon_{i,t,g}$  are error terms. Standard errors are clustered at the court level. Estimation uses seemingly unrelated estimation (SUEST) to combine estimates from the two models and correct for simultaneity in the estimations.

$\beta_{Target}$  and  $\beta_{NotTargeted}$  are the parameters of interest. They measure the effect of the reform on the number of crimes targeted by the reform ( $\beta_{Target}$ ) or not targeted ( $\beta_{NotTargeted}$ ).

The reform generates a strategic reaction if its effect on targeted new crimes is larger than its effect on non-targeted crimes. However, these two behaviors are not equally likely. Regardless of the reform, new non-targeted crimes are more likely than new targeted crimes. In order to take this into account, I test for the equality of the coefficients divided by the mean of the outcomes in the treatment group and compare the effects in terms of the proportion of the mean. Formally, I test the following equality:

$$\frac{\beta_{Target}}{Mean(Target_{i,t,g})} = \frac{\beta_{NotTargeted}}{Mean(NotTargeted_{i,t,g})} \quad (5)$$

If the equality is rejected and if the left-hand side parameter is more negative than the right-hand side, this would mean that the targeted crimes are more affected, and it would suggest that the law has triggered a strategic response based on a clear understanding of the law.

The strategy presented above rest on two main assumptions. First, it is only valid if groups are stable over time – i.e., if the composition of treatment and control groups did not evolve differently around the time of the reform’s introduction. I address this concern by focusing on 1, 3 and 6 months before and after the reform.<sup>17</sup> As discussed in Section 4, the reform did not affect the number of crimes committed during this very short period of time. Moreover, balancing checks presented in Appendix Table B2 indicate that states’ characteristics did not evolve significantly in the treatment group compared to the control group around the time of the reform.

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<sup>17</sup> When using 3 months, all crimes included in the sample have been committed after N. Sarkozy’s election. When using one months, all crimes included have been committed after the Senate voted on the law.



Second, even if the composition of the groups is stable over the period of interest, the strategy is only valid if the evolution of the main outcomes follows the same dynamic before the reform. This second assumption is the classical “common trend assumption”. In the context of this paper, the common trend assumption is satisfied if the numbers of new crimes targeted and not targeted by the reform committed in the 4 years after the offender’s release from prison evolve similarly in treatment and control groups before August 11, 2007. I address this concern by presenting the evolution of the differences between treatment and control groups before (and after) the reform in Figure 4 (discussed below in detail).

## 6. First-hand experience

### 6.1. Main results

Table 4 reports the effect of the reform on treated offenders. Panels A and B present the results of separate regressions following equations 3 and 4, respectively. Then, Panel A presents the effect of the reform on the number of new crimes targeted by the new sentencing guidelines (similar to crimes previously committed by the offender) that were committed in the 4 years following the reference trial or an individual’s subsequent release from prison. The coefficients correspond to the coefficient  $\beta_{Target}$  in equation 3. Panel B presents the reform’s effect on the number of new crimes not targeted by the reform committed in the 4 years following the reference trial (or release from prison). The coefficients correspond to the coefficient  $\beta_{NotTargeted}$  in equation 4. The full set of control variables is included.

The first three columns present the main estimates. The sample is restricted to offenders who committed the reference crime in the 1-month (Column 1), 3-month (Column 2) or 6-month (Column 3) periods before and after the reform as recidivist or repeat offenders. The results from Panel A indicate that treated offenders committed around 0.15 fewer crimes targeted by the reform. The results are significant at the 1% level. On the contrary, Panel B indicates that the number of crimes not targeted by the reform committed by treated offenders is not affected. The coefficients are small and insignificant in both specifications. The results from Columns 1 to 3 are very close in magnitude.

Since the two behaviors captured in Panels A and B are not equally likely, the last rows of the table report the mean number of targeted or non-targeted crimes committed in the treatment

group in the 4 years after the reference trial, and the main effects as a proportion of those means. On average, offenders in the treatment group committed 1.32 targeted crimes and 1.07 non-targeted crimes. Thus, the reform decreased the number of new targeted crimes by around 12% (row “(a)”) of the mean. The effect on non-targeted crimes goes from -1% to +4.7% (row “(b),” not significant). The difference between these two effects is statistically significant at the conventional levels (last row of the table).

Instead of simply comparing offenders convicted before/after the reform, it is possible to capture the dynamic of the effect using leads and lags. This more flexible approach directly addresses the common trend assumption by measuring the stability of the difference between treatment and control groups before the reform.<sup>18</sup> In practice, I measure the differences between the treatment and control groups per periods of 2 months before and after the reform. I study the period from 6 months before to 6 months after the reform. The difference between treatment and control groups in the 2 months before the reform is set as the reference. Formally, I run the following two equations:

$$Targeted_{i,t,g} = \sum_{k=-3}^{+3} (\gamma_k^{Target} * 1_{month=2k \text{ or } 2k-1} + \beta_k^{Target} * 1_{month=2k \text{ or } 2k-1} * T_g) + \alpha_g + \delta * X_i + \varepsilon_{i,t,g} \quad (6)$$

$$NotTargeted_{i,t,g} = \sum_{k=-3}^{+3} (\gamma_k^{Not} * 1_{month=2k \text{ or } 2k-1} + \beta_k^{Not} * 1_{month=2k \text{ or } 2k-1} * T_g) + \theta_g + \mu * X_i + \varepsilon_{i,t,g} \quad (7)$$

with  $k$  going from -3 to +3 excluding 0 and  $k=-1$  sets as the reference group (i.e., omitted in the regressions). Standard errors are clustered at the court level.

Figure 4 illustrates the results of these two regressions. The solid line represents the evolution of the differences in the number of targeted crimes (i.e. the  $\beta_k^{Target}$  from equation 6). The dashed line denotes the evolution of the differences in the number of non-targeted crimes (i.e. the  $\beta_k^{Not}$  in equation 7).

First, it is important to notice that the differences between treatment and control groups are stable for both outcomes in the period preceding the reform. This validates the common trend assumption.

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<sup>18</sup> The evolution of average numbers of targeted and non-targeted crime per group – treatment or control – and date of crime – from 6 months before to 6 months after the reform – is presented in appendix figure B1.

Second, while the difference between the treatment and control groups in the number of non-targeted crimes committed remains constant over the entire period, the difference for targeted crimes fell sharply just after the reform. The effect on targeted crimes represents a decrease of around 8% of the mean, a magnitude that is similar to the estimates presented in the first columns of Table 3. Figure 4 clearly shows that the effect is instantaneous and constant over the *post-reform* period.

These results indicate that treated offenders, who had first-hand experience of the reform, committed significantly fewer new crimes targeted by the reform but the same number of non-targeted crimes. This pattern is consistent with a strategic reaction to the reform induced by a better understanding of the new law. Offenders who were convicted under the new law understood its enforcement and avoided committing new crimes with more severe sentences. However, they committed non-targeted crimes at the same rate as before.<sup>19</sup>

The results, presented in Columns 1 to 3 of Table 4, are not natural evolutions over the course of a calendar year. In Columns 4 and 5 of Table 4, I measure the effect of placebo laws occurring 1 year before or after the year of the reform. Results are small in magnitude and insignificant.<sup>20</sup>

An alternative explanation of the results presented in the first two columns of Table 4 would be that offenders who had first-hand experience of the reform did not understand it, but simply avoided committing the type of crime for which they had been harshly convicted. I test for this alternative explanation by distinguishing between two types of crimes that are targeted by the reform: (1) crimes that are similar to the “reference crime” (the one for which offenders of the treatment group were labeled recidivists and eventually received harsher sentences because of the reform) and (2) crimes that are similar to other crimes committed longer ago.<sup>21</sup> If treated offenders clearly understood the reform, both types of crimes should be affected. If the alternative explanation is true, only the first type of crime should be affected. The results of the difference-in-differences analysis of those two outcomes are presented in Columns 6 (3-month periods before and after the reform) and 7 (6-month before and after the reform). The results

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<sup>19</sup> As discussed in section 5, the effect could not be driven by general deterrence. Indeed, the outcomes are measured in the 4-year period after the reference trial. This period is after the implementation of the law, and both treatment and control groups are at risk of being more severely sentenced. The results are unlikely to be driven by incapacitation since outcomes are measured after the prison spell and, potential incapacitation effect should affect both probabilities to commit new crimes targeted or not.

<sup>20</sup> The dynamics of the effects, presented in Appendix Figure B2 and B3, confirm the null results.

<sup>21</sup> For example, imagine an offender who committed a theft, a violence and another theft in June 2007. The last crime is classified as recidivism as it is the second one. The person belongs to the treatment group. During the observation period, the offender would be sentenced under the new law if he would commit a new theft but also if he would commit a violence as he committed one before the reference crime in June 2007.

for new crimes that are *similar* to the reference crime are presented in Panel C, while the results related to new crimes that are *different* from the reference crime but similar to other crimes committed by the offender are presented in Panel D. Both behaviors are affected by the reform. The magnitude of the effects, around -10% of the mean, is similar. Moreover, they are not significantly different from each other, but they are both statistically different from the effect on committing new types of crimes (see p-values in the last three rows).<sup>22</sup>

The results are robust to perturbations of the main specification as presented in table 5. They are similar when control variables are removed (column 1), first-time offenders included (column 2) or when crimes with maximum sentences below 3 years are excluded (column3). They are also similar when using a binary outcomes or duration models. The effect on targeted crimes is slightly decreasing over time. Columns 6, 7 and 8 present the main results on the number of crimes committed one, two or three years after release (instead of 4 years in table 4). The decreasing effect on targeted crimes in the treatment group goes from -17% one year after release to -9.5% three years after. The effect on non-targeted crimes is always negligible.

These results indicate that treated offenders are not only less likely to commit the type of crime for which they have been harshly convicted; they are also less likely to commit crimes that are similar to any other crimes in their criminal career. This finding reveals that the treatment group has a precise understanding of the reform.

## 6.2. Heterogeneity and mechanism

An alternative explanation of the results would be that longer sentences particularly affect crimes that offenders are experts in. This would be the case if, while in prison, offenders tended to lose “criminal human capital” (skills, contacts...). In this case, the treatment – spending more time in prison – may affects targeted crimes – new crimes similar to past ones, i.e., those offenders are experts in – and not other crimes, leading to the results presented in tables 4 and 5. However, this hypothesis could only explain the main results if criminal human capital is quite specific to one crime type and if offenders are specialized. If one of those two elements is violated, we would expect to see some effect on non-targeted crimes. Note that this hypothesis is not consistent with research finding that offenders tend to *acquire* criminal human capital in prison (Bayer et al 2009).

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<sup>22</sup> The dynamic of those effects is presented in appendix Figure B4 in a way similar to Figure 4

In order to explore this alternative explanation, I measure the heterogeneity of the effect along several dimensions. First, and most importantly, I exploit the fact that offenders do not always attend their trials. In theory, they are all supposed to do so. Yet in practice, around 20% of them do not. Offenders who attended or missed their trial differ— for example, absentees are less frequently male (97% vs 92%) and less frequently convicted for violence (27% vs 19%) – but both are affected by the reform and received harsher sentences if they were convicted as recidivists. However, those who missed their trial did not benefit from the judge’s explanation of the reform. Thus, if the main results are driven by the understanding of the criminal law and if learning happens at trial, only offenders who attended it should strategically react (i.e., change the types of crimes they commit in the future). On the contrary, if the results are driven by criminal human capital destruction both offenders who attended or missed their trial should be affected.

Columns 1 of table 6 presents the results for the subsample of offenders who attended their trial, Columns 2 for offenders who missed it. The results for offenders who attended their trial are similar to those observed in the full sample. The effect on crimes targeted by the reform is negative – around -10% of the mean – and significant, while the effect on non-targeted crimes is small and non-significant (Columns 1). The former is significantly smaller than the latter. Among offenders who missed their trial, the coefficients of the effect on targeted and non-targeted crimes are negative (non-significant) and similar in magnitude. The two effects are not statistically different from each other.

The results from Table 6 Columns 1 and 2 are further confirmed when measuring the dynamics of the effects. Figure 5 presents the effect per periods of 2 months over the 6 months periods before and after the reform for offenders who attended (4a) or missed (4b) their trial, similar to Figure 4. Among offenders who attended their trial, the pattern is similar to the one observed in the full sample: a sharp and rapid drop in the number of crimes targeted by the reform in the treatment group after the reform but no effect on non-targeted crimes. Among offenders who missed their trial, Figure 4b indicates a general downward trend for both outcomes but no clear evolution at the moment of the reform. Thus, the (non-significant) negative coefficients presented in Table 6 Column 2 may just capture the trend and not a non-specific deterrent effect.

Those results are not consistent with a story based on criminal human capital destruction. On the contrary, they suggest that offenders who missed their trial did not learn the new law. Those individuals may be deterred by the additional sentence time they received but this deterrence is not specifically adapted to the reform. This exception tends to confirm the general rule that

treated offenders strategically react to the reform because they understood it. Moreover, the finding supports the idea that knowledge of the reform is acquired during the trial. This should not be considered as a definitive answer to the question, though. Indeed, as previously mentioned, the two groups differ in many respects and other unexplored dimensions may drive the results.

The rest of Table 6 presents the heterogeneity of the results by crime types (Column 3 to 5), age (Columns 6 and 7) and gender (Columns 8 and 9). The effects of the reform are similar among offenders convicted for property crimes or violence and for young and old offenders. Those results also go against an explanation based on criminal human capital. Indeed, while learning the law is equally feasible for offenders of all age and crime types, criminal human capital is arguably larger for property crimes and for older offenders.

## **7. Second-hand experience and diffusion of knowledge**

This section investigates whether the understanding acquired by offenders sentenced under the reform spread to other persons. Two mechanisms may be at work: learning through direct observation and learning through peers. First, offenders may learn about the law by observing its enforcement even if they are not directly affected. Second, individuals may learn about it if they know offenders who have been affected. These mechanisms are similar to those documented in the literature on knowledge acquisition in a non-criminal context (e.g., Foster and Rosenzweig, 1995; Conley and Udry, 2010).

To investigate this diffusion of knowledge, I study three groups of persons related to the offenders of the “main sample” from Section 6. First, co-defendants are both the criminals’ peers and witnesses to the verdict.<sup>23</sup> They attend the reference trial, hear the explanations, observe the verdict, and likely pay attention to it. The second group includes former criminal partners, defined as people who were convicted alongside offenders from the main sample in the past 5 years. Those persons did not attend the reference trial but may have heard about it if they are still connected with offenders from the main sample. This is likely to be the case, as a previous study in the same context (Philippe 2020) finds that offenders are affected by the incarceration of their former peers, which indicates that they are still in contact. The third group is first-time offenders who attended the same session of the court as the offenders in the main

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<sup>23</sup> The way criminal groups are identified is described in appendix C.

sample and were convicted of similar crimes.<sup>24</sup> Those persons observed the enforcement of the reform even if they were not directly related to the case or the perpetrators.<sup>25</sup>

I study the understanding of the reform in those three groups using the same methodology as in Section 6. The treatment groups are (1) non-recidivists co-defendants, (2) former criminal partners and (3) first-time offenders judged during the same session of the court as the main sample's recidivists who committed a crime around the time of the reform. The control groups are (1) co-defendants, (2) former criminal partners and (3) first-time offenders judged during the same session of the court as the main sample's repeat offenders (not labeled recidivists) who committed a crime around the time of the reform. Using those groups, I run two sets of difference-in differences regressions on the number of crimes targeted or not targeted by the reform using the formulas from equations 3 and 4.<sup>26</sup>

It is important to note that offenders from the three treatment groups were not more severely sentenced.<sup>27</sup> They *observed*, *knew*, or they *were sentenced with* somebody who was more severely sentenced,<sup>28</sup> but their own judicial treatment remained the same before and after the reform. The treatments only consist of the information they may have received through their peer or their direct observation.

The results are reported in Table 7. As in the preceding tables, the panels present the results of separate regressions: the effect on crimes targeted by the reform in Panel A, and the effect on crimes not targeted by the reform in Panel B. Columns 1 and 2 present the effects on co-defendants for crimes committed in the 3-month (Column 1) and 6-month (Column 2) periods before and after the reform. In both specifications, the number of new crimes targeted by the reform significantly decreased after the reform in the treatment group, while the number of new non-targeted crimes was not significantly affected. The difference between the two effects is statistically significant in Column 2, which uses the largest sample.

The results presented in the first two columns of Table 7 are further confirmed when measuring the dynamics of the effects. Figure 6 presents the effect per periods of 2-months in the same

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<sup>24</sup> The definition of "similar" here is identical to the one used in the rest of the paper. For example, all property crimes are considered as similar and all violence are considered as similar.

<sup>25</sup> This possibility is reinforced by the fact that all verdicts are frequently delivered together in the end of a court session.

<sup>26</sup> A graphical representation of the three exercises is presented in appendix Figure C1.

<sup>27</sup> The null effect of the reform on treatment group's sentences is confirmed by balancing checks presented in appendix C Table C2 (columns 9-11).

<sup>28</sup> Targeted partners or co-trial offenders are a subsample of the main sample used in section 6. The massive effect of the reform on their sentences is confirmed by balancing checks presented in appendix C Table C3 (columns 9-11).

format as in Figures 4 and 5. The number of new crimes targeted by the reform sharply dropped in the treatment group after the reform, while no effect was observed for non-targeted crimes.

These results indicate that treated offenders' co-defendants strategically reacted to the reform, which supports the idea that information spread to co-defendants.

Columns 3 and 4 present the results for former criminal partners. The effects on both targeted and non-targeted crimes are small in magnitude and non-significant. These null results are not driven by the small number of crimes observed. Indeed, the average number of new crimes observed in the 48-month period is comparable to that identified for co-defendants.<sup>29</sup> The results indicate that knowledge does not spread to some of the most relevant peers: those who committed a crime with targeted offenders in the past.<sup>30</sup>

Lastly, Columns 5 and 6 present the results for first-time offenders who attended the same session of the court as offenders of the main sample. Again, the effects on both targeted and non-targeted crimes are small in magnitude and non-significant. Offenders convicted at the same trial as the targeted offenders are not reacting strategically: they do not seem to learn about the change in criminal law.<sup>31</sup>

Taken together, these results indicate that knowledge of the law does not spread easily among the criminal population. Co-defendants seem to have learned about the law, but they represent a small group in practice. Two sizable groups – criminal peers who did not attend the trial and other session's participants unrelated to the targeted offender – are not affected.

## **8. Conclusion**

This paper documents criminals' understanding of criminal law using the case of a complex increase in sentencing times that occurred in France in 2007. The enforcement of the reform, its political promotion and media coverage did not affect the number of crimes committed in the short run. The targeted behavior, recidivism defined as committing the same type of crime again, did not decrease after the law was passed in comparison to other types of crime.

While publicly available information was not enough to induce a change in criminals' behavior, first-hand experience of the reform was. Comparing the results of two difference-in-differences,

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<sup>29</sup> In this exercise the observation period starts with the trial of the offenders of the main sample i.e. the former partners of the offenders include in the regressions.

<sup>30</sup> The dynamic of the effect is presented in appendix figure C2.

<sup>31</sup> The dynamic of the effect is presented in appendix figure C3.



I find that offenders convicted under the new reform learned about the criminal law and strategically adapted their behavior. After receiving harsher sentences because of the reform, criminals avoided committing new crimes targeted by the new law but did not change their probability of committing other types of crimes. This learning is precise and seems to be acquired at trial.

Understanding of the reform did not spread easily. Only treated offenders' co-defendants seemed to learn about and react strategically to the reform. Offenders who witnessed the enforcement of the law without being connected to the case did not have a strategic reaction. Similarly, former criminal peers did not seem to obtain information about the new reform and did not react strategically.

Thus, learning about the criminal law seems primarily based on personal experience rather than peers' experience or direct observation. This mechanism of learning is particularly slow and may undermine public efforts to reduce crime through sentences. In the case of the French law on mandatory minimum sentencing, the costs clearly exceed the benefits. The simple cost of incarceration (i.e. excluding the cost of probation and the individual cost of the sanction for the offender) represents around 10,000 euros per treated offender.<sup>32</sup> The benefit is a diminution of 0.15 crimes committed by treated offender and, eventually, an additional diminution of 0.2 crimes committed by their co-defendants (29% of the cases) resulting in an overall decrease of around 0.21 crimes. Measuring the economic cost of crime is a difficult exercise that has never been conducted in a systematic way in France. However, none of the relevant crimes listed in the most recent version of the "The economic and social costs of crime" (Heeks et al, 2018) report by the home office in England have a cost that is sufficiently high to justify the reform.<sup>33</sup>

This paper highlights the importance of criminals' understanding of criminal law, a dimension that remains largely ignored. It could help explain why papers focusing on famous reforms like three strikes laws (Kessler and Levitt, 1999; Helland and Tabarrock, 2007; Iyengar, 2008) and personally notifying offenders about legal changes (Drago et al., 2009) detect a general deterrent effect while studies of less covered changes (McDowall et al., 1992) or potentially less knowledgeable offenders (Lee and McCrary, 2017) do not. It underlines the importance of

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<sup>32</sup> According to the French Ministry of Justice, one day in prison cost around 100 euros:  
<http://www.gip-recherche-justice.fr/conference-consensus/wp-content/uploads/2012/11/combien-coute-prison.pdf>

<sup>33</sup> With a cost of 10,000 euros and a benefit of -0.21 crime, the cost per crime needs to be above 40,000 euros. In the report, it is only the case for homicide and rape that are not targeted by the reform as they are *crimes* and not *délits* according to the French criminal code (see section 2.1).

ensuring that targeted offenders understand criminal law and the difficulties associated with increasing this knowledge.

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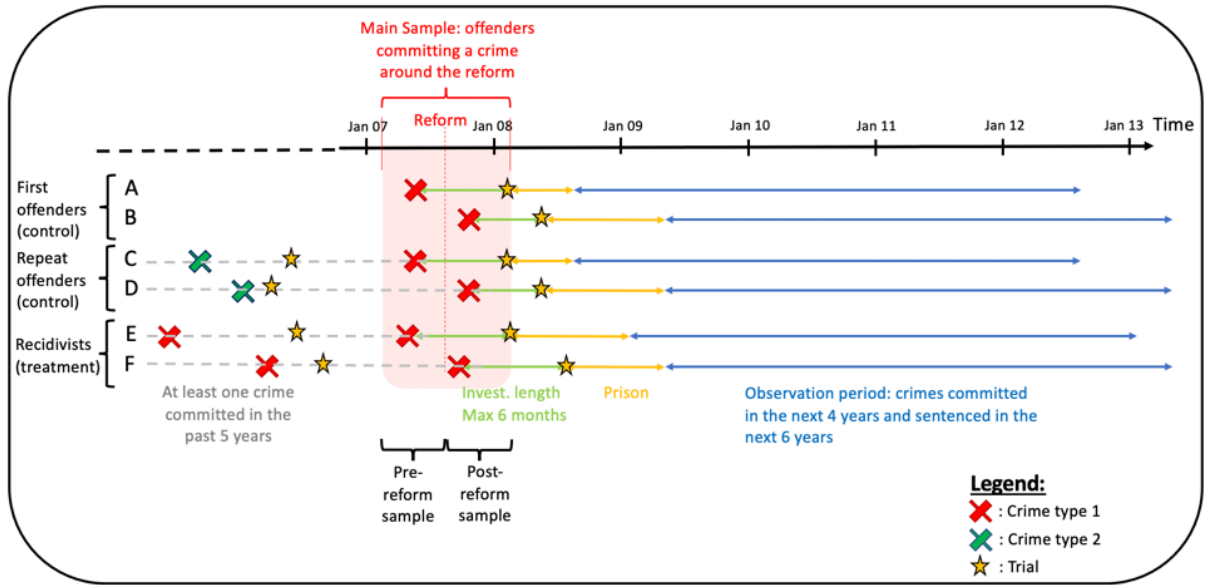


Figure 1: Structure of the data.

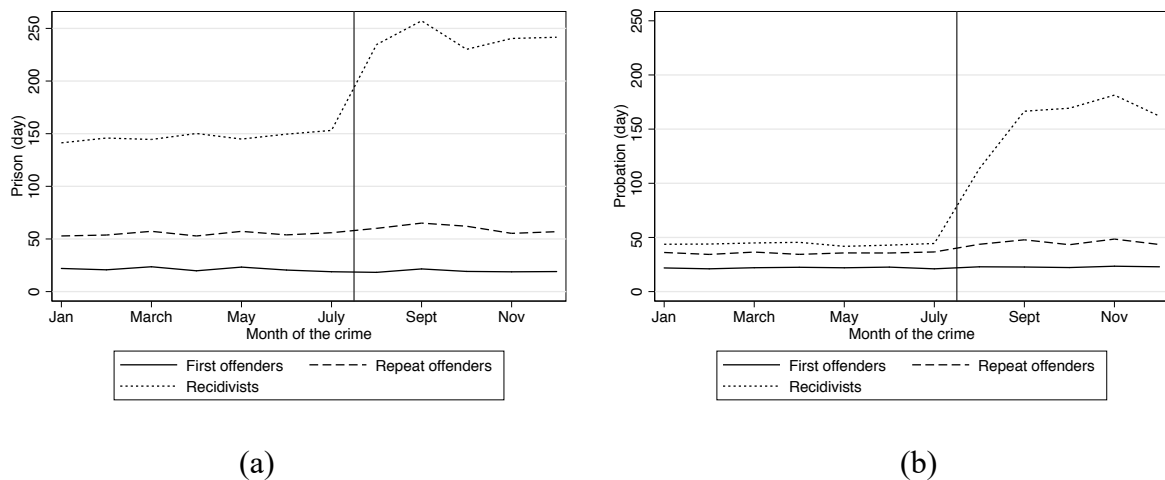


Figure 2: Average prison time (a) and probation time (b) by criminal history per month of the crime in 2007.

*The sample is restricted to crimes adjudicated less than 6 months after the crime. Road related crimes are excluded. Source: Author's calculations based on criminal records, provided by the French Ministry of Justice*

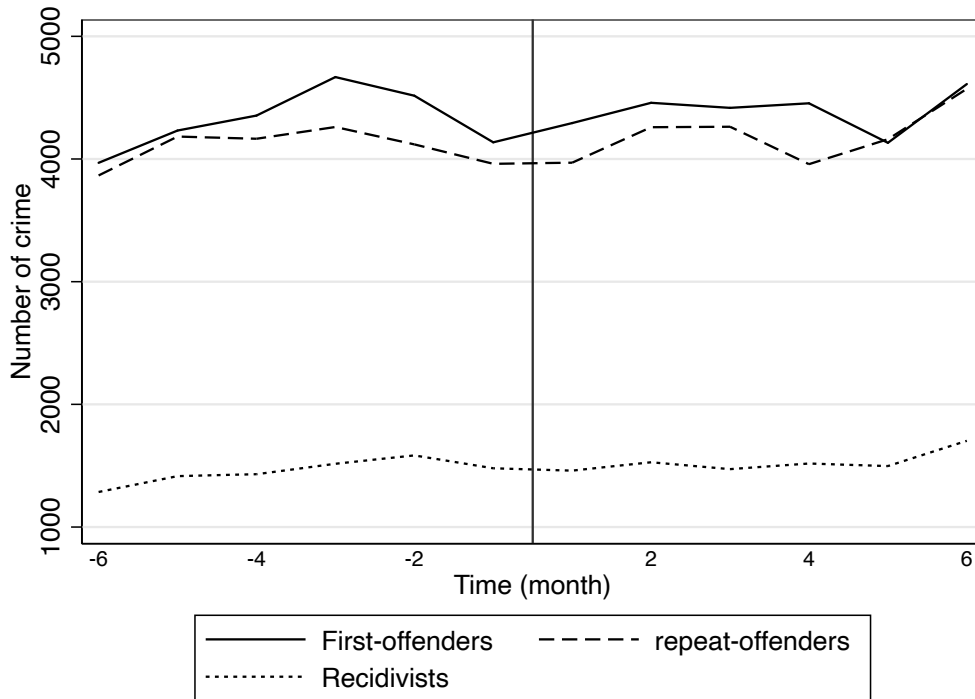


Figure 3: Average number of crimes by criminal history per month around the reform.

*The sample is restricted to crimes adjudicated less than 6 months after the crime. Road related crimes are excluded. Source: Author's calculations based on criminal records, provided by the French Ministry of Justice*

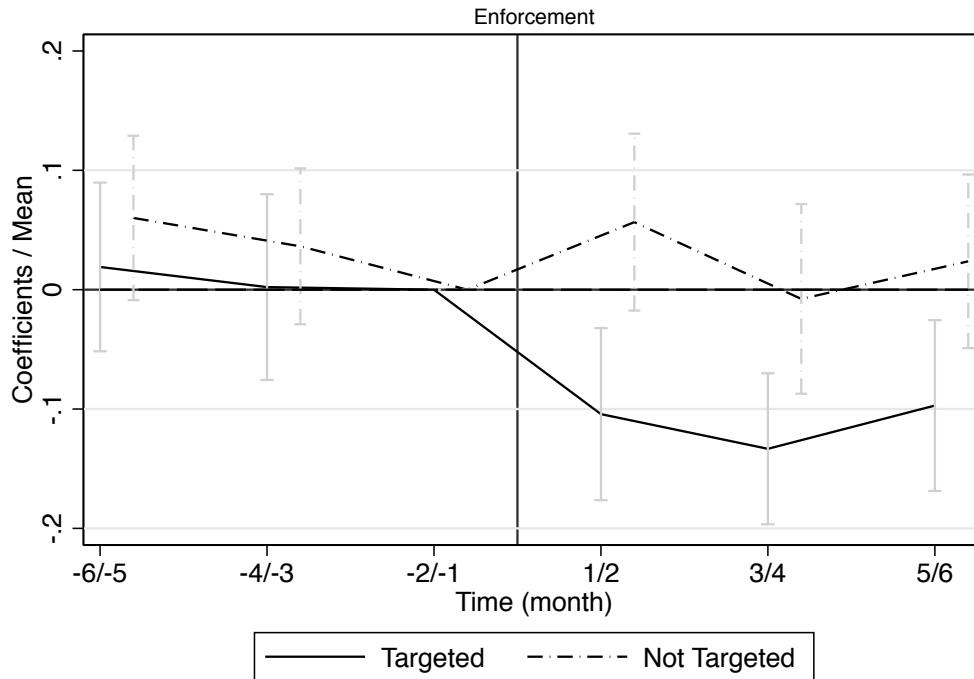
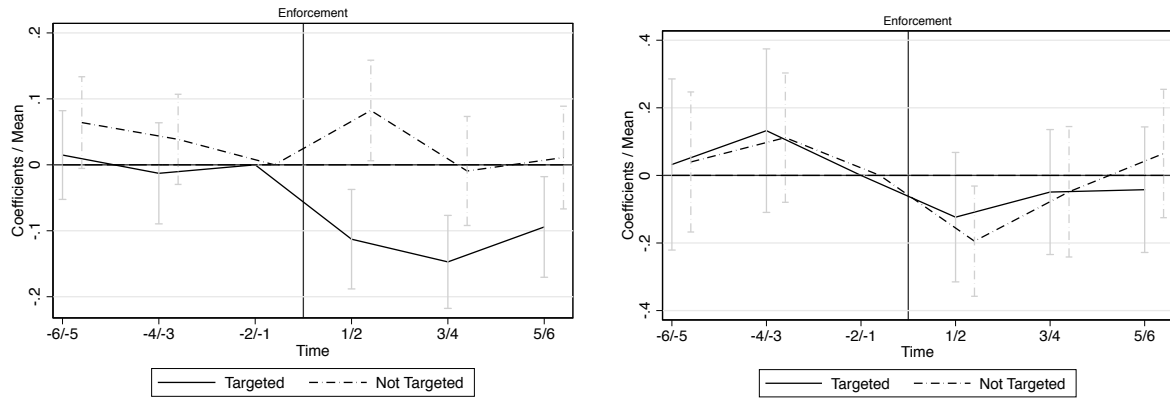


Figure 4: Effect of the reform on the number of new crimes targeted (solid line) or not targeted (dashed line) by the reform per date of the reference crime.

*The two lines correspond to the coefficients of two separate regressions. The outcomes are the number of crimes targeted or not targeted by the reform committed in the 4-year period after the reference trial or subsequent prison term. The x-axis indicates the period when the reference crime was committed. The 2-month period before the enforcement of the reform is set as the reference period. Thus, each coefficient measures the evolution of the difference between offenders convicted as recidivists and those convicted as repeat offenders compared to the 2-month period before the enforcement of the reform. Each point presents a coefficient divided by the mean of the relevant behavior – number of crimes similar to or different from the reference crime – in the treatment group. Bars indicate confidence intervals at 10%. Standard errors are clustered at the court level. Source: Author’s calculations based on criminal records provided by the French Ministry of Justice.*





(a)

(b)

Figure 5: Effect of the reform on the number of new crimes targeted (solid line) or not targeted (dashed line) by the reform per date of the reference crime for offenders who attended (a) or missed (b) their trial.

*In each figure, the two lines correspond to the coefficients of two separate regressions. The outcomes are the number of crimes targeted or not targeted by the reform committed in the 4-year period after the reference trial or subsequent prison term. The x axis indicates the period when the reference crime was committed. The 2-months period before the enforcement of the reform is set as the reference period. Thus, each coefficient measures the evolution of the difference between offenders convicted as recidivists and those convicted as repeat offenders compared to the 2-months period before the enforcement of the reform. Each point presents a coefficient divided by the mean of the relevant behavior – number of crimes similar to or different from the reference crime – in the treatment group. Bars indicate confidence intervals at 10%. Standard errors are clustered at the court level. Source: Author's calculations based on criminal records provided by the French Ministry of Justice.*

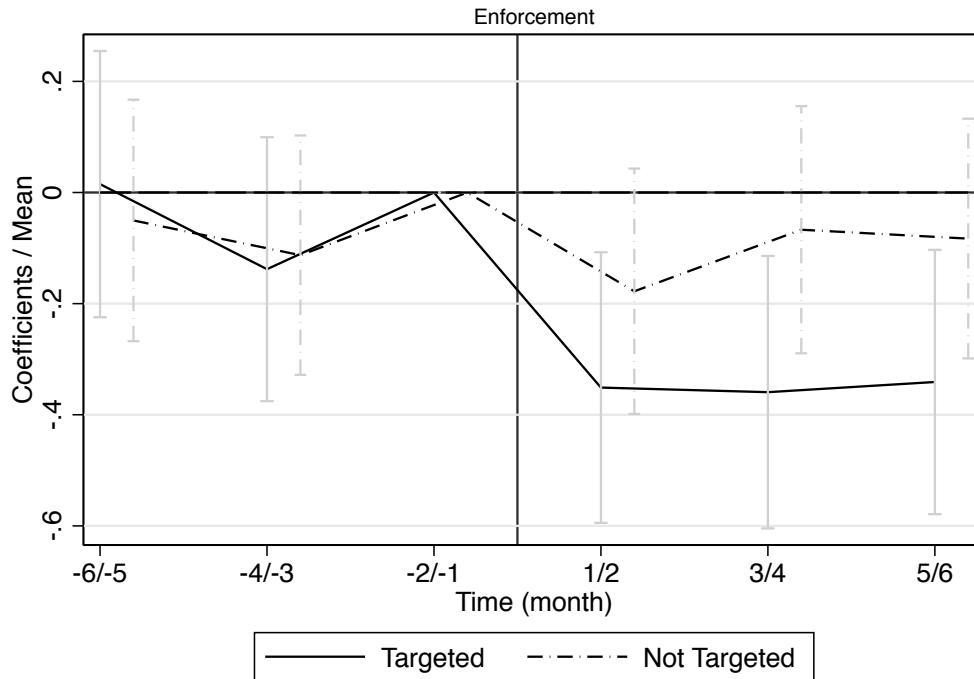


Figure 6: Effect of the reform on the number of new crimes targeted (solid line) or not targeted (dashed line) by the reform per date of the reference crime for criminal partners of offenders included in the main sample.

*The two lines correspond to the coefficients of two separate regressions. The outcomes are the number of crimes targeted or not targeted by the reform committed in the 4-year period after the reference trial or subsequent prison term. The x axis indicates the period when the reference crime was committed. The 2-months period before the enforcement of the reform is set as the reference period. Thus, each coefficient measures the evolution of the difference between offenders convicted as recidivists and those convicted as repeat offenders compared to the 2-months period before the enforcement of the reform. Each point presents a coefficient divided by the mean of the relevant behavior – number of crimes similar to or different from the reference crime – in the treatment group. Bars indicate confidence intervals at 10%. Standard errors are clustered at the court level. Source: Author's calculations based on criminal records provided by the French Ministry of Justice.*

	All		Repeat offenders non recidivists		Recidivists	
	Mean	Sd	Mean	Sd	Mean	Sd
Female	.05	.22	.05	.22	.04	.2
Age	27.96	9.58	27.65	9.57	28.81	9.58
French citizen	.83	.38	.83	.38	.82	.38
Crime type						
Property crimes	.38	.49	.32	.46	.56	.5
Violence	.25	.44	.27	.44	.21	.41
Other	.36	.48	.41	.49	.22	.42
Maximum sentences (criminal code)						
<3 years	.21	.41	.25	.43	.11	.31
≥3 years	.78	.42	.74	.44	.89	.32
Nb of charge	1.79	1.19	1.78	1.18	1.81	1.21
Nb of charge convicted	1.03	.17	1.03	.17	1.02	.16
Present at trial	.8	.4	.76	.43	.9	.3
Prison (day)	100.38	171.59	65.14	126.29	199.48	232.56
Probation (day)	60.38	133.49	44.98	98.11	103.7	195.76
Suspended prison (day)	10.61	41.17	13.29	43.07	3.08	34.17
Prison (dummy)	.56	.5	.46	.5	.82	.38
Probation (dummy)	.3	.46	.28	.45	.36	.48
Suspended prison (dummy)	.11	.31	.14	.35	.02	.14
Nb new crime 48 months after trial/release						
At least one crime	.5	.5	.48	.5	.55	.5
At least one crime targeted	.25	.43	.23	.42	.33	.47
At least one crime not targeted	.28	.45	.29	.45	.28	.45
All crimes	2.13	2.33	2.05	2.32	2.37	2.37
Targeted by the law	1.03	1.59	.93	1.51	1.31	1.77
Not targeted by the law	1.1	1.48	1.12	1.51	1.05	1.4
N	33,673		24,840		8,833	

Table 1: descriptive statistics of the sample.

*The sample is restricted to offenders who committed the reference crime in the 3-month periods before and after August 11, 2007 as recidivists or repeat offenders and adjudicated in no more than 6 months. Maximum sentences – sum of prison, probation and suspended prison time – are defined in the criminal code. Source: Author's calculations based on criminal records provided by the French Ministry of Justice.*

Group	Criminal Record	Max sent (year)	Targeted by the law	(1) (2) (3) Prison (days)			(4) (5) (6) Probation (days)			(7) (8) (9) Suspended prison (days)		
				Before	After	Difference	Before	After	Difference	Before	After	Difference
First-offenders	All			25	24	-1 (-3%)	27	29	2 (7%)	41	43	2 (6%)
	<3	0		10	13	3 (25%)	15	16	2 (10%)	27	30	2 (9%)
	>=3	0		29	28	-2 (-5%)	30	32	2 (7%)	44	47	3 (6%)
Repeat offenders (non recidivists)	All			62	68	6 (10%)	39	50	11 (28%)	13	13	0 (3%)
	<3	0		38	41	3 (8%)	27	31	4 (14%)	9	8	-1 (-7%)
	>=3	0		70	78	8 (12%)	44	58	14 (31%)	15	15	1 (5%)
Recidivists	All			151	248	97 (64%)	45	164	119 (266%)	2	4	2 (69%)
	<3	0		85	107	22 (26%)	38	72	34 (88%)	4	6	2 (55%)
	>=3	1		160	267	107 (67%)	46	177	131 (286%)	2	4	2 (71%)

Table 2: effect of the reform on sentences.

*The sample is restricted to offenders who committed the reference crime in the 3-month periods before and after August 11, 2007 as recidivist or repeat offenders and adjudicated in no more than 6 months. Maximum sentences – sum of prison, probation and suspended prison time – are defined in the criminal code. Source: Author's calculations based on criminal records provided by the French Ministry of Justice.*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Outcome:	Number of crimes per group, month, and court							
Period:	3 months before/after (May-Oct 2007)				6 months before/after (Feb 07-Jan 08)			
Groups:	Recidivists; repeat offenders; first offenders	Recidivists; repeat offenders	Any past crime; first offenders		Recidivists; repeat offenders; first offenders	Recidivists; repeat offenders	Any past crime; first offenders	
Post*committed similar crime before	0.0621 (1.148)	-0.223 (0.994)	-0.508 (1.198)		-0.0217 (0.817)	-0.0866 (0.708)	-0.152 (0.851)	
Post*committed different crime before	0.571 (1.148)				0.130 (0.817)			
Post*committed a crime before				0.286 (1.021)				0.523 (0.710)
Group fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month-of the crime fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Court fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean first offenders		24.94				24.60		
Mean repeat offenders		23.38				23.42		
Mean recidivists		8.51				8.42		
Observations	3,186	3,186	2,124	2,124	6,372	6,372	4,248	4,248

Table 3: effect of the reform on the number of crimes committed around the reform.

*The sample contains one observation per court, month and group. Groups are: first-time offenders, offenders who already committed a crime similar to the one convicted and offenders who already committed a crime different from the one convicted in columns 1, 2, 5, 6 and 7; offenders who already committed a crime similar and offenders who already committed a crime different in columns 3 and 7; first-time offenders and offenders who already committed a crime (of any type) before in columns 4 and 8. Post is a dummy equal to one after the reform. Standard errors are clustered at the court level. Source: Author's calculations based on criminal records provided by the French Ministry of Justice.*

	(1) 1 month before/after the reform	(2) 3 months before/after the reform	(3) 6 months before/after the reform	(4) Placebo, 3 months before/after 2006	(5) 2008	(6) 3 months before/after the reform	(7) 6 months before/after the reform
<b>Panel A: new crimes <i>targeted</i> by the reform (similar to any past crime)</b>							
Treat	-0.16** (0.084)	-0.12*** (0.044)	-0.15*** (0.026)	0.055 (0.043)	0.052 (0.039)		
<b>Panel B: new crimes <i>not targeted</i> by the reform (different from all previous crimes)</b>							
Treat	0.051 (0.067)	0.026 (0.042)	-0.013 (0.034)	0.0026 (0.042)	-0.0031 (0.035)	0.026 (0.042)	-0.013 (0.034)
<b>Panel C: new crimes <i>similar</i> to the “reference” one</b>							
Treat						-0.080*** (0.031)	-0.12*** (0.022)
<b>Panel D: new crimes <i>different</i> from the “reference” crime but <i>similar</i> to another past crimes</b>							
Treat						-0.036 (0.024)	-0.039** (0.018)
Observations	10,796	33,672	67,296	35,240	34,133	33,672	67,296
Mean targeted	1.35	1.32	1.32	1.56	1.16		
Mean different (not targeted)	1.09	1.07	1.07	1.17	1.01	1.07	1.07
Mean similar reference						0.97	0.97
Mean similar past						0.35	0.36
<b>(a) Treat/Mean targeted</b>	<b>-0.12**</b>	<b>-0.088***</b>	<b>-0.12***</b>	<b>0.035</b>	<b>0.045</b>		
<b>(b) Treat/Mean Different</b>	<b>0.047</b>	<b>0.024</b>	<b>-0.012</b>	<b>0.0022</b>	<b>-0.0030</b>	<b>0.024</b>	<b>-0.012</b>
<b>(c) Treat/Mean Similar reference</b>						<b>-0.083***</b>	<b>-0.12***</b>
<b>(d) Treat/Mean Similar past</b>						<b>-0.10</b>	<b>-0.11**</b>
Pval (a)=(b)	0.072	0.015	0.0027	0.44	0.30		
Pval (c)=(d)						0.77	0.89
Pval (c)=(b)						0.014	0.0057
Pval (d)=(b)						0.11	0.071

Table 4: Effect of the reform on the number of new crimes targeted (Panel A) or not targeted (Panel B) by the reform, main results.

*In the first three columns and in columns 6 and 7, the sample is restricted to offenders who committed the reference crime in the 1-month, 3-month or 6-month periods before and after August 11, 2007 as recidivists or repeat offenders. In columns 4 and 5 the sample is restricted to offenders who committed the reference crime in the 3-month periods before and after August 11, 2006 or 2008 as recidivists or repeat offenders (placebo exercises). Each panel represents a separate set of regressions with different dependent variables: the number of new crimes targeted by the reform committed in the 4-year period after the reference trial or subsequent prison term (Panel A); the number of new crimes not targeted by the reform committed in the 4-year period after the reference trial or subsequent prison term (Panel B); the number of new*

*crimes similar to the reference crime (Panel C) or similar to another crime (Panel D). Outcomes are regressed on “Treat,” a dummy equal to one for the treatment group (recidivists who committed a crime that could be sentenced by 3 years or more after August 11), month-of-the-reference-crime fixed effects, group fixed effects (interaction between maximum sentences and a dummy equal to one if the reference crime is considered recidivism), crime fixed effects and controls (gender, nationality, age, investigation length, number of charges, number of convictions, plea bargaining, presence at trial, and court fixed effects).*

*The last rows of the table present: the mean of the outcome variables in the treatment group; the effect of the reform in proportion to those means (rows noted (a) to (d)); and the p-value of the difference between those effects.*

*Standard errors are clustered at the court level. Estimation uses seemingly unrelated estimation to correct for simultaneity in the estimations. Source: Author’s calculations based on criminal records provided by the French Ministry of Justice. Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	3 months before/after the reform							
	Without control variables	First offenders in control group	Restrict to max sentence sup or equal to 3 years	Dummies	Cox model, competitive risks	New crimes in 1 year	New crimes in 2 years	New crimes in 3 years
<b>Panel A: new crimes <i>targeted</i> by the reform</b>								
Treat	-0.11*** (0.040)	-0.14*** (0.039)	-0.091** (0.044)	-0.029* (0.016)	-0.10** (0.049)	-0.071*** (0.019)	-0.099*** (0.030)	-0.10*** (0.038)
<b>Panel B: new crimes <i>not targeted</i> by the reform</b>								
Treat	0.023 (0.038)	0.020 (0.041)	0.033 (0.044)	0.0046 (0.012)	-0.015 (0.038)	0.015 (0.018)	0.0044 (0.032)	0.023 (0.037)
Observations	33,672	60,360	26,188	33,672	33,586	33,672	33,672	33,672
Mean targeted	1.32	1.30	1.32	0.57		0.43	0.77	1.07
Mean not targeted	1.07	1.07	1.07	0.54		0.32	0.61	0.85
<b>(a) Treat/Mean Targeted</b>	<b>-0.084***</b>	<b>-0.11***</b>	<b>-0.069**</b>	<b>-0.052*</b>		<b>-0.17***</b>	<b>-0.13***</b>	<b>-0.095***</b>
<b>(b) Treat/Mean not Targeted</b>	<b>0.021</b>	<b>0.019</b>	<b>0.031</b>	<b>0.0085</b>		<b>0.046</b>	<b>0.0073</b>	<b>0.027</b>
Pval (a)=(b)	0.014	0.0055	0.034	0.045		0.00081	0.018	0.016

Table 5: Robustness checks

*The sample is restricted to offenders who committed the reference crime in the 3-month periods before and after August 11, 2007 as recidivist or repeat offenders. Each Panel represents a separate set of regressions with different dependent variables: the number of new crimes targeted by the reform committed in the 4-year (resp. 1-year, 2-year, 3-year in the last three columns) period after the reference trial or subsequent prison term in Panel A (dummy in column 4); the number of new crimes not targeted by the reform committed in the 4-year (resp. 1-year, 2-year, 3-year in the last three columns) period after the reference trial or subsequent prison term in Panel B (dummy in column 4). Outcomes are regressed on “Treat”, a dummy equal to one for the treatment group (recidivists who committed a crime that could be sentenced by 3 years or more after August 11), month-of-the-reference-crime fixed effects, group fixed effects (interaction between maximum sentences and a dummy equal to one if the reference crime is considered recidivism), crime fixed effects and controls. The last rows of the table present: the mean of the outcome variables in the treatment; the effect of the reform in proportion to those means (rows noted (a) and (b)); and the p-value of the difference between those two effects. Standard errors are clustered at the court level. Estimation uses seemingly unrelated estimation to correct for simultaneity in the estimations. Source: Author’s calculations based on criminal records provided by the French Ministry of Justice. Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .*



	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
			6 months before/after							
	Present	Absent	Property crimes	Violence	Other	Young	Old	Male	Female	
<b>Panel A: new crimes targeted by the reform (similar to any past crime)</b>										
Treat	-0.16*** (0.030)	-0.13 (0.098)	-0.15*** (0.042)	-0.098** (0.047)	-0.20*** (0.065)	-0.14*** (0.043)	-0.14*** (0.038)	-0.15*** (0.027)	-0.32*** (0.12)	
<b>Panel B: new crimes not targeted by the reform (different from all previous crimes)</b>										
Treat	-0.0093 (0.035)	-0.12* (0.074)	-0.015 (0.046)	-0.024 (0.053)	-0.0092 (0.063)	-0.0014 (0.047)	0.0055 (0.043)	-0.016 (0.035)	0.042 (0.067)	
Observations	53,821	13,475	25,783	17,041	24,472	32,129	32,235	64,044	3,252	
Mean similar	1.33	1.26	1.55	0.85	1.04	1.32	1.33	1.33	1.19	
Mean different	1.07	1.06	1.12	0.99	0.99	1.38	0.81	1.10	0.43	
<b>(a) Treat/Mean Similar</b>	<b>-0.12***</b>	<b>-0.11</b>	<b>-0.099***</b>	<b>-0.12**</b>	<b>-0.19***</b>	<b>-0.11***</b>	<b>-0.11***</b>	<b>-0.11***</b>	<b>-0.27***</b>	
<b>(b) Treat/Mean Different</b>	<b>-0.0086</b>	<b>-0.12*</b>	<b>-0.014</b>	<b>-0.024</b>	<b>-0.0093</b>	<b>-0.00098</b>	<b>0.0068</b>	<b>-0.014</b>	<b>0.099</b>	
Pval (a)=(b)	0.0012	0.91	0.052	0.16	0.031	0.012	0.029	0.0047	0.034	

Table 6: Heterogeneity of the results.

*The sample is restricted to offenders who committed the reference crime in the 6-month periods before and after August 11, 2007 as recidivist or repeat offenders. Samples are further restricted to the group mentioned in the header: offenders who attended their trial or missed it; offenders convicted for property crimes, violence or other crimes; offenders below or above median age; male or female. Each Panel represents a separate set of regressions with different dependent variables: the number of new crimes targeted by the reform committed in the 4-year period after the reference trial or subsequent prison term in Panel A; the number of new crimes not targeted by the reform committed in the 4-year period after the reference trial or subsequent prison term in Panel B. Outcomes are regressed on “Treat”, a dummy equal to one for the treatment group, month-of-the-reference-crime fixed effects, group fixed effects (interaction between maximum sentences and a dummy equal to one if the reference crime is considered recidivism), crime fixed effects and controls. The last rows of the table present: the mean of the outcome variables in the treatment; the effect of the reform in proportion to those means (rows noted (a) and (b)); and the p-value of the difference between those two effects. Standard errors are clustered at the court level. Estimation uses seemingly unrelated estimation to correct for simultaneity in the estimations. Source: Author’s calculations based on criminal records provided by the French Ministry of Justice. Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .*

	(1)	(2)	(3)	(4)	(5)	(6)
	Co-defendants		Past peer		Non peer same session	
	3 months	6 months	3 months	6 months	3 months	6 months
<b>Panel A: new crimes <i>targeted</i> by the reform</b>						
Treat	-0.22*** (0.069)	-0.18*** (0.067)	0.038 (0.057)	-0.0025 (0.038)	-0.011 (0.051)	-0.022 (0.039)
<b>Panel B: new crimes <i>not targeted</i> by the reform</b>						
Treat	-0.083 (0.078)	-0.036 (0.059)	-0.028 (0.051)	0.016 (0.036)	0.0056 (0.057)	-0.035 (0.053)
Observations	4,303	8,782	10,901	21,485	8,031	15,273
Mean targeted	0.62	0.62	0.59	0.58	0.72	0.73
Mean not targeted	0.78	0.82	0.40	0.39	0.83	0.85
<b>(a) Treat/Mean Targeted</b>	<b>-0.35***</b>	<b>-0.29***</b>	<b>0.065</b>	<b>-0.0042</b>	<b>-0.016</b>	<b>-0.030</b>
<b>(b) Treat/Mean not Targeted</b>	<b>-0.11</b>	<b>-0.043</b>	<b>-0.071</b>	<b>0.039</b>	<b>0.0068</b>	<b>-0.042</b>
Pval (a)=(b)	0.093	0.063	0.41	0.71	0.80	0.87

Table 7: Effect of the reform on the number of new crimes targeted (Panel A) or not targeted (Panel B) by the reform, among main sample's criminal partners.

*In Columns 1 (resp. 2, 3 and 4) the sample is restricted to offenders who committed the reference crime in the 3-month periods (resp, 6-months) before and after August 11, 2007. Each Panel represents a separate set of regressions with different dependent variables: the number of new crimes targeted by the reform in Panel A; the number of new crimes not targeted by the reform in Panel B. Outcomes are measured in the 4-year period after the reference trial or subsequent prison term. Outcomes are regressed on "Treat", a dummy equal to one for the treatment group (first-time offenders convicted with a recidivists who committed a crime that could be sentenced by 3 years or more after August 11), month-of-the-reference-crime fixed effects, group fixed effects (interaction between maximum sentences and a dummy equal to one if convicted with a recidivist), crime fixed effects and the complete set of control variables. The last rows of the table present: the mean of the outcome variables in the treatment group ("mean similar" is the mean of the outcome used in panel A, "mean different" is the mean of the outcome used in Panel B); the effect of the reform in proportion to those means (rows noted (a) and (b)); and the p-value of the difference between those two effects. Standard errors are clustered at the court level. Estimation uses seemingly unrelated estimation to correct for simultaneity in the estimations. Source: Author's calculations based on criminal records provided by the French Ministry of Justice. Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$*

## **Appendix A: additional information on the reform and its effects**

### ***1. Recidivism***

According to the French criminal code, offenders are considered as recidivists if they commit a crime “similar” to a crime they committed in the past 5 years. All violence, all property crimes, all drug related crime and all road related crimes are considered as similar. Offenders convicted for a crime different from all other crime in her criminal career is classified as “repeat offenders”.

Table A1 presents examples of this classification. Each cell indicates if a person who committed the crime mentioned in the beginning of the row and who previously committed the type of crime indicated in column’s header, is classified as a recidivist.

### ***2. Parliamentary process***

The law was the third bill promulgated after the election of a new National Assembly in 2007. Since the two previous bills were technical texts (modification of the budget and some international ratifications), the law was the first political bill passed during N. Sarkozy’s presidency.

The law passed under an accelerating procedure limiting the number of debates in the assembly. The precise timing is the following:

- May 6, 2007: N. Sarkozy elected
- June 13, 2007: bill in Senate
- July 5, 2007: voted by the Senate
- July 6, 2007: bill in National Assembly
- July 18, 2007: voted by the National Assembly
- July 26, 2007: final version adopted by both Senate and National Assembly
- August 9, 2007: supreme court decision validating the bill.
- August 11, 2007: beginning of the enforcement

### ***3. Media coverage of the law***

Table A2 illustrates the gap between the number of articles about the law and precise information about its scope. It represents how many articles in newspapers or TV-reports talked about the law between June and September 2007 and how many of them presented targeted crimes. I focus on the two 8PM news bulletins of TF1 and France 2, which had during my study period average respective audiences of 8 million (TF1) and 5 million (France 2) viewers per day (for 60 million inhabitants in France). *Le monde* and *Le Parisien/Aujourd'hui en France* had 359,000 and 534,000 readers, respectively, during my study period. *Le monde* is viewed as a reference newspaper in France. Articles are long (twice as long as articles published in *Le Parisien/ Aujourd'hui en France* in the sample used here) and give detailed analysis. *Le Parisien/Aujourd'hui en France* is viewed as a popular newspaper. Long analyses are less frequent than in *Le Monde*, and the law was usually mentioned in articles related to criminal facts or trial.

Only a small proportion (between 4% and 17%) of the information on mandatory sentencing contains the difference between the common and legal meaning of recidivism. The Minister of Justice, Rachida Dati, was interviewed in the four media mentioned above but never explained

such a difference. Even the expression "récidive légale" used in legal publications is not mentioned.

#### ***4. Effect of the reform on sentences***

Figure 2 and Table 2 present the evolution of sentences for first-time offenders, repeat offenders and recidivists. It shows the drastic change in sentence time for recidivists after the enforcement of the reform.

Table A3 and A4 present the same type of results in a more precise way. The sample size is restricted to the 3-month periods before and after the enforcement of the reform and the main restrictions hold (road-related crimes are excluded, crimes adjudicated in less than 6 months). Table A3 is similar to Table 2 but present detailed information by types of criminal records and maximum sentences. Each row provides details for a group characterized by criminal record: first-time offenders (top third of the table), repeat offenders (middle third) or recidivists (bottom third); and the maximum sentence defined in the criminal code: below 3 years, 3 years, 5 years, 7 years or 10 years. Columns 1 and 2 indicate the average prison time for crimes committed, before (Column 1) or after (Column 2) the reform. Column 3 indicates the difference in days and in proportion of the sentence before the enforcement. Columns 4 to 6 present the same information for probation sentences and columns 7 to 9 for suspended prison time. The reform massively increased both prison and probation sentences for recidivists. While increasing, suspended prison time remains short.

Table A4 is similar to table A3 except that it presents the evolutions of the *probabilities* to get prison, probation or suspended prison sentences. It indicates that the reform did not change those probabilities.

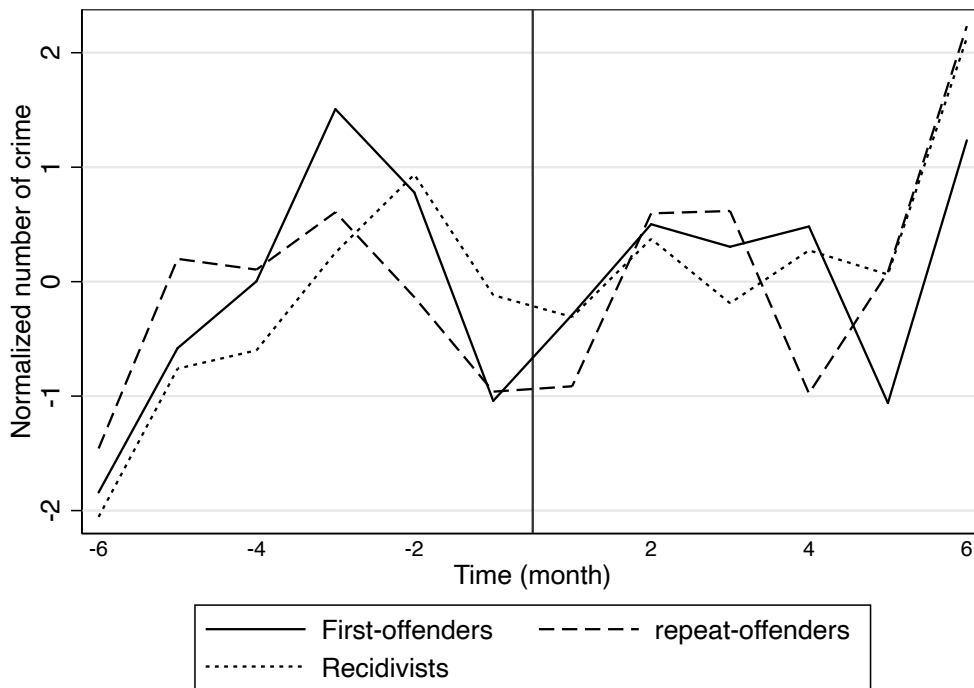


Figure A1: Average number of crimes by criminal history per month around the reform normalized at the group level (first offenders, repeat offenders, recidivists).

*The sample is restricted to crimes adjudicated less than 6 months after the crime. Road related crimes are excluded. Source: Author's calculations based on criminal records, provided by the French Ministry of Justice*

	Past crime:									
	Robbery	Sell on stolen good	Ingroup robbery	Fraud	Violent robbery	Violence on partner - temporary inability to work equal or below 8 days	Violence with weapon - no inability to work	Drug consumption	Drug possession	Undeclared work
Robbery	Recidivist	Recidivist	Recidivist	Recidivist	Recidivist	No	No	No	No	No
Sell on stolen good	Recidivist	Recidivist	Recidivist	Recidivist	Recidivist	No	No	No	No	No
Ingroup robbery	Recidivist	Recidivist	Recidivist	Recidivist	Recidivist	No	No	No	No	No
Fraud	Recidivist	Recidivist	Recidivist	Recidivist	Recidivist	No	No	No	No	No
Violent robbery	Recidivist	Recidivist	Recidivist	Recidivist	Recidivist	Recidivist	Recidivist	No	No	No
Violence on partner - temporary inability to work equal or below 8 days.	No	No	No	No	Recidivist	Recidivist	Recidivist	No	No	No
Violence with weapon - no inability to work	No	No	No	No	Recidivist	Recidivist	Recidivist	No	No	No
Drug consumption	No	No	No	No	No	No	No	Recidivist	Recidivist	No
Drug possession	No	No	No	No	No	No	No	Recidivist	Recidivist	No
Undeclared work	No	No	No	No	No	No	No	No	No	Recidivist

Table A1: Examples of crimes classified as recidivism depending on past crime.

Media	Format	Audience/ circulation per day	Report on the law	Report with clear definition of recidivism
TF1	TV	7 840 000	7	1
France 2	TV	4 140 000	6	1
Le parisien-Aujourd'hui en France	Newspaper	534 000	45	2
Le monde	Newspaper	359 000	37	2

Table A2: Media coverage of the law between June and September 2007.

Group			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			Prison (days)			Probation (days)			Suspended prison (days)		
Criminal Record	Max sent (year)	Targeted by the law	Before	After	Difference	Before	After	Difference	Before	After	Difference
First-offenders	All		26	25	-1 (-3%)	27	29	2 (7%)	41	43	2 (6%)
	<3	0	10	13	3 (26%)	15	17	1 (9%)	28	31	2 (9%)
	3	0	13	12	-1 (-7%)	28	27	-1 (-3%)	42	41	0 (-1%)
	5	0	21	16	-4 (-20%)	24	25	1 (3%)	41	44	3 (7%)
	7	0	39	44	5 (14%)	39	49	11 (27%)	51	59	7 (14%)
	10	0	119	108	-11 (-9%)	46	56	10 (22%)	56	65	9 (16%)
Repeat offenders (non recidivists)	All		62	69	7 (10%)	40	51	11 (28%)	13	14	0 (2%)
	<3	0	40	43	3 (7%)	28	32	4 (13%)	9	8	-1 (-9%)
	3	0	54	57	3 (5%)	43	49	6 (15%)	13	13	0 (1%)
	5	0	65	76	10 (16%)	37	51	14 (39%)	15	16	1 (10%)
	7	0	101	114	14 (14%)	52	76	24 (47%)	18	22	4 (23%)
	10	0	104	116	11 (11%)	56	80	24 (44%)	16	14	-2 (-10%)
Recidivists	All		151	248	97 (64%)	45	165	120 (267%)	2	4	2 (69%)
	<3	0	85	109	24 (28%)	37	74	37 (98%)	4	7	2 (55%)
	3	1	127	194	67 (53%)	48	107	59 (122%)	2	2	0 (32%)
	5	1	145	251	106 (73%)	38	173	135 (357%)	2	5	3 (149%)
	7	1	196	351	155 (79%)	43	251	208 (490%)	4	4	0 (3%)
	10	1	234	405	171 (73%)	70	291	221 (316%)	2	7	5 (267%)
	>=3	1	159	266	107 (67%)	46	177	131 (285%)	2	4	2 (71%)

Table A3: Effect of the law on sentence times by criminal record and maximum possible punishment.

Group	Criminal Record	Max sent (year)	Targeted by the law	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
				Prison (dummy)			Probation (dummy)			Suspended prison (dummy)		
				Before	After	Difference	Before	After	Difference	Before	After	Difference
First-offenders	All			.13	.13	0 (-1%)	.17	.17	0 (1%)	.44	.45	.01 (2%)
	<3	0		.11	.1	0 (-2%)	.13	.13	0 (0%)	.37	.39	.02 (5%)
	3	0		.09	.09	0 (-1%)	.2	.19	-.01 (-6%)	.49	.48	-.01 (-3%)
	5	0		.12	.11	-.01 (-9%)	.15	.14	0 (-1%)	.44	.47	.02 (5%)
	7	0		.22	.24	.02 (10%)	.2	.24	.04 (19%)	.41	.41	0 (0%)
	10	0		.29	.3	.01 (3%)	.21	.24	.02 (10%)	.41	.45	.05 (11%)
Repeat offenders (non recidivists)	All			.48	.45	-.02 (-5%)	.27	.29	.02 (8%)	.14	.14	0 (-3%)
	<3	0		.41	.39	-.02 (-5%)	.23	.23	0 (2%)	.12	.11	-.01 (-12%)
	3	0		.46	.42	-.03 (-7%)	.3	.32	.02 (7%)	.15	.15	0 (-2%)
	5	0		.47	.48	0 (1%)	.25	.27	.02 (10%)	.16	.16	0 (1%)
	7	0		.59	.53	-.05 (-9%)	.31	.37	.06 (18%)	.15	.16	.01 (4%)
	10	0		.6	.57	-.03 (-5%)	.31	.34	.03 (10%)	.12	.11	-.01 (-4%)
Recidivists	All			.81	.83	.02 (2%)	.26	.47	.21 (80%)	.02	.02	0 (-1%)
	<3	0		.65	.66	.01 (2%)	.24	.32	.08 (33%)	.04	.04	0 (-3%)
	3	1		.79	.81	.02 (2%)	.29	.45	.16 (56%)	.02	.02	0 (17%)
	5	1		.84	.83	0 (0%)	.23	.48	.25 (111%)	.02	.02	0 (-12%)
	7	1		.88	.91	.03 (4%)	.25	.53	.28 (112%)	.02	.02	0 (6%)
	10	1		.84	.9	.06 (7%)	.29	.54	.24 (84%)	.02	.01	-.01 (-29%)
	>=3	1		.83	.85	.02 (2%)	.26	.48	.22 (86%)	.02	.02	0 (-1%)

Table A4: Effect of the law on sentence types by criminal record and maximum possible punishment.



	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Number of crimes per group, month, and court							
	<i>Normalized at the group level</i>							
Outcome:	3 months before/after (May-Oct 2007)				6 months before/after (Feb 07-Jan 08)			
Period:	Recidivists; repeat				Recidivists; repeat			
Groups:	offenders; first	offenders	offenders	Any past	offenders; first	offenders	offenders	Any past
	offenders	offenders	offenders	crime; first	offenders	offenders	offenders	crime; first
				offenders				offenders
Post*committed	-0.00813	-0.0158	-0.0234		0.0187	0.0173	0.0159	
<i>similar</i> crime								
before	(0.0235)	(0.0203)	(0.0236)		(0.0162)	(0.0140)	(0.0161)	
Post*committed	0.0153				0.00282			
<i>different</i> crime								
before	(0.0235)				(0.0162)			
Post*committed				0.00757				0.00650
a crime before				(0.0181)				(0.0127)
Group fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month-of the								
crime fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Court fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,186	3,186	2,124	2,124	6,372	6,372	4,248	4,248

Table A5: effect of the reform on the number of crimes committed around the reform normalized at the group (first offenders, repeat offenders, recidivists) level.

*The sample contains one observation per court, month and group. Groups are: first-time offenders, offenders who already committed a crime similar to the one convicted and offenders who already committed a crime different from the one convicted in columns 1, 2, 5, 6 and 7; offenders who already committed a crime similar and offenders who already committed a crime different in columns 3 and 7; first-time offenders and offenders who already committed a crime (of any type) before in columns 4 and 8. Post is a dummy equal to one after the reform. Standard errors are clustered at the court level. Source: Author's calculations based on criminal records provided by the French Ministry of Justice.*

**Appendix B: Additional results on the effect of first-hand experience.**

Table B1 test for the homogeneity of the sample before and after the reform by running balancing tests. It presents the effect of the reform on state characteristics of the defendants using equations similar to equations 3 or 4 with state characteristics as outcomes. Socio-demographic characteristics are not significantly correlated with the treatment. More importantly, coefficients presented in Columns 4 and 5 indicate that there is no change in the number of charges or the number of convictions. This means that the reform did not affect the number of partial acquittals. The type of crime is only marginally affected and the proportion of offenders who attended their trial does not change significantly.

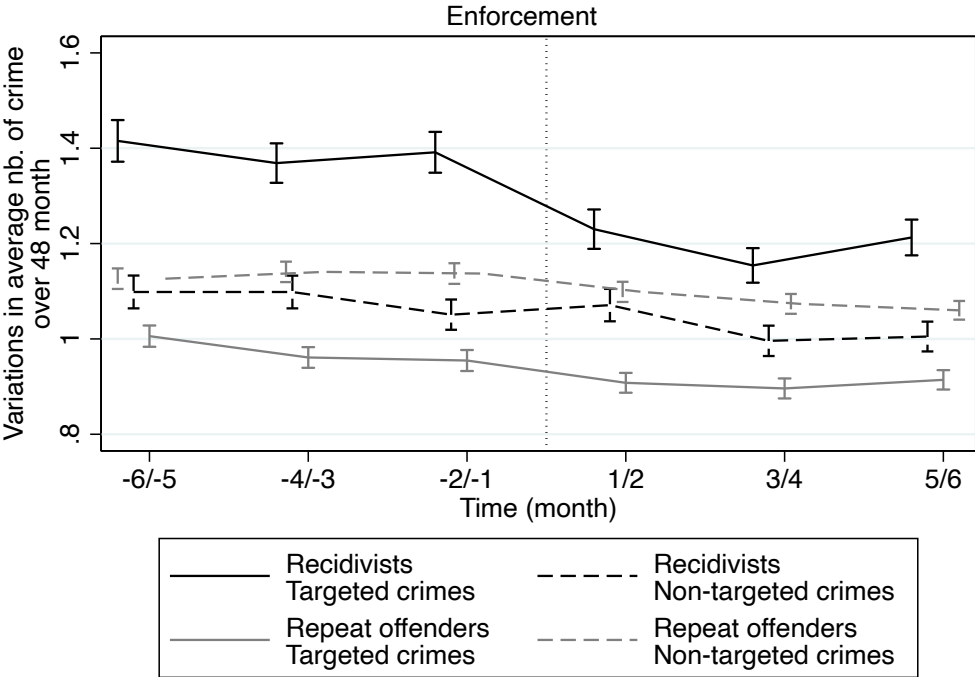


Figure B1: Average number of targeted (solid lines) and non-targeted (dash lines) crimes committed in the 4 years after release by recidivists (black lines) or repeat-offenders (grey lines) per date of crime around the reform.

*Note: Bars indicate confidence intervals at 10%. Source: Author’s calculations based on criminal records provided by the French Ministry of Justice.*

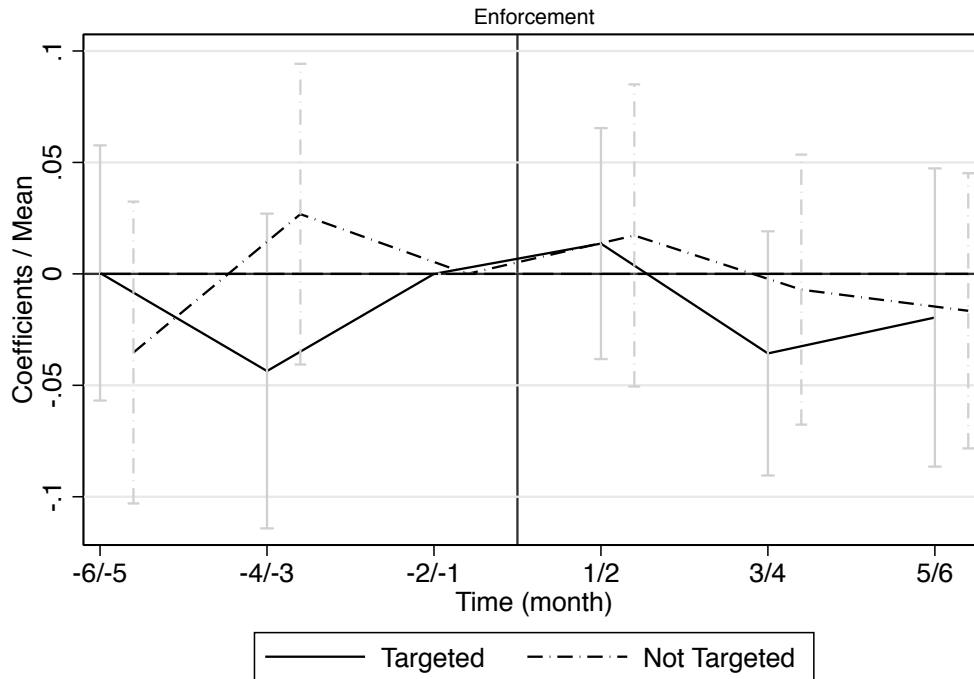


Figure B2: Effect of the reform on the number of new crimes targeted (solid line) or not targeted (dashed line) by the reform per date of the reference crime, placebo law enforced on 10 August 2006.

*The two lines correspond to the coefficients of two separate regressions. The outcomes are the number of crimes targeted or not targeted by the reform committed in the 4-year period after the reference trial or subsequent prison term. The x axis indicates the period when the reference crime was committed. The 2-months period before the enforcement of the reform is set as the reference period. Thus, each coefficient measures the evolution of the difference between offenders convicted as recidivists and those convicted as repeat offenders compared to the 2-months period before the enforcement of the reform. Each point presents a coefficient divided by the mean of the relevant behavior – number of crimes similar to or different from the reference crime – in the treatment group. Bars indicate confidence intervals at 10%. Standard errors are clustered at the court level. Source: Author’s calculations based on criminal records provided by the French Ministry of Justice.*

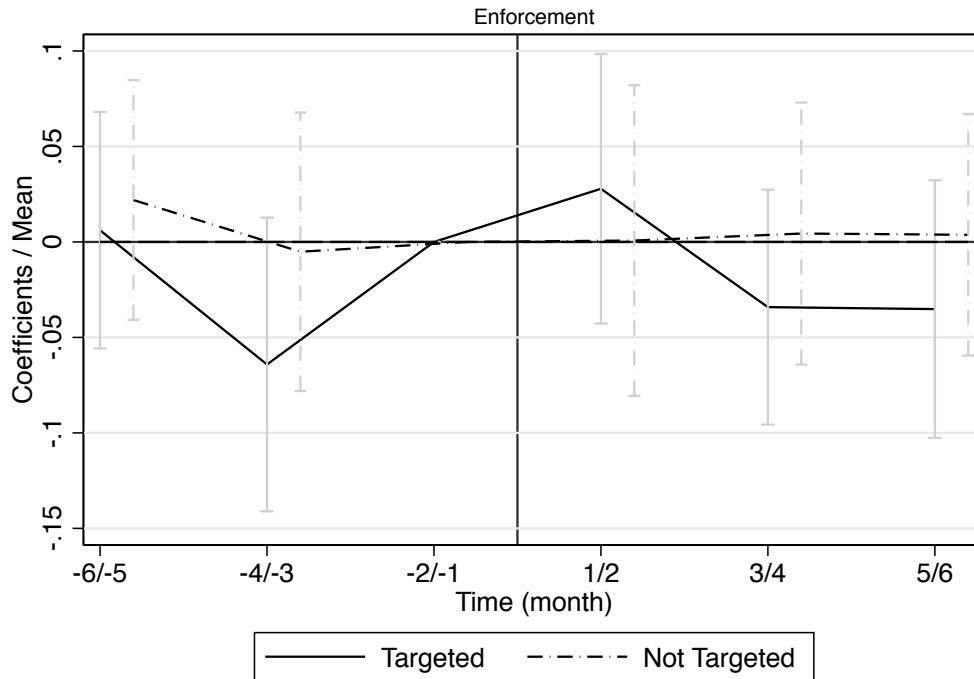


Figure B3: Effect of the reform on the number of new crimes targeted (solid line) or not targeted (dashed line) by the reform per date of the reference crime, placebo law enforced on 10 August 2008.

*The two lines correspond to the coefficients of two separate regressions. The outcomes are the number of crimes targeted or not targeted by the reform committed in the 4-year period after the reference trial or subsequent prison term. The x axis indicates the period when the reference crime was committed. The 2-months period before the enforcement of the reform is set as the reference period. Thus, each coefficient measures the evolution of the difference between offenders convicted as recidivists and those convicted as repeat offenders compared to the 2-months period before the enforcement of the reform. Each point presents a coefficient divided by the mean of the relevant behavior – number of crimes similar to or different from the reference crime – in the treatment group. Bars indicate confidence intervals at 10%. Standard errors are clustered at the court level. Source: Author’s calculations based on criminal records provided by the French Ministry of Justice.*

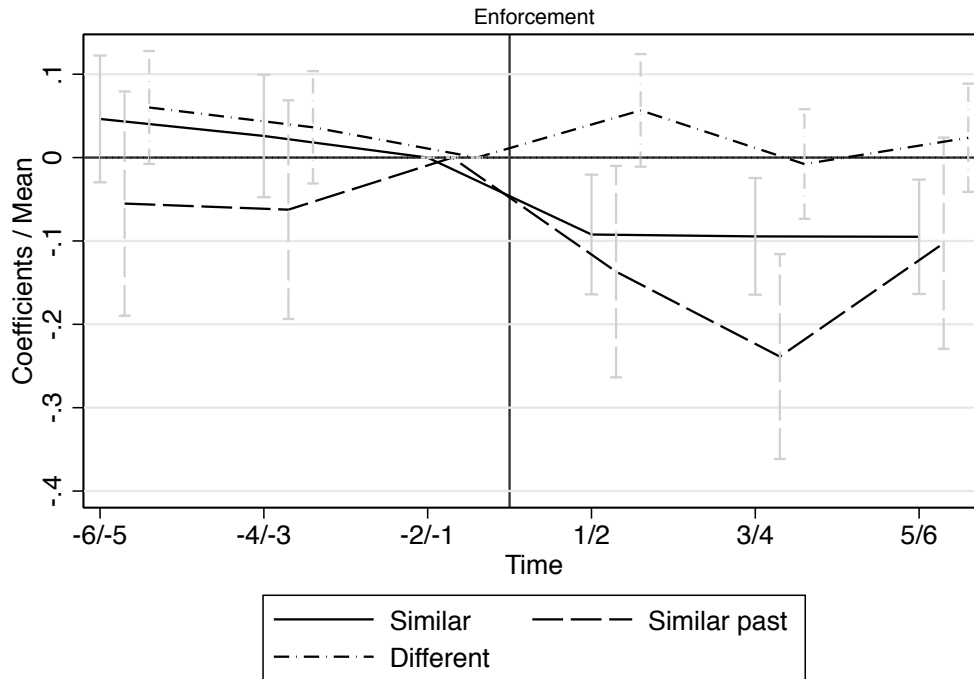


Figure B4: Effect of the reform on the number of new crime similar to the reference crime (solid line), different from the reference crime but similar to another crime in offender’s criminal career (dashed line) or different from all previous crimes (dotted/dashed line) per date of the reference crime.

*The three lines correspond to three separate regressions. The outcomes are the number of crimes of the relevant category committed in the 4-year period after the reference trial or subsequent prison term. The x axis indicates the period when the reference crime was committed. The 2-months period before the enforcement of the reform is set as the reference period. Thus, each coefficient measures the evolution of the difference between offenders convicted as recidivists and those convicted as repeat offenders compared to the 2-months period before the enforcement of the reform. Each point presents a coefficient divided by the mean of the relevant behavior – number of crimes similar to the reference crime, different from reference but similar to other past crime, different from all previous crimes – in the treatment group. Bars indicate confidence intervals at 10%. Standard errors are clustered at the court level. Source: Author’s calculations based on criminal records provided by the French Ministry of Justice.*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Woman	French	Age	Nb. Charge	Nb. Conviction	Property crimes	Violence	Present
Treat	0.00052 (0.0057)	0.013 (0.0094)	0.067 (0.24)	0.0079 (0.038)	-0.00025 (0.0039)	0.023** (0.010)	-0.0051 (0.0099)	-0.010 (0.0078)
Obs	33,672	33,672	33,672	33,672	33,672	33,672	33,672	33,672
Mean	0.050	0.83	28	1.79	1.03	0.46	0.25	0.80

Table B1: Balancing checks.

## Appendix C: additional information on the spread of information

### 1. Construction of the samples

Figure C1 present the way the three samples used in Table 6 are constructed. Sub-figure (a) illustrates the construction of the sample of co-defendant. Offenders of the sample are offenders B and B'. They were convicted for a crime committed in the 3-month (or 6-month) periods before and after the reform together with a recidivist (offenders A) or a repeat offender (offender A'). Offenders B are the treatment group while offender B' are the control group. Offenders A and A' are subsamples of the main sample used in section 6.

Sub-figure (b) illustrates the construction of the sample of former peers. Offenders of the sample are labelled D (treatment group) and D' (control group). Before April 2007, they were convicted together with a person who has been convicted as a recidivist (offenders C) or a repeat offender (offender C') for a crime committed in the three months periods before/after the reform. Offenders C and C' are subsamples of the main sample used in the paper.

Sub-figure (c) illustrates the construction of the sample of non-peer attending the same session. Offenders of the sample are labelled F (treatment group) and F' (control group). They are all first offenders. They were convicted during the same session as a person who has been convicted as a recidivist (offenders E) or a repeat offender (offender E') for a crime committed in the three months periods before/after the reform. The crime committed by offenders F (resp. F') were similar to the one committed by offenders E (resp. E').<sup>34</sup> Offenders E and E' are subsamples of the main sample used in the paper.

### 2. Identifying groups

Identification of co-defendants or former peers follows Philippe (2020). Individuals are defined as belonging to the same criminal group if they were both convicted of a crime that they committed together. This information is not directly registered in the dataset, as there is no ID per criminal case. In order to identify criminal partners, I consider people to be convicted of the same crime when they are judged in the same place (175 courts), on the same date, and for the same type of crime (172 in-group crimes) that was committed on the same day.

The validity of this strategy can be confirmed by another dataset from the Ministry of Justice.<sup>35</sup> For the period 2010–2016, this second dataset contains case IDs, which makes it possible to compare the strategy presented above to the “real groups” identified by the criminal justice system. This comparison indicates that the strategy captures 65.5% of the real groups with a false match rate of 8.5%. The remaining 34.5% of real groups that are not captured by this strategy are composed of offenders charged with different main crimes. They could not be identified in the main sample used in the paper.

I restrict the analysis to groups composed of four persons at maximum (98.65% of the identified groups). Among them, more than 80% are composed of two persons. It is important to note that

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<sup>34</sup> See section 2.1 and appendix A for the discussion of “similar”.

<sup>35</sup> At the end of the 2000s the Ministry of Justice started creating a new dataset containing detailed information on judicial responses to crimes. This dataset contains case IDs but not defendant IDs. It is partly available starting from 2010.

both members of each pair are convicted of the same main crime. Groups in which offenders are charged with different main crimes are excluded.<sup>36</sup>

The sample on co-defendants is restricted to non-recidivist(s) convicted with recidivist(s) or offender(s) convicted with repeat offender(s) having a longer criminal career.

The sample on former peers is composed of all offenders who have been convicted with a person of the main sample – recidivist or repeat offender who committed a crime in the 3-month periods before and after the reform – before April 2007.

Descriptive statistics of the three groups are presented in Table C1. Columns 1 and 2 describe co-defendants used in the first two columns of Table 6. Columns 3 and 4 describe former peers used in the columns 3 and 4 of Table 6. Columns 5 and 6 describe “non-peer attending the same session” used in the last two columns of Table 6. Offenders of the three samples are mainly French males. Their probabilities to commit a new crime during the observation period is around two times smaller than in the main sample (describe in Table 1). 32% of co-defendants commit a new crime, 23% of former peers and 29% of first offenders attending the same session.

### 3. *Additional results*

Table C2 presents the effect of the reform on state characteristics of the defendants of the three groups using equations similar to equations 3 or 4 with state characteristics as outcomes. Panel A, B and, C present balancing checks for co-defendants, former peers and, non-peer convicted at the same session respectively. The most important result in this table is that groups were stable over time and the effect of the reform on sentences were very limited.

Table C3 presents the same results for the offenders of the “main sample” who permit to identify offenders of the three groups: offenders A, A', C, C', E and E' in figure C1. This table shows that the composition of those group did not evolve around the reform and that recidivists of those groups were more severely sentenced after the reform. Then, it verifies the assumption that treated offenders in table 6 *observed, knew or were sentenced with* somebody who was more severely sentenced.

Lastly, Table C4 presents the effect of the reform on the number of new crimes among offenders of the “main sample” who permit to identify offenders of the three groups. Panel A and B present the results of separate regressions on the number of new crimes targeted (panel A) or non-targeted (panel B) by the reform. Results are similar to those observed in the general case and presented in table 4. Treated offenders – recidivists who committed the reference crime after the enforcement of the reform – commit significantly less crime identical to the reference crime (Panel A) but do not change their probability to commit a crime different from the reference crime (Panel B).

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<sup>36</sup> In particular, groups in which one person is convicted of “failure to assist a person in danger”, “assistance to commit a crime”, “non denunciation”, etc. are excluded. Cases in which the crimes are different (e.g., drug dealing vs. drug consumption, theft vs. fencing, procuring vs. prostitution) are also excluded.



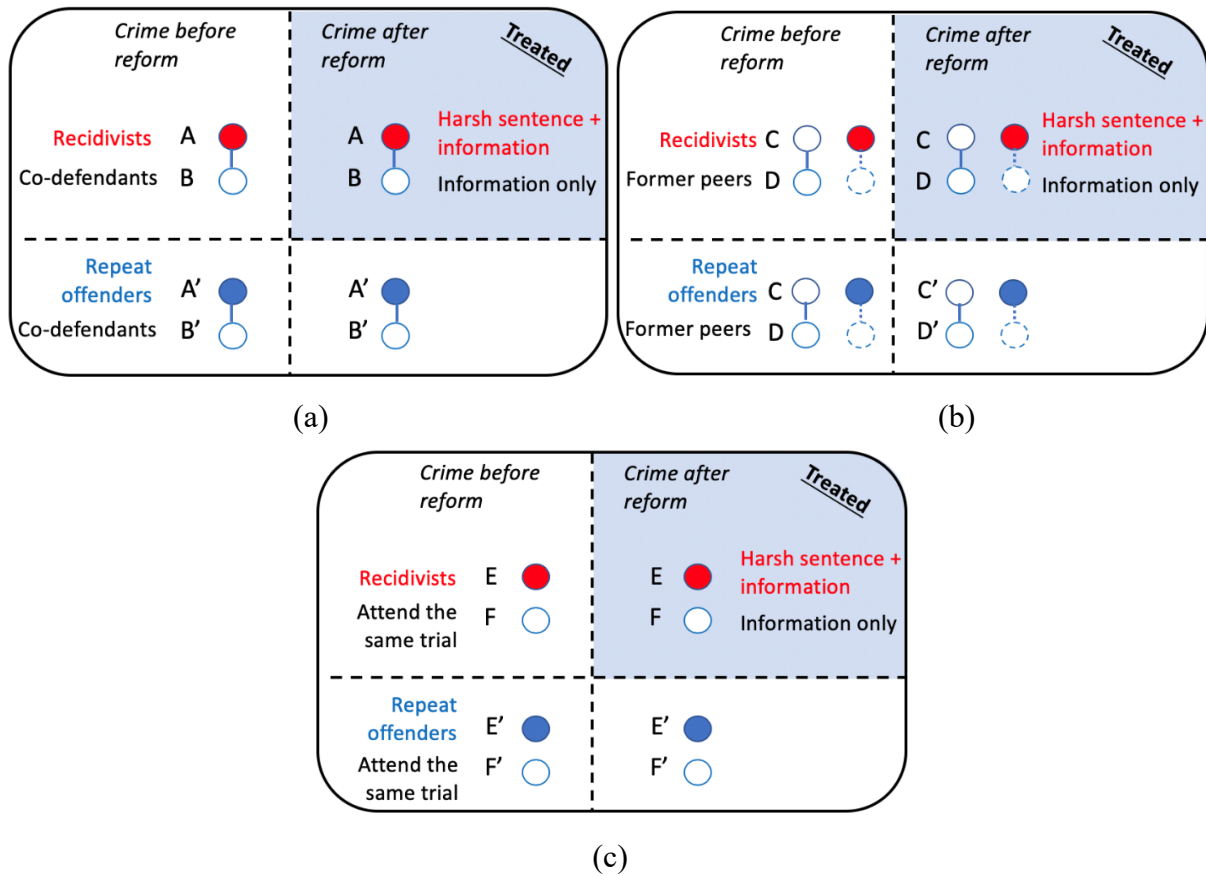


Figure C1: Composition of the sample on co-defendants (a), former peers (b), non-peer attending the same trial (c).

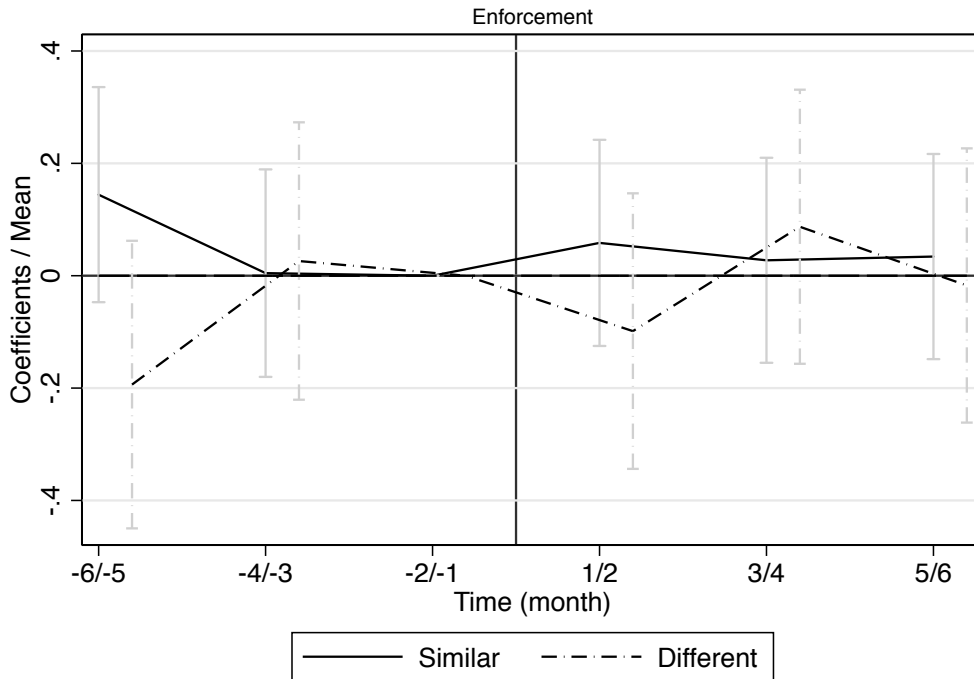


Figure C2: Effect of the reform on the number of new crimes targeted (solid line) or not targeted (dashed line) by the reform per date of the reference crime. Former peers.

*The two lines correspond to two separate regressions. The outcomes are the number of crimes targeted or not targeted by the reform committed in the 4-year period after the reference trial or subsequent prison term. The x axis indicates the period when the reference crime was committed. The 2-months period before the enforcement of the reform is set as the reference period. Thus, each coefficient measures the evolution of the difference between offenders convicted as recidivists and those convicted as repeat offenders compared to the 2-months period before the enforcement of the reform. Each point presents a coefficient divided by the mean of the relevant behavior – number of crimes similar to or different from the reference crime – in the treatment group. Bars indicate confidence intervals at 10%. Standard errors are clustered at the court level. Source: Author's calculations based on criminal records provided by the French Ministry of Justice.*

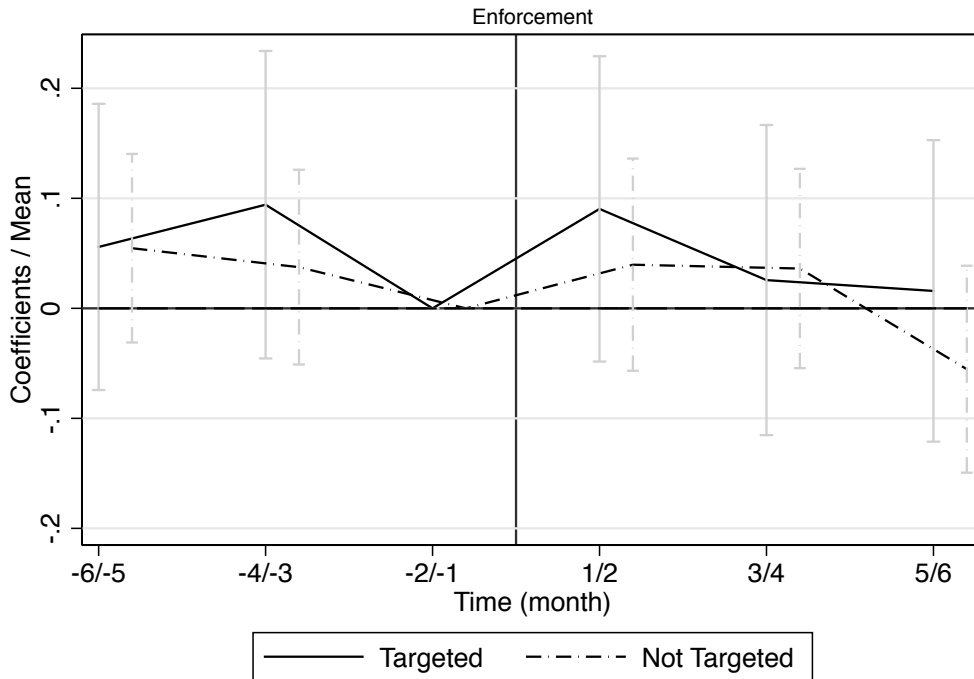


Figure C3: Effect of the reform on the number of new crimes targeted (solid line) or not targeted (dashed line) by the reform per date of the reference crime. Non-peers, same session.

*The two lines correspond to two separate regressions. The outcomes are the number of crimes targeted or not targeted by the reform committed in the 4-year period after the reference trial or subsequent prison term. The x axis indicates the period when the reference crime was committed. The 2-months period before the enforcement of the reform is set as the reference period. Thus, each coefficient measures the evolution of the difference between offenders convicted as recidivists and those convicted as repeat offenders compared to the 2-months period before the enforcement of the reform. Each point presents a coefficient divided by the mean of the relevant behavior – number of crimes similar to or different from the reference crime – in the treatment group. Bars indicate confidence intervals at 10%. Standard errors are clustered at the court level. Source: Author's calculations based on criminal records provided by the French Ministry of Justice.*

	Co-defendants		Former peers		Same session	
	Mean	Sd	Mean	Sd	Mean	Sd
Female	.1	.3	.09	.28	.09	.29
Age	25.68	8.54	26.22	8.58	30.6	11.24
French citizen	.81	.39	.8	.4	.8	.4
Crime type						
Property crimes	.52	.5			.36	.48
Violence	.17	.38			.33	.47
Other	.31	.46			.31	.46
Maximum prison term (criminal code)						
<3 years	.14	.35			.19	.39
≥3 years	.86	.35			.81	.39
Nb of charge	1.6	1.04			1.69	1.09
Nb of charge convicted	1.01	.11			1.02	.16
Present at trial	.81	.39			.79	.41
Prison (day)	40.19	96.83			35.68	101.57
Probation (day)	31.53	83.9			35.19	83.87
Suspended prison (day)	40.15	67.54			32.99	58.93
Prison (dummy)	.28	.45			.25	.43
Probation (dummy)	.19	.4			.23	.42
Suspended prison (dummy)	.39	.49			.37	.48
Nb new crime 48 months after trial/release						
At least one crime	.32	.47	.23	.42	.29	.45
At least one crime targeted	.11	.31	.12	.33	.11	.31
At least one crime not targeted	.21	.41	.13	.34	.18	.38
All crimes	1.33	1.86	.98	1.64	1.22	1.87
Targeted by the law	.48	1.06	.49	1.3	.49	1.15
Not targeted by the law	.84	1.33	.49	1.18	.73	1.26
N	4292		10901		8042	

Table C1: Descriptive statistics of the groups used in Table 6.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Woman	French	Age	Nb. Charge	Nb. Conviction	Property crimes	Violence	Present	Prison	Probation	Suspended prison
<b>Panel A: current peers (N=4,303)</b>											
traitement	0.021	0.011	-0.11	0.060	0.011	0.025	0.0046	-0.020	8.45	15.7**	8.26
	(0.020)	(0.029)	(0.56)	(0.057)	(0.0076)	(0.027)	(0.029)	(0.028)	(8.48)	(6.64)	(5.29)
<b>Panel B: former peers (N=10,901)</b>											
traitement	0.00093	-0.00094	0.23								
	(0.014)	(0.022)	(0.41)								
<b>Panel C: co-trial (N=8,031)</b>											
traitement	-0.0027	-0.0028	0.66	0.045	-0.0037	-0.0050	0.018	0.020	8.06*	14.6***	-0.13
	(0.013)	(0.019)	(0.50)	(0.046)	(0.0071)	(0.023)	(0.023)	(0.021)	(4.58)	(4.47)	(2.76)

Table C2: Balancing checks of the groups used in Table 6.

*Panel A, B and C present the results for co-defendants, former peers, and non-peer convicted at the same session as offenders of the main sample respectively. The dependent variable of each regression is specified in the column header. It is regressed on “Treat”, a dummy equal to one for offenders who knew (Panel A and B), or were sentenced with (Panel C) a recidivist who committed a crime that could be sentenced by 3 years or more after August 11, as well as month-of-the-reference-crime fixed effects, treatment dummies and controls. Only the coefficient of the former is presented in the table. Standard errors are clustered at the court level. Estimation uses seemingly unrelated estimation to correct for simultaneity in the estimations. Source: Author’s calculations based on criminal records provided by the French Ministry of Justice. Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Woman	French	Age	Nb. Charge	Nb. Conviction	Property crimes	Violence	Present	Prison	Probation	Suspended prison
<b>Panel A: co-defendants (N=3,743)</b>											
Treat	-0.013	0.029	-0.47	0.12	-0.0036	0.016	0.0065	-0.015	99.7***	168***	3.96
	(0.017)	(0.024)	(0.64)	(0.076)	(0.011)	(0.026)	(0.026)	(0.025)	(16.5)	(17.9)	(2.72)
<b>Panel B: former peers (N=8,505)</b>											
Treat	0.0042	0.013	-0.22	-0.014	0.0070	0.040**	-0.0100	-0.0094	106***	124***	1.08
	(0.0097)	(0.019)	(0.31)	(0.051)	(0.0066)	(0.016)	(0.015)	(0.017)	(10.5)	(10.0)	(1.52)
<b>Panel C: Non peer, same session (N=6,163)</b>											
Treat	-0.017	0.016	0.16	0.064	0.0021	0.019	-0.0044	-0.030	85.3***	108***	0.96
	(0.013)	(0.022)	(0.71)	(0.081)	(0.0079)	(0.023)	(0.021)	(0.020)	(8.69)	(12.8)	(2.27)

Table C3: Balancing checks of the offenders of the main sample who permit to identify the groups used in Table 6.

*The dependent variable of each regression is specified in the column header. It is regressed on “Treat”, a dummy equal to one for the treatment group (recidivists who committed a crime that could be sentenced by 3 years or more after August 11) as well as month-of-the-reference-crime fixed effects and group fixed effects (interaction between maximum sentences and a dummy equal to one if the reference crime is considered recidivism). Only the coefficient of the former is presented in the table. Standard errors are clustered at the court level. Estimation uses seemingly unrelated estimation to correct for simultaneity in the estimations. Source: Author’s calculations based on criminal records provided by the French Ministry of Justice. Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$*

	(1)	(2)	(3)	(4)	(5)	(6)
	Co-defendants		Past peer		Non peer same session	
	3 months	6 months	3 months	6 months	3 months	6 months
<b>Panel A: new crimes <i>targeted</i> by the reform</b>						
Treat	-0.17	-0.22***	-0.053	-0.13**	-0.17*	-0.15**
	(0.11)	(0.067)	(0.086)	(0.053)	(0.094)	(0.072)
<b>Panel B: new crimes <i>not targeted</i> by the reform</b>						
Treat	-0.0046	0.013	0.074	0.0085	-0.0059	-0.042
	(0.10)	(0.066)	(0.085)	(0.063)	(0.074)	(0.057)
Observations	3,743	7,578	8,055	15,867	6,163	11,738
Mean targeted	1.06	1.07	1.23	1.20	1.30	1.26
Mean not targeted	1.04	1.04	1.11	1.11	1	0.99
<b>(a) Treat/Mean Targeted</b>	<b>-0.16</b>	<b>-0.20***</b>	<b>-0.043</b>	<b>-0.11**</b>	<b>-0.13*</b>	<b>-0.12**</b>
<b>(b) Treat/Mean not Targeted</b>	<b>-0.0044</b>	<b>0.013</b>	<b>0.066</b>	<b>0.0076</b>	<b>-0.0059</b>	<b>-0.043</b>
Pval (a)=(b)	0.25	0.011	0.16	0.044	0.16	0.26

Table C4: Effect of the reform on the number of new crimes targeted (Panel A) or not targeted (Panel B) by the reform, among repeat offenders or recidivists who have a co-defendant (Columns 1 and 2), have a former peer (Columns 3 and 4) or are convicted during the same session as a first offender committing a similar crime 5columns 5 and 6).

*The sample is restricted to offenders who committed the reference crime in the 3-month periods (resp. 6-month in columns 2, 4 and 6) before and after August 11, 2007 as recidivist or repeat offenders. Each Panel represent a separate set of regressions with different dependent variables: the number of new crimes targeted by the reform committed in the 4-year period after the reference trial or subsequent prison term in Panel A; the number of new crimes not targeted by the reform committed in the 4-year period after the reference trial or subsequent prison term in Panel B. Outcomes are regressed on “Treat”, a dummy equal to one for the treatment group (recidivists who committed a crime that could be sentenced by 3 years or more after August 11), month-of-the-reference-crime fixed effects, group fixed effects (interaction between maximum sentences and a dummy equal to one if the reference crime is considered recidivism), crime fixed effects and controls. The last rows of the table present: the mean of the outcome variables in the treatment group (“mean similar” is the mean of the outcome used in panel A, “mean different” is the mean of the outcome used in Panel B); the effect of the reform in proportion to those means (rows noted (a) and (b)); and the p-value of the difference between those two effects. Standard errors are clustered at the court level. Estimation uses seemingly unrelated estimation to correct for simultaneity in the estimations. Source: Author’s calculations based on criminal records provided by the French Ministry of Justice. Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$*