# Crime Deterrence: Evidence From the London 2011 Riots

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Abstract

Significant riots occurred in London in August 2011. The riots took place in highly localized geographical areas, with crime going up hugely in the affected sub-wards. The criminal justice response was to make sentencing for rioters much more severe. We show a significant drop in riot crimes across London in the six months after the riots, consistent with a deterrence effect from the tougher sentencing. Moreover, we find that non-riot crimes actually went in the opposite direction, suggesting a response from criminals who look to have substituted away from the types of crimes that received tougher sentences. We find little evidence that spatial displacement or extra police presence on the streets of London in the wake of the riots accounts for these patterns of change. More evidence of general deterrence comes from the observation that crime also fell in the post-riot aftermath in areas where rioting did not take place.

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## 1. Introduction

A fundamental question in economics of crime research and policy is whether tougher sentencing deters crime. In various guises, the question has been around a long time, with the notion in the economics of crime literature being that tougher sentences, and maybe sending more people to jail or prison, have scope to deter crime by individuals who would, in the presence of weaker sanctions, engage in crime.[1]

However, persuasive empirical evidence on the question is hard to find. This is, at least in part, because tougher sentencing does not usually arise randomly but occurs in response to crime increases that develop over time. For example, if criminal behaviour has been persistently rising over time and reaches a level that the criminal authorities deem to be too high then sentencing may get tougher. Evaluating the possible deterrence effects that may ensue then becomes difficult, because the sentencing change was determined by the prior trend in crime.

In this paper, we take a different route to study this question. In August 2011, London experienced some of the worst riots in its history. After these riots, large numbers of rioters were convicted and given much harsher sentences than for people convicted of the same kinds of crimes before the riots occurred. However, unlike the example given in the previous paragraph, the riot period was very short and mostly opportunist in nature. As we will show below, the riots occurred in "hot spots" that were not experiencing differential rises in crime relative to non-riot areas prior to the riots happening. The subsequent harsh sentencing that ensued was not anticipated at the time and thus we think offers a credible setting to look for deterrence effects on crime that may have ensued in the post-riot time period.

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[1]The idea that severity of punishment could have a deterrence effect on crime dates back in written work at least as far as Beccaria's (1764) treatise. Of course, it is also incorporated in the Becker (1968) framework on the economics of crime (see also Freeman's, 1999, review).

We study possible deterrence effects by first validating that there actually was tougher sentencing of individuals who participated in the riots. To do so, we examine aggregate statistics from the Ministry of Justice, but also use a unique administrative data source on the sentencing of all rioters as compared to sentencing of individuals convicted of the same crimes but in a non-riot context. We demonstrate that there was a statistically significant and empirically substantial increase in sentencing severity for those convicted as a consequence of the riots.

Thus we next go on to consider possible deterrence of crime that could have occurred in response to this more severe sentencing. We analyse both whether there is evidence of a deterrence effect on crime, possibly caused by harsher punishments, and whether there is evidence of any crime displacement across different dimensions (functional and spatial, as defined below). We find that the riots were highly localized and these localized "hot spots" were spread throughout the city. Moreover, the riots significantly increased some crime rates and not others. In particular, in the riot sub-wards, burglaries, criminal damage and violence against a person (which we term riot crimes) went up by 57 percent in the riot month (August 2011). Other types of crimes were unaffected in all locations. Afterwards (up to 6 months after the riots) there was a significant decrease in the overall crime rate in London.

However, and interestingly for modeling crime behaviour, there was a change in the composition of crimes being committed. The overall crime fall in the post-riot period was characterized by a significant fall in riot crimes. But non-riot crimes actually went up. We view this as offering some evidence that criminals switched away from engaging in the kinds of riot crimes where sentencing had become much harsher, and switched towards other crimes where this did not happen. This can be interpreted as evidence of a deterrence effect on riot crimes and a simultaneous functional displacement of crime. Over and above this, we

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find little evidence that spatial displacement or extra police presence on the streets of London in the wake of the riots accounts for these patterns of change. Finally, we show that crime fell in areas far away from those directly affected by the riots, suggesting that incapacitation effects cannot be the sole explanation of our results.

To the best of our knowledge, we are the first to quantitatively assess the London riots, in terms of not only their immediate effect on crime, but also on possible medium-term deterrence and displacement. In doing so, we contribute to both the literature on crime deterrence and displacement, and the (small) literature on the economics of riots, by using the riots (and the criminal justice response to them) as the event potentially producing a change in the incentives of potential and actual offenders.

Previous literature on deterrence focuses mainly on individual deterrence. For example, Winik and Green (2010) study whether criminals charged with drug-related offences who are assigned randomly to more punitive judges have different recidivism probabilities than defendants who are assigned to relatively lenient judges. They tracked defendants using court records across a four year period after the disposition of their cases and find no significant individual deterrence effect of incarceration and supervision for the offences studied.

Probably more relevant to our analysis are the group of papers that analyse deterrence in the context of sentencing reforms. California's repeat-offenders enhancement reform (usually known as "three strikes law") has been widely studied with mixed findings. For example, Kessler and Levitt (1998) show a 10 percent drop of specific crimes subject to the enhancement while Marvell and Moody (2001) find no significant positive effect either through incapacitation or through deterrence, though they do report an increase in homicides. Shepperd (2002) uses county-level panel data and shows that all strikeable offenses are

reduced by means of the law, and some non-strikeable offences increased, suggesting substitution across crime types. In addition to these, Helland and Tabarrok (2007) use a non-parametric model with offenders data and show that felony arrest rates among criminals with two strikes decreased by 17-20 percent.[2] Finally, Drago et al. (2009) study another type of sentencing reform: in 2006 a mass pardon bill released 22,000 inmates from Italian prisons (40 percent of the prison population). If the released inmates commit another crime they will serve the residual suspended sentence (1 to 36 months) in addition to the new sentence. The authors study post-release offenders' criminal records and find a positive individual deterrence effect of the increased expected sanction: an additional month in the expected sentence for future crimes reduces the probability of recidivism by 0.16 percentage points in the seven months post-release.

Previous empirical research on the economics of riots has tended to focus on either factors that can help explain the occurrence of rioting or on the longer-term consequences of riots. Along the first dimension, DiPasquale and Gleaser (1998) examine the causes of riots, presenting evidence from the 1960s US race riots and the 1992 Los Angeles riots. They suggest that the opportunity cost of time and the potential penalties help explain such events, as does the community structure. Ethnic diversity is found to be a significant determinant while poverty is not.

The second dimension in riots research is the focus of a series of papers by Collins and Margo (2004, 2007) who consider the long-term consequences of the 1960s race riots. Their work points to negative effects on blacks' income and employment that were economically significant over a decade after the riots, and to long-term falls in the value of black-owned housing in the areas affected by the riots. What is lacking in the evidence base –

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[2] The result is obtained when comparing offenders with two strikeable offenses with those released with two trials for strikeable offenses but only one conviction for a strikeable offense

and thus the contribution of this paper to the riots literature – is an analysis of the more immediate response of crime to riots. Indeed, and perhaps surprisingly, more generally there has been very little serious work on the impact of riots on subsequent crime patterns.

The remainder of the paper is structured as follows. Section 2 provides a brief overview of the events of August 2011. In Section 3 we use detailed data on individual offenders to demonstrate that the sentences given to rioters were significantly higher than for similar offences committed in the period immediately prior to the riots. Having demonstrated this, we then move on to describe our analysis of the effect of the riots on crime in the riot period and in subsequent months in Section 4. We study different types of possible crime displacement in Section 5. Section 6 presents some discussion and interpretation of the main results. Finally, Section 7 concludes.


## 2. The August 2011 Riots

The riots developed over the course of a week as a consequence of the fatal shooting of Mark Duggan on Thursday 4th August, 2011, by police officers in Tottenham Hale, London that precipitated public protest in the area. Figure 1 shows the place where the conflict started and the spread of the riots over the following days. On Saturday 6th August, around 120 supporters of Mr. Duggan marched from the Broadwater Farm estate to Tottenham police station. What started as a peaceful protest turned into a violent disorder. By Sunday 7th August, the riots had spread to 12 areas within 5 of the 32 London boroughs. By Monday 8th August, the riots had spread nationally and eventually 66 local authority areas across the country experienced rioting. Looting, violence and disorder proliferated across 22 of London's 32 boroughs. The riots across England lasted for five days in total, until 10th

August. In London, the main incidents took place in the first four days (from the 6th to the 9th August) and then order was restored (LSE and The Guardian, 2012 and MPS, 2012).

The events of August 2011 were unprecedented in the capital's history. The speed and scale of the escalation significantly and repeatedly challenged police resources. Violence against the police, arson and looting became widespread. Between the 6th and 10th August 2011, it has been estimated that 13,000-15,000 people were actively involved in the riots (Singh et al., 2012), though it is possible not all of them committed criminal offences. According to the Home Office (HO, 2011), 5,112 crimes were committed during the riots (68 percent in London), including five fatalities, 1,860 incidents of arson and criminal damage, 1,649 burglaries, 141 incidents of disorder and 366 incidents of violence against the person. Half of the crimes committed were acquisitive offences. Across the country, 2,584 commercial premises were attacked and 231 residential properties were damaged (HO, 2011). The material cost of the riots has been estimated at more than half a billion pounds (Singh et al., 2012).

Regarding the police reaction, in the first days there were too few officers to cope with the magnitude of the rapidly moving crowds, and their response was broadly passive. As this proved insufficient, the police switched to a "targeted arrests" tactic, and intervened with numbers of officers to directly "extract" those engaging in criminal activities (MPS, 2012). Rising deployment of police officers was central to stopping the unrest: in London on the first day of disorder an additional 3,480 officers were deployed, on the second 4,275, and on the third 6,000. The riots finally ended in London on the fourth day, when a massive police deployment of 16,000 officers took place. [3]

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[3] Metropolitan Police data suggest that on average around 16,000 police officers are on duty during the day (6am – 6pm) and 6,000 in the evening (6pm – 12am). So by the fourth day in London, resources were at least twice the usual amount and considerably more in the evenings (when most of the criminal events occurred). See FOI disclosure: http://www.met.police.uk/foi/pdfs/disclosure_2012/november_2012/2012020001643.pdf.

The causes that triggered the August riots were multiple. The reports on the unrests[4] point to the discontent of a part of society with the police, especially with their perceived-as-discretional stop and search practices[5], the high proportion of youngsters that are neither in work or education[6], and also of social discontent and deprivation.[7] Although many deprived areas did not experience rioting, of the 66 local authority areas that experienced riots, 30 were in the top quartile of most deprived areas in England (Singh et al., 2012).

*The Criminal Justice Response*

A key, distinct feature of these riots was the speedy and harsh sentencing of those involved. It is strongly believed that the visibility of the criminal justice system in action reduced copycat disorder and attrition rates (MPS, 2012). Operation Withern was launched to arrest all the people that committed crimes during the disorder. In the first week of the disorder period, 1,836 suspects were arrested by the Metropolitan Police Service (MPS) and 1,009 of them were charged. Of those charged, 82 percent (830) had their first appearance in court in that same first week. Of those attending court, 71 defendants pleaded guilty to offences and were therefore also sentenced in that same first week (MPS, 2012). By November 2011 (three months after the riots), a total of 3,003 people had been arrested of which 1,931 had resulted in charges or cautions. By September 2012 (a year after the riots), Operation Withern had arrested over 4,600 individuals in connection with the riots of which around 3,000 have been cautioned, charged or summonsed to court.

It was not only the speed, but also the severity of the sanctions, that was a distinguishing feature of the way the criminal justice system reacted. There were no official

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[4] See, for example, LSE and The Guardian (2012) and Singh et al. (2012).

[5] This concern was widely felt by young Black and Asian men who felt it was not always carried out with appropriate respect (Singh et al., 2012, LSE and The Guardian, 2012)

[6] A majority of those youths participating were considered "at risk" of offending by local area Youth Offending Teams (Singh et al., 2012).

[7] 70 percent of those brought before the courts were living in the 30 percent most deprived postcodes in the country (LSE and The Guardian, 2012).

guidelines for the sentencing of rioters. However, the remarks of Judges Gilbart and Atherton from Manchester that highlighted that the context of riot "*hugely aggravates the seriousness of each individual offence*", seems to have been taken as a guideline.[8] Mr. Ikram, a judge at Camberwell Green magistrates' court, made it clear that "*the deterrent sentences sent a very clear signal about the consequences of this sort of offending.*"

Within the riots, there were two main types of offences committed: violent and dishonest. The violent offences were very severe, with acts of violence against police officers and other people (producing 5 fatalities) and damage and arson of shops (mainly) and residential buildings. The dishonest offences included a wide range of circumstances of looting, theft, burglaries and handling of stolen goods. These offences were very severely punished. There are many illustrative cases of the tough sentencing that, according to the Judges, were used as a deterrent for further crimes. For example, Nicholas Robinson (aged 23) was sentenced by a District Judge, to 6 months imprisonment for stealing bottles of water (worth £3.50) from a looted shop in Brixton, while Danielle Corns (19) was sentenced to 10 months for stealing two left-footed trainers in Wolverhampton and leaving them outside the shop. Social media played an important role in the riots and the use of it to advertise riot events was harshly punished as well. Two 20-year olds were sentenced to 4 years imprisonment for creating a Facebook riot event in Northwich (which didn't occur and to which no one attended). However, thus far, 7 out of 10 sentences have been upheld by the Court of Appeal, confirming the increased severity of sentences handed out to the rioters.

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[8] Some Judges claimed to have relied upon cases from the 2001 Bradford riots to help them with sentencing for riot-related affray, violent disorder and theft. However, it seems that such a degree of severity was unprecedented.

## 3. Evidence on Sentencing Severity

Our empirical strategy relies on there being a significant increase in the severity of sentencing for those involved in the riots. The discussion in the previous section clearly suggests this was the case, as does the extensive media coverage that followed the riots. Furthermore, aggregate statistics from the Ministry of Justice seem to confirm this impression. Table 1 presents these data. The upper panel of the Table shows the immediate custody rate, namely the proportion of individuals sentenced to jail on appearance in court accused for riot offences in the 6th to 9th August 2011 time period in magistrates and crown courts relative to individuals sentenced for similar crimes in 2010. The lower panel shows the average custodial sentence length in months. The data is on all the cases that appeared before court as of the 10th of August 2012.

The numbers in Table 1 paint a picture of tougher sentencing taking place in the courts system for individuals found guilty of criminal offences related to the riots. Both the immediate custody rate and the average custodial sentence length (ACSL) rose sharply. For all crimes, the immediate custody rate tripled from 12 to 36 percent in magistrates' courts and rose from 33 to 81 percent in crown courts. Similarly, the ACSL went from 2.5 to 6.6 months in magistrates' courts and from 11.3 to 19.6 months in crown courts. This difference was mainly due to the ACSL given for violent disorder, for burglaries and theft and handling. These are huge increases in sentencing severity induced by the riots of August 2011.

While this evidence is certainly suggestive of a substantial increase in sentencing severity it suffers from the fact that the distribution of rioter and non-rioter criminals is likely to differ across various characteristics, which makes a comparison of simple means problematic in identifying a significant effect. To address this, we have obtained access to a unique set of data from the Ministry of Justice. This set of data was provided explicitly to

address this question and contains information on all individuals appearing in court in London as a result of the riots until a year after the riots. It contains a set of demographic characteristics for each individual, together with information on the crime with which the individual is charged and the ultimate sentence handed down. In addition, a stratified random sample of pre-riot convicted individuals is included. In total we have 4,500 cases, of which one-half are riot offenders.[9]

This data allows us to directly estimate the effect of the riots on sentencing by estimating the following regression:

$$s_i^T = \alpha + \beta_1 R_i + \sum_j \beta_j X_{ji} + \varepsilon_i \tag{1}$$

where $s_i^T$ is the sanction given to individual i sentenced for crime type T (T = total crime, property crimes or violent crimes), $R_i$ is a dummy variable equal to one if the individual was a rioter and zero otherwise, the $X_{ji}$'s denote a set of individual characteristics (age, offence type, ethnicity and gender) and $\varepsilon_i$ is an error term.

Table 2 shows the results of the estimation of (1) for the custody rate (a linear probability model) in the upper panel and for sentence length in the lower panel. The first two columns show the mean for rioters and non-rioters and then the estimated effect of having offended during the riots on the two outcomes of interest. Table 2 shows different variants of (1), which give very similar results, presenting the difference in means with and without individual controls and propensity score matching. The probability of being sentenced to immediate custody is 0.31 points higher for rioters: more than doubling from 0.247 for non-rioters to 0.550 for rioters (for violent crimes it more than triples). The difference in the ACSL is 1.6 months longer for rioters (13 percent longer than the 13 months

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[9] Of the 4,500 cases we then use 3,500 which are the cases that are finished and with comparable offences for rioters and non-rioters (burglary, criminal damage, violent disorder, theft and robbery). We restrict the sample to those sentenced to less than 60 months in prison (over 99 percent of the sample).

received by their matched offenders), which is statistically significant across all the specifications. Similar patterns are found for property and violent crimes. It is clear that rioters received significantly tougher punishments in terms of immediate custody rates and sentence length, even after controlling for individual and offence characteristics that are potentially correlated with sentencing decisions.

## 4. Evidence on Crime

Having demonstrated that the change in sentencing following the riots was sizable enough to plausibly generate an enhanced deterrence effect, we now turn to direct evidence on crime. Our main crime data are administrative data from the MPS.[10] The data contain monthly counts of notifiable offences by major crime categories for the period August 2009 to February 2012 (i.e. from two years before to six months after the riots). The categories include: burglary, criminal damage, violence against a person, theft and handling, fraud and forgery, robbery, drugs and other offences. This information is broken down by sub-wards, formally called Lower Super Output Areas.[11] To obtain crime rates we divide crime counts by the population of each sub-ward. We use LSOA population estimates for mid-2010 published by the Office for National Statistics (ONS). We also have data on total police officers' hours on patrol, which we have at the Borough level from the MPS.

To determine the areas where the riots occurred (which we refer to as "treated" areas), we make use of the live coverage from *The Guardian*. During the riots, the newspaper live

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[10] We obtained the data via Freedom of Information Act Requests 2012050003218, 2012010004126 and 2012070002414.

[11] A Lower Super Output Area (LSOA) is a pre-defined area designed to have a minimum population of 1,000 and a mean population of 1,500 in 2001. There are 34,378 LSOAs in England and Wales. In London there are 4,765 LSOAs, which are described as sub-wards. We use 4,760 sub-wards, excluding the 5 ones of the City of London due to its scant population and no riot incident being registered there.

blog detailed every event of unrest. After the riots, a list of all such events was compiled.[12] We analysed the list of 121 reported events occurring in London, which contained information about their precise location (place and address), type of incident, date and time. We looked for the coordinates of each event and plotted them in a map of London. By overlaying the sub-ward boundaries from the ONS to the map of incidents, we identify those sub-wards affected by the riots. We analysed thoroughly each incident and its location and expanded the list of events to a total of 148 as some events referred to unrest happening on the border of more than one sub-wards or in a whole street – not at a precise geographical coordinate - sometimes located partly in two different sub-wards.

Figure 2 shows the 148 riot-related incidents in a sub-ward level map. One salient characteristic of the riots is that the outbreaks took place in very localized areas. Only 88 of 4,770 sub-wards were affected. However, another stylized fact is that the rapidly moving crowds caused incidents to spread throughout London affecting 22 of the 32 boroughs (see the maps in Figure 1). Also, in Figure 2 the sub-ward level choropleth map shows that riot-related incidents tend to occur in sub-wards where high crime rates were reported in the preceding two years.

*Descriptive Analysis*

The main objective of this second stage is to analyze the effects of the riots on crime, both during the month when the social unrest took place (August 2011) and in the aftermath. The idea underlying this analysis is that there are some areas where the riots occurred that are "treated" and all the rest of the sub-wards in London are "non-treated" and will be used as a "control" group of sub-wards where criminal activity did not alter. We define the treatment

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[12] http://www.guardian.co.uk/news/datablog/2011/aug/09/uk-riots-incident-listed-mapped#data. Retrieved in September 2012.

group as the 88 sub-wards with reported riot related incidents (see Figure 3).[13] Figure 4 shows the monthly crime trend in riot and non-riot sub-wards. Crime rates are higher in riot sub-wards and increase in these sub-wards in August 2011.

Table 3 shows average total crime rates in the 88 riot sub-wards and in the 4,672 non-riot sub-wards in the two years before the riots (more precisely from August 2009 to July 2011) and in the riot month of August 2011. In the riot sub-wards total crime jumped very markedly from 18.982 crimes per 1,000 population to 22.727 crimes per 1,000 population. In the non-riot sub-wards total crime was lower at 8.380 crimes per 1,000 population in the two years before and stayed much the same at 8.271 crimes per 1,000 population in August 2011.

Thus, the mean crime rate went up by a considerable 3.745 crimes per 1,000 population in the riot sub-wards and fell by 0.109 crimes per 1,000 population in the control group. The Table shows the difference-in-difference this implies, of 3.854 crimes per 1,000 population, which is strongly significant. When expressed in proportionate terms (i.e. the difference-in-difference in logs), total crime rose by 19.3 percent in the riot month in the riot sub-wards relative to the non-riot sub-wards.

The location of the riots was not random. Among possible determining factors are the ethnic composition of the neighbourhoods, the location of commercial streets with electronics and sports shops (among the most looted), the crime rate of the neighbourhood, the existence of gangs, etc. Our interest is not in disentangling the selection criteria for what became a riot sub-ward.[14] We take the riots and their location as given, although we need to show that crime trends before the riots were no different in riot sub-wards to non-riot sub-wards, as differential pre-riot trends would cause difficulties with our analysis for the usual reasons. To assess the validity of this, the final column of Table 3 confirms that we cannot reject equality

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[13]We examine the validity of this assumption when we analyse displacement as described below.

[14]See Davies et al. (2013) for a mathematical spatial model of the London Riots, and Baundains et al. (2013) for target choice explanations.

of pre-riot trends in crime between riot sub-wards and non-riot sub-wards – either in levels (with an estimated coefficient of 0.028 and an associated standard error of 0.025)) or in logs (0.001 (0.001)), in line with the patterns of pre-riot trends shown in Figure 4.

*Statistical Analysis*

To formally quantify the effect of the riots on crime during and after the riot period we make use of the following panel equation:

$$C_{st}^{T} = a + \beta_1.(R_S.R_t) + \beta_2.(R_S.PR_t) + \beta_3.(PR_t) + \gamma_s + \delta_t + \mu_{st} \tag{2}$$

where the dependent variable $C_{st}^{T}$ is the crime rate of the offence of type T (burglary, criminal damage, etc.), in sub-ward *s* and period (month-year) t. The main parameter of interest is $\beta_1$ which captures the effect of the riots on crime in riot sub-wards, by multiplying a dummy variable that equals 1 if the sub-ward had riots (treated) in August 2011 ($R_s$ is a binary variable equal to 1 for riot sub-wards and zero otherwise and $R_t$ is a binary variable that equals 1 in August 2011 and zero in all other months). A second parameter of interest is $\beta_2$ which represents the effect of the riots on post-riot periods ($PR_t$) locally – in the treated sub-wards $R_S$. Finally, $\beta_3$ captures the effect of riots on post-riot periods across all wards (in terms of time specific coefficients of different windows after the riots). We also include period fixed effects $\delta_t$ and sub-ward fixed effects $\gamma_s$. $\mu_{st}$ is a sub-ward time varying error.

Table 4 shows results from the estimation of equation (2) for total crime in three time periods. Panel A shows results for the 24 months preceding the riots and for August 2011 only so as to assess the initial impact of the riots on crime. Panel B then extends the data to three months beyond August 2011, to see if one can identify any important post-riot crime trends. Panel C then shows results where we extend the data to cover six months post-riots.

The results show that the increase in the overall crime rate in August 2011 was large and statistically significant in the riot sub-wards, confirming the results of Table 3. The

overall crime rate (per 1,000) increased by 3.854 points (up 20.3 percent from the pre-riot average in riot sub-wards). These results on the initial impact (Panel A), are robust to extending the time span (see the first rows of Panels B and C). Across all of London, once we control for the effect of the riots in riot affected sub-wards, the crime rate in August 2011 did not experience a significant increase, which confirms that the riots were highly localized in the 88 riot sub-wards, scattered throughout all London, and did not on average affect the rest of the 4,672 sub-wards.

Panel B and C of Table 4 show the evolution of crime after the riots. Across all of London (i.e. including both riot and non-riot sub-wards), the overall crime rate decreased significantly after 6 months by 0.248 points (or 3 percent from the pre-riot average level). Riot sub-wards (row 3 of each panel) experienced an additional decrease in the overall crime rate of 0.382 in the six-months following the riots, though this is not statistically significant.

## 5. Crime Displacement

When an event happens that potentially changes incentives of offenders, it is important to assess not only the overall effect on subsequent crime rates, but also to determine if there was any displacement of crime. There are different types of crime displacement (see, among others, Repetto, 1997, and Bowers and Johnson, 2003). We focus on two key dimensions: spatial displacement (where offenders target other locations) and functional displacement (where offenders substitute across crime types and choose to commit other types of offences).

i) Evidence on Spatial Displacement

Here we address whether the significant reduction in the non-riots sub-wards crime rate that we consider consistent with a global deterrence effect disguises important heterogeneities across sub-wards. For example, it could be possible that the places most affected by the riots

experienced a reduction in crime subsequently, and crime increased in other areas[15], a pattern that would not be consistent with a global deterrence effect. The natural candidates to check are the neighbouring sub-wards to riot ones, as usually offenders tend to live close to where they commit crimes and this was also true for the case of the rioters (see Baudains et al. (2013) who confirm the distance decay pattern in the journey-to-crime for rioters).

We follow the approach of Bowers and Johnson (2003) to measure what happened in the neighbouring areas of the riot places. The first thing to do is to define a "buffer" zone, which could be the neighbouring area to the affected one that could have been affected as a result of the policy studied. Figure 5 shows a map with the riot incidents and a buffer zone of 500m[16] around each riot event. We define neighbour sub-wards as those sub-wards that are mostly or entirely contained within the buffer zone (excluding the riot sub-wards). Doing so produces 271 neighbour sub-wards.

Table 5 shows the result of the estimates of equation (2) in neighbour sub-wards (i.e. we now take the neighbour sub-wards as "treated" and as "control" all the other sub-wards except for the riot ones that are excluded in this part of the analysis). The initial effect of the riots is a modest (non significant) increase in overall crime rate in neighbouring sub-wards. This confirms that the riots occurred in very localized areas that we identified correctly. Six months after the riots, there was a significant decrease by 0.410 in crime in the neighbour sub-wards. Thus, we conclude that there is no evidence of spatial displacement of crime from riot sub-wards to neighbour sub-wards. If anything, we see a diffusion of the benefit of the decrease in crime in riot sub-wards to their neighbours. Furthermore, we still find a 3 percent (0.233) decrease in crime six months after the riots across London (after controlling for the

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[15]For evidence on spatial displacement in the literature see, for example, Guerette and Bowers (2009) and Weisburd et al. (2006).

[16]The selection of 500m is in line with the literature on spatial crime displacement (see, for example, Bowers and Johnson, 2003).

evolution of crime in neighbour sub-wards and excluding riot sub-wards) that is roughly the same as we found in Panel C of Table 4. It seems that the pattern of decrease in crime was general to all types of sub-wards.

ii) Evidence on Functional Displacement

Functional displacement occurs when there is a switch in the type of crime committed as a result of the policy intervention. To explore this dimension, we open our analysis to the different types of offences. Table 6 considers differences in pre-riot and riot month crime rates by type of crime. It is clear that some crime types saw large relative rises in the riot month. Not surprisingly, the biggest rises were for burglary, criminal damage and violence against the person, which we term riot crimes.[17] The other crime types we have data on show no rise at all, and so we consider these to be non-riot crimes. Figure 6 plots the riot and non-riot crime rates for months before, during and after the riots. It is evident that the sharp spike in crimes during August 2011 is present only for the riot crimes. Thus, it was a big increase in burglaries, criminal damage and violence against the person that characterised the London riots in August 2011.

Table 7 shows estimates of equation (2) for riot and non-riot crimes separately. The first salient point is that the 3.854 points increase in the overall crime rate (per 1,000) was mainly driven by a 3.842 points increase in riot crimes. Those crimes increased a huge 57 percent in riot sub-wards. We find that the decrease in the overall crime rate in non-riot sub-wards after 6 months by 0.248 points (3 percent from its pre-riot average level) shown in Table 4, is the result of a statistically significant and persistent decrease in riot crimes by 0.460 after 6 months (13.1 percent from its pre-riot average level) which was partially outweighed by an increase in non-riot crimes by 0.212 after 6 months (4.5 percent). This can

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[17]In the first stage analysis, burglaries were the main riot offence among property crimes (and 55 percent of total riot sentences) and violent disorder the main offence among violent crimes (and 17 percent of total riot sentences).

be interpreted as a partial functional displacement of crime. Potential offenders might have interpreted the harder punishments as a change only (or to a larger extent) in riot-related offences, in comparison to non-riot crimes. This could have led to a strategic switch from riot crimes to non-riot crimes, which is consistent with our findings.[18]

In fact, if we classify the offences in the sentencing database employed in the first stage into riot and non-riot type of offences, we find that the length of sentence for riot crimes was on average a significant two months longer for rioters than for non-rioters, whereas the non-riot offence sentences were only one month longer and not statistically significant.[19]

We also compared aggregate sentences for England and Wales for the years ending in September 2011 and September 2012 (MoJ, 2013) and find suggestive evidence of a persistent change in the overall sentencing system. What we have termed riot offences were more severely punished on average in the year after the riots than in the previous one: custody rates increased from 0.36 to 0.40 and the ACSL increased from 18.3 to 19.6 months for riot offences. For non-riot offences, on the other hand, the custody rate increased only slightly from 0.21 to 0.22 and the ACSL decreased from 15.1 to 15 months.[20]

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[18]Another study that finds some evidence of functional displacement in UK is Welsh and Farrington (2002) who study the introduction of CCTV. They find that in response to CCTV, offenders switched from robbery and theft from the person to theft from vehicles. Also Curran et al. (2005) report that functional displacement might have occurred in a small scale in response to the Street Crime Initiative in London, as some of those previously involved in street crime may have been displaced to commercial robbery. Finally, Shepperd (2002) finds some kind of substitution in the context of California Three Strikes Law: a decrease in all strikeable offenses and a decrease in some non-strikable offences.

[19] Also, for the estimation of equation (1) controlling for individual characteristics, the custody rate increases by 0.33 for riot crimes (0.25 for non-riot crimes) for rioters in comparison to other offenders, and the ACSL increases by 1.97 months for riot crimes and 1.13 (not statistically significant) months for rioters.

[20]The rioters sentences are distributed approximately evenly between the two years analysed, and according to the MoJ (2013) the riots had little impact on these figures as those convicted for the public disorder accounted for less than one per cent of offenders in the 12 months ending September 2012.

## 6. Discussion and Interpretation

The evidence we have presented thus far can be summarised as follows. The riots led to a substantial increase in the severity of sentencing for those involved. Overall, crime rates subsequently declined by 3 percent in areas that were not exposed to the riots. We interpret this key result as consistent with a global deterrence effect from the increased sanctions. But there are alternative explanations that we examine in this section.

First, the overall reduction in crime could have occurred as a result of increased police deployment after the riots. To assess this, we analyse data on police officers hours of patrol by borough. Table 8 shows that the amount of hours of patrol -if anything- fell after the riots in comparison to the pre-riots monthly average. This is true for all police officers and for Safer Neighbourhood teams.[21] Furthermore, this seems to be the case both in the boroughs affected by the riots and in those that were not affected. It is difficult therefore to produce a compelling story along the lines that more police were the cause of crime reductions.

Second, there is the question of incapacitation that results from incarceration of offenders. Simply locking up criminals after the riots can reduce the crime rate, particularly if rioters were prolific offenders. Of course, we cannot separate the effect of incarceration to the deterrence effect with the data available. However, at first glance, the estimated 3 percent decrease in the crime rate for non-riot sub-wards seems too high to be explained only by incarceration of rioters. Even if all the rioters who were incarcerated had committed a crime had they not been jailed, we would under plausible assumptions still see a sizable reduction in crimes.[22]

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[21] Safer Neighbourhood teams are additional to the regular police forces in London and are focused upon particular neighbourhoods and the policing priorities specific to them.
[22] The 3 percent decrease in non-riot sub-wards crime rate amounts to approximately 2,000 fewer crimes. There were 900 rioters sentenced to immediate custody in London a year after the riots. If we assume that all of them

In addition to this, and importantly for a deterrence rather than an incapacitation interpretation of the results, as we showed in the spatial displacement section above crime rates also decreased in sub-wards that are outside the buffer zones around the riot areas. This would suggest that were the rioters free, it is very unlikely that they would have committed offences in those areas since according to crime theory patterns criminals tend to operate over small geographic areas. In the case of the riots, there also appears to be a close link between the location of the incidents and where the criminals resided. From a sample of 70 percent of the rioters[23] Baudains et al. (2013) confirm this pattern for the rioters and also show that the scale and central tendency of the distribution of distances travelled is analogous to other crimes in other contexts. They estimate that the probability of an offender targeting an area during the riots decreases by a factor of around 0.6 for every kilometre that the targeted area is far from where the offender resides.

To further investigate whether the reduction in the crime rate can be attributed to deterrence rather than incapacitation, we have also studied the crime patterns in the aftermath of the riots in areas even further from the affected places. To do this, we have pursued two different strategies. First, we analyse other geographic areas of London. We study areas that are at least 3 km away from a riot incident and also as most of the riots occurred in the central area of the City, we study the outer 5 km of London[24]. Second, we analyse all the Police Force Areas in England and Wales that did not experience any riot incident (29 out of 43).[25]

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were in prison during the 6 months after the riots and that everyone would have otherwise reoffended (both assumptions probably overstate the likely reality), still there is a decrease of 1,100 crimes left unexplained in non-riot sub-wards.

[23] The Metropolitan Police recorded 3,914 offence associated with the riots between 6-11 August 2011. Each record corresponds to an offender. For 2,299 of the records both the residential and offence addresses are recorded.

[24] We exclude from the outer 5km three sub-wards with riot incidents.

[25] To determine which Police Force Areas were unaffected, we used the same method described in Section 4 for the London sub-wards.

Table 9 confirms a generalized decrease in crime in the six months after the riots, which takes place in sub-wards far from the riot incidents as well. The size of the effect in areas far from riot sub-wards (panel B and C) is smaller than for all non-riot sub-wards (panel A), which hints at the fact that close to the riots we cannot disentangle the incapacitation from the deterrence effect. However, the decrease in crime experienced in the areas far from the riots is very unlikely to be due to incapacitation. The last panel of Table 9 reinforces the idea of a general deterrence effect operating, as we find a significant decrease in crime in the aftermath of the riots when we consider Police Force Areas unaffected by the August 2011 incidents.

Therefore, we consider that a significant part of the explanation of the decrease in the overall crime rates after the riots is a general deterrence effect of the tougher sanctions imposed by the criminal justice system. As discussed in the introduction, unfortunately there is no extant evidence on crime patterns after other riots with which to compare our results – indeed analysing crime patterns in the aftermath of significant riots is one of the contributions of this paper. Thus, for example, in the official report on the most serious riot in London prior to the events of August 2011 – the 1981 Brixton riot – Lord Scarman makes no reference to crime after the riot whatsoever. In any event it may be difficult to compare subsequent crime patterns across riots. They tend to differ substantially across dimensions that would affect such patterns, for example in terms of numbers being convicted, sentence severity and policing response in the wake of the riot. What is clear is that there is no consensus that a subsequent fall in crime is the inevitable consequence of a serious riot.[26]

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[26] Anecdotal evidence suggests that violent crime continued to rise after the 1992 Los Angeles riots http://articles.latimes.com/1993-01-05/local/me-819_1_los-angeles-county

# 7. Conclusions

The London riots of August 2011 were unparalleled in terms of speed, scale and geographical spread of the disorder (HMIC, 2011). After a fatal shooting by police officers on 4th August, a peaceful protest turned into violent disorder that in the following days escalated and spread through England (to a number of the larger cities including Liverpool, Manchester and Birmingham). It is estimated that 13,000-15,000 people were involved in the riots, among them criminals, opportunists and spectators. During the 5 days of disorder, more than 5,000 crimes were committed (apart from the 5 fatalities, the offences were mainly burglary, criminal damage and violence against persons). In the last days of the riots, the police changed the usual dispersal tactics employed in cases of disorders, making immediate arrests and the criminal justice worked intensively to deliver fast and tough sentences. By September 2012 (a year after the riots) 4,600 people were arrested and 2,250 appeared before court for incidents related to the London riots.

We study what happened to crime during the riots and in their wake. The particular emphasis is to show how large scale the crime increase was, and whether the increase in the severity of sentencing had a deterrence effect on crime. Not surprisingly, we show that a very significant amount of criminal activity took place over the riot days in August 2011. There was a set of crimes that participants engaged in, namely burglary, criminal damage and (to a lesser extent) violence against the person. We term these riot crimes. Other types of crimes did not seem to alter much relative to patterns of crime from before the riots.

These riot crimes took place in highly localized geographical areas. Incidents occurred in 88 out of 4,760 sub-wards in London (or in 1.8 percent). Riot crimes went up by a huge 57 percent in the affected sub-wards and did not rise at all in the other 4,672 London sub-wards.

In the first stage of our analysis, we show that rioters who were arrested and taken to court were almost three times more likely to be placed into immediate custody than offenders with comparable demographic characteristics and that committed the same offences but in the previous year. In addition, rioters when convicted were sentenced to significantly longer sentences (approximately 2 months more on average) than their matched offenders in the previous year. The severities of the sanctions for rioters were widely covered in the media and the perception of the population was that the sanctions imposed were tougher than expected (see Roberts and Hough (2013) for a survey on the perception of riot sanction).[27]

Did the tougher sentencing have a deterrent effect on crime? Our results show a significant drop in riot crime, both in riot and non-riot areas of London in the six months after the riots. We observe a decline in crime even in London areas located far from the riot incidents and in Police Force Areas in England and Wales that were not affected by the riots. This is consistent with the operation of a deterrence effect from tougher sentencing.

Moreover, we find that non-riot crimes actually went in the opposite direction and increased, suggesting a rational response from criminals who look to have substituted away from the types of crimes that received tougher sentences to those that did not. We find little evidence that spatial displacement or extra police presence on the streets of London in the wake of the riots accounts for these patterns of change. The main mechanism that may have operated to prolong any deterrence effect of tougher sentencing is the perception of the prospective criminals that the change in the justice system was permanent rather than transitory. The sentencing statistics show some increase in the average custodial lengths and custody rates in the months after the riots. However, the intense media coverage of the riot

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[27] See also Lochner (2007) who emphasises that, in the context of the US criminal justice system, perceptions of sanctions are important and can alter crime participation.

sentencing seems to be more likely to have reinforced the belief of more severe sentencing still taking place.

Finally, it is worth noting that our findings are related to the scant previous literature on general deterrence following a change in sentencing, which has mainly focussed on the impact of the California three strikes law. However, the contexts of the riots we study and the subsequent changes in sentencing behaviour are very different to California. In that setting, a permanent change in sentencing affecting mainly re-offenders occurred, whereas in our case we study a potential behavioural change of criminals that might have perceived as permanent because of the sudden, almost instantaneous and widely publicised, change in sentencing that occurred due to the riots.

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**Figure 1: Chronology of the Riot Related Incidents in London, August 6<sup>th</sup>-9<sup>th</sup>, 2011. Boroughs affected.**



| August 4<sup>th</sup>, 2011<br>Fatal shooting of Mr. Duggan by the police.<br>Tottenham Hale, Haringey | August 6<sup>th</sup>, 2011<br>Riots Day 1 | August 7<sup>th</sup>, 2011<br>Riots Day 2 |
| August 8<sup>th</sup>, 2011<br>Riots Day 3 | August 9<sup>th</sup>, 2011<br>Riots Day 4 | August 6<sup>th</sup>-9<sup>th</sup>, 2011<br>All Riot Related Incidents |
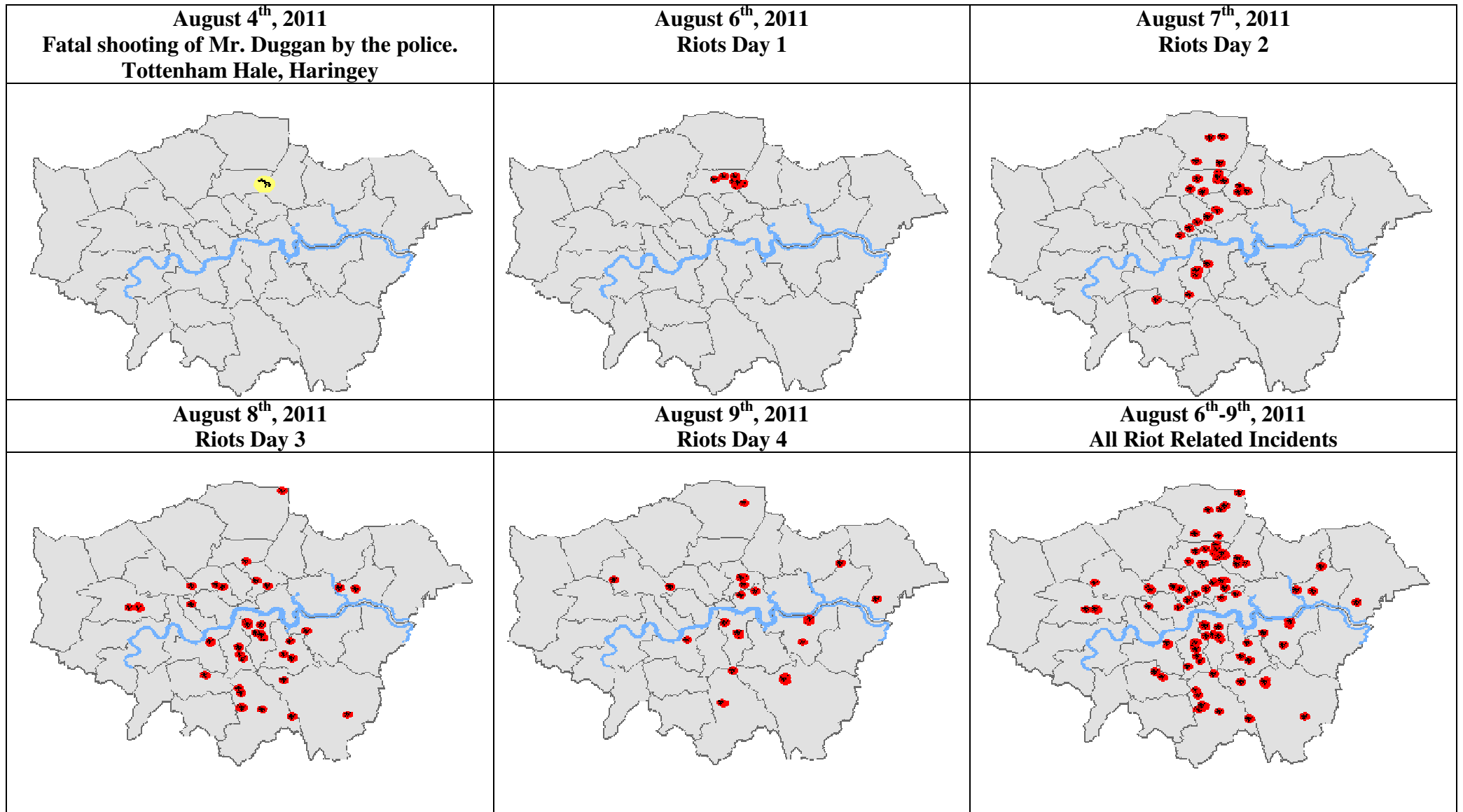
**Figure 2: Riot Related Incidents in London, August 6th-9th, 2011. 88 Sub-Wards Affected**

Monthly Crime Rate
per 1,000 population
24 months pre-riots

<4.00

4.00-5.49

5.50-6.99

7.00-9.99

>10.00

✳ Riot Incidents

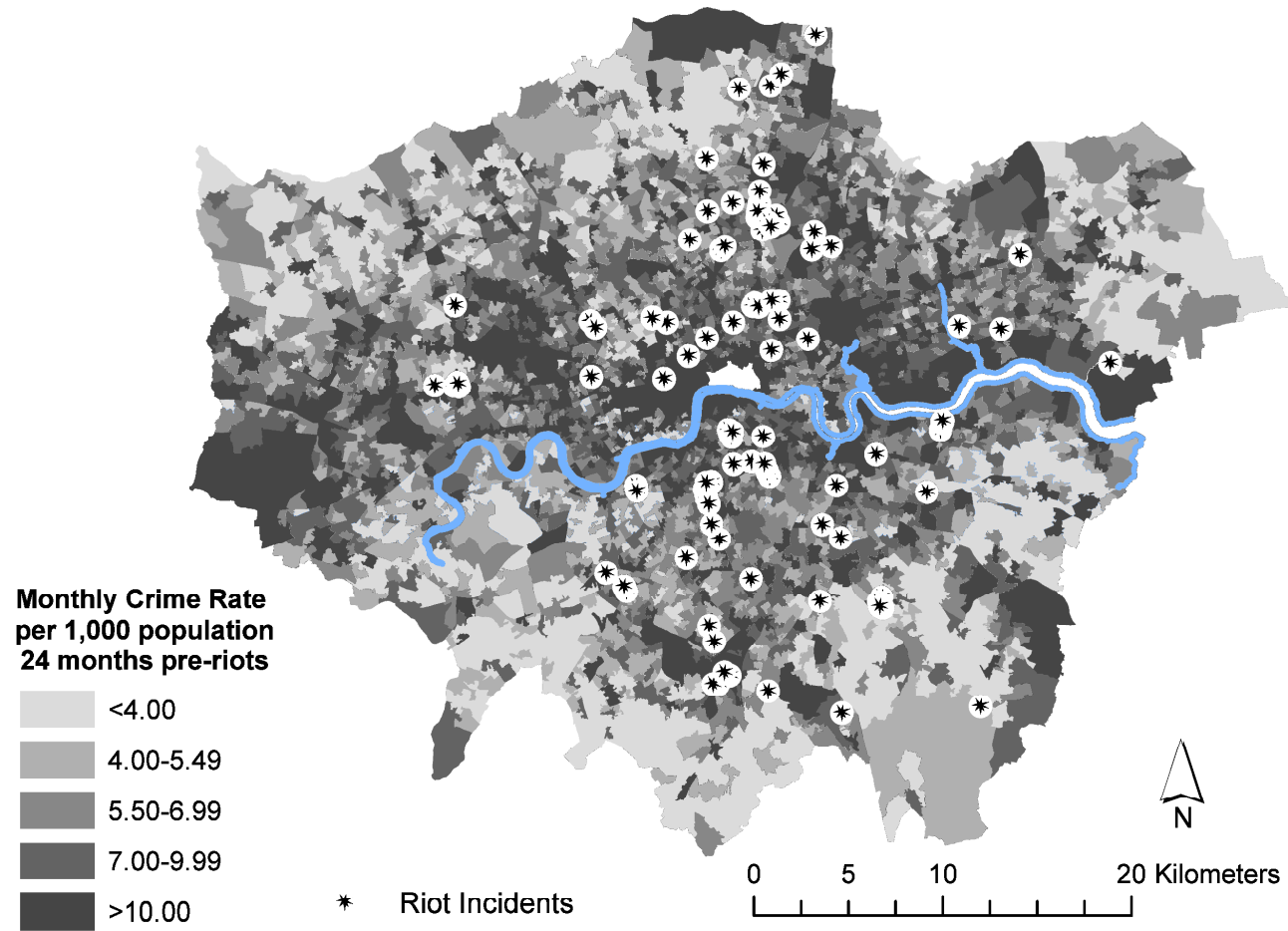0    5    10    20 Kilometers

N

**Figure 3: Riot Related Incidents in London, August 6th-9th, 2011. Treatment Group: 88 Sub-Wards Affected**
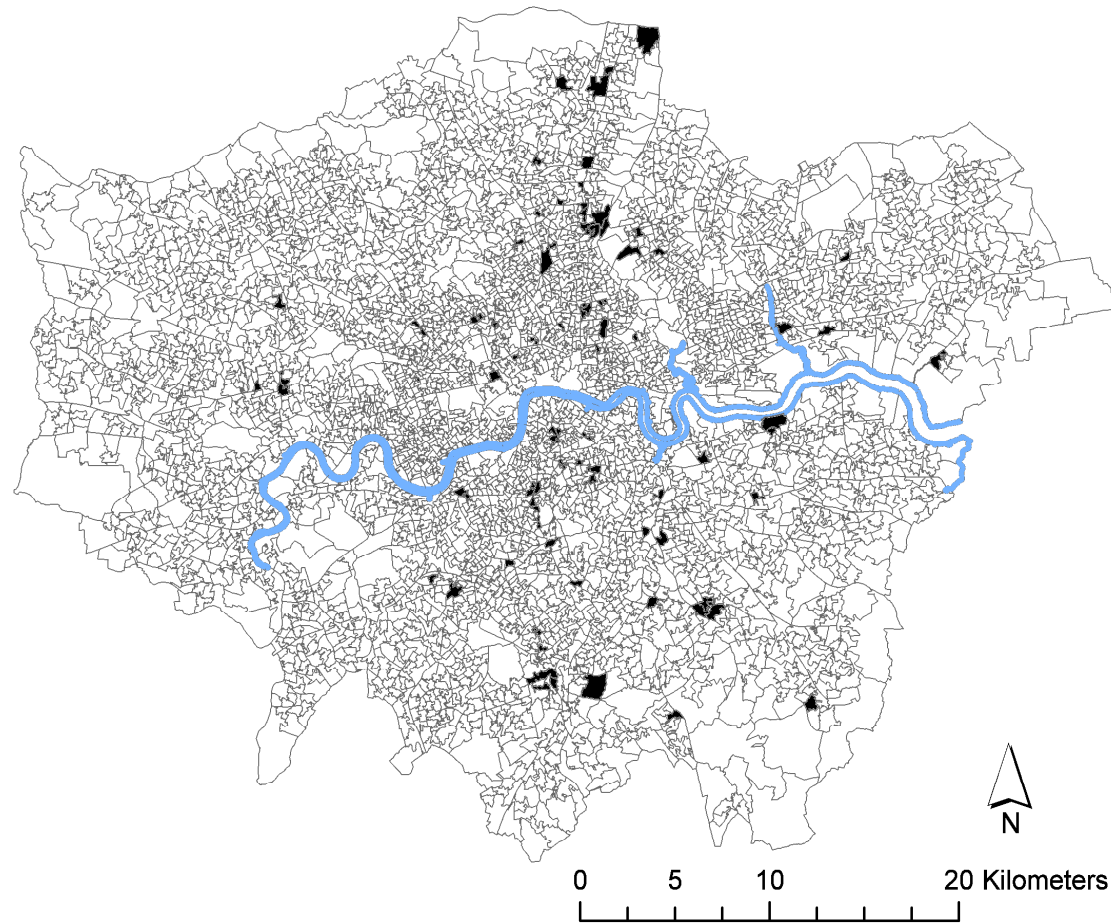
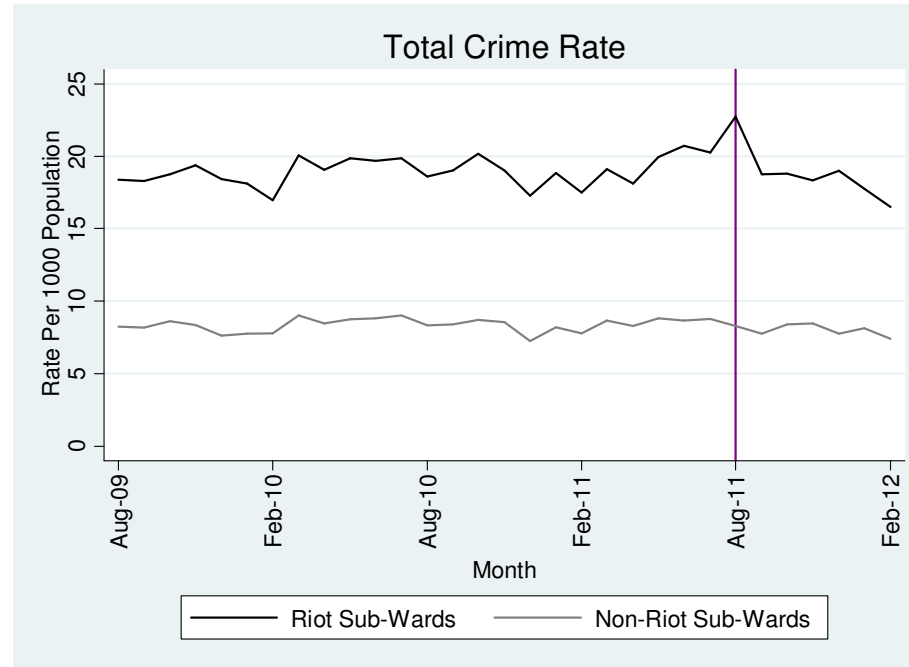**Figure 4: Monthly Total Crime Trends in Riot and Non-Riot Sub-Wards**

**Figure 5: Buffer Zones (500m Around Riot Incidents)**
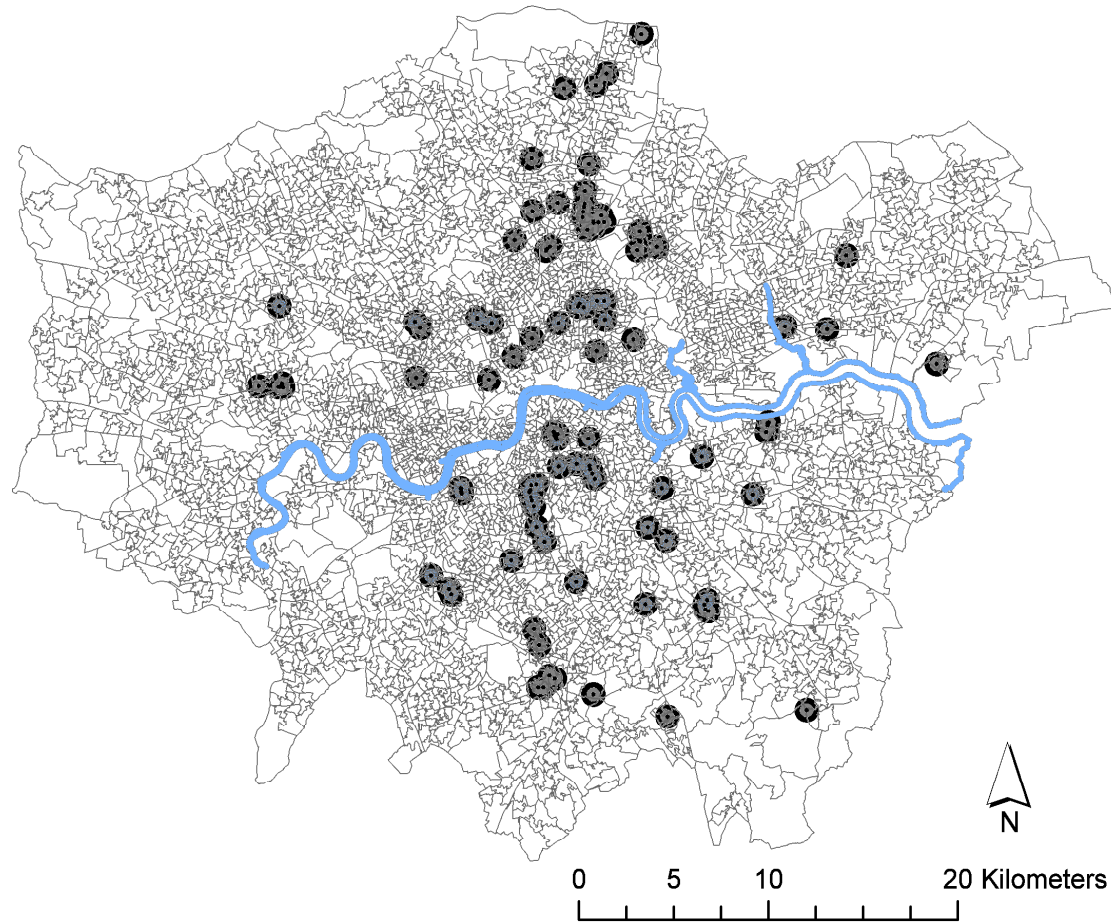
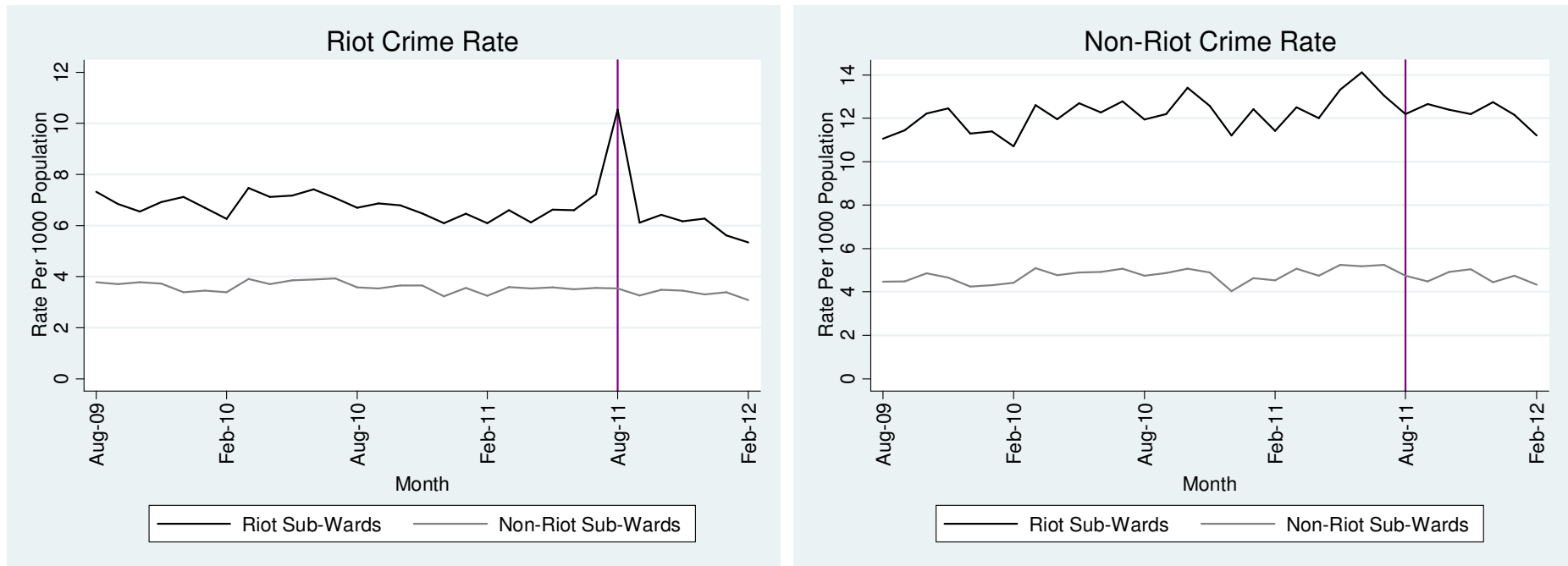# Figure 6: Differences in Crime Trends For Riot and Non-Riot Crimes

**Table 1: Sentencing Differences For Riot Related Offences and For Similar Offences in 2010**

| | Magistrates' Court | | Crown Court | |
| --- | --- | --- | --- | --- |
| | Riot Related Offences | Similar Offences (2010) | Riot Related Offences | Similar Offences (2010) |
| **A. Immediate Custody Rate** | | | | |
| Total Crime | 0.36 | 0.12 | 0.81 | 0.33 |
| Burglary | 0.39 | 0.23 | 0.86 | 0.68 |
| Criminal Damage | 0.13 | 0.16 | 0.86 | 0.52 |
| Violent Disorder | 0.39 | 0.13 | 0.87 | 0.42 |
| Robbery | 0.29 | 0.13 | 0.86 | 0.41 |
| Theft | 0.40 | 0.02 | 0.60 | 0.46 |
| Other | 0.22 | 0.02 | 0.66 | 0.36 |
| **B. Average Custodial Sentence Length (Months)** | | | | |
| Total Crime | 6.6 | 2.5 | 19.6 | 11.3 |
| Burglary | 7.2 | 4.4 | 17.4 | 16.2 |
| Criminal Damage | 3.8 | 6.8 | 17.5 | 7.7 |
| Violent Disorder | 7.7 | 3.1 | 30.6 | 9.9 |
| Robbery | 10.0 | 8.8 | 29.8 | 10.8 |
| Theft | 4.6 | 2.0 | 10.0 | 6.6 |
| Other | 4.5 | 3.1 | 18.5 | 7.6 |

Notes: The immediate custody rate is the proportion sentenced to jail. Source is Ministry of Justice Statistical Bulletin on the 6th to 9th August 2011 disorders, from the version published on 13th September 2012 (MoJ, 2012). The data are therefore as of 10th August 2012. Usually all criminal court cases start in a magistrates court and depending on the crime that the offender has been charged with, the case will either start and finish in a magistrates' court or start in a magistrates' court but finish in a higher court - normally the Crown Court. Crown Court data for 2010 are based on cases that were found guilty at magistrates courts and sentenced at the Crown Court in order to give the most reliable comparison with disorder cases which have been sentenced to date.

**Table 2: Sentencing Differences For Riot Related Offences and For Similar Offences in 2010**

| | Mean Rioters | Mean Non-Rioters sample (1/08/2010 to 31/07/2011) | Mean Difference | | Mean Difference with controls | Propensity Score Matching (Kernel) |
|---|---|---|---|---|---|---|
| **A. Immediate Custody Rate** | | | | | | |
| Total Crime (3,494) | 0.550 | 0.247 | 0.303 (0.016) | | 0.311 (0.015) | 0.307 (0.016) |
| Property Crimes (2,750) | 0.550 | 0.268 | 0.282 (0.018) | | 0.292 (0.018) | 0.289 (0.018) |
| Violent Crimes (744) | 0.549 | 0.174 | 0.358 (0.018) | | 0.380 (0.032) | 0.374 (0.033) |

| | Mean Rioters | Mean Non-Rioters sample (1/08/2010 to 31/07/2011) | Mean Difference | Mean Difference (in LN of months) | Mean Difference with controls | Propensity Score Matching (Kernel) |
|---|---|---|---|---|---|---|
| **B. Average Custodial Sentence Length (Months)** | | | | | | |
| Total Crime (1,391) | 14.601 | 13.101 | 1.501 (0.624) | 1.608 (0.168) | 1.602 (0.199) | 1.5383 (0.222) |
| Property Crimes (1,125) | 13.681 | 12.717 | 0.963 (0.663) | 1.646 (0.183) | 1.659 (0.217) | 1.5769 (0.241) |
| Violent Crimes (266) | 18.348 | 15.237 | 3.111 (1.674) | 1.311 (0.522) | 1.375 (0.467) | 1.3570 (0.544) |

Notes: The cases considered from the database are those that are finished and where we have comparable offences for rioters and non-rioters with sentence lengths of five years or less. The Non-Rioters sample runs from 1 August 2010 to 31 July 2011 (i.e. effectively the year preceding the riots). The controls included in the specifications reported on in the last two columns of Panels A and B are age, gender, ethnicity and type of offence. The coefficients reported in the last three columns of Panel B are exponentiated regression coefficients from a regression where the dependent variable is the natural logarithm of the sentence length in months. Standard errors reported in parentheses.

**Table 3: Differences in Mean Total Crime Rates For the Riot and Non-Riot Months and in Pre-Riot Trends**

| | Mean Total Crime Rates (Per 1000) | | Riot Month - Pre-Riot Change in Mean | Pre-Riot Trends |
|---|---|---|---|---|
| | August 2009-July 2011 | August 2011 | | August 2009-2011 |
| Riot Sub-Wards (88) | 18.982 | 22.727 | 3.745 (1.010) | 0.040 (0.029) |
| Non-Riot Sub-Wards (4,672) | 8.380 | 8.271 | -0.109 (0.469) | 0.012 (0.014) |
| | | | Difference-in-Difference (Levels) = 3.854 (0.649) | Difference in Pre-Riot Trend (Levels) = 0.028 (0.025) |
| | | | Difference-in-Difference (Logs) = 0.193 (0.029) | Difference in Pre-Riot Trend (Logs) = 0.001 (0.001) |

Notes: Standard errors in parentheses.

## Table 4: Crime in the Wake of the Riots

| | All Sub-Wards (4,760) |
|---|---|
| | Total Crime |

**A. Initial Impact (8/09-8/11)**

| | |
|---|---|
| Riot Month*Riot Sub-Ward | 3.854 (0.833) |
| Riot Month | 0.034 (0.066) |

**B. Three Months Post-Riots (8/09-11/11)**

| | |
|---|---|
| Riot Month*Riot Sub-Ward | 3.854 (0.832) |
| Riot Month | 0.034 (0.066) |
| September-November 2011*Riot Sub-Ward | -0.169 (0.584) |
| September-November 2011 | -0.022 (0.065) |

**C. Six Months Post-Riots (8/09-2/12)**

| | |
|---|---|
| Riot Month*Riot Sub-Ward | 3.854 (0.830) |
| Riot Month | 0.034 (0.066) |
| September 2011-February 2012*Riot Sub-Ward | -0.382 (0.367) |
| September 2011-February 2012 | -0.248 (0.065) |

Notes: From separate regression models for the three crime rates in each Panel. Regressions weighted by sub-ward population. Standard errors clustered by sub-ward are in parentheses. All specifications include a full set of pre-riot month dummies and sub-ward fixed effects. The sample sizes for Panel A, B and C are respectively 119,000 (4,760 sub-wards over 25 months), 133,280 (4,760 sub-wards over 28 months) and 147,560 (4,760 sub-wards over 31 months).

## Table 5: Crime in the Wake of the Riots; Spatial Displacement

| | All Sub-Wards except for Riot Sub-Wards (4,672) |
|---|---|
| | Total Crime |

**A. Initial Impact (8/09-8/11)**

| | |
|---|---|
| Riot Month*Neighbour Sub-Ward | 0.410 (0.311) |
| Riot Month | 0.000 (0.068) |

**B. Three Months Post-Riots (8/09-11/11)**

| | |
|---|---|
| Riot Month*Neighbour  Sub-Ward | 0.410 (0.311) |
| Riot Month | 0.000 (0.067) |
| September-November 2011*Neighbour Sub-Ward | -0.368 (0.209) |
| September-November 2011 | -0.009 (0.065) |

**C. Six Months Post-Riots (8/09-2/12)**

| | |
|---|---|
| Riot Month*Riot Neighbour-Ward | 0.410 (0.311) |
| Riot Month | 0.000 (0.067) |
| September 2011-February 2012*Neighbour Sub-Ward | -0.409 (0.177) |
| September 2011-February 2012 | -0.233 (0.065) |

Note: We define Neighbours as those Sub-wards that are mostly or totally located within the 500 metres buffer zone around the Riot incidents of August-2011, but did not register incidents (they are not considered treated). There are 271 Neighbour Sub-Wards. Regressions weighted by sub-ward population. Standard errors clustered by sub-ward are in parentheses. All specifications include a full set of pre-riot month dummies and sub-ward fixed effects. The sample sizes for Panel A, B and C are respectively 116,800 (4,672 sub-wards over 25 months), 130,816  (4,672 sub-wards over 28 months) and 144,832 (4,672 sub-wards over 31 months).

## Table 6: Riot and Non-Riot Crimes

| | Mean Crime Rates (Per 1000) | | Riot Month - Pre-Riot Change in Mean |
|---|---|---|---|
| | August 2009-July 2011 | August 2011 | |
| **A. Riot Sub-Wards (88)** | | | |
| Total Crime | 18.982 | 22.727 | 3.745 (1.010) |
| Burglary | 1.332 | 3.636 | 2.303 (0.117) |
| Criminal Damage | 1.409 | 2.695 | 1.286 (0.160) |
| Violence Against Person | 4.031 | 4.201 | 0.170 (0.342) |
| Riot Crimes | 6.773 | 10.532 | 3.759 (0.420) |
| (Burglary, Criminal Damage and Violence Against Person) | | | |
| Non-Riot Crimes | 12.210 | 12.195 | -0.015 (0.839) |
| (Robbery, Theft, Other) | | | |
| **B. Non-Riot Sub-Wards (4,672)** | | | |
| Total Crime | 8.380 | 8.271 | -0.109 (0.469) |
| Burglary | 0.976 | 1.002 | 0.026 (0.067) |
| Criminal Damage | 0.840 | 0.872 | 0.032 (0.083) |
| Violence Against Person | 1.796 | 1.655 | -0.141 (0.139) |
| Riot Crimes | 3.611 | 3.529 | -0.083 (0.196) |
| (Burglary, Criminal Damage and Violence Against Person) | | | |
| Non-Riot Crimes | 4.769 | 4.724 | -0.027 (0.335) |
| (Robbery, Theft, Other) | | | |

Notes: Standard errors in parentheses.

# Table 7: Crime in the Wake of the Riots; Functional Displacement

| | All Sub-Wards (4,760) | |
| --- | --- | --- |
| | Riot Crimes | Other Crimes |
| **A. Initial Impact (8/09-8/11)** | | |
| Riot Month*Riot Sub-Ward | 3.842 (0.781) | 0.012 (0.535) |
| Riot Month | -0.256 (0.061) | 0.290 (0.051) |
| **B. Three Months Post-Riots (8/09-11/11)** | | |
| Riot Month*Riot Sub-Ward | 3.842 (0.780) | 0.012 (0.534) |
| Riot Month | -0.256 (0.041) | 0.290 (0.050) |
| September-November 2011*Riot Sub-Ward | -0.325 (0.181) | 0.156 (0.572) |
| September-November 2011 | -0.391 (0.033) | 0.369 (0.054) |
| **C. Six Months Post-Riots (8/09-2/12)** | | |
| Riot Month*Riot Sub-Ward | 3.842 (0.778) | 0.012 (0.533) |
| Riot Month | -0.256 (0.040) | 0.290 (0.050) |
| September 2011-February 2012*Riot Sub-Ward | -0.504 (0.142) | 0.122 (0.362) |
| September 2011-February 2012 | -0.460 (0.032) | 0.212 (0.055) |

Notes: As for Table 4.

**Table 8: Police Officers Hours on Patrol**

| | Monthly Mean | | | |
| --- | --- | --- | --- | --- |
| | August 2009 - July 2011 | August 2011 | September 2011- February 2012 | Post Riot-Pre Riot Change in Mean |
| **A. Police Officers Hours on Patrol** | | | | |
| London Boroughs (32) | 51446 | 60490 | 47457 | -3989 (1527) |
| Riot Boroughs (22) | 54996 | 65107 | 50962 | - 4034 (1956) |
| Non-Riot Boroughs (10) | 42791 | 49235 | 38912 | - 3879 (1728) |
| **B. Safer Neighbourhood Teams Hours on Duty** | | | | |
| London Boroughs (32) | 10680 | 11758 | 9573 | -1107 (245) |
| Riot Boroughs (22) | 10869 | 11842 | 9756 | - 1113 (316) |
| Non-Riot Boroughs (10) | 10217 | 11552 | 9127 | - 1089 (342) |

Notes: Standard errors in parentheses. Borough means weighted by borough population.

## Table 9: Crime in the Wake of the Riots - Non-Riot Areas

| | Non-Riot Areas | | |
|---|---|---|---|
| | Total Crime | Riot Crimes | Non-Riot Crimes |

**A. Six Months Post-Riots (8/09-2/12) - All non-riot sub-wards (4,672)**

| | Total Crime | Riot Crimes | Non-Riot Crimes |
|---|---|---|---|
| Riot Month | 0.0255 (0.065) | -0.249 (0.041) | 0.274 (0.050) |
| September 2011-February 2012 | -0.257 (0.065) | -0.453 (0.032) | 0.196 (0.055) |

**B. Six Months Post-Riots (8/09-2/12) - Non-riot sub-wards more than 3 km far from riots (2,054)**

| | Total Crime | Riot Crimes | Non-Riot Crimes |
|---|---|---|---|
| Riot Month | 0.034 (0.091) | -0.205 (0.057) | 0.238 (0.066) |
| September 2011-February 2012 | -0.141 (0.079) | -0.266 (0.046) | 0.124 (0.058) |

**C. Six Months Post-Riots (8/09-2/12) - Non-riot sub-wards in the outer 5 km of London (1,333)**

| | Total Crime | Riot Crimes | Non-Riot Crimes |
|---|---|---|---|
| Riot Month | 0.018 (0.098) | -0.229 (0.065) | 0.246 (0.070) |
| September 2011-February 2012 | -0.143 (0.083) | -0.217 (0.052) | 0.074 (0.059) |

**D. Six Months Post-Riots (8/09-2/12) - Non-riot Police Force Areas in England and Wales (29)**

| | Total Crime | Riot Crimes | Non-Riot Crimes |
|---|---|---|---|
| Riot Month | 0.187 (0.188) | | |
| September 2011-February 2012 | -0.301 (0.150) | | |

Notes: Regressions weighted by sub-ward population (panels A, B and C) or Police Force Area population (panel D). Standard errors clustered by sub-ward (panels A, B and C) or Police Force Area (panel D) are in parentheses. All specifications include a full set of pre-riot month dummies and sub-ward (panels A, B and C) or Police Force Area (panel D) fixed effects. The sample sizes for Panel A, B, C and D are respectively 144,832 (4,672 sub-wards over 31 months), 63,674 (2,054 sub-wards over 31 months), 41,323 (1,333 sub-wards over 31 months) and 833 (29 Police Force Areas over 31 months).

## Data Appendix – Online Publication Only

| Variable | Definition | Units | Period | Number of Observations | Mean |
|---|---|---|---|---|---|
| **Immediate Custody Rate** | Percentage of offenders sentenced to jail. From a sample of 3,500 cases that are finished and comprise the following offences: burglary, criminal damage, violent disorder, theft and robbery. Half of the sample is from people accused of an offence during the riots and the other half is a stratified random sample of pre-riot convicted individuals in the 12 months before the riots. The sample is stratified by age, ethnicity and offence to match rioters. The sample is restricted to sentences of less than 60 months in prison (over 99 percent of the sample). | Individual | Aug-2010/ Jul-2011 & Rioters | 3494 | 0.398 |
| **Average Custodial Sentence Length** | Average prison sentence in months of those sentenced to immediate custody (see description of the sample in immediate custody rate variable description). | Individual | Aug-2010/ Jul-2011 & Rioters | 1391 | 14.133 |
| **Population** | Total population from population estimates for mid-2010 published by the Office for National Statistics. | Sub-ward | Mid-2010 | 4760 | 1641 |
| | | Borough | Mid-2010 | 32 | 244172 |
| | | PFA | Mid-2010 | 43 | 1284663 |
| **Crime Rate per 1000 Population** | Total Crime Count over total population times 1,000. Total Crime includes: burglary, criminal damage, violence against a person, theft and handling, fraud and forgery, robbery, drugs and other offences. Sub-ward level data was obtained through a Freedom of Information request to the Metropolitan Police Service. | Sub-ward | Aug-2009/ Feb-2012 | 147560 | 8.292 |
| | Police Force Area (PFA) crime counts comprise the 43 Police Force Areas in England and Wales. Before December-2010 the data was obtained from the Home Office Police Recorded Crime Open Data Tables (this is quarterly data that was interpolated to obtain monthly counts) and from December-2010 to February-2012 we used neighbourhood level data collapsed at PFA level from www.police.uk. In Table 9 we control for the potential changes in recording due to the different data sources. Data for the City of London PFA is available since December-2010. | PFA | Aug-2009/ Feb-2012 | 1317 | 5.999 |

| | | | | | |
|---|---|---|---|---|---|
| **Riot Crimes Rate per 1000 Population** | Sum of burglary, criminal damage and violence against the person over population. | Sub-ward | Aug-2009/ Feb-2012 | 147560 | 3.578 |
| **Non-Riot Crimes Rate per 1000 Population** | Sum of robbery, theft, fraud and forgery, drugs and other offences over population. This is equal to the total crime rate minus the riot crime rate. | Sub-ward | Aug-2009/ Feb-2012 | 147560 | 4.714 |
| **Police Officers Hours on Patrol** | Active hours on duty (recorded as on duty and not shown an abstracting activity such as training, court or aid) for police officers employed in a uniform operational role | Borough | Aug-2009/ Feb-2012 | 992 | 49894 |
| **Safer Neighbourhood Team Hours on Duty** | Safer Neighbourhood Team Police officer hours on active duty. Hours on active duty are where an officer has been recorded as on duty and not shown an abstracting activity such as training, court or aid that would take them away from their primary role.  For Hounslow borough, August-2009 is not available. | Borough | Aug-2009/ Feb-2012 | 991 | 10424 |