Manchester Riots of 2011 and the Index of Multiple Deprivation

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Following earlier disturbances in London, riots took place in Manchester in August 2011. This paper examines the relationship between the home addresses of people suspected of taking part in those riots and the component parts of the Index of Multiple Deprivation issued in 2010 (IMD2010). Using a non-parametric test, the paired-sample Wilcoxon test, it considers which components are the most closely related. The conclusions were that the 2011 riots were a form of entry-level crime, primarily acquisitive; and that the participants were overwhelmingly drawn from poor, unhealthy and overcrowded areas with limited housing opportunities, where high proportions were unemployed and receiving benefits and had been absent from school. The majority of people in every neighbourhood, however deprived, took no part in the disorder.

This is not a test to determine whether it was deprivation that drove people to riot or whether the presence of potential rioters was what rendered areas deprived. At most it will identify the characteristics of areas that were home to potential suspects. It also provides an opportunity to review some existing criminological literature to see how well these observations fit. Rioters took illegal opportunities in a situation where legal ones were hard to come by. Those suspected of involvement came in greatest numbers from areas with a high level of dependence and a history of absence from school. This leaves room for the argument that it was not just the deprivation but the personal attitude towards it that prompted people to cross the boundary into criminality. If data become available, similar tests may be applied in other regions to see whether those disturbances were similarly motivated. Finally there is some recently released government analysis that allows the characteristics of areas examined here to be checked against the personal characteristics of individuals charged or convicted. There was a fair degree of corroboration so that it can be stated with some confidence that the Manchester riots consisted predominantly of acquisitive crimes, committed by people often new to outright criminality but coming from a background of dependence.

The Data

All input data are contained in a file that can be made available upon request. The core is the list of Lower Layer Super Output Area (LSOA) codes in the Manchester area and the number of riot suspects charged

in each. The names and precise postcodes of the suspects are not included in the file. A LSOA typically houses 1,500 people, although sizes have changed since the borders were first defined. To these LSOA codes may be matched or merged to any other statistics published using that geography.

The 2010 Index of Multiple Deprivation is an analysis across England of relative levels of different aspects of deprivation. It is a weighted summary of several separate "domains", each of which describes a particular aspect of deprivation. Each LSOA code has a value for each domain, and also for further subdomains and component indicators. The possibility exists that the addresses of the riot suspects may correspond with the domains more so than the overall composite score.

There is no exact definition of the level at which deprivation starts. Rather an analyst or a grant-making body will determine a threshold at which to take action and then include all areas at that level or worse. Many other statistics, made available through the Neighbourhood Statistics service of the Office for National Statistics, may be matched using LSOA codes.

Gaps

One 'domain' is labelled "crime". This should be an obvious predictor of where suspects come from. However it is made up of four different crime types which may spread very differently. It has not been possible to get data for the individual crime types from Communities and Local Government in time for this paper.

Next are the other locations of August 2011 riots. They took place in several regions: Tottenham, Brixton, Hackney, Croydon, Bristol, Birmingham, Manchester. On its Datablog web-page, the Guardian has promised to publish the approximate home addresses of riot suspects from all regions but they are not available at the time of writing. They comment:

> *While the Guardian works on a wider data-driven project*
> *analysing the causes and consequences of the England*
> *riots, the court list has been removed from public view.*
> *The data will be republished alongside the findings of*
> *this work.*[1]

When others can obtain these data, it will allow testing of the hypotheses put forward in this paper, allowing for that fact that the

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[1] http://www.guardian.co.uk/news/datablog/2011/aug/11/uk-riots-magistrates-court-list

typical motivation in Manchester may be different from the earlier incidents.

Background

The point of departure is a tenfold division, Table 1: Numbers Charged, according to IMD Score, produced by Carly Lightowlers and Ludi Simpson, of the Cathie Marsh Centre for Census and Survey Research, University of Manchester.[2]

Table 2: Numbers Charged, according to IMD Score

Decile group of IMD score	Number charged
1 (lowest scoring)	2
2	4
3	3
4	6
5	9
6	15
7	15
8	18
9	22
10 (highest scoring)	53
Total	**147**

The pattern that increasing IMD scores are associated with increasing numbers of people charged is obvious without further calculation. The next step is to look at the components of the multiple index to see whether specific aspects of deprivation are more or less associated with numbers charged. This is not the same as demonstrating a causal link. For example, if a homelessness indicator is highly correlated, it may be easier for the police to identify or catch homeless people even if they are committing no more crimes than the rest of the population. Nevertheless, wherever a link may be shown it is good grounds for considering what may be causing it. The most obvious theory would that people from areas with those characteristics were more likely to be involved in riots.

Most people did not riot. In any neighbourhood, even those containing a high number of riot suspects, only a minority took the opportunity to

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[2]   [Lightowlers, C. and J. Shute, in this volume of Radical Statistics.]

create a civil disturbance. According to BBC analysis[3], a higher than usual number of first-time (or previously uncaught) criminals took part. In comparison to general offenders, there was a higher proportion of people arrested in the riots with fewer than 15 previous offences; while those with 15 offences or over were under-represented. A version of the BBC graph is reproduced below[4]:
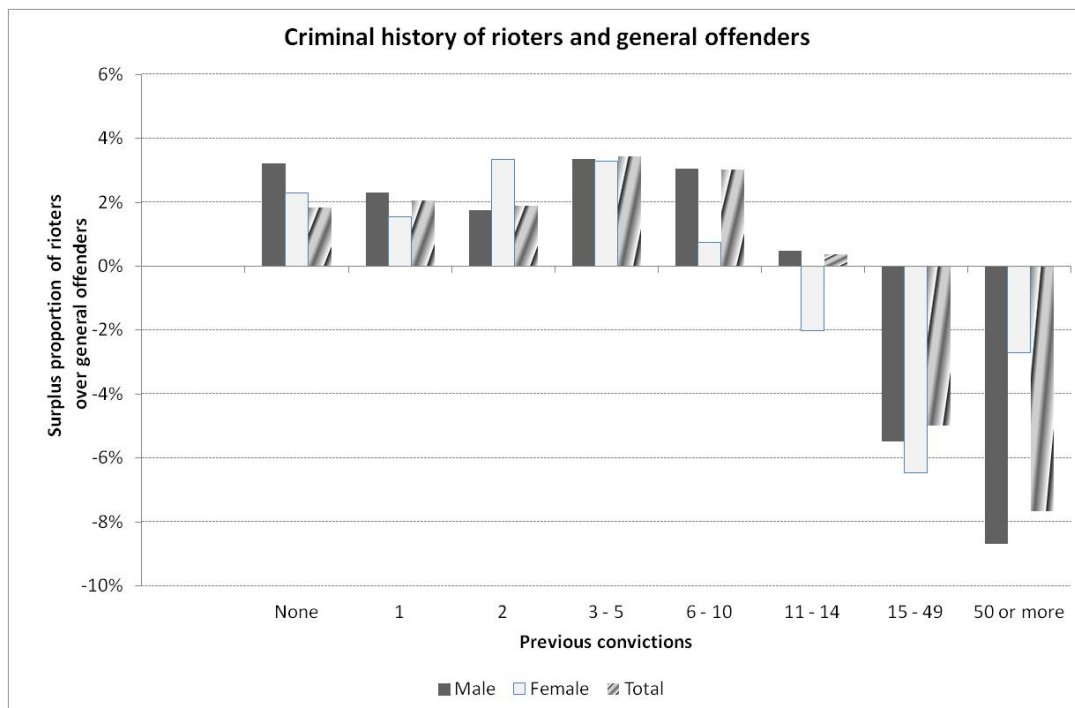
Many of the IMD2010 domains are correlated with each other. It is no surprise that areas without high levels of employment also suffer from low income, poor health and high recorded crime. A number of factors, like air quality, traffic accidents and housing barriers, can, however, affect different areas altogether. Sometimes, though not always, a small number of people could be deprived across multiple domains. The combined index is devised so that extremes in one domain are given an increased weighting in the overall index. But to see what domains of deprivation may have contributed to the riots we need to examine them, and do that on a consistent basis.

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[3]   http://www.bbc.co.uk/news/uk-14931987 , article by Dominic Casciani, 15th September 2011.

[4]   Source for data, tables 3.1 and 3.2 of Statistical bulletin on the public disorder of 6th-9th August 2011, Ministry of Justice, http://www.justice.gov.uk/publications/statistics-and-data/criminal-justice/public-disorder-august-11.htm

Consistent Comparisons

The aim is to compare any two indicators, for example area population and affordability of housing. We wish to determine whether areas where riot suspects reside are characterized more by their lack of affordability than by their high resident population. We have used many available indicators to rank the Lower Layer Super Output Areas ("output areas" or LSOAs for short), with the most deprived having low ranks, within the area bounded by the local authority districts of Manchester, Bolton, Salford, Rochdale, Stockport, Tameside, Bury, Oldham, Trafford and Wigan. Since all the suspects were from the Manchester region, we have discarded all output areas not within those districts. We have selected those output areas where riot suspects were known to reside and discarded the rest. Where more than one suspect lived in an output area, we have replicated that record to have as many records as suspects. The result is a reduced dataset, with a record for each suspect, identified, not uniquely, by an LSOA code and with ranking numbers for that output area's ranking within the Manchester region according to a variety of indicators.

Any two indicators could be compared by treating the sets of rankings for corresponding records as a paired sample. A Wilcoxon signed rank test permits the comparison. A single sample is formed by subtracting, for each LSOA record, the ranking under one indicator from the ranking under the other and testing how much positives or negatives predominate.

As a non-parametric test, the Wilcoxon test fits with the spirit of the indices of deprivation, which work by relative ranking and without attempting to impose a scale. It was calculated by taking the ranks for one area under two different indices, subtracting the second index's rank from the first and performing a single-sample test of the difference to estimate whether it had a median of zero. A positive estimated median, if coupled with statistical significance, suggested that the areas at the top end of the second index were more often home to riot suspects. Any repeat sample would, within limits of confidence, present a higher median of ranks from the second index than from the first.

The test requires that the samples come from a symmetrical population and are sampled independently. The population here is all the output areas of Manchester and the differences between where they rank according to the two indicators. For each pair of indicators, the populations show a high level of symmetry. As for independence, there is a question whether the presence of multiple suspects from single output areas counts as fully independent data. Where there is one suspect, others in the area may be easier to detect and charge. We

have treated all suspects in an output area as indepedent cases but other commentators may prefer to allow only limited replication or to allow each area only once. Minitab 14 commands for performing the test are also available to accompany the data.

Spreadsheet and Minitab Variables

Table 2: Spreadsheet and Minitab Variables lists the indicators considered in the study and the variable names used for reporting results.

Table 3: Spreadsheet and Minitab Variables

| Index, Domain or Neighbourhood Statistic	Raw spreadsheet variable	Comparison with Resident Population, 2010	Comparison with Index of Multiple Deprivation 2010
Income deprivation domain	INCOMESCORE	Pop_Income	IMD_Income
Employment deprivation domain	EMPLOYMENTSCORE	Pop_Employment	IMD_Employment
Health Deprivation and Disability Domain	HEALTHDEPRIVATIONAND-DISABILIT	Pop_Health	IMD_Health
Education, Skills and Training Domain	EDUCATIONSKILLSANDTR-AININGSC	Pop_Education	IMD_Education
Barriers to Housing and Services Domain	BARRIERSTOHOUSINGAN-DSERVICES	Pop_Housing	IMD_Housing
Crime Domain	CRIMEANDDISORDERSCO-RE	Pop_Crime	IMD_Crime
Living Environment Deprivation Domain	LIVINGENVIRONMENTSCO-RE	Pop_Living	IMD_Living
Sub-domain: Skills	SkillsSubdomainScore	Pop_Skills	IMD_Skills
Sub-domain: Geographical Barriers	GeographicalBarriersSubdo-main	Pop_Geographic	IMD_Geographic
Sub-domain: Wider Barriers	WiderBarriersSubdomainS-core	Pop_Wider	IMD_Wider
Income Deprivation Affecting Children Index	IDACIscore	Pop_Inc_Children	IMD_Inc_Children
Income Deprivation Affecting Older People Index	IDAOPIscore	Pop_Inc_Older	IMD_Inc_Older
Years of Potential Life Lost	ID2010YearsofPotentialLife	Pop_lifelost	IMD_lifelost
Comparative Illness and Disability Ratio	ID2010ComparativeIllness-and	Pop_illness	IMD_illness
Acute morbidity	ID2010Acutemorbidityindi-cato	Pop_acute_morb	IMD_acute_morb

Index, Domain or Neighbourhood Statistic	Raw spreadsheet variable	Comparison with Resident Population, 2010	Comparison with Index of Multiple Deprivation 2010
Mood and anxiety disorders	ID2010Moodandanxietydis-orde	Pop_mood	IMD_mood
Staying on in education post 16	ID2010Notstayingonineduc-ati	Pop_leaveschool	IMD_leaveschool
Entry to higher education	ID2010Notenteringhighered-uc	Pop_highereduc	IMD_highereduc
Affordability	ID2010Affordabilityindicator	Pop_afford	IMD_afford
Road distance to a GP surgery	ID2010RoaddistancetoaGPi-n	Pop_GPdist	IMD_GPdist
Sub-domain: Children and Young People	ChildrenYoungPeopleSubdo-main	Pop_childrensub	IMD_childrensub
Sub-domain: The 'indoors' living environment	IndoorsSubdomainScore	Pop_indoors	IMD_indoors
Sub-domain: The 'outdoors' living environment	OutdoorsSubdomainScore	Pop_outdoors	IMD_outdoors
Key stage 2 attainment 2007	averageks2pointscore	Pop_key2	IMD_key2
Key stage 3 attainment 2007	averageks3pointscore	Pop_key3	IMD_key3
Key stage 4 attainment 2007	averageks4pointscore	Pop_key4	IMD_key4
Secondary school absence 2007	Pupilabsencerate	Pop_absence	IMD_absence
Difficulty of access to owner occupation indicator 2007	Difficultyofaccesstoowneroc-cupat	Pop_owner_occ_07	IMD_owner_occ_07
Homelessness 2007	homelessness	Pop_homeless_07	IMD_homeless_07
Resident Population 2010	june2010population	N/A	IMD_population10
Lone parent benefit per thousand population February 2011	loneparentsper1000	Pop_lone_benefit	IMD_lone_benefit

Results

Comparisons with Resident Population

It is obvious that more populous neighbourhoods are more likely to house riot-suspects. Although the original LSOAs were broadly similar in population size, some have grown in the decade since they were defined. Neighbourhood statistics offer 2010 populations for LSOAs. The consequences of a neighbourhood's increase in density are complex. We do not investigate them here, except to state that an index has to demonstrate itself a more accurate predictor of riot suspects than mere size of population. The boxplot below shows how areas with people charged had greater populations. Outputs from the

Wilcoxon test comparing other indicators with population follow in Table 3 Results of Comparing Indicators with Resident Population. Among medians, fractions result from the presence of tied rankings.
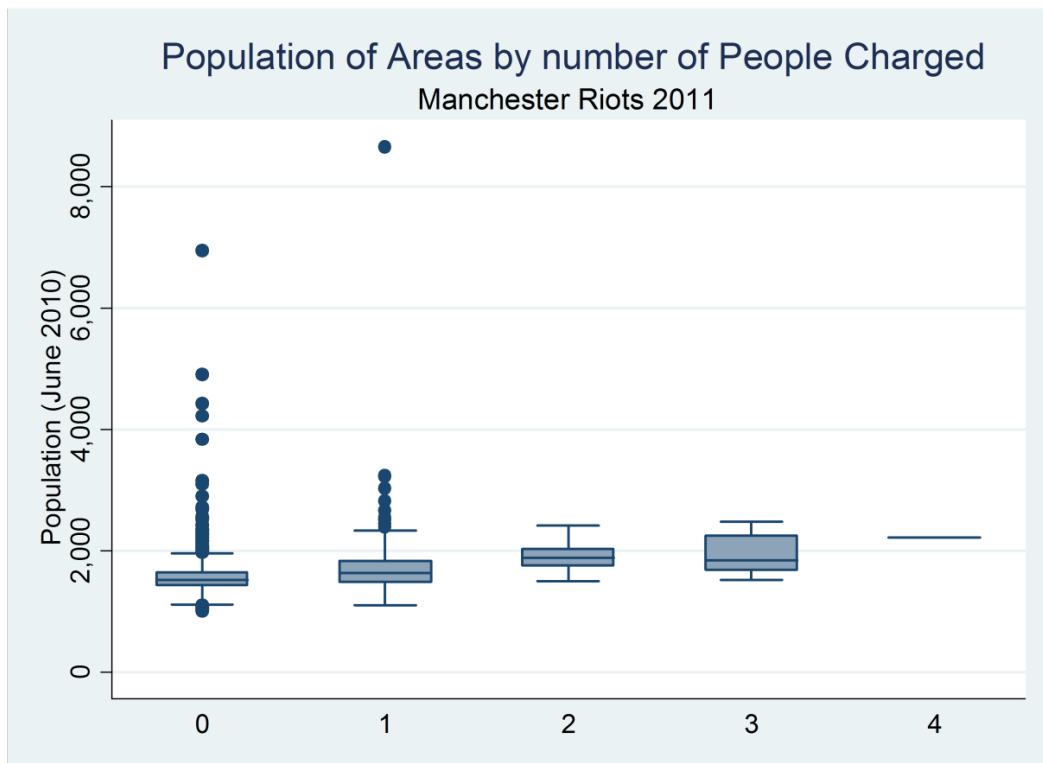
The Crime domain, compared to population, has an estimated median of -46.75. In other words, the IMD measure of crime in a locality was less accurate as a predictor than population. Crime was calculated from four variables – local rates of violence, burglary, theft and criminal damage. Our hypothesis is that the middle two will be far more closely associated with the riots that the outer two. This must wait to be tested until the data can be obtained from Communities and Local Government. It is also possible that, because the riots involved entry-level crime, attracting many people without a previous record, even past theft and burglary may remain poor predictors.

Table 4: Results of Comparing Indicators with Resident Population

	Wilcoxon Statistic	Estimated P	Median
Pop_Income	6205.5	0.101	57.63
Pop_Employment	5445	0.992	1.25
Pop_Health	6303	0.095	67
Pop_Education	5421	0.973	-1.25
Pop_Housing	4594	0.102	-49.25

Pop_Crime	4747	0.181	-46.75
Pop_Living	3431	0.000	-206.5
Pop_Skills	4692.5	0.149	-87.38
Pop_Geographic	1372	0.000	-584.5
Pop_Wider	7566	0.000	107.5
Pop_Inc_Children	7118	0.001	110.8
Pop_Inc_Older	6344	0.08	46.75
Pop_lifelost	6325.5	0.087	66.75
Pop_illness	6211.5	0.135	59.5
Pop_acute_morb	5062.5	0.467	-31.5
Pop_mood	5120.5	0.539	-33.38
Pop_leaveschool	3936.5	0.005	-172.4
Pop_highereduc	4206.5	0.017	-141.1
Pop_afford	7564	0.000	119
Pop_GPdist	1427	0.000	-600.5
Pop_childrensub	6179	0.153	56.75
Pop_indoors	2942	0.000	-323.8
Pop_outdoors	4474.5	0.062	-77.5
Pop_key2	5581	0.784	10.75
Pop_key3	6443	0.052	65
Pop_key4	6256	0.114	54.5
Pop_absence	6815	0.008	94
Pop_owner_occ_07	5563.5	0.810	6.875
Pop_homeless_07	2654	0.000	-284.8
Pop_lone_benefit	6126.5	0.184	53.38

Among the major indices, Income and Health show themselves as better predictors than population alone, with positive estimated medians (57.63 and 67.0) at close to 90% significance. Income is largely defined in terms of receipt of benefits. The technical report defines it thus:

> *The indicator is the number of adults and children in an LSOA living in families claiming Income Support, income-based Jobseeker's Allowance or Pension Credit (Guarantee), for August 2008.[5]*

The component indicator for income deprivation affecting children, abbreviated to IDACI, shows the strongest association of all, with an estimated median of 110.8 and scant doubt of its statistical significance. This represents a high proportion of households with children receiving benefits in the study year of 2008. Looking more specifically at lone parent benefit data, available from Neighbourhood

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[5]   The English Indices of Deprivation 2010: Technical Report, Communities and Local Government, 2011,
http://www.communities.gov.uk/documents/statistics/pdf/1870718.pdf

Statistics, did not suggest any closer association. Riot suspects came from areas with high proportions of children dependent on benefits, a relationship greater than found for any other measure in this study.

Health measures yielded little extra detail. The domain index, properly Health Deprivation and Disability Domain, is an aggregation of standardized measures of premature death, morbidity and diasbility and emergency hospital admissions, plus the adult rate of mood and anxiety disorders. The general, chronic measures of life lost and illness were better predictors than acute morbidity and mood disorders. These measures of health are already closely correlated with income.

The Employment (or rather unemployment) Domain offers scarcely any improvement over population as a predictor, but receives a much higher estimated median (1.25) than Skills (-87.38), which is a component of the Education Domain. It is a combined count of out-of-work benefits and participants in the New Deal programme. It is a fair guess that converting skills into jobs has an effect on reducing the temptation to riot. Comparing Employment Deprivation with population growth is a separate issue. Unemployment has grown in the same areas where extra people are resident, which is a reminder that communities need work as well as accommodation.

The effect of Housing ("Barriers to Housing and Services Domain") by itself is vague. It combines "Geographical Barriers", distances to facilities like a primary school or GP that are seldom a problem in urban areas, with "Wider Barriers", overcrowding, homelessness and affordability. Separating the geographical barriers (negative estimated median) from the wider barriers (estimated median 107.5) suggests that it is a warning sign if people cannot pay for their own housing. Drilling down one level further, affordability appeared to count more than homelessness. Specifically this was the proportion of households under 35 in 2008 with too little non-benefit income to buy their own houses. It was less fine-grained than some measures, with all LSOAs in a local authority district having the same score. Overcrowding and homelessness, measured in terms of successful applications for assistance, contributed some more locally specific information, but without statistical significance.

The Living Environment Deprivation Domain revealed very little of interest. The outdoor element of air quality and traffic accidents may be expected to contribute less than the indoor element of poor housing and heating but the reverse was true. Indeed, areas with poor housing conditions showed less of a relation to riot suspects than did the wider barriers of affordability.

With regard to Education ("Education, Skills and Training Deprivation Domain"), neither leaving school as soon as permitted nor missing out

on Higher Education suggested themselves as likely predictors of rioting. Both had large negative estimated medians, as compared to population. Key stages results, from Neighbourhood Statistics, showed no strong pattern and were submerged by other factors. Neighbourhood statistics offers a further comparison, not directly available with the IMD data, in the form of school absence rates from 2007. These show a close relation to the addresses of riot suspects, with an estimated median of 94. That means that among the sample of LSOAs that were home to riot suspects, the median rank of school absence was 94 places higher than the median rank of population size, from a population of 1,647 areas. Typically, one would have to look 94 places further up the LSOAs in population order to find as many riot suspects. It is enough to warn us that absentees from school, or the people contributing to others' absence, may look for criminal opportunities in later years.

Comparison with Index of Multiple Deprivation

The Index of Multiple Deprivation, heavily weighted towards receipt of benefits, was an improvement, though without great statistical significance, on population. In a comparison with the IMD, the same indicators continued to suggest themselves. Results are in Table 4 Results of Comparing Indicators with Index of Multiple Deprivation. Wider barriers to housing, including affordability, school absence and income affecting children, remained top of the list. Comparing those to each other, with results summarized in Table 5: Comparisons between Best-Performing Indicators, found housing barriers ("Wider") top, followed by children on benefits ("Inc_Children") then absence from school ("Absence"). General health ("Health") was some way behind. In Table 5, a positive median favours the second-named indicator.

Table 5: Results of Comparing Indicators with Index of Multiple Deprivation

	Wilcoxon Statistic	Estimated P	Median
IMD_Income	5196.5	0.640	-3.5
IMD_Employment	2801	0.000	-51.5
IMD_Health	5956	0.318	9.5
IMD_Education	3942.5	0.004	-52
IMD_Housing	3236	0.000	-123
IMD_Crime	3604.5	0.000	-92.5
IMD_Living	2857.5	0.000	-238
IMD_Skills	2639	0.000	-125
IMD_Geographic	829	0.000	-664.5
IMD_Wider	6674.5	0.017	54.88
IMD_Inc_Children	7815.5	0.000	45.5

IMD_Inc_Older	5430.5	0.988	-0.5
IMD_lifelost	5503.5	0.902	1.5
IMD_illness	5617.5	0.345	8
IMD_acute_morb	4083.5	0.009	-55
IMD_mood	3213	0.000	-86
IMD_leaveschool	3088.5	0.000	-223.5
IMD_highereduc	2753	0.000	-198
IMD_afford	6411.5	0.018	74
IMD_GPdist	883	0.000	-680.5
IMD_childrensub	5620	0.727	4
IMD_indoors	2277.5	0.000	-361
IMD_outdoors	3866.5	0.007	-94.75
IMD_key2	4187.5	0.016	-50
IMD_key3	5072.5	0.769	-4
IMD_key4	5697.5	0.618	7.375
IMD_absence	6440.5	0.053	42.75
IMD_owner_occ_07	5005	0.402	-28.25
IMD_homeless_07	1512.5	0.000	-317.8
IMD_population10	4715	0.162	-52.38
IMD_lone_benefit	5839.5	0.355	14.38

Table 6: Comparisons between Best-Performing Indicators

	Wilcoxon Statistic	Estimated P	Median
Afford_Absence	4862	0.565	-13
Afford_Wider	6028	0.255	13.5
Afford_Inc_Children	5181	0.619	-12
Afford_Health	4329	0.032	-54
Absence_Wider	5949	0.324	21.75
Absence_Inc_Children	5729	0.576	13.75
Absence_Health	4600	0.105	-28
Wider_Inc_Children	5412	0.959	-0.375
Wider_Health	4168	0.014	-55
Health_Inc_Children	6965.5	0.003	44.5

Inferences

At this stage, the inferences begin to look quite stark. On the basis of 147 suspects in the Manchester area, we can see a statistically significant pattern, showing that they come from areas with high numbers of young families receiving benefits, where large proportions of people are living in subsidized housing and where students are disproportionately likely to miss lessons. Those 147 cannot be responsible for the whole picture of deprivation in their areas since the sample has at most four people out of 1,500 or more in a LSOA. It is possible that the suspects came from areas where others showed these

three characteristics, but there is also a distinct possibility that the suspects fit the description themselves. Other areas of England can provide data to test this pattern in general terms. Tottenham may be different, depending on other causes of disturbance. It is also possible for people with access to individual linked data to test the hypothesis that many rioters (not quite the same as the suspects in this study) preferred to improve upon their benefits not by study at school but by acquisitive crime. The people sharing their neighbourhoods with riot suspects, obviously would welcome more opportunities for legitimate employment, but there is a case also for giving them protection from the rioters themselves.

Discussion

These inferences were drawn before discovering the Ministry of Justice's analysis, based on known individual characteristics of the rioters themselves.[6] The analysis has tended to confirm both assumptions and conclusions. Offenders were predominantly young and their offences acquisitive. High proportions nationwide were claiming benefit, including 20 per cent on Job Seekers' Allowance and equal numbers on other benefits. Many but by no means all (42 per cent) of the school-age participants were eligible for free school meals. Explicitly (table 4.10a) 10 to 17 year olds before the courts were shown to have come from areas with high levels of Income Deprivation Affecting Children. This was true nationally, as well as in both London and Manchester. School absence rates from the National Pupil Database (table 4.12.a) were more than double the national norms, especially for unauthorized absence. Rates of exclusion were high too.

The remainder of this paper attempts to put the numerical findings into context. Affordability of housing scored highly but the input data were only at the level of local authority district. This may suggest a limit on how fine-grained our results may be or it may imply that the effect of affordability, though actually greater, was obscured by the lack of detail. If choosing where to buy a property, people often consider the whole extent of a local authority district. A mismatch between high prices and low incomes may well cross the boundaries between Super Output Areas, but would be expected to be a greater deprivation in areas of locally lower incomes. There it would show up as greater overcrowding, homelessness, or a greater level of subsidy to allow people to remain. If people cannot in any way afford to stay in an area then they will naturally drop out of the statistics.

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[6]   Statistical bulletin on the public disorder of 6th-9th August 2011, Ministry of Justice, http://www.justice.gov.uk/publications/statistics-and-data/criminal-justice/public-disorder-august-11.htm

The data show that the riots were interwoven with patterns of deprivation. However, as stated several times, most people, however deprived the area, did not riot. Before summing up how the deprivation affected the rioting, it is helpful to reflect on what else may have prompted people to depart from the societal norm.

Anatomy of opportunity

Carly Lightowlers and Jon Shute have made a remarkable contribution to the discussion on the riots, specifically in Manchester but with useful implications at the national level. Their data collection allows many claims about the environmental and structural contributions to the disorder, previously a matter of untamed opinion, to be tested empirically. At the same time, we feel that some of the analysis lacks an appropriate focus on the transmission mechanisms between social facts and the actions observed in August 2011. Importantly, the analysis underplays the role of opportunism and individual agency during the riots and, as a result, fails to explain the pattern of criminal activity as it unfolded. This has implications for whether sentencing policy was really too harsh or likely to be ineffective at reducing crime in the future.

In the following analysis, we attempt to offer an alternative interpretation that discusses the initial spread of the rioting, some of the underlying causes, as well as what might constitute an appropriate and fair criminal justice response.

'Moment of madness'

Our analysis begins with the assumption that street crime and disorder represent a field of dynamic and strategic action. By this, we mean agents (both police, civilians and potential offenders - these are not necessarily exclusive categories) observe a local situation and act according to what they believe will best achieve their own ends while avoiding bad consequences. Their ends could constitute excitement, entertainment or material gain. Bad consequences include things such as punishment or injury. These individual decisions, in turn, add to and change that situation, presenting a new set of opportunities to the same and to other agents.

The main questions, on this account, are what draws people into this field where they may have the opportunity to participate in crime, and what influences that final decision to commit crime or to refrain. A substantial body of quantitative evidence suggests that potential offenders respond to the likely cosequences of their crimes. Studies have suggested that potential offenders respond to the threat of being

detected[7] or convicted.[8] Potential offenders are also affected negatively by the number of police available in a district,[9] as well as police hot spots, that is, increased presence in a given neighbourhood.[10] A common outcome of this research, whether in a local analysis or a higher level of aggregation, is that individuals have been shown to become substantially less likely to commit crime when the threat of detection is more credible.

A riot presents a special case, where police are visibly under strain and the (perceived) probability of committing crime without being detected increases substantially. The dynamic nature of the situation means that a riot, after it is triggered, can almost become its own cause. Every additional crime committed makes the arena safer for the potential offender to participate and harder for the police to control. This explains the spiral in August 2011 from broken windows, to opportunistic thefts, and finally to arson.

This cyclical phenomenon may have been bolstered by mediated observation; a likely factor considering the national spread of the riots. Individuals watching BBC News 24 or logging onto Twitter may have seen and heard evidence of police standing nearby while looting was taking place. This may have temporarily reduced the immediate deterrent value of police presence in itself, necessitating the more robust policing approach that was associated with the end of the disorder.

Some analysis has suggested that the riots represented a 'moment of madness' for those who participated,[11] also a classic phrase used by politicians when apologizing for acts they later regretted. We think it is certainly plausible to describe this as a fundamentally transient phenomenon, unlikely to repeat in the absence of a particular trigger. However, we are not sure if it is helpful to attribute to 'madness' what could be more parsimoniously attributed to rational calculation. When the threat of sanction was low, more people than usual were prepared

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[7] Siddhartha Bandyopadhyay & Samrat Bhattacharya & Rudra Sensarma, 2011. "An Analysis of the Factors Determining Crime in England and Wales: A Quantile Regression Approach," Discussion Papers 11-12, Department of Economics, University of Birmingham.

[8] David P. Farrington and Darrick Joliffe, (2005) in Michael Tonry (ed) Crime and Justice: Crime and Punishment in Western Countries, 1980--1999 v. 33 (Crime and Justice: A Review of Research), University of Chicago Press, p. 70.

[9] Robert Witt, Alan Clarke and Nigel Fielding (1999), 'Crime and economic activity. A panel data approach', British Journal of Criminology, (1999) 39 (3): 391-400.

[10] Braga AA, 'The effects of hot spots policing on crime', Campbell Systematic Reviews 2007:1.

[11]

http://www.cabinetoffice.gov.uk/sites/default/files/resources/The%20August%20Riots%2 0in%20England%20%28pdf,%201mb%29.pdf

to commit crime. This is consistent with the fact that a higher proportion of offenders with no previous convictions decided to participate in rioting than participate in offending in general. These are individuals with a lower tolerance for risk of detection than the average offender and so are motivated to engage in crime only when the environment seems to offer a 'safer' opportunity to do so.

So, one key cause of the extent of the riots was a lack of robust policing on the streets. The solution would have been a more visible and pro-active police presence in the early stages of the riots. Besides resulting in fewer victims of crime, this would have actually benefited the pool of potential offenders as well. Dissuaded from participating in crime, their lives would have been less likely to be disrupted by resulting judicial proceedings which have also put their opportunities for future employment at risk. Prevention is certainly preferable to punishment.

Social Determinants

While Lightowlers and Shute emphasize the role of poverty in causing crime in general and the riots specifically, we think this does not always fit the available facts, and that a greater focus on causal mechanisms is required. For example, they cite Wilkinson and Pickett as evidence that relative deprivation is responsible for higher rates of crime. Wilkinson and Pickett's evidence amounts to a series of cross-country correlations between income inequality and various social characteristics (including crime). They assume, without demonstrating, that the association is causal and that the causality runs always from inequality to the undesirable social characteristic. In fact, criminal activity could be the independent variable in some cases, since criminal careers rarely provide a stable income and are not associated with the high human capital (education and work experience) that is required for well-paid employment in developed nations. In essence, Wilkinson and Pickett's research displays a high degree of what Daniel Little calls 'monocausality': a focus on a single nominal variable without looking at how that variable is likely to influence social outcomes through social mechanisms.[12]

Moreover, the poverty explanation for crime is inconsistent with Lightowlers and Shute's own claims regarding 'more powerful sections of our society who have been engaged in fraudulent and criminal behaviour'. If poverty were a key determinant of crime, we would expect white collar crime to be very rare indeed, but, of course, that is far from the case. We might also be surprised to see such a large number of low-income individuals remain as law-abiding as they are.

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[12] http://understandingsociety.blogspot.com/2011/07/income-inequalities-and-social-ills.html

Even in lower-income groups, criminal behaviour is the exception rather than the rule.

The MPs' and Peers' expenses scandal, where it has emerged that a proportion of all parliamentarians have engaged in unlawful practices, with a smaller proportion having been convicted, presents a significant challenge to the structural explanation of crime. MPs are afforded a remarkably high status and salary, as well as the promise of a reasonably stable income into retirement. Yet a substantial number of MPs have engaged in theft and fraud for pecuniary gain. What is the explanation for this behaviour? A plausible answer seems to be that the opportunity presented itself, and that they developed an expectation that they were unlikely to be detected or punished.

These events seem more consistent with an opportunistic account of criminal behaviour than with a structural account. High-income individuals do not necessary refrain from committing crime; instead they commit different kinds of crime, crimes that are made easier by their positions of trust, power and authority. MPs may not be typically representative of high-income individuals. Politics rarely rewards honesty and probity. Nevertheless, the idea that deprivation alone explains crime seems terribly lacking given what we now know.

Deterrence and Sentencing

Lightowlers and Shute also attempt to compare the treatment of higher-status criminals, involved in, for example, banking, politics and journalism, and the lower-status offenders involved in the rioting, claiming that the rioters received disproportionate punishment. This is not borne out by the facts, at least not straightforwardly. Their own data suggest that rioters receiving a custodial sentence were given an average of 5.1 months, compared with 2.5 for regular offenders. By contrast, the MPs and peers jailed so far have received sentences of between 9 months and 18 months. This suggests that judges are prepared to give exemplary sentences when the crime is compounded by its public nature and the abuse of trust. These sentencing decisions have been undercut by administrative discounts, not all of which rioters would be eligible to receive as well. But this hardly suggests bias amongst the judiciary in favour of higher-status offenders.

Lightowlers and Shute further imply that the increased sentence severity of sentences for rioters was a knee-jerk reaction. In fact, treating offences that contributed to public disorder more severely is an established practice amongst judges and magistrates. Current sentencing guidelines explain:

> • *Where offences of violent disorder are committed in the context of wider public disorder, it is appropriate to pass a deterrent sentence.*
>
> • *Such a context adds gravity to the offence and therefore the individual acts by the offender cannot be considered in isolation when passing sentence.*[13]

This might not be the best of all possible sentencing practices, but it is certainly not an unprecedented or unreasoned decision by judges and magistrates. Lightowlers and Shute further claim that the evidence for the deterrent values of custodial sentences is weak. We contest this: evidence reviews have tended to suggest that the deterrent value of sentencing is present in a number of circumstances.[14] Evidence from one natural experiment in Italy has demonstrated the effectiveness of prospective harsher sentences on reducing likelihood of re-offending,[15] as well as suggesting a transmission mechanism for lowering criminal propensity: through local communities and social networks.[16] In other words, individuals given a specific credible threat of incarceration, should they be convicted of a subsequent offence, appear to have an indirect effect on their peers, discouraging them from engaging in criminal activity. Nor does quantitative analysis of former prisoners in the UK suggest that longer sentences translate into a greater propensity to commit crime on release. The opposite appears to be the case, according to a 2011 Ministry of Justice study.[17]

Taken together, this suggests that exemplary and public sentences in a local district could, in fact, contribute to future crime prevention. This is not to suggest anything as simple as "the harsher the better", but the evidence suggests that willingness to punish opportunistic criminal behaviour can play an important part in reducing crime, as much as it is to be regretted given that much of the crime could have been prevented at an earlier stage through an enhanced police presence.

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[13] http://sentencingcouncil.judiciary.gov.uk/docs/web_case_compendium.pdf

[14] Steven N. Durlauf and Daniel S. Nagin, the Deterrent Effect of Imprisonment, http://economics.uchicago.edu/pdf/durlauf_060710.pdf

[15] Francesco Drago , Roberto Galbiati , Pietro Vertova , 'The Deterrent Effects of Prison: Evidence from a Natural Experiment'*, Journal of Political Economy*, 2009, vol. 117, no. 2.

[16] Francesco Drago and, Roberto Galbiati, 'Indirect Effects of a Policy Altering Criminal Behaviour: Evidence from the Italian Prison Experiment', forthcoming in: American Economic Journal: Applied Economics:
http://www.iza.org/en/webcontent/publications/papers/viewAbstract?dp_id=5414&menu Triggered=true&noPageLoaded=true

[17] 2011 Compendium of re-offending statistics and analysis, *Ministry of Justice,* Statistics bulletin, 10 May 2011

Concluding Remarks

We are not attempting to demonstrate any link between deprivation and criminality. At most we are hinting that, among people willing to contemplate breaking the law for personal advantage or enjoyment, the August 2011 riots in Manchester were more attractive to people at the deprived end of the scale. Sheer poverty by itself was not the link. Important parts of the Index of Multiple Deprivation are measured in terms of benefits received. If high levels of dependence match high relative levels of participation in the riots, it can imply that the benefits are too low to alleviate poverty or that it is the expectation of receiving them that is the problem. It may be true that for the law-abiding majority benefits are too low. Our question concerns not them but those that saw the riots as an opportunity for looting with impunity. The most likely participants were from those areas where high proportions of children lived in households receiving means-tested benefits, where high proportions were absent from school and from the boroughs where house prices were unaffordable without subsidy. If legitimate means of self-advancement can be made available, these stand to benefit the whole population. The riot presented an illegal means, of greatest appeal, so these data suggest, to people that regarded welfare payments not as a safety net but as an entitlement. In restoring law and order, the police performed a service to the whole community. Had they acted sooner to deter the riots, they might also have performed a service to the rioters, by dissuading them from entry-level crime.

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