An Analysis of Crime and Crime Policy

Siddhartha Bandyopadhyay

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Siddhartha Bandyopadhyay[1]

Department of Economics, University of Birmingham

About the Author

Dr Siddhartha Bandyopadhyay is Lecturer in Economics at the University of Birmingham and an internationally recognised scholar in political economy, public choice and development issues. He holds degrees from the Universities of Calcutta and Delhi, and has a PhD from Pennsylvania State University. His work has been published by the Royal Economic Society and in the European Journal of Political Economy.

Introduction

Crime and crime policy are never far from the public policy domain. There is heated debate among politicians, policy makers, law enforcement officers and the general public about what is the best approach for tackling crime. Even within the same political party there is disagreement. For example, in what was his first major speech since he took office, the Justice Secretary Ken Clarke said prison was often 'a costly and ineffectual approach that fails to turn criminals into law-abiding citizens'[2]. He went on to talk about the need to address the underlying causes (economic and sociological) of criminal behaviour. This view was immediately contested by his fellow Conservative and former Home Secretary Michael Howard (who said he stood by his long standing view that 'prison works').

In this note, I try to provide an analysis of some empirical findings on what deters crime based on some recent research in which I have been involved. I then go on to point out what we don't know and point out fresh challenges that law enforcement may face from deep budget cuts and having to comply with EU legislation. In the concluding section, I summarize our findings and touch briefly on complementary methods of crime fighting such as citizen reporting which have not been rigorously examined. Although this analysis does not provide an overview of recent work in the economics of crime (that would fill an entire book!), it explains some key issues of my recent research.

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[2] See http://www.bbc.co.uk/news/10457112 for details.

Determinants of crime in England and Wales: a panel data analysis [3]

Background and methodology

We explore which factors affect criminal behaviour in England and Wales using a detailed panel dataset. Our data has two parts - a cross-sectional part which comprises the 43 police force areas and a time series part which looks at these same police force areas over time starting from 1992 till 2008. This is called panel data and is very useful for our analysis.

Using a panel we can understand the factors across time which vary and thus affect crime rates as well as account for the differences across regions (in our case police force areas) which leads them to have different crime rates. To use a bit of jargon, panel data tracks the same units of observation (in our case police force areas) over time and has very important advantages over using time-series data (which does not capture the variation across regions) or purely cross section (which looks at various units of observation at one point in time and thus cannot be used to capture effects across time).

This is particularly important if we are to ascribe a cause-and-effect relationship to factors explaining differences in crime rates across regions. For example, an important question in the crime literature is whether a higher crime detection rate in a neighbourhood lowers the crime rate. We can't simply conclude on the basis of a simple positive relationship of detection rates and crime across areas that higher detection rates lower crime as the areas may have various observable and unobservable differences. While controlling for the observables (i.e. those variables for which we have data) is relatively simple, a nagging issue in disentangling such effects is the presence of variables which may be affecting both crime rates and policing but for which we don't have data.

Examples of such an unobserved variable could be police efficiency or a lower tolerance rate of crime which could vary across regions but cannot be directly observed by the researcher. In that case, a negative relationship between higher crime detection rate and crime observed in the data could simply be reflecting the lower tolerance level for crime in a given neighbourhood. This is where the availability of panel data becomes very useful. Using statistical techniques on panel data, one can separate out the differences in unobserved characteristics across neighbourhoods, thereby enabling us to analyse whether a higher detection rate truly reduces crime in a neighbourhood.

Furthermore, panel data also allows a researcher to model the evolution of a crime rate over time. If recidivism (repeat offending) is an important factor in explaining crime rates, then including a lagged crime rate as one of the variables that explains the current crime rate is a justifiable modelling technique which can only be used if we have both time-series and cross-section components. Using appropriate panel estimation techniques one can also

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[3] This is based on Han, Bandyopadhyay and Bhattacharya (2011)

handle better the potential problem of reverse causality i.e. a correlation of X with Y may imply that Y is causing X rather than X is causing Y. The same is especially true when we want to look at crime and some measures of policing. A simple plot of the data of police manpower per capita *vs.* crime rates may show a positive relationship suggesting that higher policing may cause higher crime! As one would expect, the causality lies in the opposite direction: higher crime causes higher deployment of police force. Such reverse causality can usually be corrected for using appropriate panel techniques and can thus greatly aid our understanding of correctly identifying the determinants of crime.

We look at the impact of a number of law enforcement and socio-economic variables. Further, we look at whether past values of crime affect current crime.

Main findings

In our analysis we find a strong and negative relationship between detection rates and crime. In fact, our results show that an increase of 1 per cent of the detection rate leads to 0.11 per cent decrease in burglary, a 0.20 per cent decrease in theft and handling and a 0.14 per cent decrease in fraud and forgery. Even for violent crime, detection rates have a significant deterrent effect. We find that an increase of 1 per cent of the detection rate leads to a 0.21 per cent decrease in violence against the person, a 0.34 per cent decrease in robbery and a 0.12 per cent decrease in sexual offences.

Table 1: *Average reduction in crime associated with 1% increase of detection rate (%)*

Crime Type	Crime Rate reduction (%) for increase of 1% of the detection rate
Burglary	0.11
Theft and Handling	0.20
Fraud and Forgery	0.14
Violence against the person	0.21
Robbery	0.34
Sexual Offences	0.12

Translated into numbers of offences this represents a significant number of crimes which are deterred because of the fear of detection. For example, a 1 per cent increase in detection of burglary means that the detection rate increases from 16.9 to 17.1 per cent.

Even this small improvement causes an average 0.11 per cent decrease of burglaries committed nationwide, which represents a total of around 1000 fewer burglaries than in an average year. This can be interpreted as the number of burglaries deterred following a 1 per cent increase in average detection.

An illustration of the impact that successful police detections have on criminality can be shown by estimating their effects on an average year. This is a year with average national crime rates and average national detection rates and is calculated as the mean of the years 1992-2008. Modest increases in detection are associated with visible reductions in crime. Table 2 shows how many crimes are prevented by an increase of 1 per cent of the detection rate. Table 3 shows how many crimes a 1 percentage point increase in the detection rate (a more ordinary measure of increased police effectiveness) prevents.

Table 2: *Number of estimated additional crimes detected and prevented by 1% increase of the average national detection rate*

Crime Type	National Detection rate (average from 1992-2008)	National Detection rate if increased by 1%	Additional crimes detected nationwide	Estimated crimes prevented
Burglary	16.93%	17.10%	1400	1000
Theft and Handling	19.84%	20.04%	3500	4500
Fraud and Forgery	33.47%	33.81%	640	310
Violence against the person	55.61%	56.16%	2700	1300
Robbery	19.99%	20.19%	110	280
Sexual Offences	49.62%	50.12%	190	50

Table 3: *Number of estimated additional crimes detected and prevented by 1 percentage point increase in average national detection rate*

Crime Type	National Detection rate (average from 1992-2008)	National Detection rate if increased by 1 percentage point	Additional crimes detected nationwide	Estimated crimes prevented
Burglary	17%	18%	8200	6000
Theft and Handling	20%	21%	17600	22500
Fraud and Forgery	33%	34%	1900	940
Violence against the person	56%	57%	4800	2300
Robbery	20%	21%	530	1400
Sexual Offences	50%	51%	370	100

Our results, while surprising to those who maintain that policing is an ineffective tool against crime, should be reassuring to those who believe that criminals respond to incentives. Further, as there is a persistence of crime rates over time, past values of crime are good predictors of current crime rates.

While detection works as a deterrent, the relationship between prison population and crime is not so strong according to our analysis. This might be because prison is not an effective deterrent for some crime types. It is also possible that our prison population variable, which does not disaggregate prison sentences by crime type or locality, is not sufficiently fine-tuned to measure a consistent effect.

What is more surprising is that economic variables which are thought to be important such as the unemployment rate, wage rate and the proportion of young people in the population are not significant across all crime types and often have a counterintuitive sign. Both unemployment rates and wages have a positive impact on various economic crimes and,

contrary to the perception that most criminals are young people, the proportion of young people in the population does not seem to affect most crime rates. The relative lack of an association or counterintuitive signs of these socio-economic measures are not so surprising though when one examines the incentives for criminal behaviour carefully. Higher wages may imply higher opportunity for work in the non-criminal sector but it also implies that there are more lucrative opportunities for committing crime. Thus, the net effect could go either way. Indeed, the impact of an increase in average wages does not indicate whether living standards are going up for everyone. Increased average wages accompanied by growing inequality may well lead to increased crime.

Unresolved issues

In future work we will look at how changes in earnings for different income groups affect property crime. If one believes that people at the lower end of the wage distribution have more incentives to commit crime, it would be interesting to look at changes in wages or earnings of the low end of the income distribution (as in Machin and Meghir, 2004) using our time period to see if we can replicate their findings of a negative effect of increased wages in the lowest quarter of the population on property crimes. Again, from the point of view of criminal incentives, the effect of unemployment is ambiguous. While it lowers the opportunity cost of staying crime-free, if accompanied by a general decline in the economy, crime opportunities may also decrease because there is less to steal.[4]

Contrary to the perception of young people being mainly responsible for crime, we find they have in general no statistically significant impact. The perception that young people are more crime-prone is rationalized by suggesting that the younger people have, on average, lower earnings than their older counterparts. Therefore, if caught, they have less to lose when it comes to foregone earnings. Moreover, the penalty associated with committing crimes is probably lower for younger people than their older counterparts because they usually receive a lenient punishment, and if they are under 18, their criminal records will be sealed by the age of 18. As a result, the proportion of young people in the population could be positively correlated with crime rates in later empirical analyses. However, against this one can argue that young people could also be deterred from committing crime as their future labour market opportunities could be negatively affected by their criminal records. Hence, the net effect of the proportion of young people on crime could be ambiguous and we do not necessarily expect a positive sign between this variable and the crime rate. Thus, a lack of statistical association could imply that the two opposing forces cancel each other out.

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[4] See Bagchi and Bandyopadhyay, 2011 for a theoretical analysis of the problem.

In summary, the findings that law enforcement variables matter should come as no surprise but it is worth emphasizing given that a number of people have often looked at raw correlations which have suggested that policing has little impact on crime. Our panel data methods allow us to separate such correlation from causation and once we apply appropriate techniques we get a strong significant effect of law enforcement variables. In particular, even crime rates for categories which are not committed for economic gain respond strongly to increased detections rates as we have discussed earlier, strongly suggesting that criminals respond to incentives. Further, the significant lagged values for crime suggest a strong persistence in crime rates over time. Thus, improved detection rates not only have a direct impact by reducing current crime; they also lower future crime. Hence, the welfare gains from effective policing can be enormous. The impact of socio-economic variables, as we see, is more complicated, and the net impact of the various channels by which the socio-economic variables affect crime could be positive or negative.

While our analysis strongly suggests that law enforcement has a deterrent effect on crime, there are still many things we would like to know. The fact that socio-economic variables have a complicated relationship with crime suggests that we need more information on the distribution of wages for instance to understand when economic growth has a positive impact in lowering crime. Further, could some of the regional variation across police force areas be explained by differences in efficiency across police forces? How do sentencing policies affect crime? Do tougher sentences lead to lower crime or does increased jail time increase recidivism by lowering the ability of convicted criminals to work in the non-criminal sector? An answer to these questions would greatly aid our understanding of how optimally to design crime policies. I turn in the next section to two new challenges that will have to be tackled by law enforcement officials in the UK.

New challenges

As we see, law enforcement variables have a very significant impact in deterring crime. The finding that increased detection rates have a strong impact in deterring crime implies that long or increased prison sentences may not be the only way to prevent crime. In view of that, there is some justification for the serious concerns that have been expressed about the cuts to the police budget. Would lowered policing expenditure lead to a lowered detection rate and hence increased crime? Indeed the perception that police are stretched may encourage criminals to commit more crime which would indeed stretch the police.[5] The government has suggested otherwise, pointing out that there is a lot of scope for efficiency savings. The suggestion is that if the worst performing forces could reach the standard of the best performing ones, one could easily cut 12 per cent of the budget without losing out

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[5] The idea that expectations about probability of detection can play an important role in explaining differences in crime rate has been explored by various people e.g. Fender, Glasear et. al and Sah among others.

on services. However, questions remain about how one measures efficiency: how does one develop a sensible measure of efficiency taking into account that different police forces are not comparable in that they face very different populations with different crime propensities? Using the latest quantitative techniques, Dr. Rudra Sensarma (University of Hertfordshire) and I are developing a 'net ranking' of the police forces after separating out factors within the control of a police force from those outside its control. This will enable us to understand the scope of efficiency savings and thus whether or not the funding cuts can be made up by efficiency savings.

Another challenge facing law enforcement is how the inflow and outflow of migrants following EU integration changes the determinants of crime, and the ramifications of having to follow a common code of law and justice. This might require a re-think about where best to spend resources in crime fighting. It should be emphasised that this is not suggesting that EU integration will increase crime. Quite the opposite could happen as increased economic activities may actually make crime less attractive. Thus, this is an open question and this is an area on which my colleague Professor John Fender, Dr. Sensarma and I are hoping to shed some light in the future. Our objective is to understand how EU or Schengen area enlargement changes the location and composition of crime and whether there is a net increase or decrease in different categories of crime. *Specifically, we ask whether potential criminals move from poor to rich areas causing the latter's crime rates to increase (displacement effect) or does the opening up of new economic opportunities reduce crime in the EU as legitimate areas of work become more attractive?* We hope the answer to this question provides important insights into how EU enlargement will impact on crime and crime policy.

Alternative Solutions

Given the cost burden of increased policing, one always looks for less costly ways to reduce crime. An innovative suggestion that citizens report crime has gained much currency, but so far there has been no rigorous analysis to see whether such a programme can work. In a formal mathematical model, my research has shown that such policies, while well intentioned, can have perverse effects and actually increase crime.[6] Part of the problem lies with the inability of citizens to understand what constitutes suspicious activity and this may result in too many frivolous reports, overburdening an already stretched police force. This may actually lead to more serious crime being under-investigated. As of now, this is an open area which deserves more scrutiny.

Another radical but controversial suggestion has been to put locally elected police in charge of the budget. While this is supposed to hand back power to the public, the impact of having

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[6] See Bandyopadhyay and Chatterjee (2010)

to tailor policing to the popular will remains an untested issue and its impact on crime remains far from clear. Indeed, in the US, which elects prosecutors and judges, there is research suggesting that such elections distort the criminal justice system.[7]

Conclusion

The decision to commit crime depends on a number of factors, but at least some of them can be identified with careful analysis. Given the huge impact that crime has on societal welfare, analysing the determinants of crime is an important research agenda with very clear policy implications. But care needs to be taken as causal identification is not easy to do and looking at correlations from raw data can be misleading. Thus, there is a need for rigorous quantitative analysis. Our own analysis suggests that policing interventions are important determinants of crime rates while frequently cited economic and social factors are not so closely linked.

Crime and crime policy are complex but important areas of research. In this article, I have tried to highlight what we know about the determinants of crime in the UK and outlined a number of issues which we need to understand in order to design an effective crime policy.

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[7] See Bandyopadhyay and McCannon (2011), Shepherd (2009)

References:

Bagchi, A and S. Bandyopadhyay 2011 'Workplace Deviance and the Business Cycle', Discussion paper, University of Birmingham

Bandyopadhyay, S and K. Chatterjee. 2010 'Crime Reporting: Profiling and Neighbourhood Observation'*, The B.E. Journal of Theoretical Economics*: Vol. 10: Issue 1(Advances), Article 7

Bandyopadhyay, S and B. McCannon, 2010 'The Effect of the Election of Prosecutors on Criminal Trials', Discussion Paper, University of Birmingham

Fender, J. (1999), 'A general equilibrium model of crime and punishment', *Journal of Economic Behavior and Organization* 39(4), pp. 437-453

Glaeser, E L, B Sacerdote and J Scheinkman (1996) 'Crime and Social Interactions', *The Quarterly Journal of Economics,* 111, (2), pp. 507-548.

Han, L, S. Bandyopadhyay and S. Bhattacharya (2011). Understanding the Determinants of Violent and Property Crime in England and Wales: A Panel Data Analysis. Discussion paper, University of Birmingham

[available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1773913]

Machin, S. And Meghir, C. (2004); "Crime and Economic Incentives", *Journal of Human Resources* XXXIX, pp. 958-979

Sah, R. K. (1991), 'Social Osmosis and Patterns of Crime', *Journal of Political Economy* 99(6): 1272.

Shepherd, J (2009), 'The Influence of Retention Politics on Judges' Voting', *Journal of Legal Studies* 38(1), 169-206.