Acquisitive Crime: Imprisonment, Detection and Social Factors

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Introduction

The analysis of the determinants of crime is always at the forefront of public debate. Effective crime-fighting strategies are widely debated with some commentators in policy circles and the popular press highlighting the role of law enforcement and punishment, and others emphasizing the role of socio-economic factors. Often one of the two views has been emphasized while neglecting the other. Those who would look for the so-called root cause of crime (the dominant academic view among criminologists at one time) argue that social circumstances lead to criminal behaviour and tend to dismiss policing as an effective crime fighting tool while others have pushed for harsher penalties for crime and neglected the socio-economic environment. In particular, the role of prisons as an effective crime fighting tool has been much debated, particularly in the UK, while the recent budget cuts for the police have led to worries of lowered detection rates leading to an increase in crime.

The present Justice Secretary Ken Clarke recently caused controversy by suggesting that prison was often 'a costly and ineffectual approach that fails to turn criminals into law-abiding citizens.'[1] While this has been criticised (both within his own party as well as by others e.g. Green, 2010), there are few rigorous studies which look at the impact of sentencing on crime. In this report, I review my recent research on how crime rates are affected both by law enforcement variables (viz. sentencing and detection) as well as socio-economic variables (for example, unemployment and wages) using a detailed dataset for England and Wales. To the best of our knowledge this is the first econometric study of how both detection and sentencing together affect crime in England and Wales.

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

A panel data analysis of the determinants of crime in England and Wales[2]

Background and methodology

The economic model of criminal behaviour (going back to Becker, 1968) assumes that criminals respond to costs and benefits. In Becker's framework both probability of apprehension as well as severity of punishment affect crime. Socio-economic factors also influence crime as it changes the costs and benefits of criminal activity. A lot of empirical research has tried to find empirical proxies for factors which affect the cost and benefits of crime.

While it has been acknowledged that both probability of apprehension and severity of punishment affect crime, most empirical work focuses on one or the other with most research looking at arrest rates (as a proxy for probability of apprehension). One of the main contributions of our research has been to include both probability of apprehension (proxied by detection rate) as well as severity of punishment (proxied by average sentences) to analyse acquisitive crime for England and Wales using a detailed panel dataset. Our panel 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.

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. Panel data tracks the same units of observation (in our case, police force areas) over time and has very important advantages over both time-series data (which does not capture the variation across regions) or cross-section data (which looks at various units of observation at one point in time and thus cannot be used to capture effects over-time).

Ascribing cause-effect relationships is a tricky issue in the analysis of crime. For detection rate, in particular, there is the potential problem of reverse causality. i.e. a correlation of X

[2] The bulk of this analysis is based on my work with Samrat Bhattacharya, Marianna Koli and Rudra Sensarma. Our paper entitled 'Acquisitive Crime, Detection and Sentencing: An Analysis of England and Wales' is available online at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2035639. I am grateful to Nick Cowen and Nigel Williams for thought-provoking discussion as well as help with procuring and organizing the data, as well as the statistics department at the Ministry of Justice for swiftly and effectively providing the necessary data for this analysis.

with Y may imply that Y is causing X rather than X is causing Y. Thus, while one can argue that detection lowers crime, one could also plausibly argue that, in fact, high crime lowers detection as increases in criminal activity stretch the police force.[3] In our analysis, we use a technique called instrument variable analysis to control for such causality of detection rates. While one can argue that such potential causality can affect our analysis of sentencing as well, with the possibility of judges going for higher sentences in response to high crime rates, sentencing guidelines restrain judicial discretion. Further, as argued by Machin and Meghir (2004), the potential for such reverse causality in sentencing means that the estimates we get of the impact of sentencing are actually underestimates. So any negative relationships we find between crime and sentence are likely to be on the conservative side.

A further point of interest is that a linear regression analysis cannot distinguish between long and short sentences. There is some thinking among policy makers that short sentences are actually counterproductive. To test for that, we try a quadratic specification to see if sentencing affects crime in a non-linear way.

Main results[4]

Our analysis finds a strong and negative relationship between detection rates and crime and a similar negative relationship between sentence and crime for three of the four crime categories (with it being statistically significant for two out of the three). In fact, our results show that a 1 per cent increase in detection rate leads to 0.38 per cent decrease in burglary, a 0.81 per cent decrease in theft and handling and a 0.26 per cent decrease in fraud and forgery. These results, suggest that policing is an effective tool against crime, implying that potential criminals respond to incentives.

For sentences, a 1% increase in sentence decreases burglary by 0.08% and fraud by 0.2%. A much smaller 0.016% reduction in theft is also found but is not statistically significant.

[3]Sah (1991) and Fender (1999) examine the idea that expectation of low detection could lead to high crime which would lead to the police being stretched which would in fact lead to low detection. Thus, they show that the same type of economy could be in a low-crime high-detection situation or a high-crime, low-detection scenario. Glasear at.al (1996) invoke a similar idea to explain variations across crime rates in neighbourhoods with otherwise similar characteristics.

[4]This section uses Tables 2 and 3 from Bandyopadhyay at. al. (2012)

Table 1: Fixed effects (within) IV regression results – (linear model) (Table 2 in Bandyopadhyay et al. (2012))

	(1) Burglary	(2) Theft	(3) Robbery	(4) Fraud
Detection t-1	-0.38***	-0.805***	-0.61***	-0.26**
	(0.05)	(0.128)	(0.14)	(0.11)
Sentence t-1	-0.08**	-0.0156	0.03	-0.20***
	(0.03)	(0.0369)	(0.06)	(0.05)
Young pop	-0.85***	-0.487***	-2.17***	-2.50***
	(0.18)	(0.165)	(0.35)	(0.41)
Unemployment	0.16***	0.0516	-0.16**	-0.84***
	(0.05)	(0.0429)	(0.07)	(0.10)
Real earning	0.42*	0.437*	2.66***	3.12***
	(0.25)	(0.265)	(0.39)	(0.56)
Pop density	0.06	0.204	0.63**	0.64*
	(0.16)	(0.141)	(0.26)	(0.35)
trend	-0.06***	-0.0527***	-0.04***	-0.12***
	(0.01)	(0.00532)	(0.01)	(0.01)
constant	5.56***	6.051***	0.13	2.87
	(1.06)	(1.086)	(1.74)	(2.44)
N	501	501	497	501
R^2 (within)	0.73	0.41	0.44	0.47
Sargan-Hansen	1.14	0.60	0.59	0.61
p-value	0.29	0.44	0.44	0.44

Standard errors in parentheses

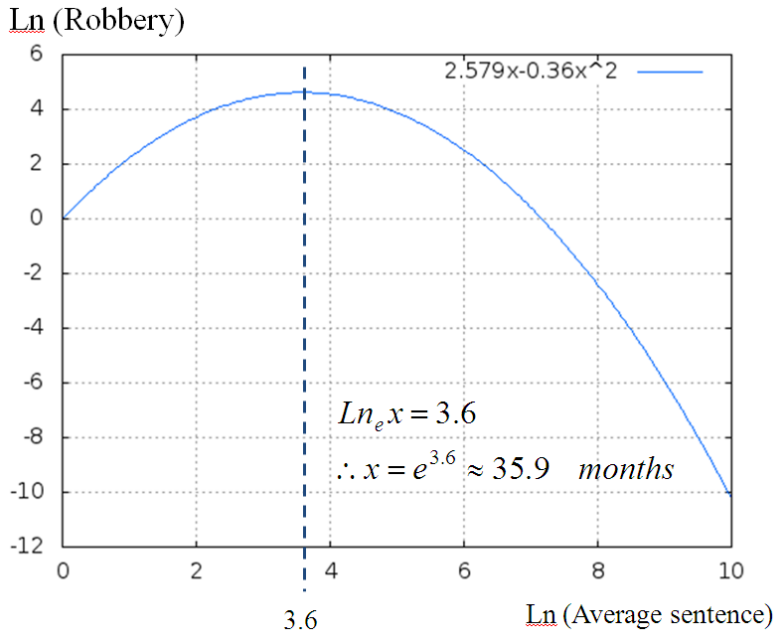
* p<.10, ** p<.05, *** p<.01Second lag of detection and third lag of police expenditure per police officer are used as instruments for Detection t-1 for burglary, robbery and fraud; non-rejection of the Sargan-Hansen test indicates validity of the instruments. For theft we need to use third lag of detection and third lag of police expenditure per police officer for it to pass the Sargan Hansen test.

Short sentences worse than longer sentences?

The main surprise in the result is that for robbery, the sign is positive, although not significant, for the sentencing variable. We now look at a plausible reason why this could be the case. One possible explanation could be that our linear specification is unable to distinguish between long and short sentences. It may well be that, particularly for serious crimes such as robbery, short sentences are counterproductive. To check for this possibility,

we try a non-linear specification which would capture the fact that one needs a certain minimum level of sentences for robbery to cause it to reduce crime.

The figure below shows the point where the average sentences on robbery begin to reduce the crime rate of robberies:



This suggests that, on average, increasing sentences lower than the turning points is actually counterproductive in that it increases crime. We speculate that imprisonment, while acting as a deterrent, can also lower the cost of crime or even increase benefits. This could occur because a person in prison might find it harder to get employment on release. They may also be able to get access to criminal social networks while in prison, improving their opportunities to commit crime. Further, those serving short sentences do not have access to offender-management programmes, nor are they supervised by a probation officer to whom they report regularly after release (which in itself can represent an additional form of incapacitation). Thus, at least for those offenders who are candidates for short sentences, non-custodial alternatives could be considered. For more serious offenders, somewhat longer sentences could be crime-reducing. Unfortunately, the data cannot distinguish between incapacitation and deterrence effects, i.e. whether the crime reduction is occurring because more otherwise likely repeat offenders are in prison or because the threat of prison deters criminal behaviour in the general population.

The fact that the quadratic term for theft and handling also comes out as significant and negative suggests that a similar account may apply to offenders convicted of theft and handling offences too. It appears that increasing the average sentence length on already long sentences is more effective at reducing acquisitive crime than increasing the length of a short sentence. We present the results for the quadratic model below.

Table 2: Fixed effects (within) IV regression results – (quadratic model)(Table 3 in Bandyopadhyay et al. (2012))

	(1) Burglary	(2) Theft	(3) Robbery	(4) Fraud
Detection t-1	-0.384***	-0.819***	-0.637***	-0.262**
	(0.0541)	(0.129)	(0.137)	(0.106)
Sentence t-1	0.263	0.0122	2.579**	0.174
	(0.173)	(0.0396)	(1.251)	(0.465)
Sentence t-1 squared	-0.0736**	-0.0266**	-0.360**	-0.0890
	(0.0368)	(0.0118)	(0.177)	(0.111)
Young pop	-0.783***	-0.432***	-2.217***	-2.458***
	(0.183)	(0.168)	(0.355)	(0.412)
Unemployment	0.144***	0.0651	-0.152**	-0.832***
	(0.0474)	(0.0438)	(0.0741)	(0.0982)
Real earning	0.467*	0.410	2.601***	3.133***
	(0.250)	(0.267)	(0.391)	(0.558)
Pop density	0.0355	0.194	0.636**	0.623*
	(0.158)	(0.142)	(0.260)	(0.346)
Trend	-0.0632***	-0.0537***	-0.0392***	-0.123***
	(0.00594)	(0.00537)	(0.0117)	(0.0131)
constant	5.139***	6.065***	-4.110	2.483
	(1.089)	(1.094)	(2.702)	(2.509)
N	501	501	497	501
R^2 (within)	0.73	0.41	0.46	0.49
Sargan-Hansen	1.23	0.685	0.70	0.55
p-value	0.27	0.41	0.40	0.46

Standard errors in parentheses

* p<.10, ** p<.05, *** p<.01Second lag of detection and third lag of police expenditure per police officer are used as instruments for Detection t-1for burglary, robbery and fraud; non-rejection of the Sargan-Hansen test indicates validity of the instruments. For theft we need to use third lag of detection and third lag of police expenditure per police officer for it to pass the Sargan Hansen test.

How large are the real world effects?

We should preface our discussion of the possible 'real world' implications of our results with a few caveats. Firstly, this analysis relies on police recorded crime, and not, for example, crime victimisation rates as estimated by the British Crime Survey. Although there is an important relationship between recorded crime rates and real crime rates, estimating what our results mean for overall crime will take further analysis. Although it targets a far from perfect indicator, reducing crime as measured by police records is widely considered a legitimate policy goal, which makes our results useful.

Secondly, our analysis considers almost exclusively the empirically observable effects of criminal justice interventions on subsequent crime rates. There are other important ways of evaluating criminal justice policy. They include perceptions of crime and public security, whether penalties are proportionate to the crimes committed in terms of justice and as accepted by the public, as well as opportunities permitted for offender rehabilitation. Our results do not weigh these different aims of a criminal justice system, but concentrate on one key and legitimate aim of criminal justice, the reduction of crime. By doing this, we do not intend to suggest that crime reduction should be pursued while ignoring other policy goals.

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 acquisitive crime. Table 3 shows how many acquistive crimes are prevented by an increase of 1 per cent of the detection rate. Table 4 shows how many crimes a 1 percentage point increase in the detection rate (a more ordinary measure of increased police effectiveness) prevents.

Table 3: *Number of estimated additional acquisitive crimes detected and prevented by 1 per cent increase of the average national detection rate*

Crime Type	Average national detection rate (1992-2008)	National Detection Rate if increased by 1%	Additional Crimes detected nationwide	Estimated Crimes Prevented
Burglary	16.9	17.1	1,600	3,500
Theft	19.8	20.0	4,400	18,000
Robbery	20.0	20.2	160	520
Fraud	33.5	33.8	750	580

Table 4: *Number of estimated additional acquisitive crimes detected and prevented by 1 percentage point increase in average national detection rate*

Crime Type	Average national detection rate (1992-2008)	National Detection Rate if increased by 1 percentage point	Additional Crimes detected nationwide	Estimated Crimes Prevented
Burglary	16.9	17.9	9,300	26,000
Theft	19.8	20.8	21,000	85,000
Robbery	20.0	21.0	830	2,500
Fraud	33.5	34.5	2,300	1,800

Sentencing

We can also estimate how a change in sentencing policy in one year would affect the number of recorded crimes in a subsequent year. We do this by estimating both the number of crimes committed and the average sentence length in a 'typical year'. Our typical year is the national average of all years from 1993 to 2008, which is the extent of our available sentencing data. As an example, we estimate what would happen if we added one month to the length of average sentence for each crime type.

We use the linear model to estimate the effects on burglary and fraud, and the quadratic model to estimate the effects on robbery. We exclude theft from this estimate because,

although the effects suggest that increased sentences could produce a modest reduction in crime, the results are not statistically significant.

Table 5: *Number of estimated additional acquisitive crimes prevented by 1 per cent increase in average length of sentence*

Crime Type	Average number of crimes recorded (1993-2008)	Average sentence length (months)	Average sentence length if increased by 1%	Estimated crimes prevented
Burglary	962,700	15.39	15.54	740
Robbery	89,800	36.42	36.78	10
Fraud	242,400	9.70	9.81	400

Table 6: *Number of estimated additional acquisitive crimes prevented by 1 month increase in average length of sentence*

Crime Type	Average number of crimes recorded (1993-2008)	Average sentence length (months)	Average sentence length + 1 month	Estimated crimes prevented
Burglary	962,700	15.4	16.4	4,800
Robbery	89,800	36.4	37.4	47
Fraud	242,400	9.7	10.7	4,700

These estimates indicate that even a relatively small change in sentencing can achieve a visible reduction in the number of recorded crimes. In our average year, sentencing all imprisoned burglars to one additional month of custody (16.4 months rather than 15.4 months) reduces the number of subsequent burglaries by nearly 5,000. This is a substantial effect, especially when we consider that usually approximately half the length of the sentence is served in actual custody. Reductions of a similar scale are noted for fraud. For robbery, however, we see a negligible net reduction. Our interpretation of this result is that convicted robbers represent a diverse population of offenders. For some convicted robbers, a longer sentence acts as additional incapacitation and a potential deterrence from future crime. For others, being incarcerated for longer tends to reinforce, rather than reduce,

criminal behaviour. For those offenders, an alternative disposal to custody might be more appropriate for reducing crime. In other words, an across-the-board increase in sentence length will not be optimal.

The estimated impact of a significant shift in sentencing policy

Throughout the years of our analysis, the default penal policy has been for offenders sentenced to immediate custody to spend half the length of their sentence incarcerated and the remainder on release in the community. This was initiated by then Home Secretary Douglas Hurd in 1987, who decreased the default time in custody from two-thirds.[5] If we assume that our effects are mainly capturing the impact of longer periods spent in prison, then going back to a presumption that convicts should serve two-thirds of their custodial sentence in prison would be the equivalent of increasing the average sentence handed down in court by one third. In table 7 we estimate what impact such a shift in policy would have on recorded crime. For all crimes estimated, we see substantial reductions in crime.

As with the previous examples, this broad and substantial increase is unlikely to be an optimal sentencing policy if the intent is to minimise crime. For robbery, in particular, it would be more efficient to target longer sentences specifically at the serious and dangerous offenders while finding alternatives to custody for the remaining offenders.

Table 7: *Number of estimated additional acquisitive crimes prevented by an increase in average length of sentence of one third*

Crime Type	Average number of crimes recorded (1993-2008)	Average sentence length (months)	Average sentence length if increased by one third	Estimated crimes prevented
Burglary	962,700	15.39	20.52	21,000
Robbery	89,800	36.42	48.55	2,600
Fraud	242,400	9.70	12.94	11,000

[5] See: http://www.legislation.gov.uk/uksi/1987/1256/made

Socio-economic impacts

Socio-economic variables are significant across all crime types in both a linear and quadratic specification but some of them have a counterintuitive sign. Higher unemployment increases burglary and theft but reduces robbery and fraud. Fraud goes down with unemployment (a 1% increase in unemployment decreases fraud by 0.84%), which is perhaps not surprising and suggests that a lot of fraud is committed in the workplace. 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 actually lowers most acquisitive crime rates. The 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 (a similar association is found in Han et. al, 2011). 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.

The negative association between the proportion of young people in a local population and crime is consistent with the idea of dynamic deterrence: young people have more to lose by having a criminal record which lowers future employment prospects. It could also be the case that unemployed youth may be more prone to crime but perhaps not young people in general. Further, it may be that the crime prone young people are those who are serving a prison term but the general population of young people may not be so crime prone. In fact, there is some suggestive research arguing that young people in general may not be especially likely to engage in crime (see Martin, et. al, 2010). However, we should note that this remains an unproven hypothesis and there are other studies which have previously documented a positive relationship between young people and crime. Further analysis, focusing more specifically on youth crime would help to test this claim.

Conclusion

The decision to commit crime depends on a number of factors. Our research separates out some of these effects and provides a detailed analysis of how law enforcement and socio-economic variables affect crime in England and Wales. Our results suggest that individuals

respond to incentives. With respect to policing, the evidence is unequivocal: more detection is associated with substantial reductions in crime. It plays a sustained role in preventing crime. The effect of imprisonment is more complex as we have seen. Longer average sentences can significantly reduce crime. This effect appears to be especially strong for fraud and is relatively consistent for burglary. However, prison can also produce counter-productive results. This is indicated by the insignificant results for theft and handling, and the non-linear result for robbery. Our interpretation of this is that prison can have very different effects on different offenders. This suggests that an optimal policy will target repeat and serious offenders for long sentences while using alternatives to custody for other offenders. This complex picture offers some support to the view that 'prison works' as an important way of reducing crime while warning that prison sentences can also be misapplied.

Socio-economic variables also significantly affect crime by changing the costs and benefits of crime. Hence, the debate on the importance of law enforcement vs. socio-economic factors in affecting crime may be a largely misleading one. Both types of factors have significant coefficients, so we find strong evidence that both impact on crime.

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