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How much crime does prison stop? The incapacitation effect of prison on burglary

Don Weatherburn, Jiuzhao Hua & Steve Moffatt

This bulletin presents the results of a study into the incapacitation effect of prison on burglary. The results indicate that current levels of imprisonment in New South Wales (NSW) prevent approximately 45,000 burglaries per annum. Rates of burglary could be reduced if sentences for burglary were longer, a higher percentage of burglars were sent to prison or clear-up rates for burglary were higher. The effectiveness of these measures would be reduced, however, if they resulted in fewer guilty pleas, higher re-offending rates or the entry of more offenders into the stolen goods market. Increased use of imprisonment may not be a very cost-effective way of reducing burglary. To get a 10 per cent reduction in the current burglary rate via imprisonment the number of burglars sentenced to prison in NSW would have to be increased by at least 34 per cent. This would cost an additional $26 million per year. The bulletin concludes by calling for more research into the cost-effectiveness of prison and its alternatives in controlling crime.

INTRODUCTION

In the decade between 1995 and 2004, the Australian prison population increased by more than 39 per cent (Australian Bureau of Statistics 2004a). On any given day there are now more than 25,000 people held in Australian prisons (Australian Bureau of Statistics 2005). The cost of keeping this many people in prison is substantial. Last financial year the recurrent cost of imprisonment in Australia exceeded $1.6 billion, or about $92 per head of population per annum (Productivity Commission 2005). Prison may not be the most common sanction for offending but it is undoubtedly the most expensive. It is also one that courts in New South Wales (and perhaps other States as well) have increasingly been turning to in dealing with persistent and/or serious offending (Fitzgerald 2001).

Surprisingly little research has been conducted in Australia into the effect of prison on crime. This is very unfortunate. Imprisonment may be a very blunt instrument of crime control but it is an important instrument, nonetheless. The fact that so much public money is spent on imprisonment only serves to underscore the need for a careful and thorough assessment of its effects. The purpose of this bulletin is to present the results of a study into the effect of imprisonment on burglary. The remainder of the bulletin is divided into four sections. In the next section we introduce some key concepts and discuss the results of earlier research into the effectiveness of prison. In the section that follows we describe the methods and data sources used for our analysis. In the third section we present our results. In the last section we summarise and discuss our findings.

PAST RESEARCH

STUDIES OF THE IMPRISONMENT/CRIME CORRELATION

In theory, prison could influence crime either through deterrence and/or incapacitation. Deterrence refers to the crime prevention effect that results from fear of being sanctioned for offending. Incapacitation refers to the crime prevention effect that results from keeping offenders locked up and therefore unable to offend. Deterrence can take the form of specific deterrence: the effect a penalty has on offending by the person on whom it is imposed, or general deterrence: the general effect that penalties have on the general willingness of people to offend. Criminologists have traditionally been somewhat sceptical about the capacity of prisons to influence crime through deterrence or incapacitation. According to one commonly cited argument, for example:

> "…for every 1,000 crimes committed in Australia, 400 are reported to police, 320 are recorded by police as crimes, about 64 result in the detection of an offender, 43 result in convictions and 1 person is gaoled." (Mukherjee, Walker, Psaila, Scandia & Dagger 1987)

Doubling of the prison population, on this account, would affect only about one tenth of one per cent of crimes committed. It does not follow from the fact that 64 people are arrested for every 1,000 offences, however, that 936 offenders get off without being apprehended and punished. Many offenders commit large numbers of offences and have long criminal careers. These people account for a disproportionate amount of all offending (Blumstein, Cohen, Roth & Visher 1986). Imprisoning even a small proportion of them might exert a disproportionate effect on crime. In the absence of research evidence demonstrating its ineffectiveness, then, it would be wrong to assume that prison exerts no effect on crime.

There is research that gives us cause to doubt the deterrent effectiveness of imprisonment. A number of studies have found that, unless the perceived risk of apprehension is fairly high, the threat of tougher penalties does not exert much deterrent effect on the stated willingness of people to become involved in a particular offence (Howe & Loftus 1996). This evidence is consistent with studies of the specific deterrent effect of tougher penalties, many of which find either no effect or inconsistent effects (Spohn & Halloren 2002; Smith & Akers 1993; Gottfredson 1999; Briscoe 2004; Dejong 1997). Most attempts to assess the effectiveness of prison, however, make no assumptions about whether prison exerts its effects via deterrence or incapacitation. They simply examine the correlation between crime and some measure of penal severity (e.g. imprisonment rates) while controlling for other factors that might influence crime. If imprisonment does reduce criminal behaviour, rates of crime and imprisonment should be negatively correlated after other relevant factors have been taken into account.

Early studies of crime and imprisonment rates obtained inconsistent findings on this issue. Many of these studies, however, made no attempt to deal with the problem of *simultaneity*: the reciprocal relationship between crime and criminal justice activity (see Blumstein, Cohen & Nagin 1978). When crime rates increase we expect police to arrest more offenders (Listokin 2003) and courts, as a consequence, to put more offenders in prison. This pattern of rising crime and rising imprisonment rates may hide whatever preventative effect prison has on crime. Several studies published in the last decade have found ways of adjusting for *simultaneity* and they provide consistent evidence that incarcerating offenders does exert a significant suppression effect on crime. According to Spelman (2000), the best estimates of the effect on serious crime of a 10 per cent increase in imprisonment in the United States range between 1.6 and 3.1 per cent (Spelman 2000).

Because crime and imprisonment rates vary from one country to another we cannot safely assume that the results of overseas studies on the effectiveness of prisons automatically apply here. Only a few studies, however, have ever been conducted in Australia into the effect of prison on crime. Withers (1984) conducted the first, using data on recorded crime rates in the Australian States and Territories over the period 1964 to 1976. He examined the effect of rates of apprehension (as measured by the ratio of court committals to recorded crimes) and imprisonment (as measured as the ratio of prisoners to court committals), on rates of various kinds of crime, controlling for a range of other factors (e.g. income, unemployment, education) that might be expected to influence crime. His analysis indicated that higher rates of imprisonment are associated with lower rates of property crime but not with lower rates of what he called 'crimes of passion', such as homicide and sexual assault. Withers' analysis indicated that a 10 per cent increase in imprisonment would reduce property crime by between 5.1 and 6.2 per cent.

In a later study, Bodman and Maultby (1997) updated and extended Withers' (1984) analysis, making three significant improvements. First, they measured the effect of imprisonment using expected sentence length rather than the number of offenders imprisoned, arguing that this provided a more sensitive measure of the effect of tougher prison penalties on crime. Second, they made adjustments in their analysis for the reciprocal relationship between criminal justice activity and crime. Third, they used a more extensive dataset than Withers had been able to use. They found evidence that longer prison sentences were associated with lower rates of robbery, motor vehicle theft and fraud. However, unlike Withers, they did not find any effect of imprisonment on burglary. Their analysis indicated that a 10 per cent increase in prison sentence lengths would reduce robbery, motor vehicle theft and fraud, by between 3.8 and 5.2 per cent.

Since the Bodman and Maultby (1997) study, two other Australian studies have been conducted which, while not directly concerned with the effect of prison on crime, have nonetheless yielded evidence of its effects.

Chilvers and Weatherburn (2003) examined the effect of heroin dependence on long-term robbery trends, controlling for changes in unemployment, heroin use, robbery clear-up rates and rates of imprisonment for robbery. They found that the rise in robbery in New South Wales between 1966 and 2000 was strongly correlated with a rise in heroin use but it was also independently related to a long-term fall in rates of imprisonment for the offence.[1] In a more recent study, Moffatt, Weatherburn and Donnelly (2005) examined trends in burglary and robbery in New South Wales between January 1998 and October 2003. They found that longer aggregate prison sentences were associated with lower levels of burglary (but not robbery) after controlling for treatment entry, drug use, unemployment, consumer spending and arrest rates. Their results indicated that a 10 per cent increase in aggregate prison time would reduce burglary by 6.3 per cent.

None of these studies is entirely immune to criticism. Neither Chilvers and Weatherburn (2003) nor Moffatt et al. (2005) included controls for simultaneity. Withers (1984) and Bodman and Maultby (1997), on the other hand, did not control for trends in heroin dependence, a factor that Chilvers and Weatherburn (2003) had found to be strongly linked to trends in property crime. Omitting important variables is not a problem when the omitted variables are not strongly correlated with those whose effects are being measured. When, however, the omitted variables are correlated with imprisonment estimates of the effect of imprisonment on crime can give biased and misleading results. Imprisonment, in effect, ends up acting as a proxy for other factors that influence crime but which have not been included in the analysis (see Spelman 2000, p.440).

INCAPACITATION STUDIES

The difficulties involved in adequately controlling for extraneous factors have tempted some researchers to take what Spelman (2000) has called a 'bottom up' approach to estimating the effect of prison on crime. Instead of looking at the correlation between the rate of offending and the rate of imprisonment, they estimate its effect using a mathematical model developed by Avi-Itzhak and Shinnar (1973) and Shinnar and Shinnar (1975). This model assumes there is a finite population of offenders who, when they are free in the community, commit crime at a certain rate and remain involved in crime over a certain period of time (known as their criminal career). According to the model, the larger the fraction of an offender's criminal career spent in prison, the less crime they are able to commit.

The amount of crime prevented by prison in the model depends on five things: (1) the rate at which offenders commit crime when free, (2) the likelihood of an offender being caught and convicted, (3) the likelihood, if convicted, that an offender will receive a prison sentence, (4) the average time spent in prison and (5) the likelihood of an offender resuming his or her involvement in crime once he or she is released from prison. Equation (1) below, describes the precise relationship Avi-Itzhak and Shinnar derived concerning the relationship between the amount of crime prevented and these five factors:

$$I = \frac{\lambda qJS\{T_R/(T_R+S)\}}{1+\lambda qJS\{T_R/(T_R+S)\}} \qquad (1)$$

where:

- I = the fraction of crimes avoided as a result of incapacitation
- λ = the rate at which offenders commit crimes
- q = the probability of being apprehended and convicted for a crime
- J = the probability of being sentenced to prison if convicted
- S = the average time spent in custody
- T_R = the average time offenders will remain involved in crime

The parameter I measures the amount of crime prevented by the current level of imprisonment. It can be thought of as the percentage increase in crime that would result if all offenders (or all offenders of a certain type) were released. Note, however, that I must be adjusted downwards to account for the fact that, when co-offenders commit a crime, imprisoning both will only save one offence (Blumstein et al. 1986, p.60).[2]

The Shinnar and Shinnar model can be used to derive an equation for the percentage change in the annual custodial population required to achieve a one per cent change in the level of crime. This change, known as the elasticity (E) of crime in relation to prison, is given by:

$$E = \frac{1+\lambda qJS^2T_R/(T_R+S)^2}{-\lambda qJST_R^2/(T_R+S)^2} \qquad (2)$$

Just as the variable I has to be adjusted to account for co-offending, E also has to be adjusted for the same effect (see method section below).

The advantage of the incapacitation approach is that it sidesteps the problem of having to work out what to control for when looking at the effect of prison on crime. Like all models, however, the model of incapacitation developed by Avi-Itzhak and Shinnar (1973) and Shinnar and Shinnar (1975) rests on a number of assumptions. There are four in particular that deserve mention:

1. In any application of the model, accurate estimates of the model have been obtained.
2. All offenders run the risk of being arrested and incarcerated.
3. The more offenders we imprison, the fewer there are in the general population
4. The experience of imprisonment does not change the expected length of a criminal career (T_R) or the rate at which individuals offend (λ).

We will return to these assumptions when we discuss our results.

Most studies of incapacitation suggest that prison exerts a significant suppression effect on crime; however, the estimated effects appear to vary markedly from study to study. Blumstein et al., for example, cite evidence that the level of imprisonment prevailing in the United States (US) during the 1970s would have had an incapacitation benefit of 20 per cent (Blumstein et al. 1986, p.123). A study of incapacitation in the United Kingdom by Tarling (1993), however, put the incapacitation effect of prison in that country in the mid-1980s at between 7.3 and 9.0 per cent. Although the estimates reported by Blumstein and Tarling differ significantly, most incapacitation studies conclude that large increases in the prison population only produce fairly modest reductions in crime. Research in the United States, for example, suggests that in most US states to obtain a 10 per cent reduction in crime, the prison population would have to be more than doubled (Chan 1995, p.6).

THE PRESENT STUDY

The fact that incapacitation estimates vary so significantly between Britain and the United States suggests that to obtain reliable information about the incapacitation effect of prison in Australia we need to conduct our own research. This is difficult to do because very little research has been conducted in this country on how frequently different types of offenders commit crime or how long different groups of offenders spend involved in crime.

Fortunately, data on offending frequency and criminal career length can be obtained for at least one offence. Salmelainen (1995) conducted a study of 247 juvenile theft offenders held in NSW detention centres. She asked her respondents whether they had ever committed a burglary and, if they had, how many they had committed in the six months prior to the arrest that resulted in their incarceration. Their answers can be used to estimate offending frequency. We can obtain an estimate of residual criminal career length, on the other hand, from data collected as part of a study of re-offending among NSW parolees conducted by Jones, Hua, Donnelly, McHutchison and Heggie (2005). They examined the re-offending rates of a group of more than 2,000 prisoners released on parole in the financial year 2001-2002. More than five hundred of these offenders had been convicted of break, enter and steal (i.e. burglary). The remaining data needed for equation (1) can be extracted from databases maintained by the NSW Bureau of Crime Statistics and Research.

SOURCES OF DATA AND METHODS

MEAN OFFENDING RATE (λ)

There are two ways of estimating the parameter λ. The simplest and probably most reliable method is through studies of self-reported offending frequency. Only two such studies have been conducted in New South Wales, one by Salmelainen (1995) and the other by Stevenson and Forsythe (1998). In this study we rely on Salmelainen's data for reasons that are explained in detail in the notes to this bulletin.[3] Suffice to say that the estimates of average offending frequency based on Stevenson and Forsythe's data are so high and so inconsistent with the estimates obtained using other methods (see below), they cannot be regarded as credible.

Salmelainen's data show that the mean number of burglaries per burglar is approximately 68 per annum. The distribution on which the average was based, however, was extremely skewed, with one offender claiming to have committed 700 burglaries in the preceding six months. It is hard to see how anyone would have time to commit this many burglaries (about 4 per day), let alone remember each one well enough to keep track of the total number committed over a six month period. It is likely that such extreme values of offending frequency simply reflect exaggeration on the part of the respondent. If we follow the procedure recommended by Visher (1986) for dealing with such cases, and truncate the offending frequency distribution at the 90th percentile, Salmelainen's data indicate a mean offending frequency of 38.1 burglaries per annum. Note that this estimate, though high, is in the range cited by Blumstein et al. (1986, p.66) in the United States.

It may seem somewhat arbitrary removing 10 per cent of the sample on which our estimate of offending frequency is based. As a check on the reliability of our estimate of offending frequency, therefore, we obtain a second independent estimate using the equation:

$$\mu = \lambda p \qquad (3)$$

where μ is the arrest (or court appearance) rate of an individual burglar, λ is the rate at which the burglar commits burglaries and p is the probability that any particular offence results in an arrest (or an appearance in court). If this equation is accepted, the value of λ is given by μ/p. Information on μ can be obtained from unpublished court data held by the NSW Bureau of Crime Statistics and Research. This source shows that the average number of charges of burglary per person convicted of burglary in 2004 was 1.9. As noted earlier, however, we need to adjust this figure downwards, to account for the fact that, if two offenders commit one burglary, imprisoning both offenders will only prevent one burglary. We do this by dividing the parameter μ by the average number of burglars per burglary. Unpublished Bureau crime data show that the average number of offenders per burglary incident in New South Wales in 2004 was 1.49. This gives us an adjusted value of μ = 1.28.

We can estimate p from police data on the annual percentage of burglary offences cleared by police. This source gives a value of 5.8 per cent for the 180 day clear-up rate for home burglary and 6.2 per cent for the 180 day clear-up rate for burglaries not involving dwellings (NSW Bureau of Crime Statistics and Research 2005, p.37). We therefore assume that the overall clear-up rate is somewhere around 6.0 per cent. This clear-up rate must be adjusted downwards to take account of the fact that some burglaries are not reported to police. To make this adjustment we multiply the clear-up rate by the percentage of burglaries reported to police. Crime victim survey data (Australian Bureau of Statistics 2004b, p.10) indicate that in 2004, 67 per cent of home burglaries were reported to police. Multiplying .06 by .67, gives .04 as our adjusted clear-up rate. Dividing 1.28 by .04 gives an alternative estimate of λ of 32 burglaries per year.

The similarity of this estimate to the estimate obtained in Salmelainen's self-report study is very reassuring. All the same, the estimate obtained via equation (3) is likely to be an underestimate because it assumes that no one charged with burglary in 2004 was in prison during that year. We therefore treat 38.1 as the more reliable estimate of λ. As a check on the sensitivity I_a to λ, we plot I_a for a range of values of λ on either side of 38.1.

THE PROBABILITY OF BEING APPREHENDED AND CONVICTED FOR BURGLARY (q)

The parameter q is the product of (a) the probability that an offence detected by police leads to the arrest of an offender and (b) the probability that the offender is convicted. As noted in the previous section we use the clear-up rate for burglary in NSW as an estimate of the first of these probabilities. Unpublished court data held by the NSW Bureau of Crime Statistics show that in 2004, 76 per cent of persons charged with a burglary offence were convicted of that offence. Accordingly we assume q = 0.060*0.76 = .045.

THE PROBABILITY THAT A CONVICTED BURGLAR RECEIVES A PRISON SENTENCE (J)

Unpublished court data held by the NSW Bureau of Crime Statistics and Research show that, in 2004, 44 per cent of the persons who had been charged with burglary and either convicted of burglary or some other offence,[4] received a prison sentence. Accordingly we assume J = .44.

THE AVERAGE TIME (IN YEARS) SPENT BY BURGLARS IN CUSTODY (S)

Unpublished court data held by the NSW Bureau of Crime Statistics and Research show that in 2004, the average minimum term imposed by NSW Courts on persons convicted of burglary was 1.02 years.[5] Some offenders are not released at the end of their minimum term but the figure of 1.02 nonetheless accords very closely with the estimated time spent in custody by a sample of 466 burglars released to parole supervision in the 2001-2002 financial year, and followed up by Jones et al. (2005). Data drawn from that study show that burglars released on parole during this period had spent, on average, 1.01 years in custody prior to their release.[6] Accordingly we assume that S = 1.02 years.

RESIDUAL CAREER LENGTH (T_R)

There are no data that can be used to obtain a direct estimate of T_R. However, if T_R is large compared with S (i.e. if the expected residual criminal career length is large compared with the expected sentence length), $T_R / (T_R + S)$ approaches 1 and equation 1 reduces to:

$$I = \lambda qJS / (1 + \lambda qJS) \qquad (4)$$

Shinnar and Shinnar use equation (4) to avoid the problem of estimating T_R. Rather than make this assumption we take a somewhat different tack. It can be shown that, if the length of a criminal career is distributed exponentially, with mean residual career length T_R, and if time served in prison is also exponentially distributed with mean length S, then $T_R / (T_R + S)$ is the probability P_A that an offender is still active in a criminal career after serving a sentence (Tarling 1993). In this case we can estimate T_R from the equation $T_R = P_A S / (1 - P_A)$. The distribution of time to re-offend and time in custody in NSW are both reasonably well approximated by an exponential distribution (see Appendix). The parameter P_A on the other hand, can be estimated from the study by Jones et al. referred to earlier. That study found that 80.1 per cent of burglars released on parole had re-appeared in court within the follow up period of 27-39 months.[7] Putting this value into the equation for T_R gives a value of T_R = 4.1 years.

SUMMARY OF PARAMETER VALUES

In summary, except where otherwise indicated we assume (a) that imprisoned burglars commit an average of 38.1 burglaries per year when free, (b) that the chance of a burglar being arrested and convicted in the course of a year is about 4.5 per cent, (c) that 44 per cent of those convicted are given a prison sentence, (d) that the average period spent in custody by those imprisoned is 1.02 years and (e) that the average residual criminal career for a burglar lasts 4.1 years.

RESULTS

We are now in a position to present the results of our analysis. We begin by presenting data on the incapacitation effect of prison. This is followed by an analysis of the effects on burglary of (a) increasing the average sentence for burglars, (b) increasing the proportion of convicted burglars sent to prison and (c) increasing the burglary clear-up rate. We then examine the costs associated with reducing burglary via greater use of imprisonment.

THE INCAPACITATION EFFECT OF PRISON

Figure 1, below, shows the adjusted[8] incapacitation effect (I_a) of prison on burglary in NSW as a function of offending frequency (λ). The point at which the dashed horizontal line crosses the Y-axis indicates the level of incapacitation corresponding to our assumed value of λ (38.1).

Figure 1: Burglaries prevented by offending rate

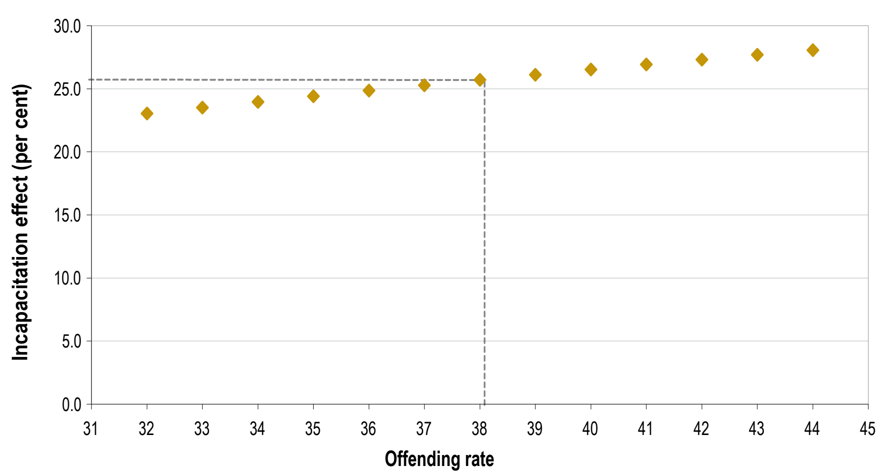


Figure 1 indicates that the current imprisonment rate for burglary in New South Wales keeps the number of burglaries about 26 per cent lower than it would otherwise be. This is equivalent to preventing about 44,700 domestic and commercial burglaries.[9] This conclusion is not overly sensitive to the value of λ we assume. If the true value of λ were 32 offences per year, for example, (i.e. the value of λ obtained using equation (3)), the estimated incapacitation effect of prison on burglary falls to 23 per cent. If the true value of λ were 44, on the other hand, the incapacitation effect would only rise to about 28 per cent. These estimates are well within the range reported in Blumstein et al. (1986) for burglary offenders.

We turn now to the question of whether, and to what extent, further increases in imprisonment would bring the burglary rate down. To explore this issue we examine the effect on I of changes in: S (sentence length), J (the proportion of burglars sent to prison) and the percentage of burglaries cleared by police.

THE EFFECT OF CHANGING SENTENCE LENGTH

Figure 2 shows the estimated incapacitation effect of prison (I_a) on burglary as the average sentence length (S) for burglary increases.

It can be seen that, as the average sentence length increases from one year (its current level) toward two years, the incapacitation effect steadily increases from about 26 per cent, to a little over 34 per cent. In other words, if the average term of imprisonment were increased from one to two years, the burglary rate would fall by about eight percentage points or about 10,188 burglaries.

THE EFFECT OF PUTTING MORE BURGLARS IN PRISON

A second way to increase the incapacitation effect of prison is to put more burglars in prison. Figure 3 shows the effect on I_a of changes in J (the probability of a prison sentence).

It can be seen that as the probability of a prison sentence increases from about 44 per cent toward 88 per cent (i.e. double its current value), the estimated number of burglaries prevented rises from about 26 per cent to a little over 37 per cent, a prevention gain of approximately 11 percentage points (or about 14,000 fewer burglaries). The true effect of doubling the likelihood of a prison sentence, however, is likely to be much lower than this estimate suggests. This is because offenders in prison generally have higher offending rates (when free) than offenders who have been arrested but not deemed to be persistent enough to deserve a prison sentence. Offenders who have not been arrested generally have lower offending rates again. Canela-Cacho, Blumstein, and Cohen (1997), for example, found that only one to four per cent of robbers in the community commit more than 10 robberies per year, but between 24 and 48 per cent of imprisoned robbers commit robberies at this rate. Similarly, while Salmelainen (1995) found that incarcerated juvenile theft offenders in NSW commit burglaries at the rate of about one offence every three weeks, Baker (1998) found that NSW secondary school students who admitted involvement in burglary committed only about one or two offences per year.

Figure 2: Burglaries prevented by sentence length

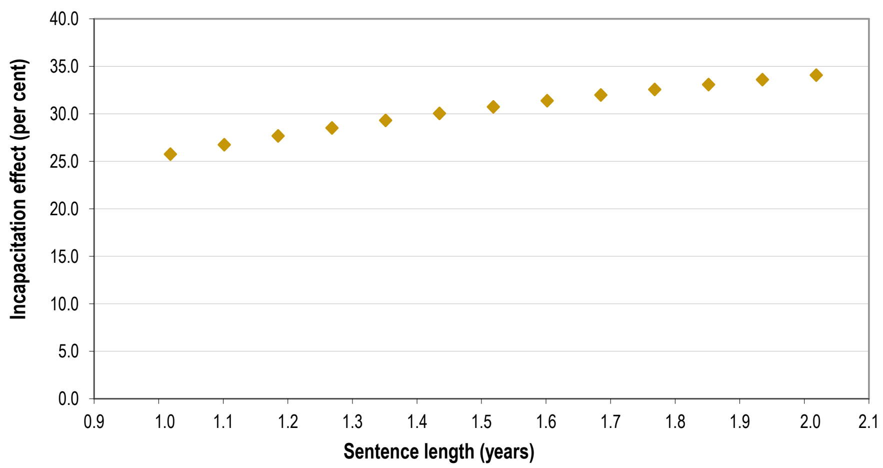
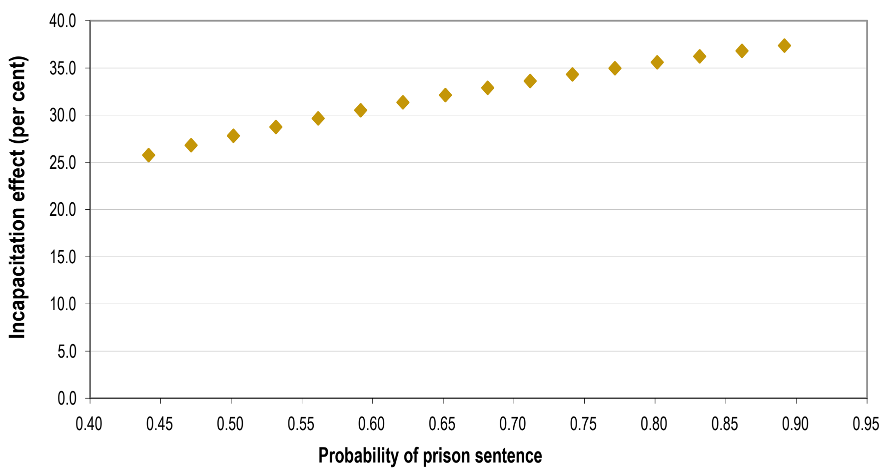


Figure 3: Burglaries prevented by prison sentence probability



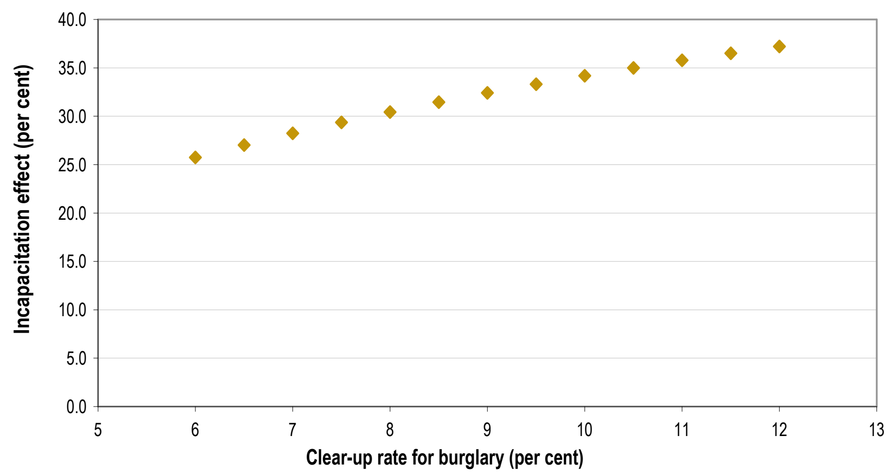
These considerations suggest that, as we put more burglars in prison, the average frequency of offending among those we incarcerate will fall. There is no way of knowing precisely how λ will fall but we can use equation (3) above to obtain an estimate of λ among burglars who reach court but are not currently sent to prison. There were 1,262 individuals convicted of burglary in NSW in 2004 who were not sentenced to a term of imprisonment in that year and had not been given a sentence of imprisonment since at least 1994.[10] These people accumulated an average of 0.75 charges of burglary per year between 2002 and 2004. As expected, this is much lower than the average number of charges amongst convicted burglars sent to prison. Scaling this figure up (using equation (3) above) gives a value of λ = 12.5 burglaries per year. If all imprisoned offenders offended at this rate and we doubled the imprisonment rate, the incapacitation effect of prison would only be about 20 per cent.

THE EFFECT OF CHANGING CLEAR-UP RATES

The incapacitation effect of prison on burglary will also increase if either (a) police improve their clear up rate for burglary or (b) prosecutors become more successful at convicting those they charge with burglary. There are no easy ways of increasing the conviction rate for burglary, which is in any event already fairly high. The clear-up rate for burglary is quite low and might be higher if police had the resources required to investigate each burglary more thoroughly. Figure 4 shows the effect of increasing the burglary clear up rate from six per cent (its current level) to 12 per cent.

As the clear-up rate rises from six per cent to about 12 per cent (i.e. double its current value), the incapacitation effect of prison rises from about 26 per cent to about 37 per cent. Note, however, that this is only true if police can increase their clear-up rate without apprehending offenders whose burglary rate is significantly lower than our assumed 38.1 offences per year. If the clear-up rate rose to 12 per cent but in the process the average frequency of offending among those sent to prison fell to 24 offences per year (i.e. about half way between the assumed offending rate of those currently sent to prison and the estimated offending rate of burglars brought to court but not currently sent to prison) the incapacitation effect of prison would only rise from 26 per cent to 30 per cent. This is equivalent to a saving of 5,094 burglaries.

Figure 4: Burglaries prevented by clear-up rate

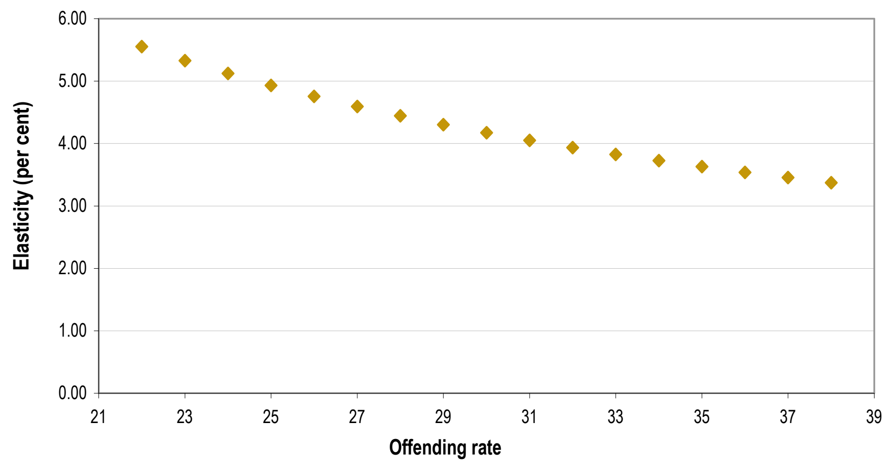


The cost of reducing burglary through increased imprisonment

So far we have only considered the benefits of incapacitation. Every drop in crime produced by an increase in incapacitation, however, comes at a cost in terms of increased prisoner numbers. This raises the question of how much we would need to pay (in terms of increased prison numbers and expenditure) to achieve a given percentage reduction in crime.

If we assume that λ = 38.1, and that all other values of the parameters are held at the values shown earlier, the adjusted elasticity of crime with respect to imprisonment obtained from equation (2) is –3.37. In other words, to get a 10 per cent reduction in burglary we would need to increase the number of burglars in

Figure 5: Prison/crime elasticity as a function of offending rate



prison by about 33.7 per cent. At present there are about 1,135 convicted burglars in NSW prisons.[11] It follows that, to get the burglary rate down by 10 per cent we would need to increase the number of burglars held in prison by about 382. The recurrent cost of keeping someone in prison in NSW is $189.10 dollars per day.[12] The cost of a 10 per cent reduction in burglary via incapacitation would therefore amount to a little over $26 million per annum.

In arriving at this figure we have assumed that the increase in imprisonment comes about solely from keeping the current stock of burglars in prison for longer. As we discussed earlier, if we change the proportion of burglars who are imprisoned we are likely to find ourselves imprisoning offenders whose offending frequency is lower. Figure 5 illustrates this point by plotting elasticity (E) as a function of offending frequency (λ).

It is obvious that the elasticity of crime with respect to prison is much higher at low levels of offending frequency. In other words, if the average offending frequency among burglars were significantly lower than 38.1 offences per year, the size of the increase in the prison population required to produce a 10 per cent reduction in burglary would be much higher. If, for example, λ were 60 per cent of its assumed value (i.e. if λ = 23), the cost of getting a 10 per cent reduction in burglary via incapacitation would rise to over $43 million per annum.

DISCUSSION

The first point to emerge from the foregoing analysis is that, notwithstanding occasional suggestions to the contrary, at least so far as burglary is concerned, prison does seem to be an effective crime control tool. Our best estimate of the incapacitation effect of prison on burglary (based on the assumption that burglars commit an average of 38 burglaries per year when free) is 26 per cent. This estimate does not appear to be overly sensitive to the value of offending frequency we assume. If the true rate at which burglars commit burglary is 32 offences per year, for example, the incapacitation effect of prison falls to 23 per cent. If the true rate is 44 offences per year, the incapacitation effect rises to 28 per cent.

These percentage effects might not seem large but in absolute terms an incapacitation effect of 26 per cent is equivalent to preventing over 44,700 burglaries per annum. Moreover, because offenders generally commit a variety of different offence types (Tarling 1993, p.120), we can be reasonably certain that imprisoning burglars prevents other kinds of crime as well. It must be remembered, however, that our estimates of incapacitation are based on a number of assumptions. These are: (1) that the parameter values on which our estimate of incapacitation is based are reasonably accurate (2) that all offenders run the risk of being arrested and incarcerated (3) the more offenders we imprison, the fewer there are in the general population and (4) that the experience of imprisonment does not change the expected length of a criminal career (T_R) or the rate at which individuals offend (λ). We will now critically examine each of these assumptions, in turn.

There are few grounds for concern about q, S and J because they are relatively easy to measure. Errors of measurement are more likely with T_R (residual career length) or λ (offending frequency). T_R, it will be recalled, was obtained from the equation $T_R = P_A S / (1 - P_A)$, where P_A is the probability that an offender remains active after released from prison. The equation is valid if time to re-offend and time in custody in NSW are both exponentially distributed and Appendix 1 suggests that they are. The parameter P_A was estimated from a large-scale study of re-offending amongst parolees released from prison. There was no evidence in this study that rates of re-offending would have been higher with a longer follow-up period. Unless substantial numbers of parolees return to crime without being re-arrested, then there is little cause for concern about T_R. If, however, T_R is higher than we have assumed, we will have underestimated the incapacitation effect of prison.

The value of λ chosen for our analysis was based on Salmelainen's (1995) study of self-reported offending among juvenile offenders. It is possible that the value of λ for adult offenders is very different. The main reason for believing this is not the case, is that our alternative estimate, obtained using equation (3) and based on offending by both juvenile and adult offenders produced very similar results.[13] It is worth noting, however, that if we are wrong in our estimate of λ we are more likely to have underestimated its value (for imprisoned offenders) than to have overestimated it. This is because we truncated Salmelainen's (1995) offending frequency distribution at the 90th percentile in order to exclude values of offending frequency we deemed to be implausibly high. If these cases had been included, the value of λ would have been considerably higher, in which case our estimate of the incapacitation effect of prison would have been too low.

It is impossible to test assumption (2) but it seems highly unlikely that large numbers of burglars face a zero risk of arrest and imprisonment. Assumption (3) is more problematic, at least in the long run. There is a market for stolen goods and if prison created a significant unmet demand for these goods it is possible that new thieves would enter that market. To the extent to which this happens, our analysis will have overestimated the long-term benefits of incapacitating burglars. The validity of assumption (4) is difficult to assess. Sending people to prison may make them more likely to re-offend but rehabilitation programs may reduce the risk of further offending. Some argue that these two effects cancel each other out at the aggregate level (Cohen 1983, p.10) but there is no way of knowing whether this is true. Note, however, that if sending people to prison does make them more likely to re-offend, the incapacitation effect of longer prison terms will be higher than our estimates suggest.[14]

The fact that prison is effective in preventing a large number of burglaries raises the question of whether increased use of imprisonment would be an effective way of further reducing the burglary rate. Our findings on this issue, like those of incapacitation studies in Britain and the United States (Cohen 1978; Tarling 1993), are not that encouraging. They suggest that a doubling of the sentence length for burglary would cost an additional $26 million per annum but would only reduce the annual number of burglaries by about eight percentage points. A doubling of the proportion of convicted burglars would produce a larger effect (about 12 percentage points) but only if those who are the subject of our new penal policy offend as frequently as those who are currently being imprisoned. Given what we know about the frequency of offending amongst burglars who do not currently receive a prison sentence, this seems highly unlikely.

It might be objected that $26 million is a small price to pay when weighed against the cost of burglary. The annual burglary insurance claim in New South Wales is somewhere between $3,500 and $3,800.[15] If we take the lower of these two figures and multiply it by the estimated number of burglaries prevented as result of imprisonment we arrive at a figure of $156 million as the net dollar savings obtained as a result of imprisoning 1,135 burglars. This is nearly twice the annual cost of keeping 1,135 burglars in prison in New South Wales. Of course, the average cost of burglaries *not* reported to police may be substantially lower than the average cost of burglaries that *are* reported. However even if the true cost of each burglary were only half the first amount cited above, the recurrent cost of imprisoning burglars would still be on par with the financial cost of burglary.[16] On the surface, then, it would seem that there is a compelling case for greater use of imprisonment to control burglary.

When assessing the marginal benefits of higher imprisonment rates, however, the relevant issue is not whether prison costs less money than it saves but whether it is the most cost-effective way of bringing crime down. Given the current state of knowledge we cannot even begin to answer this question. There are policing strategies (e.g. targeted patrols at crime hotspots, weapons confiscation) and criminal justice programs (e.g. coerced treatment, cognitive behavioural therapy, post-release support) that have been shown to be effective in reducing crime and re-offending (Sherman et al. 2002). Any one of these programs and strategies might be more cost-effective than prison in controlling crime. In the vast majority of cases, however, we have no information whatsoever on the cost of these programs, let alone on which programs produce the greatest return on investment (Welsh & Farrington 2000).[17]

There are three other important considerations that also need to be borne in mind when considering whether to increase imprisonment rates to reduce the burglary rate. Firstly, sudden increases in penalty severity are sometimes accompanied by a reduction in the proportion of defendants willing to plead guilty, with the result that fewer defendants end up convicted and more of those who are convicted end up (as a result of plea bargaining) convicted on lesser charges (Cohen & Tonry 1983; Ross & Foley 1987). In terms of the model examined here, this would mean that any gain in incapacitation achieved by changing J or S, may be nullified or partially offset by a reduction in q.

Secondly, even if prison does exert a beneficial short-term effect, having a prison record substantially reduces the employment and earnings prospects of offenders (Hagan and Dinovitzer 1999). This may prolong the period of involvement in crime. The benefits, in terms of crime control that accrue from putting more offenders in prison therefore need to be carefully weighed against any long-term criminogenic effects. Given the inordinately high levels of Indigenous overrepresentation in the justice system (Weatherburn, Lind & Hua 2003), this is an issue of particular importance where Indigenous offenders are concerned.

Thirdly, while the effectiveness of prison in controlling crime is an important consideration in framing penal policy, it is not by any means the only consideration. The use of prison as a crime control tool raises important ethical issues, particularly where it is being used to prevent future offending rather than to punish offenders for past offences. As well as being effective, the penalties imposed by the courts have to be fair and just. We may be able to substantially reduce burglary by making greater use of imprisonment but there is no guarantee that the penal policies required to achieve this outcome will be acceptable to the general community, especially if they involve much higher levels of imprisonment for juvenile offenders and other vulnerable groups in the community.

Given the enthusiasm with which some media commentators greet any suggestion that tougher penalties are effective in reducing crime, it might be worth sounding a note of caution against any tendency to assume that because prison exerts a substantial preventative effect on burglary, it must exert a substantial preventative effect on other kinds of crime as well. As we have already seen, the incapacitation effect of prison depends upon a large number of factors. These factors may and probably do vary substantially from one group of offenders to another. The only way to gauge the incapacitation effect of prison on other kinds of crime, then, is to repeat the analysis conducted here for other kinds of crime.

The qualifications surrounding our findings and the limited scope of our study may be viewed by some as limiting its utility in gauging the value of prison as a crime control tool. It would indeed be unwise to base future decisions about penal policy solely on the basis of the results reported here. If they demonstrate nothing else, however, our findings show that prison should neither be dismissed as irrelevant to crime control nor treated as a panacea. The evidence that prison stops a lot of crime is very strong. The cost-effectiveness of further investment in prison relative to other options for bringing down crime, however, is very unclear, not only for burglary but for all other offences as well. At the risk of stating the obvious, there is a pressing need for further Australian research into the cost-effectiveness of prison and its alternatives in preventing and controlling crime.

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NOTES

1. The fall in imprisonment, unfortunately, was accompanied by a decline in clear-up rates for robbery, making it difficult to disentangle the two effects.

2. This adjustment is conventionally made (see Blumstein et al. 1986, p.60), however, Paul Mazerolle has pointed out that incarcerating one offender from a group may not materially affect the rate at which the group offends.

3. Stevenson and Forsythe (1998) report median offending frequency rather than mean offending frequency. When we used their raw data to calculate an overall mean offending frequency the calculation revealed an average rate of 407 offences per year, an implausibly high figure. If accepted it would imply that, if all the burglars currently held in prison were set free, the number of burglaries would rise to more than four and a half times its current level. The problem, it seems lies with the question Stevenson and Forsythe used to obtain information about offending frequency. Whereas Salmelainen simply asked respondents how many burglaries they had done in the six months leading up to the arrest that resulted in their incarceration. Stevenson and Forsythe first asked their respondents to indicate whether they do 'break, enter and steals': (a) 'every day or almost every day', (b) 'several times a week', (c) 'every week or almost every week' (d) 'less than once a week', (e) 'less than once a month' or (f) 'other'. If they answered in the affirmative to (a) they were asked how many offences per day they had committed per day. If they answered in the affirmative to (b) they were asked how many offences they committed per week. If they answered in the affirmative to (c) or (d) they were asked how many offences they committed per month. If they answered 'other' they were asked how many offences they committed in the previous six months. A large percentage of those who provided information gave grossly implausible answers (several involved claims of over a thousand of burglaries per year). Many respondents also seemed to give answers that simply corresponded with the beginning of the reference period. In the circumstances we judged it unwise to rely on data on offending frequency taken from the Stevenson and Forsythe study.

4. We include people charged with burglary but convicted of some other offence on the grounds that burglars convicted of and sent to prison for non-burglary offences cannot commit burglary. This assumes, of course, that anyone charged with burglary committed the offence.

5. If several minimum terms are imposed as a consequence of being convicted of several offences, we take the minimum term for the principal offence (i.e. the longest minimum term to which the offender is subject).

6. The lower value obtained in this study is probably a reflection of the fact (a) that average sentence lengths for burglary have been increasing (Moffatt, Weatherburn & Donnelly 2005) and (b) that some of those included in the minimum term estimates for burglars had also been convicted of more serious offences and therefore had longer minimum terms.

7. This figure accords very well with that obtained by Tarling (1993) for P_A in his study of incapacitation in Britain.

8. The adjustment is for co-offending effects (see method section)

9. It is reassuring to note that this is very close to the figure you obtain when you multiply the number of imprisoned burglars (1135) by the assumed value of λ (38) by the average sentence length in years (1.02).

10. This is the earliest data from which we can track an individual's criminal record.

11. Personal communication: Kyleigh Heggie, Corporate Research and Evaluation, NSW Department of Corrective Services.

12. Facts and figures: Corporate Research, Evaluation & Statistics, Corrective Services August 2005.

13. The seeming stability of λ suggests that the current heroin shortage (which began after Salmelainen conducted her study) has not had much effect on the offending frequency of those who remained involved in burglary. We are indebted to Dr Toni Makkai (Director of the Australian Institute of Criminology) for raising this issue with us.

14. As the mean number of offences increases or the average length of a criminal career length increases, the proportion of crime averted through longer prison terms also increases.

15. Data kindly supplied by a senior Australian insurance industry executive who wishes to remain anonymous. The smaller estimate relates to household insurance claims. The larger relates to burglary claims by business policy-holders.

16. The recurrent cost of keeping 1,135 burglars in prison is approximately $78.3 million per annum. This figure is obtained by multiplying the number of imprisoned burglars (1,135) by the daily cost of imprisonment ($189.10) by 365.

17. For an exception see Lind et al. 2002.

APPENDIX

Figures 6 and 7 show the observed and predicted distributions of time to re-offend (TTR) and prison time served (PT) on the assumption that the true distributions in each case are exponential. The sample mean in each case has been used to calculate the predicted distribution.

Figure 6: Time to reoffend (TTR) for parolees
Fit to exponential distribution for frequencies observed over 50 day intervals

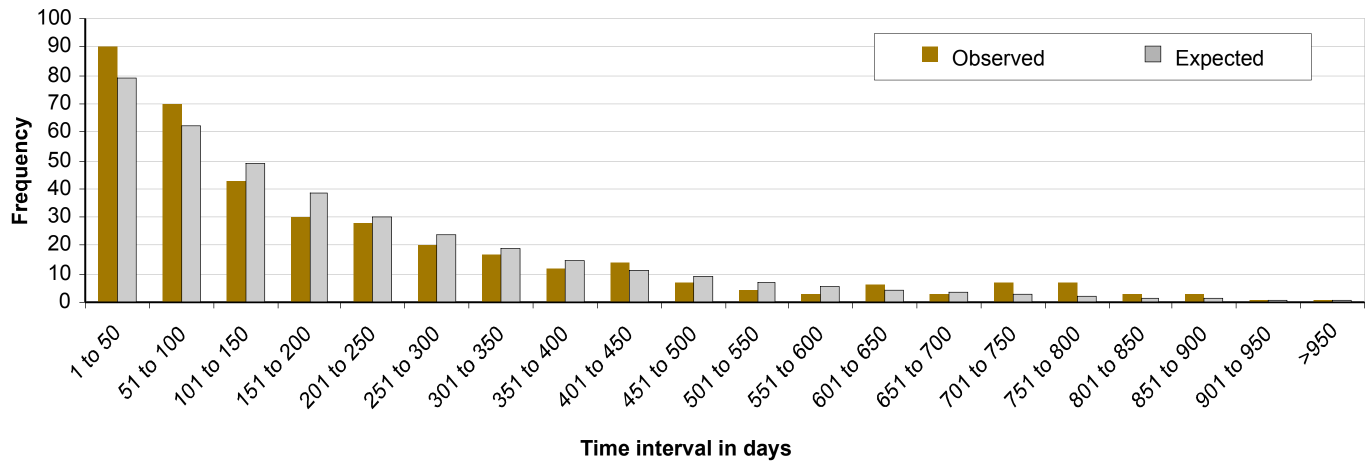
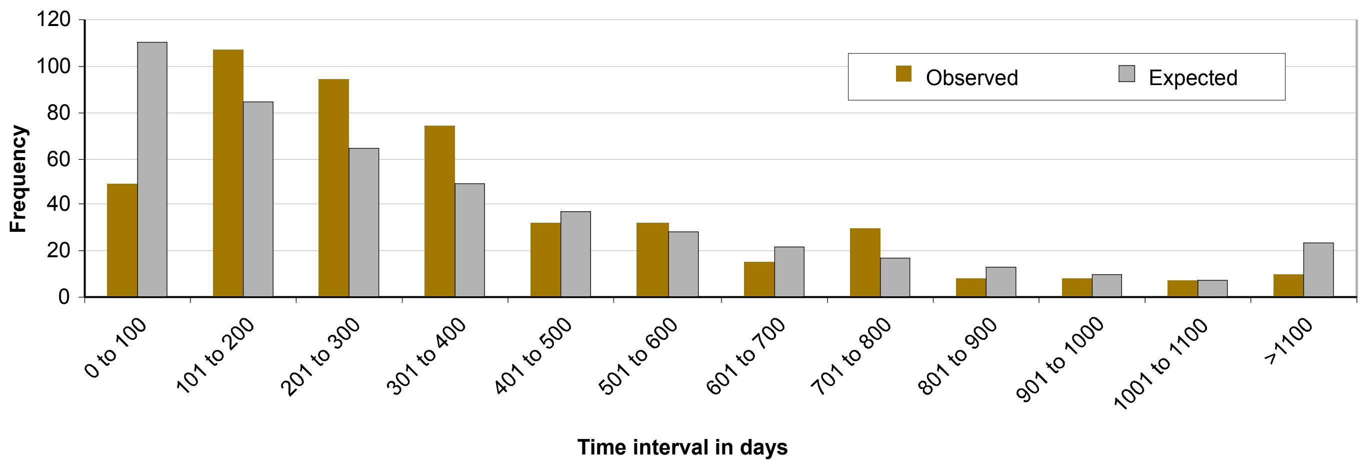


Figure 7: Prison time served (PT)
Fit to exponential distribution for frequencies observed over 100 day intervals



The exponential is a much better fit to the TTR distribution than to the PT distribution, probably because of a tendency on the part of judges and magistrates to impose terms of imprisonment that are multiples of three months. The predicted survival times seem to deviate at both ends of each of the distributions but Kolmogorov-Smirnoff tests indicate (p(TTR) = 0.22; p(PT) = 0.87) that the differences are well within the realm of chance. Cumulative probability plots show good fit to the exponential for both TTR and PT, with the exception that low values of PT tend to deviate more from the expected distribution.

NSW Bureau of Crime Statistics and Research - Level 8, St James Centre, 111 Elizabeth Street, Sydney 2000
bcsr@agd.nsw.gov.au • www.lawlink.nsw.gov.au/bocsar • Ph: (02) 9231 9190 • Fax: (02) 9231 9187
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