A NOTE ON USING VICTIMIZATION RATES TO TEST DETERRENCE

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I. Introduction

Several recent studies have attempted to establish the effect of criminal sanctions on crime rates. Most researchers found that the probability of punishment--usually measured by the ratio of apprehensions to the number of crimes--has a significant negative effect on crime rates.[1] As is well known, measurement errors can produce a spurious negative effect of the sanction-probability on the crime rate because the number of crimes appears in the numerator of the dependent variable (the crime rate) and in the denominator of the explanatory variable (the ratio of apprehension to crimes). It has been shown that because of the way the crime rate and sanction risk are defined, any variation in the measurement error across the units of observation can produce a negative effect even if there is in fact no deterrent effect.[2]

Most recent studies of deterrence have been based on statistics of crimes recorded by police, mainly the Uniform Crime Reports (UCR) issued by the F.B.I. Many have claimed, however, that the UCR crime statistics are subject to serious measurement errors. Differential underreporting and "unfounding" are two of the major sources of error mentioned in the literature: because the UCR statistics are based on crimes reported to police by victims, differences in reporting rates across jurisdictions, as well as in the methods and incentives of police in recording reported crimes, may cause variations in the error of measuring the number of crimes.

The National Crime Panel (NCP) victimization surveys provide an opportunity to check the validity of the deterrence effect.[3] The NCP surveys, composed of interviews with households, included questions about crime incidents in the twelve months preceding the interview. The victimized households were asked to describe the incident and whether or not it was reported to the police. The surveys were conducted in various cities and it is therefore possible to calculate from them victimization or crime rates which are comparable to the traditional UCR crime rates. The victimization rates calculated on the basis of the NCP surveys (henceforth referred to as NCP crime rates) have some important advantages and disadvantages, in comparison to the UCR index, as a data base for a deterrence analysis. In particular, although subject to other errors, they are relatively free from errors introduced by underreporting to the police and underrecording ("unfounding") by the police. Because a recent work by Wilson and Boland[4] (who examine only burglary) is one of the few tests of the deterrence hypothesis that does not depend on the UCR data, an attempt to check the validity and robustness of the deterrence effect using NCP data seems worthwhile.[5]

In Section II we elaborate on the error sources in the UCR data, in Section III we discuss the NCP crime rates, and in Section IV we use the NCP rates to test deterrence.

II. Underreporting and "Unfounding" in the UCR Index

A major source of measurement error in the UCR index is the underreporting of crimes. The problem was of course recognized by researchers who used the UCR index,[6] but due to the unavailability of data, little was known about the magnitude of the problem and nothing could have been done to control for it.

As we learn from Table 1, about half of the offenses are never reported to the police.[7] Except for larceny, the property crimes (auto theft and burglary) have higher reporting rates than crimes against the person (robbery, rape, and assault). Not surprisingly, the reporting rates are higher for completed offenses which involve a greater loss. One should be cautious in interpreting these reporting rates because there is, of course, the problem of underreporting to the NCP interviewer. For some types of crime, the victim is reluctant to reveal the crime not only to the police but also to the interviewer. This should be true for assault, some robberies and especially for rape. Since reporting to the police and reporting to the interviewer are probably positively correlated for these crimes, the observed reporting ratio is an overestimate of the "true" ones.

Another source of measurement error in the UCR crime index is "unfounding": the underrecording of reported offenses by the police. Police departments are allowed some discretion in the non-recording

TABLE 1

REPORTING RATES

	Means and Coefficients of Variation (C.V.)			
	(With Attempts)		(Without Attempts)	
	Mean	C.V.	Mean	C.V.
Rape	0.519	0.194	0.649	0.252
Robbery	0.445	0.189	0.564	0.219
Assault	0.439	0.108	0.562	0.117
Burglary	0.534	0.065	0.614	0.069
Larceny	0.277	0.126	0.287	0.130
Auto Theft	0.737	0.144	0.929	0.129

Reporting rate with (without) attempts = the number of reported (and reported attempted) NCP crimes/NCP completed (and attempted) crimes.

of offenses; if the extent of non-recording differs across departments, one should expect this measurement error to produce the same type of bias as the one produced by underreporting. Crude measures of unfounding can, in principle, be derived, but they should be interpreted with caution since the comparability of the UCR and NCP data is not clear.[8]

It is important to realize, however, that for establishing a potential bias in measuring a deterrent effect one is interested in the variation of unfounding rates rather than in their absolute values. As it turns out, the former are quite substantial relative to the variation of the reporting rates.[9] One may conclude that recording procedures differ across police departments and therefore the measurement error may produce a spurious deterrent effect.

III. The Victimization Rates as Crime Indices

The use of victimization rates computed from the NCP surveys as indices of crime for testing deterrence poses some conceptual and methodological problems. Conceptually, one faces the problem of defining a crime; in particular, it is not clear whether to include in crime statistics those acts which technically qualify as crimes but produce negligible damage to victims.[10] It is not obvious, for example, especially in property crimes, whether attempts should be included in computing crime rates.[11] The UCR crime index does include attempts, but UCR crimes have already met the criterion of being important enough to be reported to and recorded by the police. Since this definitional

question remains unsolved, two alternatives to the NCP crime rates were also used: NCP rates excluding attempts and NCP "reported" crimes. The latter are computed on the basis of the number of incidents which, according to the respondent, were reported to the police. These NCP "reported" rates are free from the unfounding bias and, in contrast to the NCP total rates, are at least important enough to deserve reporting to the police. They are, however, subject to errors arising from the possible tendency of individuals to falsely claim that they have reported crimes to the police.

The main advantage of the NCP crime rates as a data base for testing deterrence is that they are free from the biases introduced by unfounding and underreporting to the police. However, it has been argued by critics of the NCP surveys that one should expect underreporting or overreporting by the respondents to the NCP interviewer.[12] It has to be admitted that this phenomenon is not only possible, but may also give rise to errors of measurement which might potentially bias our estimated deterrence effects. There is little one can do about this problem, however, except in those cases when the direction of the potential bias is well specified.

An important example of such criticism is the argument that surveyed individuals in high crime areas are less likely to report minor crimes to the NCP interviewers and such differential underreporting is a source of a systematic measurement error in the NCP crime index.[13] However, we can, and do, subject this argument to an empirical examination: Assume that, controlling for the average income of the victim's population, the high and low crime areas have the same "true" distribution of losses per

incident. The argument mentioned above suggests that in high crime areas the minor loss incidents are never mentioned to the interviewer. Consequently, the observed distribution in high crime areas is truncated at the lower end and thus the observed mean is higher than the "true" mean in this area. Obviously, therefore, the observed mean in the high crime area is also higher than the observed (and true) mean in the low crime area. If the true mean per incident is higher in the high crime area than in the low crime one, the observed mean should be a fortriori higher than the one in the low crime area. Thus, if the argument of the critics is true, the average loss per incident should be higher in high crime than in low crime areas, controlling for the average income of the population in both locations. We will test whether this implication is consistent with the data.

IV. Empirical Implementation

Since the purpose of this work is to test the validity of the deterrency hypothesis by using the NCP surveys, the availability of the survey data dictated the choice of the sample. Victimization surveys were conducted in four time periods: eight cities were surveyed in 1972, the five largest cities in 1973, and another thirteen cities in 1974. In 1975, the 1972/1973 cities were surveyed again. By pooling the time-series observations (1972/1973 and 1975) on thirteen cities (26 observations) with the thirteen cities which were covered once (in 1974), we get a sample of 39

observation points. Several disadvantages of this sample should be noted: this data set covers central cities only and therefore we lose information on suburban populations and any possible urban-rural variation.

Table 2 presents the elasticities of the crime rates with respect to the crime specific probabilities of clearance.[14] These coefficients were estimated in single-variable regressions since other runs which included the proportion of blacks, proportion of males in the age group 15- to 24-years-old, average income, prison terms, and unemployment rates all showed that the coefficients of the clearance probability are not appreciably affected by the inclusion of these variables.[15] As expected, the UCR regressions results differ from and are less significant than the results obtained by others because the sample used is smaller: We have only 26 distinct cities as opposed, for example, to 51 states used in Ehrlich's study.[16] The difference in sample size might also explain the insignificant results we get in the UCR data for assault and larceny. The main conclusion to be drawn from Table 2 is that on the basis of the "true" NCP crime rates, as much as on the basis of the traditional UCR data, one cannot reject the deterrence hypothesis. Obviously, one must still bear in mind all the qualifications that were raised about the alternative interpretations of similar findings, a topic which is not addressed here.[17]

However, a comparison of the NCP and UCR results is instructive: In larceny, which is the least reported crime (see Table 1), not only is the deterrent effect[18] larger (in absolute value) in the NCP data than in the

TABLE 2

UCR AND NCP CRIME RATES
OLS Regression Estimates

The dependent variables are specific crime rates and the independent variables are the appropriate clearance probabilities. (All variables in logarithmic form.)

	UCR (1)	NCP (Without Attempts) (2)	NCP (With Attempts) (3)
RAPE	-0.48	-0.65	-0.53
t	(-1.98)	(-7.17)	(-7.12)
ROBBERY	-0.91	-0.62	-0.42
t	(-5.83)	(-3.83)	(-3.26)
ASSAULT	0.26	-0.06	-0.09
t	(1.29)	(-1.49)	(-2.17)
BURGLARY	-0.41	-0.31	-0.24
t	(-3.40)	(2.98)	(-2.47)
LARCENY	-0.12	-0.29	-0.28
t	(-0.83)	(-2.78)	(-2.72)
AUTO THEFT	-0.35	-0.12	-0.25
t	(-3.26)	(-2.01)	(-2.34)

Column (1): Crime rate = UCR number of offenses/population
Probability = FBI number of clearances/UCR number of offenses

(2): Crime rate = NCP number of completed offenses/population
Probability = FBI number of clearances/NCP number of completed offenses

(3): Crime rate = NCP number of completed and attempted offenses/population
Probability = FBI number of clearances/NCP number of completed and attempted offenses

UCR index, the results using NCP surveys are statistically more significant than those using the UCR. The deterrent effect for rape is also larger and appreciably more significant in the NCP data than in our UCR results; this too can be explained by reporting because the rape reporting rate (Table 1) is most probably overestimated (see Section II). The highly reported crimes--auto theft, burglary and robbery--have smaller coefficients but the effects are strongly significant. The crime rates in column (3) include both completed and attempted offenses. The inclusion of attempted offenses reduces the magnitude and significance of the coefficients in most crimes.

Table 3 presents the results of the deterrence regressions, using the NCP "reported" crimes. The results do not differ from the NCP total crimes regressions presented in Table 2.

There are, however, two criticisms of these results which we must still consider.[19] First, we present in Table 4 the results of testing the implications which follow from the argument alluded to in Section III that minor incidents in high crime areas are excluded from the NCP data. The average loss per incident appears to be a positive function of average income (except in robbery) but the crime rate does not seem to have a positive effect on the average loss. In fact, though insiginficant, the effect of the crime rate is negative. As explained in Section III, this result seems inconsistent with the argument that respondents in high crime cities exclude minor incidents from accounts in survey interviews.[20]

TABLE 3

NCP "REPORTED" CRIME RATES
OLS Regression Estimates

The dependent variables are specific crime rates and the independent variables are the appropriate clearance probabilities.

	Without Attempts (1)	With Attempts (2)
RAPE	-0.68	-0.49
t	(-8.32)	(-6.64)
ROBBERY	-0.77	-0.61
t	(-5.41)	(-4.21)
ASSAULT	-0.06	-0.07
t	(-1.59)	(-1.66)
BURGLARY	-0.29	-0.25
t	(-2.84)	(-2.53)
LARCENY	-0.23	-0.22
t	(-2.16)	(-2.15)
AUTO THEFT	-0.28	-0.27
t	(-3.03)	(-2.69)

Column (1): Crime rate = NCP reported crimes (excluding attempts)/population
Probability = FBI number of clearances/number of NCP reported crimes (excluding attempts)

(2): Crime rate = NCP reported crimes (including attempts)/population
Probability = FBI number of clearances/number of NCP reported crimes (including attempts)

TABLE 4

OLS LOSS REGRESSIONS

The dependent variables are crime specific average losses. All variables are in logarithmic form.

	Constant	Crime rate	Income	R^2	N
ROBBERY	-2.699	-0.216	0.749	0.04	39
t		(1.14)	(0.96)		
BURGLARY	-2.725	-0.167	0.933	0.24	39
t		(-1.57)	(2.68)		
LARCENY	-3.524	-0.087	0.886	0.30	39
t		(-1.22)	(3.18)		
AUTO THEFT	-1.178	-0.098	0.649	0.09	39
t		(-0.83)	(1.67)		

Crime rate = NCP number of crimes/population

Income = Total per capita personal income*

Average loss = Average property and cash loss (NCP)

*Source: U.S. Department of Commerce, Social and Economics Statistics Administration, Bureau of Economic Analysis, "Survey of Current Business."

Second, our data presents the problem that the victimization rates used in the previous regressions are derived from the NCP surveys of households while the FBI data on clearances for burglary and robbery aggregates crimes against households as well as businesses. Burglary and robbery of a commercial enterprise differs in many respect from crimes against individuals; ideally, one would like to exclude crimes against business from our regressions but unfortunately there is no data available for this purpose. In Table 5 we analyze the effect of this problem on our results by using NCP data on robberies and burglaries of commercial establishments. The sanction probability in 5A and 5B includes in its denominator both individual and commercial victimizations. Two dependent variables are used alternatively: the combined crime rate or the crime rate against individuals. The latter alternative assumes that the aggregate probability of clearance applies to crimes against individuals. Combining the two types of crime (see 5A and 5B) has a minor effect on the results for robbery: the estimated coefficient is somewhat lower but it remains highly significant. Adding up commercial and household burglaries, however, reduces the significance of the results: excluding attempted burglaries, the results are still significant at the 10% level; including attempts, the results are significant only at the 15% level.

In 5C, we test the deterrence hypothesis within the subset of burglaries and robberies against commercial enterprises. The UCR probability of clearance is used since most crimes against business are reported to

TABLE 5

BURGLARY AND ROBBERY REGRESSIONS

5A. Commercial crimes included, without attempts

	CONSTANT	PROBABILITY	N
ROBBERY	-5.989	-0.513	39
t		(-2.74)	
BURGLARY	-3.925	-0.215	39
t		(-1.80)	
ROBBERY*	-5.583	-0.522	39
t		(-3.09)	
BURGLARY*	-3.470	-0.173	39
t		(-1.79)	

The crime rate = NCP crimes against individuals/population

The crime rate* = NCP crimes against individuals and commercial establishments/population

The clearance probability = FBI number of clearances/number of NCP crimes against individuals and commercial establishments

TABLE 5

BURGLARY AND ROBBERY REGRESSIONS

5B. Commercial crimes included, with attempts

	CONSTANT	PROBABILITY	N
ROBBERY	-5.379	-0.364	39
		(-2.41)	
BURGLARY	-3.516	-0.157	39
		(-1.45)	
ROBBERY*	-4.952	-0.332	39
		(-2.38)	
BURGLARY*	-3.073	-0.126	39
		(-1.40)	

The crime rate = NCP crimes including attempts against individuals/population

The crime rate* = NCP crimes including attempts against individuals and commercial establishments/population

The clearance probability = FBI number of clearances/number of NCP crimes including attempts against individuals and commercial establishments

TABLE 5

BURGLARY AND ROBBERY REGRESSIONS

5C. Crimes against commercial establishments

(All variables are in logarithmic form)

Dependent Variable: Crime Rates

	Without Attempts		With Attempts	
	Robbery	Burglary	Robbery	Burglary
c	-6.530	-4.781	-6.168	-4.393
Probability				
	-0.539 (-3.25)	-0.276 (-2.36)	-0.517 (-3.21)	-0.247 (-2.11)
N	39	39	39	39

Crime Rate

Without attempts = NCP number of completed offenses/population

With attempts = NCP number of completed and attempted offenses/population

Probability = FBI number of clearances/UCR number of crimes

the police.[21] Assuming that the aggregate probability applies to crimes against commercial establishments, we see that in these separate regressions for commercial crimes, the deterrence effect is strongly significant.[22]

V. Conclusion

This work is another small contribution to the empirical testing of criminal deterrence. The negative effect of criminal sanctions on crime rates was found to be significant when the NCP vicitmization rates, rather than the conventional UCR crime rates, are used as a data base. Moreover, the effects turned out to be significant in all the six types of crimes covered by the NCP surveys.

We should emphasize that these findings are subject to several qualifications. Although the NCP crime rates are presumably free from biases introduced by unfounding and underreporting to the police, the extent of under- or overreporting to the NCP interviewer is of course unknown. We were able, however, to examine in some detail the argument that there is a systemmatic bias in the NCP crime rate due to the underreporting (to the NCP interviewer) of minor incidents in high crime areas. This claim, made by critics of the NCP, does not seem to be consistent with our findings. We also explored another source of measurement error which might arise from the aggregation of personal and commercial victims in the po-

lice clearance data. There appears to be no dramatic change in the results when this problem was taken into account.

Obviously, many potential problems remain and further research is required to refine the tests of deterrence based on the NCP victimization surveys.

Notes

[1]For a comprehensive survey of this literature and its various critiques see National Research Council, Deterrence and Incapacitation: Estimating the Effects of Criminal Sanctions on Crime Rates (Washington, D.C.: National Research Council, 1978).

[2]See, for example, National Research Council, supra note 1, pp. 23-25, 136-137.

[3]A recent summary of the uses of these data is provided in Research Triangle Institute, "Analysis of the Utility and Benefits of the National Crime Surveys" (Research Triangle Park, North Carolina: Research Triangle Institute, 1968). A collection of articles on the advantages and limitations of the victimization surveys can be found in W.G. Skogan (ed.), Sample Surveys of the Victims of Crime (1976).

[4]J.Q. Wilson and B. Boland, "Crime" (Appendix A) in The Urban Predicament (W. Gorham and N. Glasser, eds.) (Washington, D.C.: 1976).

[5]Another exception is P.J. Cook's analysis of burglary: "Punishment and Crime: A Critique of Current Findings Concerning the Preventive Effect of Criminal Sanctions," Law and Contemporary Problems, 1977. See also another study of this author and F.C. Nold: "Does Reporting Deter Burglars? An Empirical Analysis of Risk and Return in Crime" (Mimeo, 1978).

[6]See, for example, the appendix in I. Ehrlich, "Participation in Illegitimate Activities: A Theoretical and Empirical Investigation," Journal of Political Economy 81(3) (1973), 521-565.

[7]The reporting rates in Table 1 are computed from the sample of 26 cities in 1972-1975 described in Section IV.

[8]By dividing the number of police-recorded crimes (UCR) by the NCP crimes which are claimed to be reported to the police, one obtains the following ratios (the coefficients of variations are bracketed): rape, 0.84 (.52); robbery, 0.75 (.31); assault, 0.34 (.63); and burglary, 0.57 (.25). These ratios seem rather low and incidate a very high percentage of unfounding. This can be explained by incomparabilities between the data sources. In particular, the ratios may be small because the NCP "reported" crimes may be inflated due to two possibilities: (a) forward "telescoping," a tendency to report an incident as having occurred, for example, in the last twelve months when it actually happened eighteen months ago (see Wolfang and Singer, J. of Crim. L. and C. 379 (1978)); or (b) false claims of reporting by respondents who are reluctant to admit nonreporting. In contrast, the number of larcenies and auto thefts recorded exceeds the number reported by the NCP respondents, probably because a large fraction of the victims of these crimes consists of tourists and commuters.. Consequently, a large

percentage of these crimes is recorded by the police but the victim population is not covered by the NCP surveys. This is especially true for suburban residents who commute to the central cities and are victimized there, but are never covered in the surveys.

[9]The coefficients of variations of the unfounding rates are given in note 8. As was mentioned in note 8, the absolute values of these ratios are not reliable but their variation-coefficients are not affected by the problems discussed in that note.

[10]This point is discussed by J.P. Levine, "The Potential for Crime Overreporting in Criminal Victimization Surveys," Criminology 14 (1976), 307-327 and "Reply to Singer," Criminology 16 (1978), 103-107.

[11]The ratios of attempted to completed crimes are as follows: rape, 2.71; robbery, 0.73; assault, 1.47; burglary, 0.38; larceny, 0.11; and auto theft, 0.48.

[12]See Levine, supra note 10.

[13]National Academy of Sciences, supra note 1, p. 36.

[14]The probability of clearance is approximated by the ratio of crimes "cleared" to the number of crimes reported (see notes to Table 2). A crime is classified as "cleared" by the police when they consider

the case to be solved. The data on clearances and the UCR number of offenses are derived from unpublished FBI statistics.

[15]The only exception is the proportion of non-whites variable, whose inclusion reduces the larceny and assault deterrent effect.

[16]See Ehrlich, supra note 6.

[17]The main problems which were mentioned in addition to the errors in measuring crime are: confounding of deterrence and incapacitation, common third causes and the possibility that crime and sanctions are simultaneously related (see the National Research Council, supra note 1, pp. 19-63).

[18]We refer to the regression coefficient of the crime rate on clearance probability as the "deterrent effect."

[19]Another source of measurement error in the NCP crime rates and probabilities which is not considered here arises from the fact that only residents of a city were interviewed by NCP, whereas the number of clearances from FBI sources refer to all crimes within a city, whether the victim was a resident or a nonresident. This problem was discussed by Wilson and Boland (Appendix B), supra note 4.

[20]Note, however, that if income is an incomplete measure of the victim population's wealth and the crime rate is negatively correlated with wealth, the nonpositive effect of crime on average loss may be due to the fact that crime serves as a proxy for wealth.

[21]The reporting rates for commercial victimizations are as follows: robbery, 0.76; and burglary, 0.86.

[22]It has been suggested (see the National Research Council, supra note 1, page 50) that another approach to correct for the problem of error in measuring crime is to use two separate data sources to estimate the number of crimes, one for the crime rate variable and the other for the sanction variable. If the errors in the two different crime estimates are uncorrelated, then no negative association of crime and sanction is imposed on the estimates. Although there is always the possibility of correlated errors, the estimation in Table 5C comes close to this suggestion: the number of crimes used to construct the crime rates is from NCP sources and relates to commerical victimizations only, while the number of crimes used to construct the sanction probability is from UCR sources and includes the total number of crimes against persons and persons.