Trend and Deviation in Crime Rates: A Comparison of UCR and NCS Data for Burglary and Robbery

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ABSTRACT

Trends and year-to-year deviations in UCR and NCS data on burglary and robbery are examined for the period 1973 to 1985. We find strong correspondence between year-to-year deviations in UCR crime rates and NCS victimization rates for both crime types. The difference between the two data series is located primarily in their contrasting trends, although there is some evidence that trends in UCR and NCS crime rates have been converging in recent years. Ex post forecasts reveal that the UCR/NCS relationships estimated from the 1973-85 data continued through 1986 and 1987. While the UCR rates in 1986 were somewhat influenced by unusual increases in the proportion of crimes reported to the police that year, changes in crime reporting for the period as a whole have had little effect on UCR burglary and robbery rates. We conclude that, within the two serious crime types examined in this study, there is strong consistency between the alternative data sources on variations in crime rates over time.

BACKGROUND

Criminal justice researchers and policy analysts are fortunate in having two independent data series to test theory, develop and evaluate policy, and inform the public about changes in levels of serious crime over time. For over fifty years the Federal Bureau of Investigation, through the Uniform Crime Reporting Program, has generated national and local level offense and arrest data, based on police records. In recent years these data have been supplemented by information collected from crime victims through the National Crime Survey (see Bureau of Justice Statistics, 1989b and Garofalo, 1990 for summaries of NCS history and objectives).

An important stimulus for the development of victimization surveys was the recurring criticism that offense data based on police records omit a "dark figure" of crimes that victims do not report to the police (Biderman and Reiss, 1967; Ennis, 1967; Schneider and Wiersema, 1990). However, the availability of victimization data does not seem to have allayed concerns about the accuracy of estimates of serious crime in the United States. Since the inception of the National Crime Survey nearly twenty years ago, the relative quality, comparability, and correspondence of the UCR and NCS crime data have been questioned and debated in the research literature (see Gove, Hughes, and Geerken, 1985 and O'Brien, 1985 for comprehensive reviews).

Concerns about the relative merits of the two data sources in reflecting the pattern of year-to-year changes in crime have also received widespread media attention. For example, when contrasting the 6% increase in UCR rates for serious crimes in 1986 with NCS victimization rates for the same year that,

according to Justice Department officials, "remained essentially unchanged from the year earlier," news articles attributed the UCR rise to increased reporting by the public to the police (New York Times, 1987:20; Washington Post, 1987:16; U. S. Department of Justice, 1987a). Such accounts serve to reinforce the impression of noncomparability and divergence in UCR and NCS data, not only on the part of the general public, but also in the criminal justice community. The apparent conflict between UCR and NCS crime estimates for 1986 prompted at least one state criminal justice agency to ask: "Did crime go up in 1986?" (Illinois Criminal Justice Information Authority, 1987:4).

SIGNIFICANCE OF THE PROBLEM

Schlesinger (1990:6) maintains that successful crime data collection, and ultimately effective policy, require acceptance of the need for multiple indicators of crime. If this assessment is correct, the correspondence between alternative indicators of serious criminal activity in the United States is a research issue of fundamental scientific and practical importance. A central aim of research in criminology is to identify the determinants of variation in crime rates across place and time. Crime reduction is a major purpose of criminal justice policy. These efforts are impeded to the degree that estimates based on different but presumably complementary measurements of crime diverge, or when the sources of divergence between alternative estimates of crime are poorly understood.

Providing data to evaluate the influence of crime reporting by the public on possible divergence between UCR and NCS

estimates of change in crime rates over time has been a longstanding and important goal of the National Crime Survey. In addition to surveying commerical and city crimes (programs that were discontinued in the mid-1970s), the NCS was to "launch a time series tracing changes in the incidence of crime...intended to complement information available from the FBI's Uniform Crime Reports (UCR) by collecting data on crimes not reported to the police..." (Bureau of Justice Statistics, 1989b:2; see also Lynch, 1990:98-99).

This paper examines the relationship between UCR and NCS data as indicators of serious crime in light of that objective. Specifically, we address the following research questions: (1) To what degree do UCR crime rates and NCS victimization rates correspond over time, either in their trends or in year-to-year fluctuations, for the crime types of burglary and robbery? (2) To what degree have changes in reporting to the police influenced annual UCR crime rates and thereby contributed to divergence between the two crime data series? (3) Is the recent upturn in UCR crime rates primarily attributable to increases in crime reporting or to underlying levels of criminal victimization? None of these issues has been adequately addressed in previous research.

PREVIOUS RESEARCH

Cross-sectional studies based on a sample of 26 cities surveyed in the early 1970s have generally found weak or even inverse relationships between the UCR and NCS data for several crime types (Booth, Johnson, and Choldin, 1977; Cohen and

Lichbach, 1982; Decker, 1977; Menard and Covey, 1988; Messner, 1984; O'Brien, 1985:87-91; O'Brien, Shichor, and Decker, 1980; for an exception, see Cohen and Land, 1984). Such findings have prompted many researchers to urge caution in the use and interpretation of one or the other data source (usually the UCR data) and/or to conclude that the two sources are noncomparable because they "appear to have been measuring two different phenomena" (Menard and Covey, 1988:371).

Research on the relationship between UCR and NCS data over time is more limited, undoubtedly due in part to the small number of data points available for analysis. However, when viewed in relation to the NCS objective of revealing the "dark figure" of crime, the conclusions of existing longitudinal research on the comparability and correspondence of UCR and NCS data have not been promising. Longitudinal studies of the two crime data series have reached conclusions similar to those from the cross-sectional research: crime classifications used often differ enough that UCR and NCS data measure different domains of events, or when the crime events are comparable, the measures resulting from the two data sources are not significantly related (Menard and Covey, 1988; Messner, 1984; O'Brien, 1985). A common interpretation of the apparent lack of association between the two series is that the UCR rates vary substantially over time, while the NCS data exhibit less year-to-year and longer term change (Menard, 1987:462; Messner, 1984:440; O'Brien, 1985:96-97).

An important exception is a study by Biderman, Lynch and

Peterson (1983), which finds strong correspondence between UCR and NCS data over time. This study is also noteworthy because of its meticulous examination of the conceptual and procedural differences between the two data sources, and its use of systematic adjustments of the data to increase their comparability. Biderman et al. (1983) is one of the few studies to systematically examine (and adjust for) the influence of reporting rates of crimes to the police on the relationship between the two series. Interestingly, this earlier study was prompted in part by media accounts, similar to those described above, of conflict between the two data sources in the early 1980s which "had the unfortunate consequence of reviving old and usually ill-informed arguments about which is the 'better' measure of 'trends in crime'" (Biderman et al., 1983:1).

Limitations of Existing UCR/NCS Temporal Comparisons

In spite of its strengths, Biderman et al. (1983) shares significant limitations with other studies of the relationship between UCR and NCS data over time. The most obvious problem with existing longitudinal analyses is their reliance on very brief time series. Biderman et al. (1983) compares UCR and NCS data for the period 1973 (the first year of the NCS series) to 1979, while Messner (1984) and O'Brien (1985) examine the period 1973 to 1981. This was a necessary limitation of earlier studies that was acknowledged as such by some researchers (e.g., O'Brien, 1985:97-98). Even more recent investigations, however, use less than the full range of data available for temporal comparisons. For example, the temporal analysis in Menard and Covey's study,

published in 1988, is restricted to the period 1973 to 1982.

Use of such brief time spans limits the efficiency of regression estimates of the strength of the association between the two time series, as well as the degrees of freedom available for multivariate analysis, including analysis of the effects of crime reporting on changes in UCR crime rates. Obviously, the development of models to predict future changes in one variable based on past changes in the other is limited for the same reasons.

While previous studies usually include the standard caveats about generalizing from small samples, a related and more fundamental conceptual issue has been largely overlooked. Examinations of temporal changes in the UCR and NCS data have focused almost exclusively on "trends" in crime (or in crime reporting).[1] Such studies neglect the important difference between consistent, unidirectional change in a variable manifested in <u>trend</u>, on the one hand, and year-to-year fluctuation or <u>deviation</u> from trend (i.e., the detrended variation in the data over time), on the other. Conflating the two types of change can result in misleading or erroneous conclusions about the relationship between two time series. For example, a measure of association such as the correlation coefficient may show little or no relationship between two variables even if--or precisely because--they are positively correlated in their deviations, but negatively correlated in their trends (or vice versa). As we show below, failure to adequately distinguish between trend and deviation has led to

just such errors of interpretation in existing research on the relationship between UCR and NCS data over time.

Biderman et al. (1983) do distinguish between trend and deviation in the UCR and NCS data in their conclusion that, when adjusted for comparability, "the two series display the same directional changes, both with regard to trend over the seven years and fluctuations from year to year" (vii). However, this conclusion is based largely on visual inspection of changes in the two variables over an extremely limited time span of only seven years, and the authors make no attempt to assess the relative contribution of each type of change to the total variation in each of the crime measures. Nor do they systematically isolate trend from deviation in crime reporting, even though they assume, based on suggestive but very limited evidence, that "over time, a larger proportion of all crimes falling within the NCS became crimes known to the police" (vii).

Menard (1987) provides more precise estimates of trends in the two data series by regressing UCR and NCS crime rates on a time variable for the period 1973 to 1982. Finding nonsignificant or contrasting trends for most of the crime types examined, the study concludes that "the two measures--UCR and NCS--present very different pictures of the changes in crime rates and the risk of being victimized" (463). However, because he dismisses changes not captured by linear trend as "random fluctuations" in the data (470), Menard ignores the possibility that UCR and NCS crime rates may be meaningfully related in their <u>detrended</u> variation.

The present study tries to overcome each of these limitations of previous temporal comparisons UCR and NCS crime rates. First, we base our analysis on a longer time period (1973-1985), thereby improving the efficiency of regression estimates of the relationship between the UCR and NCS data. Second, we perform multivariate analyses to identify more precisely the structure of the relationship between the two data series, specifically, the relative influence on UCR rates of trends and of year-to-year fluctuations in both NCS crime rates and reporting rates to the police. Finally, we test the predictive accuracy of our models by comparing actual 1986 and 1987 UCR rates with ex post forecasts based on the 1973-1985 NCS data. This also permits a detailed assessment of the influence of changes in reporting on recent increases in the UCR burglary and robbery rates.

DATA AND METHODS

The basic data used in our analysis, displayed in Table 1, consist of UCR and NCS robbery and burglary rates and the respective NCS reporting rates to the police for the period 1973 to 1985. Data for 1986 and 1987 are reserved for evaluating forecasting models introduced later in the analysis. We constructed the NCS crime rates reported in Table 1 (ROBN and BURN) by dividing the number of robbery and burglary victimizations published each year by the Bureau of Justice Statistics (reproduced in Flanagan and Jamieson, 1988:240, Table 3.34) by the total U. S. resident population for each corresponding year (Bureau of the Census, 1982, 1986) and

multiplying the result by 100,000. The UCR rates (ROBU and BURU) were similarly constructed by dividing the number of robberies and burglaries "known to the police" (Federal Bureau of Investigation, annual, 1974-1988) by the same annual population bases (x 100,000). The robbery and burglary reporting rates (RREP and BREP) represent the fraction of crime victimizations that NCS respondents say were reported to the police each year (Bureau of Justice Statistics, 1988:5, Table 6).

[Table 1 about here]

Our NCS crime rates differ from those published by the Bureau of Justice Statistics, which are based only on the population of persons age 12 and over for personal crimes such as robbery, or on the total number of households in the case of household crimes such as burglary, and are expressed as rates per 1,000. We use the total resident population and a multiplier of 100,000 to construct our NCS rates in order to establish minimal comparability with the corresponding UCR measures. We might just as well have chosen the more "risk specific" population bases (and the same multiplier) used by NCS, since temporal comparisons of the two data series are not affected by the choice of denominators, as long as the same denominators are used in each case.[2]

Standardizing the denominators of the two series is the only adjustment we make in the data, even though UCR and NCS crime rates differ in their numerators as well as their denominators (Biderman et al., 1983:39-54; Bureau of Justice Statistics, 1981; O'Brien, 1985:18-24, 45-49). The major difference between the

UCR and NCS crime counts is the inclusion in the NCS data of crimes not reported to the police. Rather than adjusting the data to eliminate this difference, we compare models which contain reporting rates with those which do not in order to determine the influence of crime reporting on divergence between the two series.

Another important difference between the UCR and NCS measures of robbery and burglary is the exclusion of commercial crimes from the NCS incidence counts. Commercial crimes represent a significant proportion of all robberies and burglaries, but this proportion has remained roughly constant in recent years.[3] Therefore, while the exclusion of commercial crimes from the NCS counts deflates the magnitude of NCS rates relative to the UCR rates, it should not have a substantial effect on the degree of association between the two crime series, which is the central focus of this study.[4]

In sum, our analysis isolates the influence of crime reporting on the relationship between population-standardized UCR and NCS crime rates. We leave the possible significance of other differences in the definitions and procedures of the two crime series as topics for further research.

Selection of Crime Types

We confine our analysis to burglary and robbery and do not apply it to the other crime types available for comparison across the two data sources (assault, rape, larceny, vehicle theft) for several reasons. First, and most importantly, burglary and robbery are serious property and violent felonies, respectively,

and are regarded as such by the public. While judgments of a crime's seriousness depend on the amount of physical or financial harm to the victim, burglary and robbery are generally rated as more serious and as deserving more severe penalties than larceny or vehicle theft (Flanagan and Jamieson, 1988:150-153, Tables 2.25-2.28; Wolfgang, Figlio, Tracy, and Singer, 1985:47-50, Table 29).

Second, burglary and robbery are not subject to the same degree or sources of sampling and nonsampling error connected with rape and other assaultive crimes. In spite of the large size of the NCS samples (interviews are conducted in 50,000-60,000 households each year), information was obtained on fewer than 125 rapes for the average NCS data year during the early 1980s, roughly one-seventh the number of robbery victimizations reported to NCS interviewers (Garofalo, 1990:82; Bureau of Justice Statistics, 1989a:119-121). The limited number of data points for rape produces very large standard errors around estimated rates over time. For example, NCS data show a 25.3% drop in rape victimization rates and a 22.7% decline in robbery victimization rates between 1973 and 1987. While the change in rape rates is not significant at the .10 level, the slightly smaller estimated decline in robbery rates is statistically significant (Bureau of Justice Statistics, 1988:3, Table 4). Evaluations of changes over time in indicators of serious crime cannot be conclusive when, even by a permissive confidence standard, changes of this magnitude can be attributed to sampling error.

Nonsampling error may even be a more serious problem affecting the measurement of assaultive offenses in the NCS data. Although the reasons remain unclear, police crime reports and patrol dispatch data suggest that rapes and other assaultive crimes are underreported to the NCS, especially when the offender is known to the victim (Garofalo, 1990:91). The Bureau of Justice Statistics reports that assault "is the least well recalled of the crimes measured by the NCS," which "may result in a substantial understatement of the 'true' rate of victimization from assault (1989:123). Some of the undercount of assaults undoubtedly results from respondents' inability to recall or unwillingness to report minor incidents that result in little or no injury to the victim. However, even restricting attention to very serious assaults is not likely to eliminate the bias associated with the underreporting of assaults involving offenders known or related to the victim. Over half of all aggravated assaults resulting in injury to victims involve nonstrangers, and in the words of one long-time NCS analyst, "we have no idea how representative the non-stranger assaults are" (Garofalo, 1990:91; Bureau of Justice Statistics, 1989a:56, Table 54).

These considerations support Garofalo's overall assessment of the quality of the NCS crime measures: "The NCS does not do equally well in measuring all of the crimes that come within its scope. It appears to do quite well with robberies and thefts but not with purely assaultive crimes" (1990:90-91). Similar concerns have been raised about the classification and recording

of crimes by the UCR, in addition to the underreporting of crimes to the police by citizens (Schneider and Wiersema, 1990:24-33). In light of these concerns, it seems advisable to compare temporal changes in the two crime indicators for the serious and less abiguous crime types of robbery and burglary, rather than extend the analysis to other offense categories--or worse, single "indexes" that combine dissimilar offense types--whose error properties are less well understood or cannot be reliably estimated. It follows that conclusions drawn from this study cannot be generalized to other crime types without testing them directly, and that our methods should be applied only to offense categories permitting valid and reliable comparisons of NCS and UCR data.

RESULTS

We begin the analysis by comparing the magnitude and direction of change in the two crime data series between 1973 and 1985. We then detrend the data by regressing the rates on a time variable to determine the significance of linear trend and of year-to-year fluctuation around trend in accounting for the total variation in each of the crime and reporting rates. The fitted values and residuals from the trend regressions are used to create NCS crime and reporting "trend" and "deviation" variables, and these are incorporated in alternative multivariate estimations of annual UCR crime rates. As a test of the robustness of the results, we interchange the independent and dependent variables in the final round equations. If the two crime series do in fact reflect the same--or highly correlated--

underlying processes over time, then models containing UCR crime data should provide good estimates of year-to-year change in NCS crime rates, as well as vice versa. Finally, to assess the influence of crime reporting on recent increases in the UCR rates, we compare the actual UCR rates for 1986 and 1987 with predicted rates based on ex post forecasts of crime reporting rates estimated from the 1973-1985 data.

The Correspondence Between the UCR and NCS Crime Rates

The UCR and NCS crime indicators have always differed in scale--with UCR robbery and burglary rates being about one-half NCS rates, reflecting the unreported crimes included in the NCS series. However, the two series have been highly consistent in characterizing yearly fluctuations in crime rates. As indicated in Figure 1, for example, a simple adjustment by a factor of two (which corresponds to a 50% reporting rate) in plotting the UCR rates reveals strong correspondence between the two series regarding yearly upturns and downturns in U. S. robbery and burglary rates, and this correspondence holds regardless of any changes in reporting rates by the public. Even the highly publicized decline in NCS rates during the early 1980s cited earlier is mirrored by a similar pattern in UCR rates.

[Figure 1 about here]

Bivariate correlations have been used in previous research to assess the strength of the relationship between the alternative crime data sources. For our data, the correlation between the NCS and UCR measures is $r = .561$ for robbery and .595 for burglary.[5] While both are statistically significant ($p \leq$

.05), the magnitude of these relationships indicates that the variation in annual NCS rates alone leaves considerable unexplained variance remaining in the annual UCR rates for the same crime type (the correlation coefficients correspond to R^2s that are below .3 in each case). Other researchers have concluded from this modest linear relationship between UCR and NCS crime rates that the two series do not reflect the same underlying changes in crime over time (e.g., Menard and Covey, 1988). However, such a conclusion remains premature until separate comparisons are made between the longer term trends and the year-to-year fluctuations of the UCR and NCS data. These comparisons reveal that the differences between the two series are located primarily in their trends.

Trends in the Crime and Reporting Rates

In exploring the extent to which changes in UCR crime rates reflect corresponding changes in victimization rates, on the one hand, and in crime reporting rates, on the other, it is instructive to first examine the overall variability in each of the crime and reporting measures. The coefficients of variation at the bottom of Table 1 indicate that, when measured in terms of deviation from their respective means, the two crime series show essentially the same magnitude of variation, with standard deviations that are about ten percent of the means. The reporting rates, by contrast, exhibit much less variability over the 13-year period. The question now becomes whether the observed variation in each series is primarily attributable to "trend" in the data, or to yearly fluctuations around trend.

We estimated the trend component of each series by regressing the crime and reporting rates on a time trend variable (trend = 1, 2,...13). We detrended the data in this way in order to obtain separate measures of trend and yearly deviation from trend which can be entered in multivariate estimations of UCR crime rates--a research objective we could not have achieved by differencing or other detrending methods.[6] Our method isolates the influence of linear trend in the data. Conceptually, it is not clear what a more complex pattern of trend would mean in a series comprised of only 13 observations. It seems reasonable to treat observations that depart from linear trend in a 13-point series as deviations from trend rather than as parts of more complex quadratic or higher-order polynomial trends. This approach is also consistent with previous research comparing trends in UCR and NCS data (Biderman et al., 1983; Menard, 1987).

Table 2 displays the slope coefficient (b) and the proportion of variance explained by trend (the unadjusted R^2) for the crime and reporting variables.[7] The results in Table 2 indicate:

- no trend in UCR burglary rates, but a significant decrease in NCS burglary rates over the period 1973 to 1985;
- opposite trends for UCR and NCS robbery rates (while not statistically significant--because of the high year-to-year fluctuation in robbery rates--trends of about 1% change per year are estimated relative to the intercepts);
- a significant positive trend in burglary reporting rates and a positive but nonsignificant trend in robbery reporting rates.

In general, these results indicate that, with the exception of the NCS burglary rate (the only case where R^2 exceeds .5), most of the variation in the crime and reporting series over time is attributable to their deviation components and not to their trend components.[8]

[Table 2 about here]

Nonetheless, the data also show a tendency toward opposite trends between the two crime series. These differences (i.e., declining NCS crime trends that are not matched by similar UCR trends) are not fully accounted for by increases in the rates of victims reporting crimes to the police. The significant increasing trend in the rate of reporting burglaries to the police found in the NCS data (BREP) is not sufficient to offset the declines in NCS burglary rates; even the rate of NCS burglary victimizations that are reported to the police (BURNREP) declines over time. While not significant, a similar pattern is observed for robbery.

Another factor that might account for the opposite trends in NCS and UCR rates is early measurement problems during the starting years of the NCS surveys. Any problems that might have contributed to over-counts of crimes in the NCS surveys (e.g., crime classifications that were too broadly defined, respondents telescoping earlier crimes into the reference period) would inflate the NCS rates in earlier years (Bureau of Justice Statistics, 1989b:4; Levine, 1976; O'Brien, 1985:51-52). As the survey was refined and improved, over-counts would be reduced, resulting in declines in NCS rates over time.[9]

If this explanation is correct, we should expect trend differences between the two crime series to diminish over time. We tested this expectation by dividing the full period into half-periods (1973-1978 and 1979-1985) and performing separate regressions on the half-period time trends. The results suggest that the trends in the two series have in fact been converging. The NCS and the UCR data show negative trends of similar magnitude for both crime types between 1979 and 1985 (decreasing by 2 to 3% per year for robbery, and by 4 to 5% per year for burglary). During the 1970s, by contrast, the UCR robbery rate displayed virtually no trend, while the NCS robbery rate showed a strong negative trend. The trends in the two burglary series were more modest, but in the opposite directions.[10] Although these results must be treated with caution due to the small number of cases on which they are based, they provide limited support for the hypothesis that, for the two crime types under consideration, NCS and UCR data exhibit increasing correspondence in their trends.

Models of the UCR/NCS Relationship

To examine the relationship between the UCR crime rates and the trend and year-to-year fluctuation in the NCS crime and crime reporting rates, we created "trend" and "deviation" variables from the results of the trend regressions reported in Table 2. The trend variables are the fitted values from the time trend regressions, and the deviation variables are the resulting residuals. Since the fitted values and the residuals sum to the actual values of the original variables, they

effectively partition each data series into a trend and a deviation component, which can then be separately entered into alternative models of the structure of the relationship between the UCR and NCS data.

The results of our multivariate analyses are summarized in Table 3. The first model contrasts the NCS and UCR crime rates directly (column 1). The significant coefficient for the NCS rates (BURN and ROBN) confirms the modest correlation between UCR and NCS rates noted previously. Comparing model 1 with model 2, however, shows the extent to which the bivariate correlation suppresses the strong relationship between year-to-year fluctuations in UCR and NCS crime rates by conflating the trend and deviation components of the two series. In model 2 the fit between annual UCR rates and NCS crime data improves substantially (adj R^2 = .807 for burglary and .557 for robbery) by relying exclusively on the yearly deviations from trend (BURN(D) and ROBN(D)) in the NCS rates. Similar improvement is not observed when only the deviations in NCS reporting rates are used (model 3). When the deviation components are used for both the NCS crime rate and reporting rate (model 4), the annual UCR rates are again related primarily to the NCS crime rate variable. Little or no improvement in R^2 is observed by adding the reporting rate variables (model 4 versus model 2), and the reporting rate variables are not significant for either crime type.

[Table 3 about here]

Deviation in the reporting rate for burglary (BREP(D)) is

significant ($p \leq .01$) when entered alone (model 3), suggesting some influence on the UCR burglary rate (BURU) of year-to-year fluctuations in the proportion of burglaries reported to the police. However, the effect of the reporting deviation variable is quite small--the increment in variance explained in BURU by adding BREP(D) to a model that already contains the burglary victimization rate, BURN(D) (model 4 versus model 2), is .039, or less than 5% (.846 - .807 / .807).

Moreover, some of the effect of the reporting rate on the UCR burglary rate may be an artifact of the influence of yearly fluctuations in burglary victimizations on fluctuations in the rate at which they are reported to the police. In fact, a significant association exists between BURN(D) and BREP(D) ($r = .590$, $p \leq .05$), which probably accounts for the reduction in the significance of BREP(D) observed between models 3 and 4. Such an association would be expected if year-to-year changes in the overall burglary victimization rate were driven largely by changes in subclasses of more serious offenses (e.g, completed versus attempted burglaries), which victims are more likely to report to the police (see Bureau of Justice Statistics, 1985; Flanagan and Jamieson, 1988:215, Table 3.2; Schneider and Wiersema, 1990:25-26).

The final model 5 in Table 3 assesses the contribution of time trends in accounting for UCR crime rates. Because the various trend variables are perfectly collinear, the separate effects on the UCR crime rates of trends in the NCS victimization rate and in the reporting rate to the police cannot be

simultaneously estimated. We have therefore combined the victimization and reporting trends in a single "reported victimization" trend variable (i.e., the trend component of the product of the NCS victimization rate and reporting rate for each of the crime types). Differences in the trend components of the UCR and NCS data do not emerge as a concern for burglary. The estimated effect of trend in the reported victimization variable BURNREP(T) is negligible. In addition, no significant trend effects emerge when the trend components of the burglary victimization and reporting variables are estimated in separate equations otherwise identical to model 5 (results not shown); these are hardly surprising results in light of the fact that there is no trend in the UCR burglary rate to explain (see Table 2).

Time trends, however, are a factor in robbery rates. The negative trend coefficient in model 5 highlights the opposite directions of trend between UCR rates and NCS reported victimization rates. This trend coefficient is significant and results in an increase of .197 in R^2 (model 5 versus model 4).[11]

It appears that the trend effect on the UCR robbery rates is attributable primarily to the victimization rate, which accounts for a much greater proportion of the variance in the "reported victimization" rate (ROBNREP) than does the robbery reporting rate.[12] In addition, when the reported victimization trend in model 5, ROBNREP(T), is replaced with the victimization trend ROBN(T) or the reporting trend RREP(T) in separate equations, the victimization trend is significant while the reporting trend is

not, and the equation containing the victimization trend yields a higher R^2 (results not shown). However, contrary to these indications, it should be recalled that the reporting trend RREP(T) is in the same positive direction as the trend in the UCR robbery rate ROBU(T), whereas the trend in the NCS robbery rate, ROBN(T), is negative.

Based on these analyses, the relationship between UCR and NCS crime rates for burglary and robbery can be summarized as follows: (1) Most of the annual variation in UCR crime rates is accounted for by variation in NCS crime rates (model 2); variations in NCS reporting rates have little or no effect on UCR crime rates (model 3). (2) Most of the annual variation in UCR crime rates is due to yearly deviations from trend as opposed to trend in NCS crime rates; trend makes no difference at all for burglary, but has a modest effect for robbery (model 5). Trend differences between the two data series appear to be declining over time.

Over time, the two data series tell virtually the same story about variations--especially year-to-year fluctuations--in crime rates. Indeed, if the UCR and NCS crime rates measure essentially the same underlying domain of events, then substituting one measure for the other in our final round estimation of their relationship should produce few major changes in results. The findings reported in equations (i) and (ii) support this expectation. The crime/reporting trends in these equations (BUROREP(T) and ROBUREP(T)) adjust the data for trends in underreporting of crimes to the police by dividing the UCR

crime rate by the appropriate NCS reporting rate, and regressing the result on a time trend variable ($^{*}p \leq .05$; $^{**}p \leq .01$; $^{***}p \leq .001$).

(i) $$BURN = -10597.653 + 1.311\ BURU(D)^{***} - 994.797\ BREP(D) + 4.638\ BURUREP(T)^{***}$$
$$(t= 4.775) \qquad (t= -0.330) \qquad (t= 8.741)$$
$$\text{adj } R^2 = .906$$

(ii) $$ROBN = 992.972 + 2.022\ ROBU(D)^{**} - 53.765\ RREP(D) - 1.235\ ROBUREP(T)^{*}$$
$$(t= 4.257) \qquad (t= -0.098) \qquad (t= -2.252)$$
$$\text{adj } R^2 = .692$$

Comparing these results with those for final model 5 in Table 3, it seems to make little difference whether the NCS victimization and reporting data are used to estimate the UCR crime rates or UCR crime data (adjusted with NCS reporting rates) are used to estimate the NCS crime rates. For both crime types, variation in one crime indicator is significantly influenced by deviations from trend in the other crime indicator, but not by similar deviations in reporting rates. For robbery, the alternative specifications both show significant negative trend effects, reflecting the opposite trends in the two series. For burglary, a highly significant positive trend effect appears in the estimation of the NCS rate, while no trend effect was found in the estimation of the UCR rate. The difference reflects the fact that adjusting the UCR burglary rate for nonreporting induces a negative trend in BURUREP, which varies positively with the highly negative trend component in the NCS burglary data. Perhaps because of the significant trend effect, the explanatory

capacity of the NCS burglary model (equation i) is slightly greater than that of the UCR burglary model 5 in Table 3 (adj R^2 = .91 and .83, respectively). The alternative robbery models both explain approximately 70% of the variance in robbery rates between 1973 and 1985.

Inspection of the Durban-Watson statistics for these equations, as well as for the ten estimations reported in Table 3, reveals no significant first-order autocorrelation for either crime type. We also inspected the serial correlation diagnostics for second and third-order autocorrelation in each of the twelve equations. We found only one significant autocorrelation coefficient among the twenty-four coefficients examined (for the burglary model 2, second lag, $t = -.200$, $p \leq .05$). These results indicate that the relationship between the two time series is not contaminated by serial correlation in the error terms of the OLS estimates.

Predicting Recent Changes in Crime Rates

Much of the recent controversy over differences between UCR and NCS crime rates has focused on the 1986 rates. One explanation offered for the apparent divergence between UCR and NCS rates in 1986 is a large increase in reporting crimes to the police, especially for robbery. Preliminary NCS estimates--which were widely reported in the media--put the robbery reporting rate at .61 in 1986, the highest level ever recorded since the NCS began in 1973 (U. S. Department of Justice, 1987b). While the final estimate of the robbery reporting rate was somewhat lower at .58, it was still the largest ever recorded by the NCS and

represented a substantial increase over the 1985 rate of .54. The burglary reporting rate for 1986 was also an all-time high at .52 (up from .50 in 1985). Bureau of Justice Statistics officials attributed the upswings in reporting rates to neighborhood watch programs and to "a less tolerant attitude toward crime generally" (New York Times, 1987:20).

Table 4 examines the role of reporting changes in UCR crime rates for 1986 and 1987. The relationships between the UCR and NCS rates estimated from 1973-85 data, as reflected in the coefficients for final model 5 reported in Table 3, were applied to NCS data observed for 1986 and 1987 (NCS data for 1986 and 1987 are from Bureau of Justice Statistics, 1988; UCR and population data are from Federal Bureau of Investigation, 1988). The resulting predicted UCR rates are the rates that would be expected if the relationship between UCR and NCS that prevailed through 1985 were to continue into 1986 and 1987. The difference between the observed rates in 1986 and 1987 (items 1a and 2a in Table 4) and the predicted rates based on actual reporting changes (items 1b and 2b) is small: the error is under 5% in all cases. These results suggest that no major structural changes occurred after 1985 in the relationship between the UCR and NCS crime series.

[Table 4 about here]

The final prediction in items 1c and 2c of Table 4 ignores actual changes in reporting rates for 1986 and 1987; the predicted reporting rate is assumed to be determined solely by extending the 1973-85 trend with no deviations from this trend

for 1986 and 1987. The change in reporting in 1986 appears to be an important factor in the UCR crime rates that year. The error rate increases by 50 to 60% for burglary and robbery when the unusual increases in reporting rates for 1986 are ignored. For 1987, however, ignoring the deviations from trend in the reporting rate results in smaller errors for both crime types.

The reason for the better predictions in 1987 is that the reporting increases observed in 1986 did not continue through the following year. The reporting rate for burglary remained unchanged at .52, and the rate for robbery fell to .56, a level of reporting reached or exceeded on several occasions in the past (see Table 1). Meanwhile, NCS burglary and robbery crime rates increased slightly in 1987 (the increase in robbery rates had begun the previous year), while the UCR rates declined. This is why the error associated with our UCR predictions for 1987, albeit very small, is positive.[13]

In any case, these findings suggest that claims about the role of changes in reporting to the police in UCR crime rates--or the factors responsible for these changes--should be based on more than a single year's observation. When viewed in terms of the stability in the underlying relationships over the entire period for which data are available, the results for 1986 and 1987 do not alter the conclusion that year-to-year changes in UCR burglary and robbery rates reflect actual changes in criminal victimization and are not simply an artifact of variations in the rate at which victims report crimes to the police.

CONCLUSION

Relying primarily on linear trend data, previous research has rejected the notion of convergence between annual UCR and NCS crime data for all crime types that permit comparisons. The evidence presented in this paper, by contrast, supports a conclusion of some important consistency between UCR and NCS crime data over time. While strong conclusions are limited by the small number of observations involved in temporal comparions, we find consistency for: (a) the two serious crime types of burglary and robbery; (b) the period from the early 1970s through the mid-1980s; and (c) the yearly fluctuations from linear trend in the two series.

The consistency we find between the two series does not mean that the raw crime rate measures provided by each series are similar, but rather that the two series are systematically related to each other over time so that the value of one series can be estimated with reasonable accuracy from the value of the other. This finding of a strong correspondence between UCR and NCS crime rates that persists over time suggests that both series may indeed be indicators of a single underlying crime phenomenon, whose year-to-year fluctuations are reflected in annual deviations from trend that are similar for the two series.

Our analysis has yielded results that are seemingly at odds with those of previous comparisons of UCR and NCS data, as well as most media accounts of the contrasting pictures of criminal victimization and reported crime rates presented by

the two crime statistics programs administered by the Justice Department. On this matter, however, we agree with the recent assessment of two UCR statisticians that progress in reconciling apparent differences in UCR and NCS data will depend on "statistically dividing the differences into well-defined parts" (Akiyama and Rosenthal 1990, p. 65). Consistent with this approach, our analysis departs from previous research (based on even more limited data) by isolating the components of the two series that behave similarly--the year-to-year deviations from trend--from those that behave differently--the linear trends.

The initial step in our analysis was to convert the two crime series to the same population base for purposes of valid comparison. Some of the difference between our results and those of other studies, therefore, is due simply to our use of the same population standard in the two measures of crime. In particular, the population age 12 and older and of households used in NCS rates increased faster than the total population during the 1970s and early 1980s, and this difference contributes to sharper declines over time in NCS rates than are observed in UCR rates.

The main reason, however, that our findings differ from previous results showing little or no correspondence between UCR and NCS crime data lies in our analysis of the separate influences of trend and deviation in the NCS data on the UCR rates. Detrending the two crime series reveals strong relationships between yearly fluctuations in the two crime

measures that are suppressed by their contrasting linear trends; it follows that studies that do not detrend the data (e.g., Messner, 1984; O'Brien, 1985) cannot uncover these relationships. The methods and conclusions of these studies are not invalid or "wrong" with respect to trend differences, so much as they are limited in their ability to identify the alternative sources of discrepancy between UCR and NCS crime data.

If the yearly variations in crime rates were dominated by their trend components, then the failure to detrend them would not be a serious problem. In fact, detrending could be misleading if conclusions regarding the relationship between two time series disregarded entirely large time trends. The point of detrending the alternative crime indicators in our analysis is not simply to isolate the correlations between their deviation components, but also to estimate the relative magnitude and significance of the distinct components of trend and deviation within each series. It turns out that the residual deviation component, and not the fitted linear trend, is clearly the dominant factor in annual variations of three of the four crime measures and of both crime reporting measures examined in this study--a fact that we could not have discovered, much less used to analyze the relationship between the two crime series, without first detrending the data.

Given these considerations, it is ironic that one of the few UCR/NCS comparisons based on detrended data, Menard (1987), has concluded that UCR and NCS crime rates are

unrelated because they exhibit weak or inconsistent trends. This conclusion rests on the questionable assumption that the (often sizeable) residuals in regressions of the crime indicators on a time variable represent "random fluctuations" in the data. However, since random error would deflate correlations between unreliably measured variables, the strong relationships we observe between the deviation components of the UCR and NCS crime rate measures suggest an important non-random character in these deviations from trend that may be a better indicator of the pattern of yearly fluctuations in the underlying crime phenomenon.

While our findings for burglary and robbery support the conclusion of previous research that UCR and NCS crime rates differ in their "trends," our analysis contributes a more precise conceptualization of trend and assessment of the impact of linear trend on the variation within each of the crime series and on the covariation between the two series. We have also offered a preliminary hypothesis that locates trend differences between the two series, and the possibility of greater convergence in trends over time, in measurement errors that systematically inflated victimization estimates in the early years of the NCS. Further research is required to test this and other explanations of the trend differences between the two crime series, as well as to identify the factors accounting for the generally much stronger similarities between UCR and NCS crime rates in their year-to-year deviations from trend.

Contrary to persistent speculation, one factor that does not explain the divergence in the trends of the two crime series--or for that matter, the correspondence between their detrended components--is the reporting of crimes to the police. Unusual changes in crime reporting rates, such as the highly publicized record increases in 1986, can help to explain short-run changes in UCR crime rates. It would be very surprising if record-level changes in the reporting of crimes to the police did not register in the crime statistics derived directly from these reports. However, the estimated effect of crime reporting rates on UCR crime rates (as reflected by the coefficients of the reporting rate variables) is so weak that exceptionally large changes in the level of crime reporting are required to produce appreciable changes in the UCR rates. The response of UCR crime rates to the more typical variations in crime reporting, like those recorded in 1987, is small.

It may well be that crime reporting plays a more important role when comparing UCR and NCS crime rates within crime types other than burglary and robbery. In general, however, we advise that if there are good reasons to suspect high levels of measurement error in alternative crime indicators--as for assaultive crimes--then the two measures cannot be reliably compared.

Also, aside from examining the influence of crime reporting on UCR crime rates, the factors affecting crime reporting rates merit attention. The probability that crimes

will be reported to the police is a function of the characteristics of crimes (e.g., seriousness) and victims (e.g., age) (Bureau of Justice Statistics, 1985). Since offenses involving injury to the victim or substantial property loss are more likely to be reported to the police, it has been proposed that UCR crime rates may be a better indicator of variations in serious crime than the more inclusive NCS rates (Gove et al., 1985). On the other hand, since older victims are more likely than younger victims to report crimes to the police, UCR rates may rise and fall with changes in the age composition of the population (Biderman et al., 1983:16-24). Such factors that are known to influence crime reporting should be used to systematically evaluate claims that block watch programs, "get tough" attitudes, and greater trust in the police have led to divergence between UCR and NCS crime estimates by driving up reporting rates.

Over the years the two major national crime series have tracked each other quite closely, at least for the serious crime types of burglary and robbery. This is particularly so for the year-to-year variations, which provide answers to the most frequently asked question of whether crime is "up" or "down". However, sound answers to questions about crime require more meaningful questions, from reporters, policy-makers, and researchers alike. Much of the confusion over the "disparate results"[14] of the nation's two crime statistics programs stems from the failure to ask whether the two crime series differ in their shortrun variations or longer-term

trends, and which of the two components is the more important in the annual variations in crime rate measures.

Significant progress in reconciling UCR and NCS crime data would result, in our view, were policy-makers and reporters to ask: "How well can you reproduce one program's crime statistics based on the information produced by the other?" We have presented answers to this question for robbery and burglary. Within the context of the models estimated here, knowing the rates from one data source provides a basis for obtaining good estimates of the corresponding rates from the other data source--an encouraging finding with regard to the original NCS goal of providing a national time series on unreported crimes to complement UCR data on crimes known to the police.

NOTES

1. E.g., O'Brien (1985:106): "In my comparisons of UCR and NCS crime trends for the period 1973 to 1981, I found a low degree of convergence." Messner (1984:440) adopts the same usage and draws the same conclusion: "The picture of trends in crime is noticeably different when estimates are based on NCS sources in comparison with UCR sources...."

2. We standardize the two data series with the same population base in order to remove differences between UCR and NCS rates that result from changes in population composition over time. In particular, during the post baby-boom years from 1973 to 1985 the population age 12 and older was increasing faster (up 18%) than the population under age 12, as was the number of households (up 27%). This contrasts with a 13% increase in the total population over the same period. Use of the faster increasing denominators will inflate negative trends in NCS published rates relative to UCR rates.

3. Commercial burglaries comprised roughly one-third of all burglaries reported to the police between 1976 and 1986 (Flanagan and Jamieson, 1988:343, Table 3.117). While it is more difficult to clearly isolate commercial from personal robberies in UCR data (see Biderman et al., 1983:46-48), between one-fifth and one-quarter of all robberies known to the police occurred in convenience stores, gas stations, banks, or other commerical establishments over the same period (Flanagan and Jamieson, 1988:342, Table 3.114).

4. Biderman et al. (1983:24-28) found that excluding commercial crimes from the UCR data had little effect on the divergence between UCR and NCS crime rates between 1973 and 1979; they concluded that "there is slightly less apparent correspondence than without the adjustment" (25). This finding is based on comparisons of offense indices which include larceny and vehicle theft in addition to robbery and burglary.

5. The adjustment of NCS rates to the total population base used in UCR rates improves the bivariate correlations between the two crime series. When the NCS rate is restricted to the population age 12 and over, the correlations are reduced to .436 for robbery and .500 for burglary. When burglary is calibrated relative to households in the NCS published rates and compared to UCR rates based on total population, the bivariate correlation is only .408.

6. An anonymous reviewer has pointed out that the use of a linear component to detrend the data over weights the end-points of the series, and could thereby induce the appearance of linear trend in small series. Since, as explained below, we find a significant trend in only one of the four crime series and in one of the reporting series, any bias introduced by our detrending method seems minimal. In any event, even though all time series must have start- and end-points, we re-estimated each of the equations reported in this paper with the observations for 1973 and 1985 removed from the data (i.e., on the 1974-1984 series). The revised estimations produced no important changes in results.

7. We report the unadjusted R^2 for these trend regressions

because it exhaustively partitions the total sum of squares into trend and deviation components (i.e., Deviation = 1.00 - R^2 (Trend)). Adjusting R^2 for degrees of freedom in each regression does not alter these substantive conclusions.

8. The adjustment of NCS rates relative to the same total population base as is used in UCR rates is a factor in diminishing negative trends found in the original NCS published rates. The NCS trend parameter for robbery reduces by 44% in magnitude and for burglary by 33% when total population is used to compute the rates in place of the faster increasing population age 12 and over.

9. Another researcher favors UCR rates over NCS rates as more reliable indicators of robbery trends during the 1970s. When comparing time trends in unadjusted UCR and NCS robbery rates between 1973 and 1980, Cook (1985:489) concludes that "the FBI [UCR] data probably give a more accurate indication of the true robbery rate trend than the NCS data." He notes that both bank robberies and criminal homicide rates--which are highly correlated with robbery and well recorded in official data--increased over the 1970s as did UCR robbery rates. These increases contrast with unadjusted NCS rates that remained constant.

10. The half-period regression results are as follows (substantive conclusions remain the same when the R^2 is corrected for degrees of freedom used in the estimates):

	1973-1978 b	R^2	1979-1985 b	R^2
ROBU	-1.354*	.037	-4.698	.255
ROBN	-14.674*	.701	-17.870*	.354
BURU	22.173	.180	-60.234**	.633
BURN	-13.402	.261	-139.220**	.768

Sig. level in a 2-tailed test

*$p \leq .05$
**$p \leq .01$

11. The increment in variance explained by trend is somewhat reduced when model 5 is contrasted with model 2, which does not contain the nonsignificant robbery deviation variable.

12. Regressing ROBNREP on ROBN and RREP yields standardized regression coefficients (Beta) of .858 and .315, respectively.

13. Between 1986 and 1987, UCR rates fell from 1345.79 to 1329.58 for burglary and from 225.35 to 212.70 for robbery. Our 1986 and 1987 adjusted NCS rates are, respectively, 2307.19 and 2310.19 for burglary, 418.92 and 423.17 for robbery. The adjusted NCS robbery rate in 1985 was 412.58. The unadjusted NCS data show the same patterns of change during these years (Bureau of Statistics, 1988:2, Table 2).

14. This characterization is from testimony by an official of the General Accounting Office to the U. S. House Judiciary Criminal Justice Subcommittee (quoted in Consortium of Social Science Associations, 1990:2).

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Table 1. UCR and NCS Robbery and Burglary Series, 1973-1985

YEAR	ROBU	BURU	ROBN	BURN	RREP	BREP
1973	181.79	1213.82	524.23	3055.82	0.53	0.47
1974	207.37	1424.57	562.01	3150.15	0.54	0.48
1975	215.80	1509.34	532.34	3129.84	0.53	0.49
1976	194.17	1424.78	510.66	3062.75	0.53	0.48
1977	185.40	1393.66	492.81	3078.31	0.56	0.49
1978	189.82	1404.49	467.37	3018.53	0.51	0.47
1979	211.38	1477.60	496.96	2977.02	0.56	0.48
1980	245.87	1665.22	532.00	3068.36	0.57	0.51
1981	254.96	1641.20	601.38	3219.86	0.56	0.51
1982	235.44	1481.58	575.01	2872.03	0.56	0.49
1983	213.51	1332.06	490.43	2587.88	0.53	0.49
1984	205.08	1261.94	463.86	2386.10	0.54	0.49
1985	208.54	1287.32	412.58	2343.13	0.54	0.50
Mean	211.47	1424.43	512.43	2919.21	0.54	0.49
St D	22.49	134.69	50.56	291.00	0.02	0.01
CV	0.11	0.09	0.10	0.10	0.04	0.02

Note: ROBU, BURU = Annual UCR robbery and burglary rates (reported crimes per 100,000 population);

ROBN, BURN = Annual NCS robbery and burglary victimization rates (as adjusted to reflect rates per 100,000 population);

RREP, BREP = Annual NCS rates of victims reporting crimes to the police for burglary and robbery.

CV = Coefficient of variation obtained from the ratio of the standard deviation (St D) to the mean.

Table 2. Trends in UCR and NCS Rates, 1973-85

	Burglary			Robbery		
Variable	Intercept	Trend b (t stat.)	R^2	Intercept	Trend b (t stat.)	R^2
UCR Crime Rates (BURU, ROBU)	1430.393	-.852 (-.082)	.001	193.823	2.521 (1.610)	.191
NCS Crime Rates (BURN, ROBN)	3323.193	-57.711** (-4.033)	.597	545.260	-4.689 (-1.285)	.131
NCS Reporting Rates (BREP, RREP)	.475	.002* (2.289)	.323	.535	.001 (.881)	.066
NCS "Reported Crime" Rates (BURNREP, ROBNREP)	1584.688	-22.744* (-2.579)	.377	291.830	-1.888 (-.778)	.052

Significance Level in a 2-Tailed Test

* $p \leq .05$
** $p \leq .01$

Table 3. Alternative Models Relating UCR Crime Rates to NCS Data

a. UCR Burglary Crime Rate, BURU (1973-85)

NCS Variables[a]	1	2	3	4	5
Intercept	620.082	1424.431	1429.328	1426.303	1401.565
BURN	.276* (t= 2.457)				
BURN(D)		.661*** (t= 7.152)		.544*** (t= 5.315)	.544*** (t= 5.045)
BREP(D)			9096.862** (t= 3.372)	3477.926 (t= 1.941)	3467.063 (t= 1.833)
BURNREP(T)					.017 (t= .095)
Adj R^2	.296	.807	.464	.846	.829

b. UCR Robbery Crime Rate, ROBU (1973-85)

Intercept	83.656	211.473	210.703	211.228	578.835
ROBN	.249* (t= 2.247)				
ROBN(D)		.368** (t= 4.010)		.323* (t= 2.907)	.329** (t= 3.897)
RREP(D)			713.790 (t= 2.113)	227.252 (t= .733)	198.604 (t= .844)
ROBNREP(T)					-1.319* (t= -2.894)
Adj R^2	.252	.557	.224	.537	.734

Table 3. Alternative Models Relating UCR Crime Rates to NCS Data (Continued)

Significance in a 2-tailed test:

* $p \leq .05$
** $p \leq .01$
*** $p \leq .001$

[a]The variables are defined as follows:

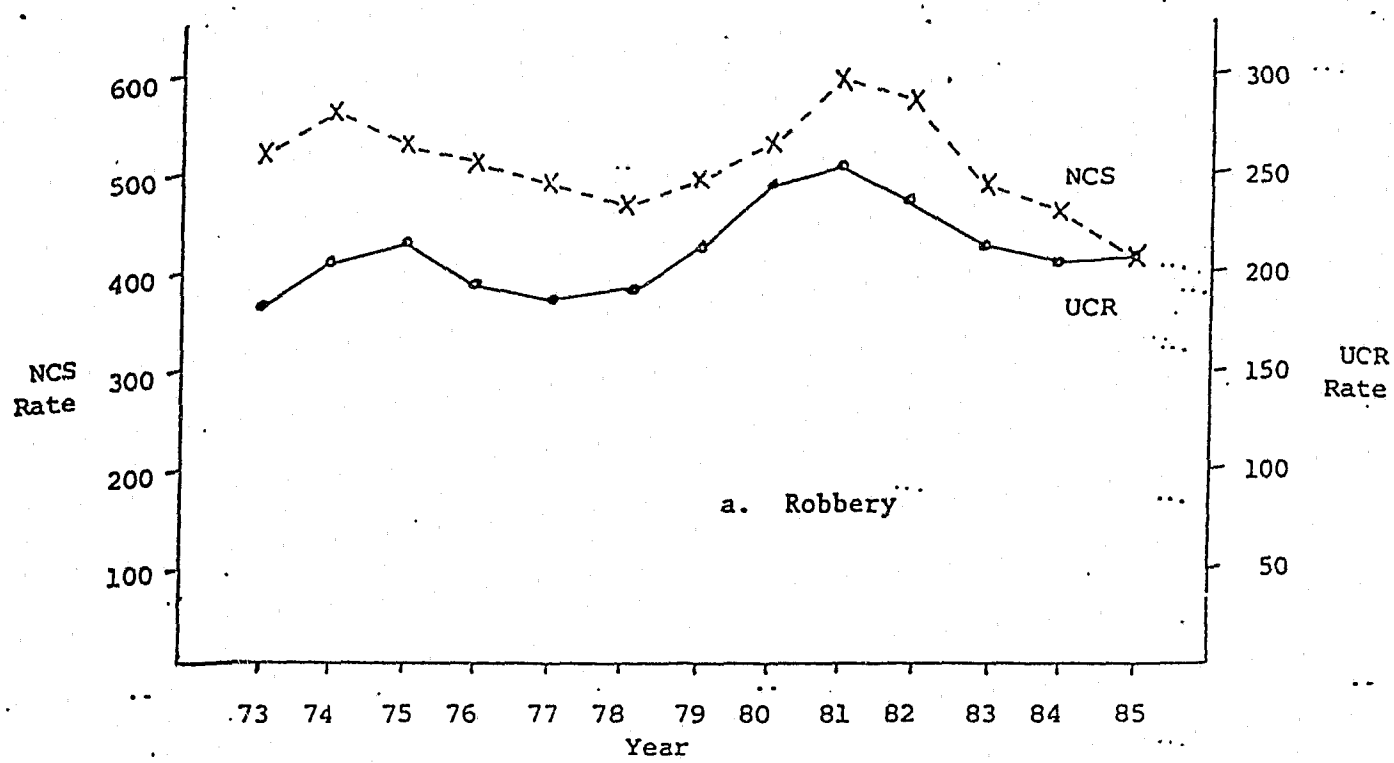
BURU, ROBU	-	Annual UCR crime rates for burglary and robbery (reported crimes per 100,000 population);
BURN, ROBN	-	Annual NCS crime victimization rates for burglary and robbery (as adjusted to reflect rates per total resident population);
BURN(D), ROBN(D)	-	Yearly deviations from the simple time trend in annual NCS crime victimization rates for burglary and robbery;
BREP(D), RREP(D)	-	Yearly deviations from the simple time trend in annual NCS rates of victims reporting crimes to the police for burglary and robbery;
BURNREP(T), ROBNREP(T)	-	Annual time trend values of NCS "reported" crime rates for burglary and robbery (obtained from the product of NCS crime victimization rates and NCS reporting rates).

Table 4. The Role of Recent Reporting Changes in Predicting 1986 and 1987 UCR Rates from 1973-85 Models

Alternative UCR Rates	1986	1987
1. Burglary		
a. Observed	1345.79	1329.60
b. Estimated Using Actual Reporting Change[a]	1368.85	1394.56
(% Error)	(+1.7)	(+4.9)
c. Estimated Using Predicted Reporting Change[b]	1309.91	1342.55
(% Error)	(-2.7)	(+1.0)
2. Robbery		
a. Observed	225.35	212.70
b. Estimated Using Actual Reporting Change	214.96	216.22
(% Error)	(-4.6)	(+1.9)
c. Estimated Using Predicted Reporting Change	208.81	214.24
(% Error)	(-7.1)	(+0.9)

[a]All predictions for 1986 and 1987 extend the 1973-85 trends for all variables into 1987 and calculate deviations as the difference between the observed and the estimated trend values for each variable. "Actual reporting change" utilizes the actual deviation from the 1973-85 trend that is observed in the 1986 and 1987 reporting rates.

[b]The "predicted reporting change" is based solely on extending the 1973-85 trend in reporting rates through 1987. The deviation from this predicted reporting rate is set to zero for 1986 and 1987.



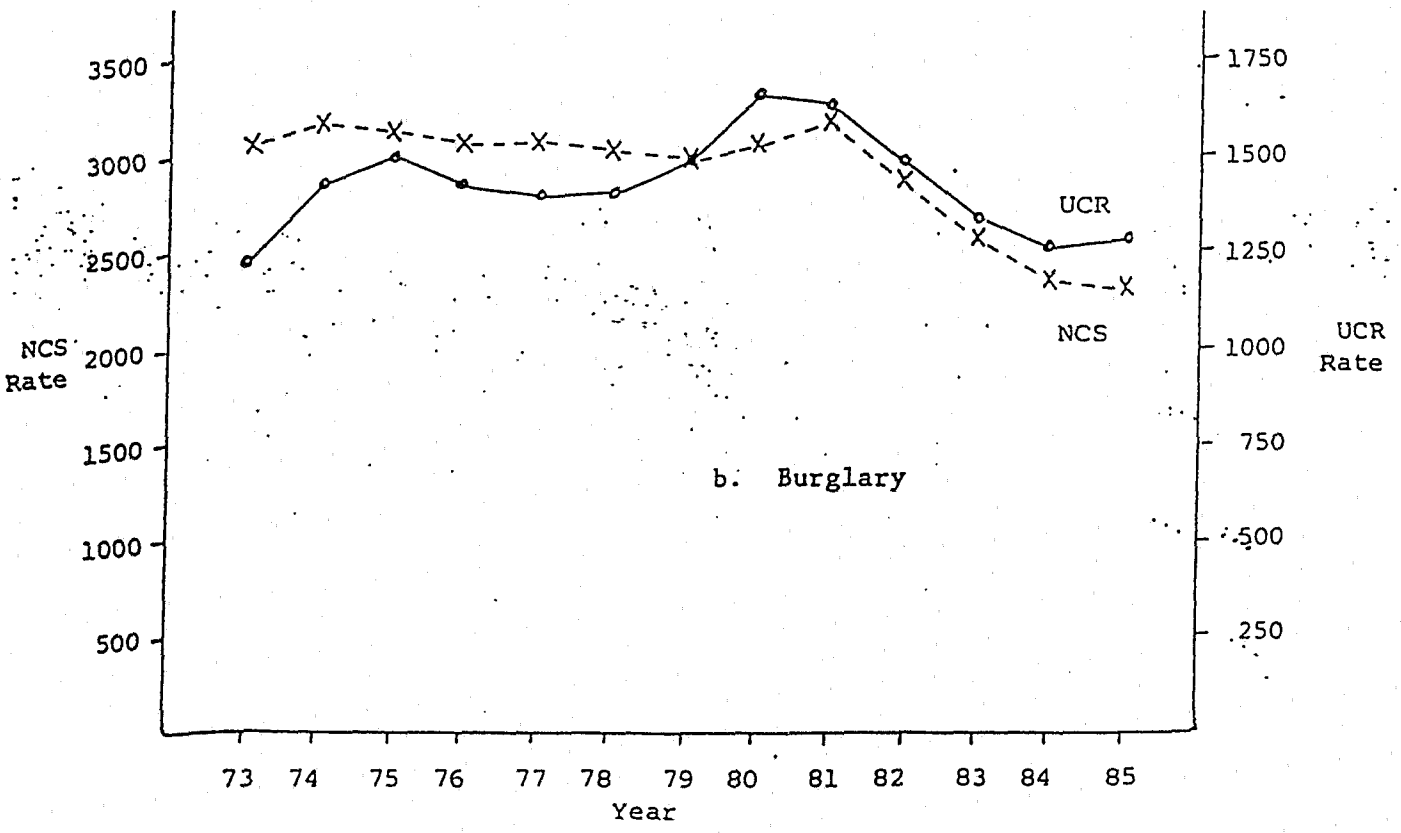


Figure 1. Comparison of Annual UCR and NCS Crime Rates (per 100,000 population) - 1973 to 1985