U.S. Department of Justice
Bureau of Justice Statistics

# Crime and Seasonality

1974　　　1975　　　1976　　　1977

A National Crime Survey Report

# Bureau of Justice Statistics Reports

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  Minneapolis, NCJ-46241
  New Orleans, NCJ-46242
  Oakland, NCJ-46243
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  6: Ark., La., N.Mex., Okla., Tex., NCJ-17935
  7: Iowa, Kans., Mo., Nebr., NCJ-17936
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# Crime and Seasonality

National Crime Survey Report
SD-NCS-N-15, NCJ-64818

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# Contents

# Highlights of the findings

This is an exploratory study of seasonal patterns for selected crimes included in the National Crime Survey. Seasonality is found in many data series, especially in the economic area. Covering incidents occurring in the years 1973 through 1977, this is the first attempt to describe seasonal variations in crime based on data from a large-scale nationwide sample survey. The principal findings are as follows:

1) Seasonal influences were particularly evident in the crimes of household larceny, personal larceny of less than $50, and unlawful entry burglary. Other crimes with less pronounced seasonal patterns were personal larceny of $50 or more, forcible entry burglary, assault, and motor vehicle theft. Personal robbery showed no evidence of seasonality.

2) With one exception, these crimes peaked in the summer months and reached their lowest levels in the winter. The exception was personal larceny under $50, which registered its highest point in October and dropped to lows in the summer.

3) When seasonal movements were eliminated from each of the crime series, upward trends were evident in the number of incidents of household and personal larceny of $50 or more and of simple assault. There were no clear downward trends.

4) A number of factors have been suggested as causing seasonal variation, such as differences in the length of months, holidays, the weather, and the number of daylight hours. Although definitive answers are not provided in this study, for most crimes there is an obvious association between warmer weather and a greater number of crime incidents. There is evidence to suggest that petty larcenies occurring away from home, many of whose victims are school children, peak in the fall at the beginning of the school year and reach their lowest levels during the summer vacation period. These and other possible explanations for seasonality will be examined more closely in future reports.

# Introduction

The fact that the incidence of crime ebbs and flows during the course of a year has been noted by observers for well over a century. What few early studies there were linking crime movements with the seasons of the year were confined to the countries of Western Europe, where police statistics were more highly developed. Comparable official data for the United States were not available until the 1930's. More recently, the application of the sample survey method to the measurement of crime in the form of the National Crime Survey (NCS) has made possible the examination of a broader spectrum of the crime picture than ever before. Even with these advances in data quality, very little has been done in recent times to examine systematically the seasonal component in crime data. This report is an exploratory look at seasonal patterns for selected crimes experienced by victims who were interviewed in the National Crime Survey.

Seasonality is an important attribute of many data series. Climate, variations in the calendar, and the effect of vacations and holidays impact on human behavior and, thus, upon the process of measuring such diverse phenomena as unemployment, commodity prices, marriage rates, and crime victimization. Seasonality may be generally defined as periodic fluctuations in data series which tend to recur each year at about the same time period and with a similar degree of intensity, although the pattern may change gradually over time. These fluctuations mask long range trends in the series which are usually of greater interest to the analyst. To overcome this difficulty, methods have been developed to seasonally adjust data, i.e., to eliminate the recurring movement due to seasonal factors so that underlying trends may be examined.

The seasonal adjustment of economic time series is widespread, with well known applications in such areas as unemployment rates and retail trade statistics. Seasonal adjustment of demographic data is not as common, although the technique has been utilized in the vital statistics field, i.e., birth, marriage, and death rates. The elimination of seasonal movements from crime data is a necessary first step to an in-depth examination of crime and its relationship to other demographic, social, and economic factors.

Long ago, the Belgian statistician and social thinker, Adolphe Quetelet, summed up the prevailing wisdom regarding seasonality and crime in the following way: "The seasons in their course, exercise a very marked influence: thus, during summer, the greatest number of crimes against persons are committed and the fewest against property; the contrary takes place during the winter."[1] This report will attempt to provide a contemporary account of seasonal influences on crime using data from the National Crime Survey.

# Possible explanations for seasonal fluctuation

Consideration of the causes of seasonality in crime has been all but nonexistent in modern criminology. Whatever its weaknesses, Quetelet's effort stands out as one of the few theoretical expositions on the relationship between fluctuations in natural phenomena and criminal activity. Criminologists, however, are not the only social scientists guilty of ignoring causation; economists, schooled in the art of time series analysis, often have neglected to consider the factors determining seasonality. The reason, one author suggests, is that seasonality has been "treated as being so easily explained that neither an exact definition nor an explanation of its origins is required."[2]

Fortunately, a few analysts have turned their attention to the task of delineating

[1] *A Treatise on Man and the Development of His Faculties*, (New York, N.Y.: Burt Franklin, 1968), p. 90. (English translation originally published in 1842.)

[2] Clive W.J. Granger, "Seasonality: Causation, Interpretation, and Implications," in *Seasonal Analysis of Economic Time Series*, (Washington, D.C.: U.S. Government Printing Office, 1976), p.33.

the whys and wherefores of seasonality. In their separate investigations, BarOn[3] and Granger,[4] identify a number of factors, some overlapping, which determine seasonal variation in a variety of economic series. In this preliminary examination we will consider the applicability of these factors to explaining seasonality in crime.

*Weather*—It has been suggested that weather, among all possible determinants, is the true seasonal factor. Weather was considered to be an important element in the patterning of antisocial activity by a number of classical criminologists. Peaks in violent personal crime in the summer months were attributed to the eruption of human emotions caused by the heat, whereas the relatively large amount of theft in the winter was laid at the doorstep of economic need.

*School year*—Another factor is the timing of the school year with its traditional summer vacation. The seasonal impact of vacations on such economic series as labor force participation and unemployment has been well documented. Of interest here is the effect of the opening and closing of schools on the incidence of crime. What happens to crime that occurs inside school buildings during the school year once schools are shut down for the summer? Is the crime merely dispersed to other locations or is the *opportunity* presented by large numbers of students (and their belongings) collected together in a relatively confined space not duplicated elsewhere?

*Amount of daylight*—Another possible influence on seasonal patterns is the number of hours of daylight. Regarding crime, it might be expected that, on balance, daylight crimes, that is, those types of offenses most likely to be carried out in the day, would be most common in those months when the hours of daylight

were at their maximum, whereas nighttime crimes would be more prevalent in the months with short days.

*Length of month*—Short-term variations in time series occur because of differences in the number of days in a month. In the business sector, it has been determined that fluctuations in the number of workdays or trading days affect such series as retail sales and industrial production. With respect to the personal and household crimes measured by the survey, we might expect a direct positive relationship between length of month and the incident count.

## Method

There are numerous approaches to the seasonal adjustment of time series. Perhaps the method in most general use in government and business today is the X-11 program developed at the Census Bureau. The basic assumption of this method is that the total variation of a time series can be broken down into components: a trend-cycle which consists of long-term movements of at least several years duration; a seasonal component which encompasses intrayear movements which repeat more or less regularly from year to year; and irregular fluctuations which comprise the residue left after the other two elements have been removed.

Monthly data for *incidents* of crime covering 5 calendar years (1973-1977) are used in this report. The crimes studied are: household larceny (under $50 and $50 and over), personal larceny without contact (same dollar amounts as for household larceny), household burglary (forcible entry and unlawful entry), motor vehicle theft, aggravated and simple assault, and personal robbery. There are two additional crimes measured in the NCS, rape and personal larceny with contact, but neither crime generates enough incidents per month to sustain this kind of analysis.

The seasonal patterns are described for each of the crimes, in terms of the peaks and troughs in each series, the contribution of the seasonal component to month-to-month variation, the presence of significant seasonality, and evidence of underlying trends in the data.

Significant seasonality is determined by a statistical test which is part of the X-11 program. This test produces a ratio which, if 2.34 or greater, ordinarily would signify that there is a less than 1 percent probability that the differences between the monthly means are due to chance.[5] Because of the nature of the sample and the fact that the data cover only 5 years of observations, a more stringent criterion has been adopted for this ratio—in the sense that ratios between 2.34 and 10.0 are considered to be merely indicative of seasonality, whereas those above that level are felt to indicate strong seasonality.[6]

## Data tables

There are four components to each data table for each of the crimes analyzed, except personal robbery. Data are shown for each month of the 5 years, 1973-77, included in this analysis. In order of presentation, the elements are: (1) Seasonally adjusted data—the number of crimes per month, rounded to the nearest thousand, after the seasonal patterns have been removed; (2) Final seasonal factors—the factors are in the form of percents, rounded to one deciminal place, and, when divided into the original data, produce the seasonally adjusted data; (3) Original data—the weighted estimate of the number of crimes per month, rounded to the nearest thousand, produced from the survey, before any adjustment; (4) Trend-cycle data—the number of crimes per month, rounded to the nearest thousand, for that portion of the adjusted series which describes long term trends in the data.

There is only one element in the data table for personal robbery, that showing unadjusted figures, because there was no significant seasonal pattern evident for this crime.

[3]Raphael R.V. BarOn, *Analysis of Seasonality and Trends in Statistical Series*, Vol I: *Methodology, Causes and Effects of Seasonality*, Technical Paper No. 39, (Jerusalem: Israel Central Bureau of Statistics, 1973).

[4]Granger, op.cit., pp. 33-45.

[5]See the technical note, Appendix, for a more complete description of this test.

[6]This distinction is suggested by a discussion in Estela Bee Dagum, "A Comparison and Assessment of Seasonal Adjustment Methods for Employment and Unemployment Statistics," a background paper prepared for the National Commission on Employment and Unemployment Statistics, (Washington, D.C., 1978), p. 52.

**Figure 1.** Household larceny, by month, 1973-77.

4

**Table 1. Series components of household larceny, by month, 1973–77**

| | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Seasonally adjusted data (000's) | | | | | | | |
| 1973 | 626 | 512 | 551 | 634 | 649 | 641 | 627 | 661 | 627 | 653 | 681 | 636 |
| 1974 | 753 | 877 | 763 | 754 | 681 | 730 | 704 | 745 | 747 | 746 | 758 | 719 |
| 1975 | 708 | 726 | 771 | 719 | 748 | 745 | 822 | 755 | 821 | 796 | 774 | 811 |
| 1976 | 796 | 812 | 770 | 760 | 776 | 809 | 778 | 756 | 740 | 737 | 827 | 753 |
| 1977 | 747 | 732 | 764 | 813 | 804 | 791 | 788 | 816 | 779 | 802 | 783 | 770 |
| | | | | | Seasonal factors (percent) | | | | | | | |
| 1973 | 81.6 | 79.8 | 86.9 | 94.3 | 103.8 | 115.5 | 122.6 | 122.9 | 101.0 | 101.7 | 90.1 | 99.9 |
| 1974 | 81.5 | 79.6 | 86.8 | 94.3 | 103.8 | 115.8 | 122.8 | 123.1 | 100.8 | 101.9 | 90.1 | 99.8 |
| 1975 | 81.2 | 78.9 | 86.6 | 94.4 | 104.0 | 116.1 | 123.1 | 123.5 | 100.5 | 102.1 | 90.0 | 99.6 |
| 1976 | 80.8 | 78.6 | 87.3 | 93.8 | 103.6 | 116.3 | 124.2 | 123.0 | 101.0 | 102.4 | 89.8 | 99.5 |
| 1977 | 80.5 | 78.4 | 87.6 | 93.3 | 103.4 | 116.5 | 124.9 | 122.7 | 101.2 | 102.4 | 89.5 | 99.5 |
| | | | | | Original data (000's) | | | | | | | |
| 1973 | 511 | 408 | 479 | 598 | 674 | 740 | 769 | 812 | 634 | 664 | 614 | 635 |
| 1974 | 614 | 698 | 663 | 711 | 707 | 845 | 865 | 917 | 753 | 760 | 683 | 717 |
| 1975 | 575 | 573 | 668 | 679 | 778 | 865 | 1,011 | 933 | 825 | 813 | 697 | 807 |
| 1976 | 643 | 638 | 673 | 713 | 803 | 941 | 967 | 929 | 748 | 755 | 742 | 749 |
| 1977 | 602 | 574 | 669 | 758 | 831 | 921 | 984 | 1,002 | 789 | 821 | 701 | 766 |
| | | | | | Trend data (000's) | | | | | | | |
| 1973 | 561 | 576 | 593 | 611 | 627 | 637 | 641 | 643 | 649 | 663 | 685 | 711 |
| 1974 | 733 | 748 | 751 | 746 | 737 | 731 | 731 | 735 | 738 | 740 | 738 | 734 |
| 1975 | 729 | 728 | 732 | 740 | 751 | 764 | 775 | 785 | 793 | 798 | 799 | 798 |
| 1976 | 794 | 790 | 786 | 784 | 781 | 776 | 770 | 762 | 754 | 745 | 740 | 742 |
| 1977 | 749 | 759 | 771 | 784 | 794 | 800 | 801 | 797 | 793 | 789 | 785 | 781 |

# Household larceny

In general, crimes involving theft of either personal possessions or household goods exhibited strong seasonal patterns in contrast to crimes against persons, such as assault or robbery. Household larceny was especially striking in this regard. This crime typically involves the loss of property or cash from inside a home or a yard, without the use of force. It is frequently committed by persons having a legitimate right to be on the property. Over the interval examined in this report, an average of approximately 9 million larcenies occurred each year. As shown in Figure 1, household larceny was most prevalent in midsummer and least prevalent in the first few months of the year. Illustrative of this point, the largest average monthly estimate, 919,000, was recorded in July whereas the smallest estimate, 578,000, occurred in February (Table 1).

The X-11 test for seasonality produced the strongest value (51.75) for any of the major crimes surveyed. Seasonal factors for July and August were more than 20 percent above average, while the values for January and February were about 20 percent below average.

Roughly 80 percent of the month-to-month variation in the original series was ascribed to seasonality, most of the remainder to irregularity. On the other hand, 70 percent of the variation over a 12-month period (i.e. same-month-next-year) appeared to be the consequence of an underlying trend. Application of the smoothing technique used to remove the effects of both seasonality and irregularity resulted in a series which shows the increasing incidence of the crime over time.
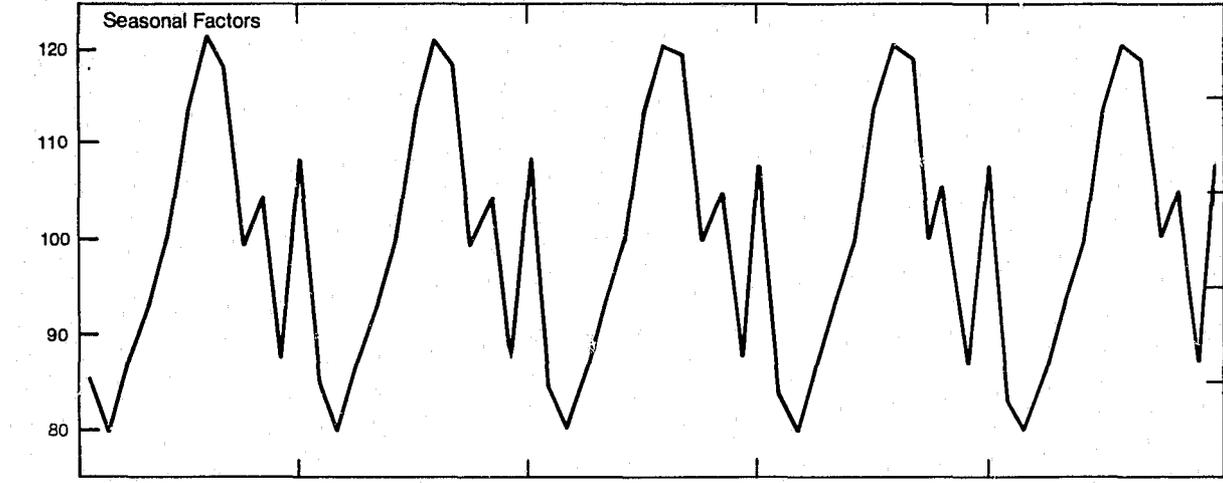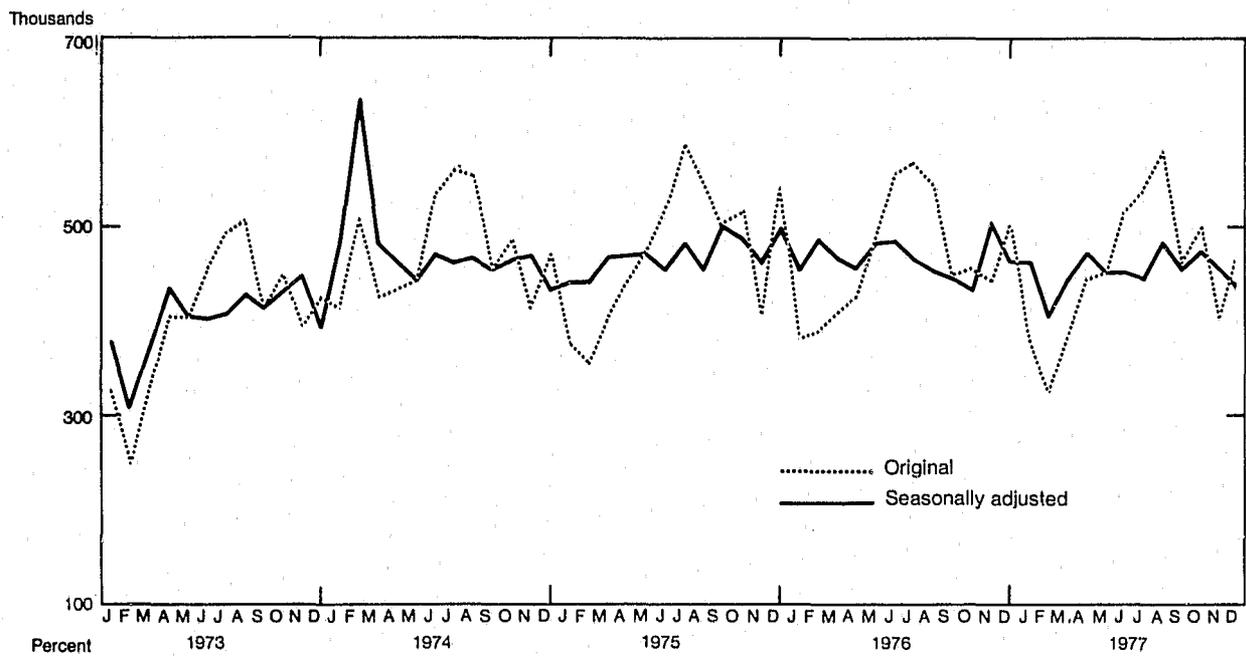
**Figure 2.** Household larceny less than $50, by month, 1973-77.

| | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Month | | | | | | | | | | | |
| **Seasonally adjusted data (000's)** | | | | | | | | | | | | |
| 1973 | 378 | 309 | 370 | 435 | 405 | 401 | 407 | 428 | 415 | 430 | 448 | 391 |
| 1974 | 484 | 631 | 484 | 462 | 444 | 470 | 461 | 466 | 456 | 464 | 470 | 433 |
| 1975 | 441 | 441 | 469 | 470 | 472 | 456 | 482 | 455 | 502 | 490 | 461 | 500 |
| 1976 | 455 | 486 | 468 | 456 | 483 | 486 | 469 | 454 | 447 | 433 | 506 | 465 |
| 1977 | 461 | 404 | 442 | 471 | 451 | 451 | 446 | 483 | 457 | 473 | 458 | 437 |
| **Seasonal factors (percent)** | | | | | | | | | | | | |
| 1973 | 85.3 | 79.9 | 87.5 | 93.2 | 100.2 | 113.7 | 121.5 | 118.2 | 99.7 | 104.4 | 87.6 | 108.8 |
| 1974 | 85.1 | 80.1 | 87.2 | 93.3 | 100.2 | 113.9 | 121.3 | 118.8 | 99.7 | 104.5 | 87.6 | 108.6 |
| 1975 | 84.7 | 80.2 | 86.6 | 93.7 | 100.1 | 113.9 | 120.9 | 119.8 | 99.8 | 104.9 | 87.7 | 108.0 |
| 1976 | 84.0 | 80.2 | 86.7 | 93.8 | 100.0 | 114.0 | 121.0 | 119.6 | 100.5 | 105.2 | 87.5 | 108.0 |
| 1977 | 83.3 | 80.1 | 86.6 | 93.9 | 100.1 | 114.0 | 121.0 | 119.5 | 100.8 | 105.3 | 87.2 | 108.0 |
| **Original data (000's)** | | | | | | | | | | | | |
| 1973 | 323 | 247 | 324 | 405 | 406 | 456 | 494 | 506 | 413 | 449 | 392 | 425 |
| 1974 | 412 | 506 | 422 | 431 | 445 | 536 | 560 | 553 | 454 | 484 | 411 | 470 |
| 1975 | 374 | 354 | 406 | 440 | 473 | 519 | 583 | 545 | 501 | 514 | 404 | 540 |
| 1976 | 383 | 389 | 406 | 427 | 483 | 554 | 568 | 543 | 449 | 455 | 443 | 502 |
| 1977 | 384 | 323 | 383 | 443 | 452 | 514 | 539 | 577 | 461 | 498 | 400 | 472 |
| **Trend data (000's)** | | | | | | | | | | | | |
| 1973 | 371 | 375 | 382 | 389 | 396 | 403 | 412 | 421 | 430 | 440 | 448 | 456 |
| 1974 | 461 | 466 | 468 | 469 | 468 | 466 | 463 | 460 | 457 | 455 | 454 | 453 |
| 1975 | 454 | 455 | 458 | 461 | 465 | 469 | 473 | 476 | 478 | 479 | 479 | 479 |
| 1976 | 478 | 468 | 474 | 472 | 469 | 466 | 463 | 460 | 458 | 456 | 455 | 454 |
| 1977 | 453 | 454 | 455 | 457 | 458 | 459 | 459 | 459 | 459 | 458 | 458 | 458 |

*Household larceny under $50*—Minor thefts of less than $50 comprised about three-fifths of all household larcenies. Figure 2 shows that as with total larcenies, the less costly incidents were most likely to occur in midsummer and least likely to occur early in the year. Estimated average monthly values ranged from 549,000 in July to 364,000 in February (Table 2). There was a noticeable increase over all household larcenies in nonrecurring short-term fluctuation, most likely a product of greater sampling variability. Nonetheless, a relatively strong indication of seasonality was recorded for this series (22.61). There was considerable correspondence between the seasonal factors for larceny under $50 and those for total larceny. The amplitude was slightly less for the minor offense series, an average of about 40 percent, but the peak and trough months were the same.

With the exception of an extraordinarily high estimate for the month of February 1974, the seasonally adjusted series exhibited a modest amount of irregular movement (Figure 2).[7] When adjusted for irregularity and seasonality, less costly larceny did not display the underlying trend evident for total larceny. Three-fourths of the month-to-month variation in the original series was attributed to seasonality, but only 38 percent of the same-month-next-year variance was explained by trend. In each case, irregularity accounted for much of the remaining variability.

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[7] Because of sampling variability, there is always the possibility that an exceptionally high (or low) monthly value will be obtained in the series. If the estimate occurs in a month which, over the life of the series, has moderate or low values, the final seasonally adjusted number is further enlarged. In the absence of any additional information, the unusually large estimate for February 1974 can probably be traced to sampling variability.

Thousands
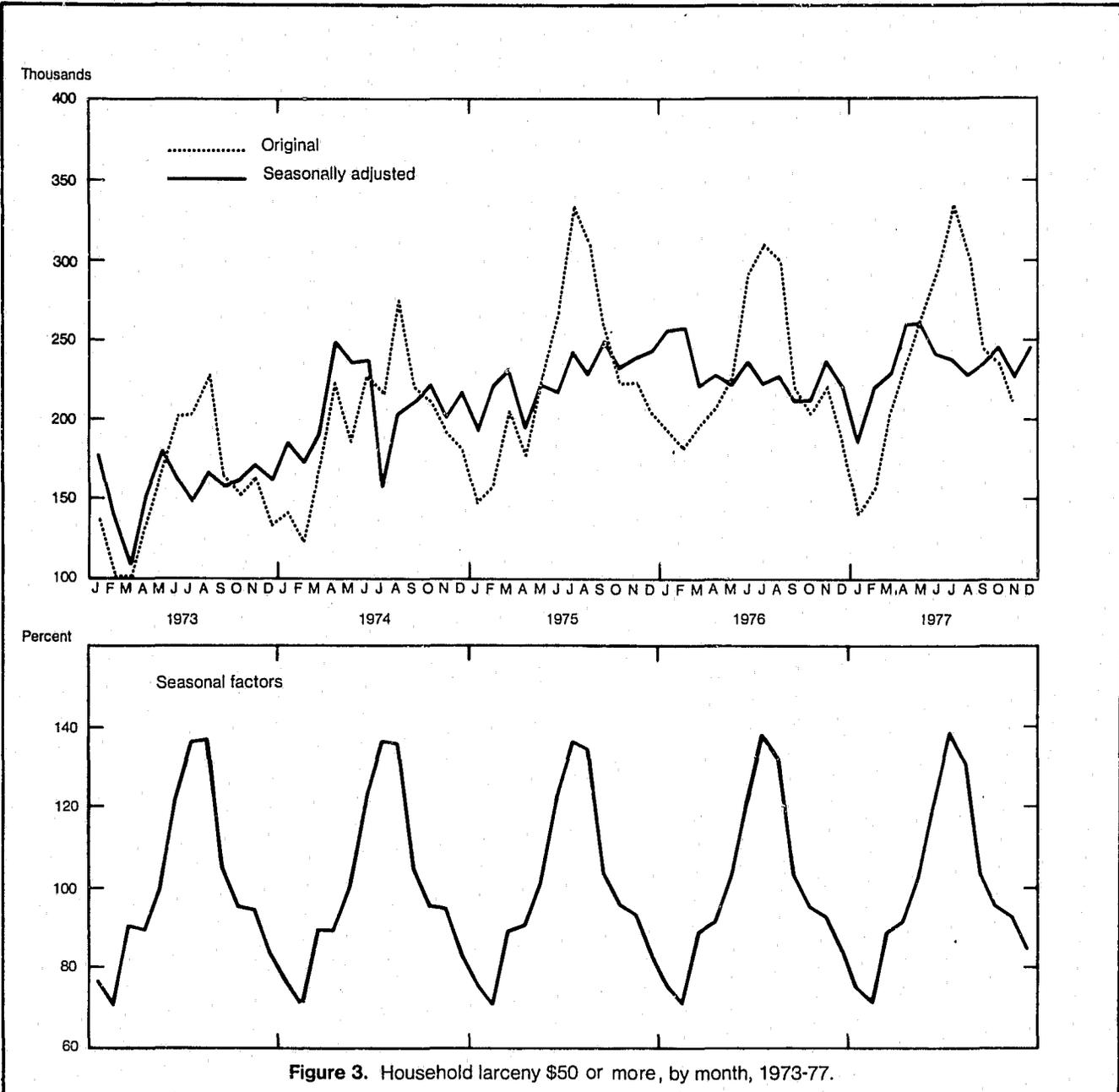


Figure 3. Household larceny $50 or more, by month, 1973-77.

8

# Table 3. Series components of household larceny $50 or more by month, 1973-77

| | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Seasonally adjusted data (000's)** | | | | | | | | | | | | |
| 1973 | 178 | 140 | 110 | 151 | 180 | 164 | 149 | 167 | 157 | 161 | 173 | 163 |
| 1974 | 185 | 173 | 190 | 249 | 186 | 187 | 158 | 204 | 211 | 222 | 202 | 217 |
| 1975 | 193 | 221 | 231 | 195 | 222 | 218 | 243 | 229 | 249 | 233 | 239 | 244 |
| 1976 | 257 | 258 | 222 | 229 | 223 | 236 | 224 | 227 | 212 | 213 | 237 | 223 |
| 1977 | 187 | 221 | 230 | 261 | 262 | 243 | 240 | 230 | 237 | 248 | 230 | 248 |
| **Seasonal factors (percent)** | | | | | | | | | | | | |
| 1973 | 76.1 | 70.9 | 90.4 | 89.0 | 99.3 | 122.4 | 136.2 | 137.3 | 104.9 | 95.6 | 94.6 | 83.0 |
| 1974 | 76.1 | 70.9 | 89.8 | 89.8 | 100.1 | 122.6 | 136.5 | 136.4 | 104.5 | 95.6 | 94.4 | 83.2 |
| 1975 | 75.9 | 70.7 | 88.9 | 91.2 | 101.8 | 122.7 | 136.9 | 134.7 | 103.8 | 95.6 | 93.7 | 83.8 |
| 1976 | 75.6 | 71.3 | 88.8 | 91.5 | 102.5 | 121.7 | 138.4 | 132.8 | 103.9 | 95.6 | 93.2 | 84.7 |
| 1977 | 75.2 | 71.7 | 88.6 | 91.7 | 103.0 | 121.4 | 139.3 | 131.7 | 103.9 | 95.4 | 92.0 | 85.1 |
| **Original data (000's)** | | | | | | | | | | | | |
| 1973 | 136 | 100 | 100 | 134 | 179 | 201 | 203 | 229 | 164 | 154 | 164 | 135 |
| 1974 | 141 | 123 | 171 | 224 | 186 | 229 | 216 | 278 | 220 | 212 | 191 | 181 |
| 1975 | 147 | 156 | 205 | 178 | 226 | 268 | 332 | 309 | 258 | 223 | 224 | 205 |
| 1976 | 194 | 184 | 197 | 209 | 229 | 288 | 310 | 301 | 220 | 204 | 221 | 188 |
| 1977 | 141 | 159 | 204 | 239 | 269 | 295 | 335 | 303 | 246 | 236 | 214 | 211 |
| **Trend data (000's)** | | | | | | | | | | | | |
| 1973 | 143 | 145 | 147 | 150 | 152 | 155 | 157 | 160 | 163 | 165 | 168 | 172 |
| 1974 | 175 | 179 | 183 | 187 | 191 | 195 | 199 | 202 | 205 | 207 | 209 | 212 |
| 1975 | 213 | 215 | 218 | 220 | 223 | 227 | 231 | 235 | 239 | 241 | 243 | 243 |
| 1976 | 242 | 240 | 237 | 234 | 231 | 227 | 224 | 222 | 221 | 222 | 224 | 227 |
| 1977 | 230 | 234 | 237 | 239 | 241 | 242 | 242 | 242 | 242 | 242 | 242 | 242 |

*Household larceny $50 and over*—The time series for costly larcenies exhibited pronounced short- and long-run patterns (Figure 3). An apparent seasonal pattern was accompanied by a gradual increase in the incidence of the crime over the history of the series. Thus, the low average estimate, 144,000, occurred in February and the high, 284,000, was reached in August (Table 3), although these figures mask the extent of the rising trend.

The test for seasonality registered a relatively strong value of 27.65. Seasonal amplitude was the greatest for any crime examined. The summer months of July and August were more than 30 percent above average; February, on the other hand, was 30 percent below the mean (Figure 3). After adjusting for seasonality the series showed a pronounced upward trend. After 7 months the trend component of the series exceeded the irregular component in its relative contribution to the total variance. Over a 12-month period, two-thirds of the variance was ascribable to trend. However, an important but undermined part of this increase may have been due to rising prices.
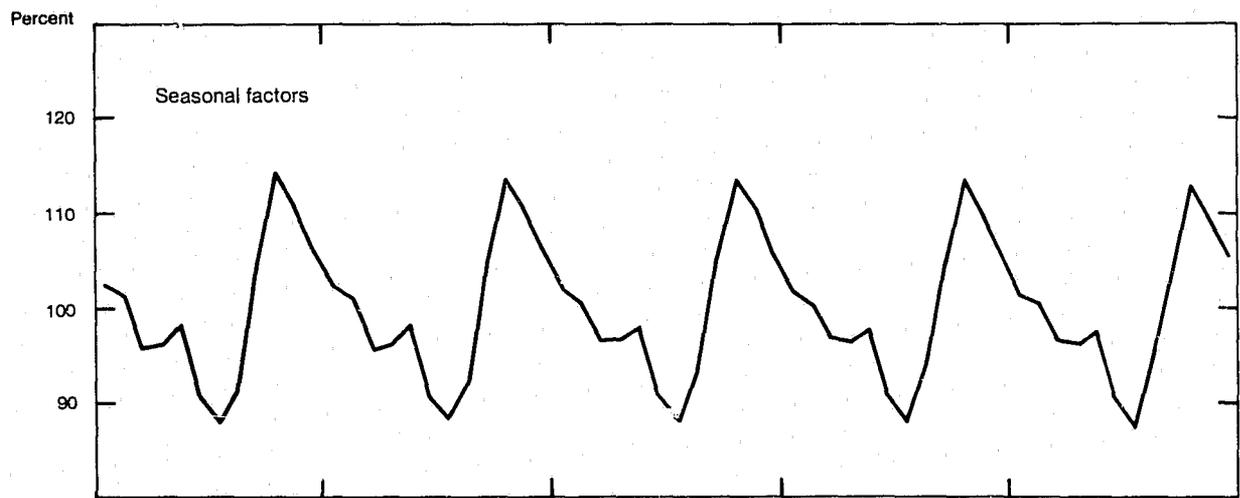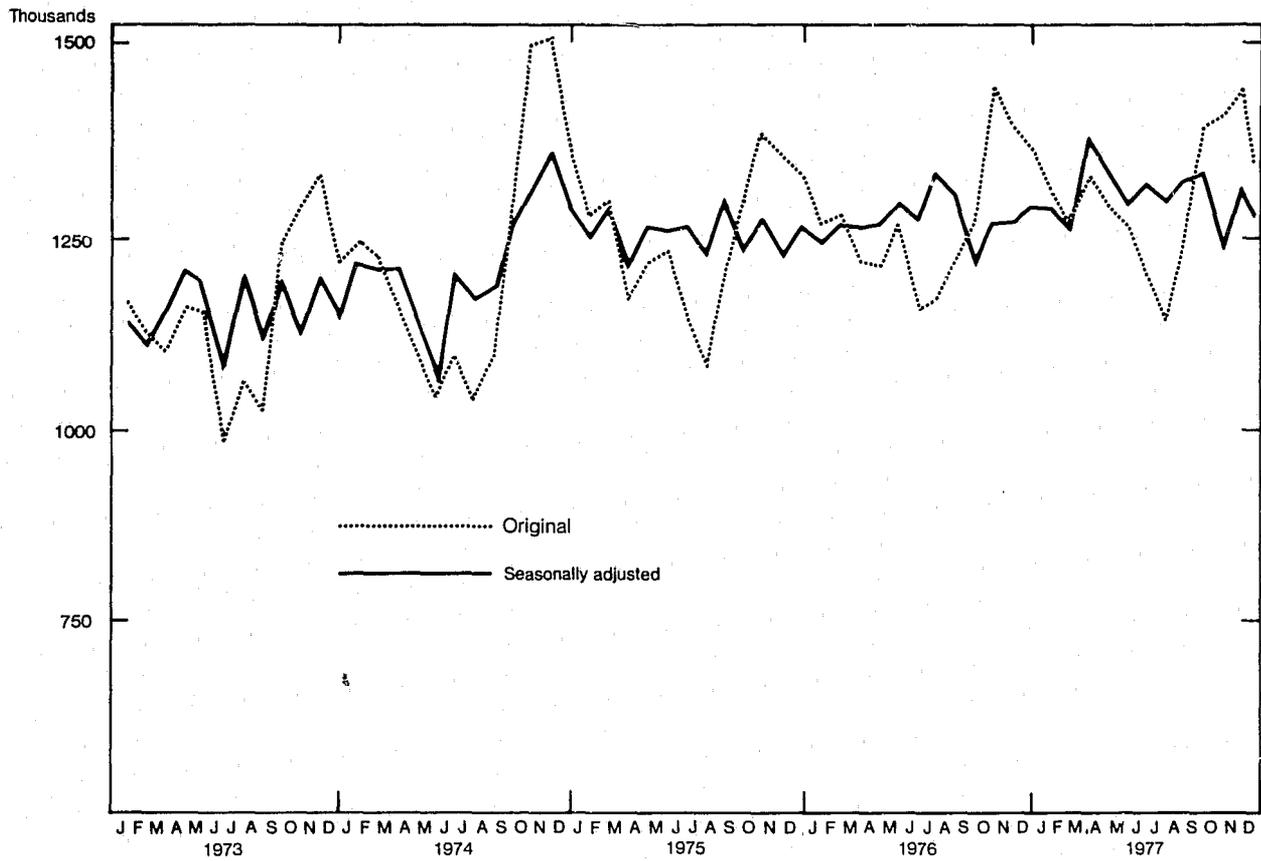
**Figure 4.** Personal larceny without contact, by month, 1973-77

10

| | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Month | | | | |
| Seasonally adjusted data (000's) | | | | | | | | | | | | |
| 1973 | 1,143 | 1,118 | 1,158 | 1,211 | 1,181 | 1,087 | 1,207 | 1,125 | 1,190 | 1,127 | 1,196 | 1,154 |
| 1974 | 1,220 | 1,216 | 1,216 | 1,145 | 1,063 | 1,206 | 1,181 | 1,187 | 1,264 | 1,318 | 1,366 | 1,291 |
| 1975 | 1,252 | 1,290 | 1,219 | 1,264 | 1,260 | 1,264 | 1,233 | 1,298 | 1,240 | 1,275 | 1,231 | 1,261 |
| 1976 | 1,247 | 1,267 | 1,265 | 1,268 | 1,296 | 1,277 | 1,335 | 1,310 | 1,220 | 1,271 | 1,272 | 1,293 |
| 1977 | 1,292 | 1,261 | 1,380 | 1,341 | 1,295 | 1,317 | 1,300 | 1,324 | 1,337 | 1,240 | 1,314 | 1,277 |
| Seasonal factors (percent) | | | | | | | | | | | | |
| 1973 | 102.4 | 101.3 | 95.5 | 96.1 | 98.3 | 90.8 | 88.1 | 91.5 | 104.8 | 114.3 | 110.8 | 106.1 |
| 1974 | 102.2 | 101.0 | 95.9 | 96.2 | 98.2 | 90.8 | 88.2 | 92.0 | 104.7 | 114.0 | 110.7 | 106.0 |
| 1975 | 102.0 | 100.5 | 96.5 | 96.5 | 98.0 | 90.9 | 88.2 | 92.7 | 104.7 | 113.4 | 110.6 | 105.7 |
| 1976 | 101.9 | 100.9 | 96.7 | 96.2 | 97.8 | 90.9 | 88.0 | 93.9 | 104.4 | 113.7 | 110.1 | 105.8 |
| 1977 | 101.6 | 100.9 | 96.7 | 96.2 | 97.7 | 90.9 | 87.9 | 94.7 | 104.1 | 113.6 | 109.7 | 105.8 |
| Original data (000's) | | | | | | | | | | | | |
| 1973 | 1,171 | 1,133 | 1,106 | 1,164 | 1,161 | 987 | 1,063 | 1,029 | 1,247 | 1,288 | 1,325 | 1,224 |
| 1974 | 1,247 | 1,228 | 1,167 | 1,101 | 1,044 | 1,095 | 1,041 | 1,092 | 1,323 | 1,503 | 1,512 | 1,369 |
| 1975 | 1,277 | 1,297 | 1,176 | 1,220 | 1,235 | 1,149 | 1,087 | 1,203 | 1,299 | 1,445 | 1,361 | 1,333 |
| 1976 | 1,271 | 1,278 | 1,223 | 1,220 | 1,268 | 1,161 | 1,175 | 1,230 | 1,274 | 1,446 | 1,401 | 1,368 |
| 1977 | 1,312 | 1,273 | 1,334 | 1,290 | 1,266 | 1,197 | 1,143 | 1,254 | 1,392 | 1,408 | 1,441 | 1,351 |
| Trend data (000's) | | | | | | | | | | | | |
| 1973 | 1,158 | 1,159 | 1,162 | 1,166 | 1,168 | 1,170 | 1,172 | 1,173 | 1,175 | 1,177 | 1,178 | 1,179 |
| 1974 | 1,181 | 1,183 | 1,187 | 1,192 | 1,199 | 1,208 | 1,218 | 1,229 | 1,241 | 1,252 | 1,260 | 1,266 |
| 1975 | 1,269 | 1,270 | 1,268 | 1,265 | 1,258 | 1,258 | 1,256 | 1,255 | 1,254 | 1,255 | 1,256 | 1,259 |
| 1976 | 1,262 | 1,267 | 1,272 | 1,277 | 1,280 | 1,283 | 1,285 | 1,286 | 1,286 | 1,287 | 1,288 | 1,291 |
| 1977 | 1,295 | 1,300 | 1,305 | 1,310 | 1,313 | 1,314 | 1,313 | 1,311 | 1,309 | 1,306 | 1,303 | 1,300 |

# Personal larceny without contact

Larcenies occurring away from the victim's home (and not involving direct contact with an offender) also exhibited strong seasonal influences during the period from 1973 to 1977 (Figure 4). There were also differing patterns depending on whether the amount of the loss was under $50 or higher.

The number of incidents for all personal larcenies averaged just under 15 million per year and varied from a mean of 1,102,000 in July to 1,418,000 in October (Table 4). The unadjusted data showed evidence of recurring seasonality, with peaks in the fall of the year and troughs in the summer months. A plot of the final seasonal factors indicated a peak in October, with November, December, and September the next highest months, in that order. The low month was July, although June and August were also well below average. The annual swing of the seasonal factors was 26 percent— from 14 percent above average in October to 12 percent below in July. The statistic for significant seasonality was 25.08, with seasonality contributing 52 percent to the month-to-month change. The final trend-cycle data showed a gradual rising curve from 1973 to 1977.
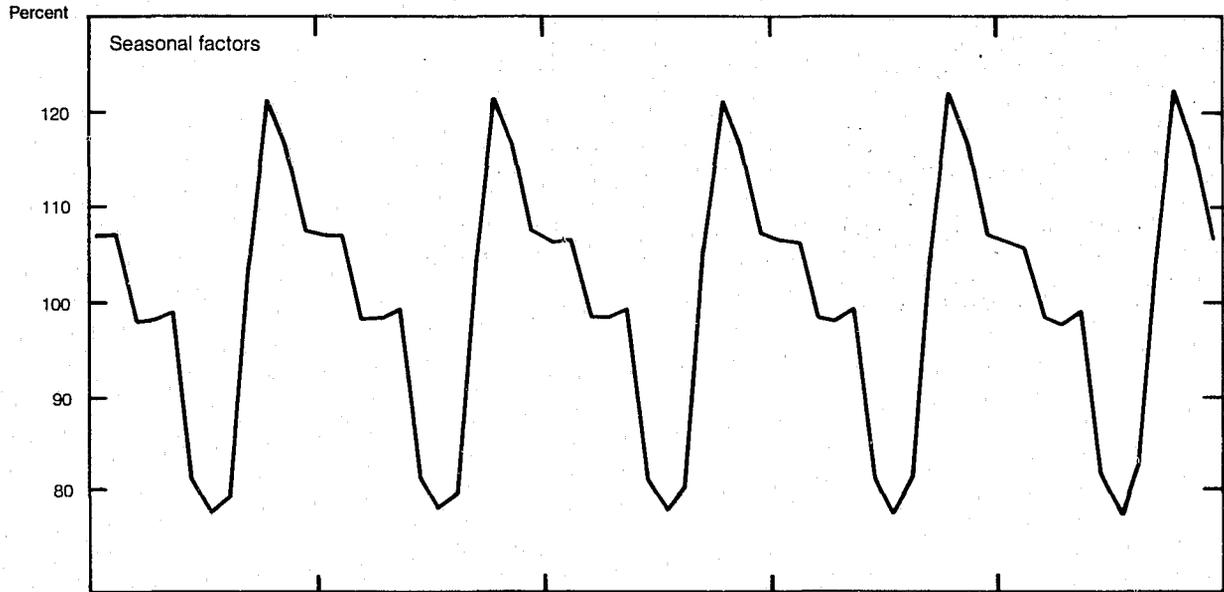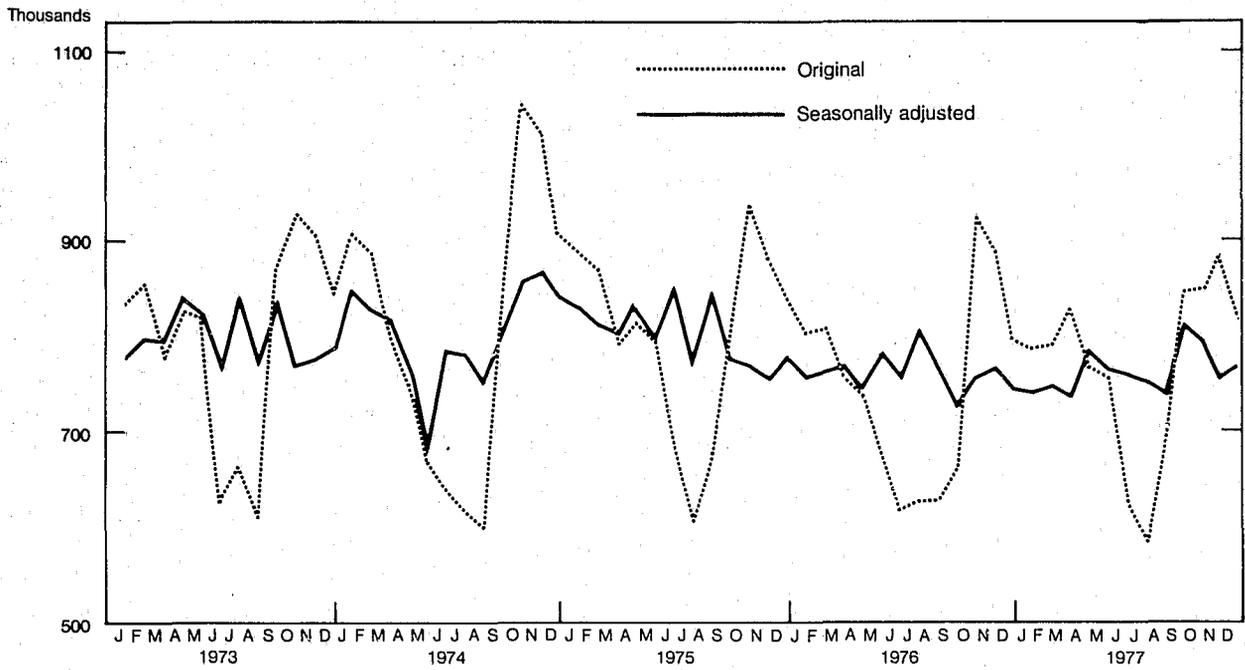
**Figure 5.** Personal larceny without contact, less than $50, by month, 1973-77.

## Table 5. Series components of personal larceny without contact less than $50 by month, 1973-77

| | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Month | | | | | |
| **Seasonally adjusted data (000's)** | | | | | | | | | | | | |
| 1973 | 778 | 797 | 794 | 840 | 821 | 766 | 839 | 771 | 832 | 764 | 774 | 788 |
| 1974 | 848 | 827 | 815 | 762 | 681 | 782 | 779 | 750 | 804 | 857 | 865 | 840 |
| 1975 | 829 | 810 | 802 | 824 | 798 | 844 | 771 | 840 | 775 | 767 | 755 | 777 |
| 1976 | 754 | 760 | 766 | 747 | 780 | 757 | 802 | 765 | 726 | 758 | 762 | 741 |
| 1977 | 740 | 746 | 836 | 783 | 765 | 759 | 751 | 839 | 809 | 692 | 758 | 766 |
| **Seasonal factors (percent)** | | | | | | | | | | | | |
| 1973 | 107.2 | 107.2 | 98.0 | 98.1 | 99.2 | 81.4 | 78.6 | 79.6 | 104.8 | 121.3 | 116.9 | 107.6 |
| 1974 | 107.0 | 107.0 | 98.1 | 98.2 | 99.3 | 81.4 | 78.6 | 80.0 | 105.0 | 121.5 | 116.8 | 107.6 |
| 1975 | 106.5 | 106.6 | 98.4 | 98.4 | 99.4 | 81.4 | 78.3 | 80.6 | 105.4 | 121.6 | 116.5 | 107.1 |
| 1976 | 106.6 | 106.3 | 98.5 | 98.0 | 99.2 | 81.8 | 77.8 | 81.7 | 104.8 | 122.2 | 116.6 | 107.0 |
| 1977 | 106.4 | 105.9 | 98.5 | 97.9 | 99.1 | 82.1 | 77.6 | 82.4 | 104.5 | 122.3 | 116.4 | 106.8 |
| **Original data (000's)** | | | | | | | | | | | | |
| 1973 | 834 | 855 | 778 | 824 | 815 | 624 | 659 | 614 | 872 | 927 | 905 | 848 |
| 1974 | 907 | 885 | 800 | 749 | 677 | 636 | 613 | 600 | 844 | 1,041 | 1,010 | 902 |
| 1975 | 883 | 863 | 790 | 811 | 793 | 687 | 604 | 677 | 817 | 933 | 880 | 832 |
| 1976 | 804 | 808 | 755 | 732 | 774 | 619 | 624 | 625 | 761 | 927 | 889 | 793 |
| 1977 | 788 | 790 | 823 | 767 | 758 | 623 | 583 | 691 | 845 | 847 | 883 | 818 |
| **Trend data (000's)** | | | | | | | | | | | | |
| 1973 | 805 | 804 | 805 | 806 | 806 | 805 | 804 | 803 | 802 | 801 | 800 | 798 |
| 1974 | 795 | 793 | 791 | 791 | 792 | 795 | 799 | 804 | 810 | 816 | 822 | 827 |
| 1975 | 829 | 828 | 825 | 820 | 814 | 807 | 799 | 792 | 785 | 779 | 773 | 768 |
| 1976 | 765 | 763 | 763 | 763 | 763 | 763 | 762 | 760 | 757 | 755 | 754 | 753 |
| 1977 | 753 | 755 | 758 | 761 | 765 | 768 | 771 | 772 | 773 | 774 | 775 | 776 |

*Personal larceny without contact under $50*—Roughly 70 percent of the personal larcenies reported in the NCS during the 5-year period were under $50 in value. Seasonality was clearly evident in the original unadjusted data series and the seasonal factors were similar to those for all larcenies, but the amplitude was greater (Figure 5). The monthly estimates varied from an average low of 616,000 in July to 935,000 in October (Table 5). The peak month was October, with November a fairly close second. As with total larcenies, July was the low month, followed closely by June and August. The total amplitude of the seasonal factors was 42 percent, evenly divided above and below the mean. The seasonality test registered a strong 43.50, and seasonality accounted for 75 percent of the month-to-month variation. There was no appreciable trend in the series over the 5-year period.
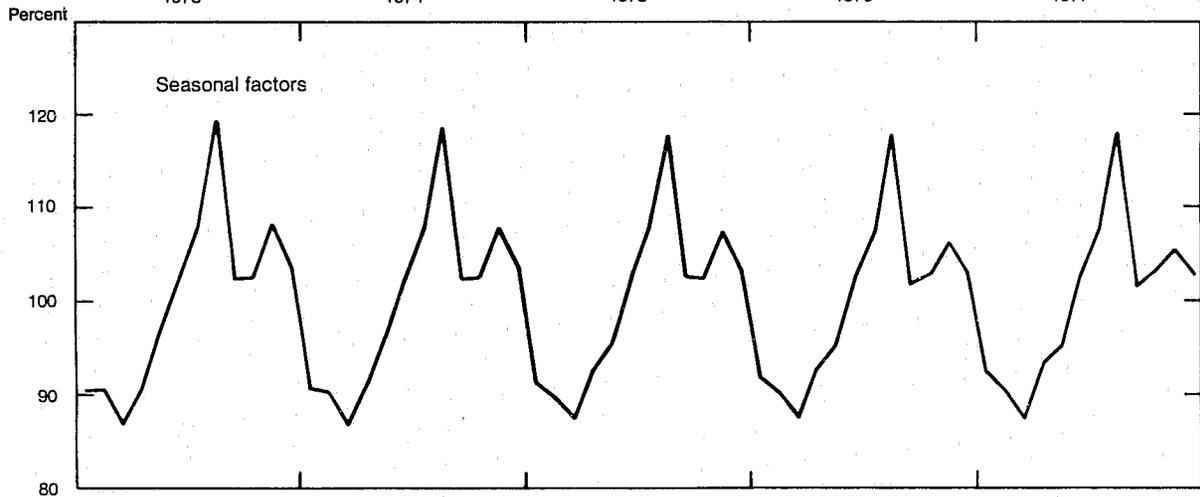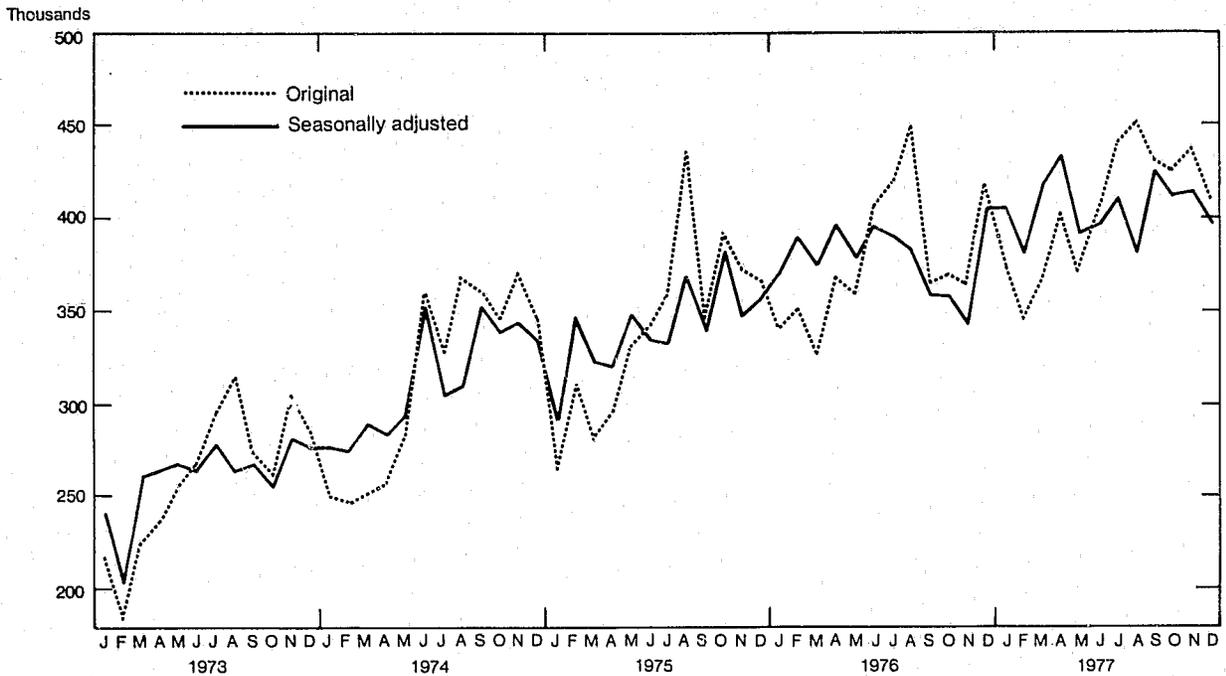
**Figure 6.** Personal larceny without contact $50 or more, by month, 1973-77.

# Table 6. Series components of personal larceny without contact $50 or more by month, 1973-77

| | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Seasonally adjusted data (000's) | | | | | | | |
| 1973 | 241 | 204 | 260 | 263 | 267 | 263 | 276 | 264 | 267 | 255 | 281 | 276 |
| 1974 | 276 | 274 | 289 | 283 | 294 | 353 | 305 | 310 | 353 | 319 | 344 | 335 |
| 1975 | 291 | 347 | 323 | 320 | 348 | 335 | 333 | 370 | 339 | 383 | 347 | 356 |
| 1976 | 370 | 390 | 375 | 397 | 378 | 396 | 390 | 383 | 359 | 358 | 343 | 405 |
| 1977 | 405 | 381 | 418 | 433 | 391 | 396 | 410 | 382 | 425 | 413 | 414 | 397 |
| | | | | | Seasonal factors (percent) | | | | | | | |
| 1973 | 90.2 | 90.2 | 86.6 | 90.2 | 96.5 | 102.2 | 107.4 | 119.3 | 102.3 | 102.5 | 108.3 | 103.6 |
| 1974 | 90.6 | 90.1 | 86.8 | 91.0 | 96.1 | 102.3 | 107.6 | 118.9 | 102.2 | 102.3 | 107.9 | 103.5 |
| 1975 | 91.2 | 89.6 | 87.3 | 92.3 | 95.4 | 102.3 | 108.0 | 117.9 | 102.3 | 102.2 | 107.4 | 103.1 |
| 1976 | 91.8 | 90.0 | 87.3 | 92.9 | 95.2 | 102.6 | 107.6 | 118.0 | 101.9 | 102.9 | 106.2 | 102.9 |
| 1977 | 92.2 | 90.3 | 87.3 | 93.3 | 95.1 | 102.7 | 107.5 | 118.1 | 101.4 | 103.2 | 105.5 | 102.7 |
| | | | | | Original data (000's) | | | | | | | |
| 1973 | 218 | 184 | 225 | 237 | 257 | 269 | 296 | 315 | 274 | 262 | 304 | 286 |
| 1974 | 250 | 247 | 251 | 257 | 283 | 361 | 328 | 369 | 361 | 347 | 371 | 347 |
| 1975 | 265 | 311 | 282 | 295 | 332 | 343 | 360 | 436 | 346 | 392 | 373 | 367 |
| 1976 | 340 | 351 | 327 | 369 | 360 | 406 | 420 | 452 | 366 | 369 | 364 | 417 |
| 1977 | 374 | 344 | 365 | 404 | 372 | 407 | 441 | 452 | 431 | 426 | 437 | 408 |
| | | | | | Trend data (000's) | | | | | | | |
| 1973 | 246 | 251 | 256 | 261 | 265 | 267 | 267 | 267 | 267 | 268 | 270 | 273 |
| 1974 | 276 | 280 | 283 | 287 | 293 | 302 | 312 | 322 | 331 | 337 | 340 | 340 |
| 1975 | 337 | 333 | 331 | 332 | 334 | 339 | 344 | 348 | 352 | 355 | 359 | 364 |
| 1976 | 370 | 377 | 384 | 388 | 390 | 387 | 382 | 376 | 373 | 373 | 378 | 387 |
| 1977 | 396 | 404 | 407 | 406 | 403 | 403 | 403 | 405 | 408 | 409 | 410 | 409 |

*Personal larceny without contact $50 and over*—Seasonal factors were less important in the movement of the more costly larcenies, but a long-term trend was clearly evident (Figure 6). The pattern of seasonality differed substantially from that found in larcenies under $50. The estimated number of incidents ranged from 287,000 in February to 405,000 in August (Table 6). In addition to the August peak, there was a secondary peak in November. The low point for these larcenies was March, with the seasonal factors for February, January, and April nearly as far below the average. The amplitude for larcenies of $50 or more was narrower than for those under $50— rising to 18 percent above average in August and falling to 13 percent below average in March. The seasonality ratio was much lower than was the case for the less costly thefts, but at 15.36 was well above the 1 percent confidence level. The importance of the trend component is indicated by the fact that it took only 6 months for the cyclical component to exceed the irregular component in its relative contribution to the total variation. Over a 12-month span, the trend-cycle contributed 80 percent to the total variation. Larcencies of $50 or more displayed a decided upward trend between 1973 and 1977; however, like the more expensive household larcenies, inflation may have been responsible for much of this increase.

Thousands
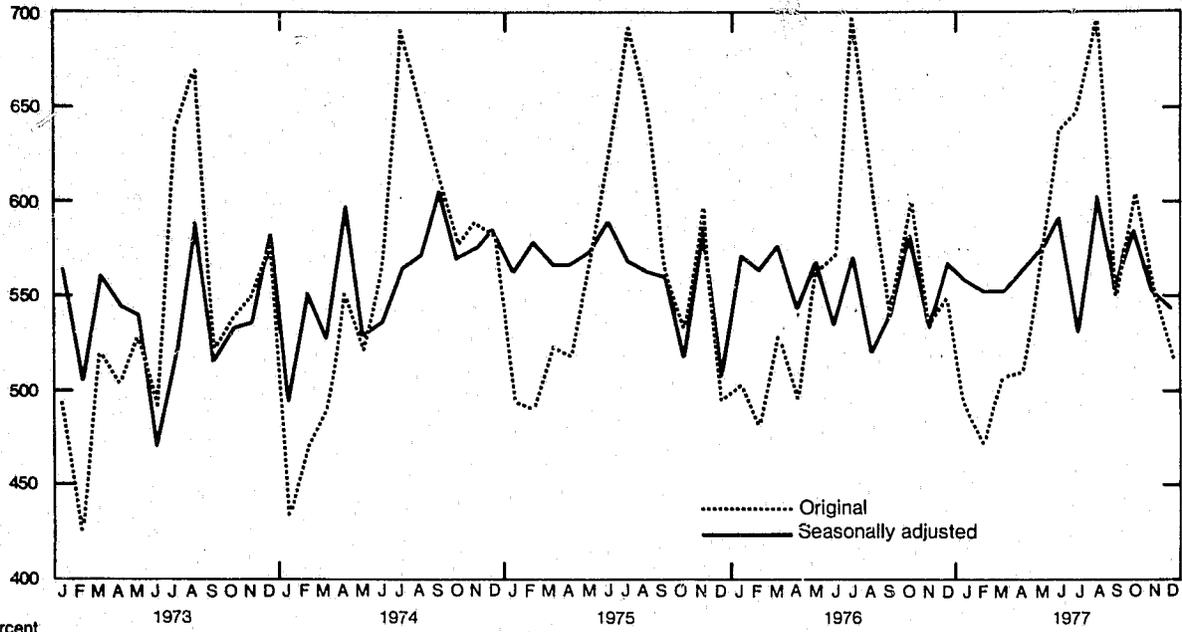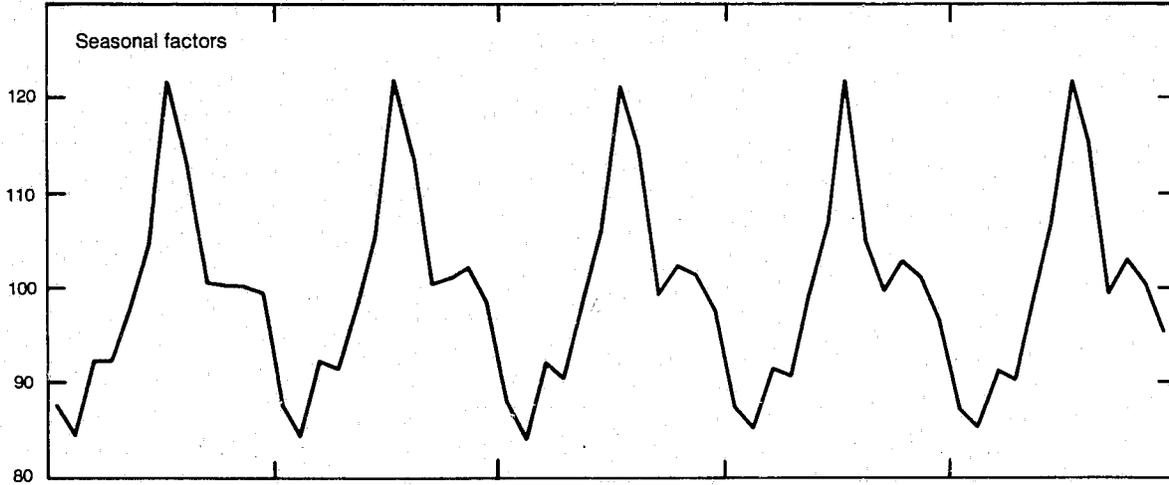


**Figure 7.** Burglary, by month, 1973-77.

# Table 7. Series components of burglary by month, 1973-77

| | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Seasonally adjusted data (000's)** | | | | | | | | | | | | |
| 1973 | 564 | 505 | 561 | 545 | 540 | 470 | 521 | 589 | 515 | 533 | 535 | 583 |
| 1974 | 492 | 554 | 528 | 598 | 529 | 535 | 565 | 571 | 606 | 570 | 575 | 587 |
| 1975 | 563 | 579 | 567 | 567 | 573 | 590 | 569 | 564 | 560 | 519 | 588 | 507 |
| 1976 | 571 | 564 | 576 | 544 | 568 | 535 | 571 | 520 | 541 | 583 | 532 | 568 |
| 1977 | 560 | 553 | 553 | 563 | 575 | 592 | 530 | 603 | 554 | 585 | 551 | 544 |
| **Seasonal factors (percent)** | | | | | | | | | | | | |
| 1973 | 87.7 | 84.6 | 92.5 | 92.2 | 98.0 | 105.0 | 122.5 | 113.9 | 100.9 | 100.6 | 102.8 | 99.0 |
| 1974 | 87.9 | 84.7 | 92.5 | 91.9 | 98.3 | 105.3 | 122.4 | 114.2 | 100.5 | 101.4 | 102.3 | 98.5 |
| 1975 | 88.0 | 84.7 | 92.2 | 91.4 | 98.8 | 106.1 | 121.8 | 115.1 | 99.8 | 102.6 | 101.4 | 97.7 |
| 1976 | 87.8 | 85.2 | 91.8 | 90.9 | 99.3 | 106.8 | 122.1 | 115.3 | 99.8 | 103.0 | 101.1 | 96.5 |
| 1977 | 87.7 | 85.5 | 91.6 | 90.6 | 99.7 | 107.3 | 122.2 | 115.4 | 99.5 | 103.2 | 100.8 | 95.7 |
| **Original data (000's)** | | | | | | | | | | | | |
| 1973 | 494 | 427 | 519 | 503 | 529 | 493 | 639 | 671 | 520 | 536 | 550 | 578 |
| 1974 | 433 | 469 | 488 | 550 | 520 | 563 | 692 | 652 | 609 | 578 | 588 | 579 |
| 1975 | 496 | 490 | 523 | 518 | 566 | 626 | 693 | 649 | 559 | 532 | 596 | 495 |
| 1976 | 502 | 481 | 528 | 495 | 564 | 571 | 697 | 600 | 540 | 600 | 538 | 548 |
| 1977 | 491 | 473 | 507 | 510 | 573 | 636 | 647 | 696 | 551 | 604 | 555 | 520 |
| **Trend data (000's)** | | | | | | | | | | | | |
| 1973 | 547 | 545 | 542 | 540 | 537 | 535 | 533 | 532 | 532 | 532 | 533 | 534 |
| 1974 | 536 | 540 | 543 | 547 | 552 | 557 | 562 | 567 | 571 | 574 | 577 | 578 |
| 1975 | 578 | 577 | 576 | 573 | 570 | 568 | 566 | 564 | 562 | 560 | 560 | 559 |
| 1976 | 558 | 557 | 557 | 556 | 555 | 553 | 552 | 551 | 550 | 551 | 552 | 554 |
| 1977 | 558 | 561 | 564 | 567 | 569 | 570 | 570 | 570 | 569 | 568 | 566 | 564 |

# Burglary

There were, on the average, about 6.7 million burglaries committed annually during the 5-year period, with monthly average estimates ranging from 468,000 in February to 674,000 in July (Table 7).

Clear evidence of seasonality existed in the unadjusted burglary series (Figure 7). Monthly estimates rose throughout the first half of the year, peaking in midsummer, then dropped off at the end of the year. When tested for the presence of significant seasonality, the series registered a relatively strong value of 22.98. Examination of the seasonal component showed a series with one big peak and a small bump. The range from peak to trough was about 37 percent, with July being 22 percent above average and February 15 percent below.

Much of the short-term fluctuation was removed from the seasonally adjusted series. The X-11 program attributed slightly more than half the month-to-month variation in the original series to seasonality and the bulk of the remainder to irregularity. Adjusted for both seasonality and irregularity, burglary appeared to be a relatively stable crime.
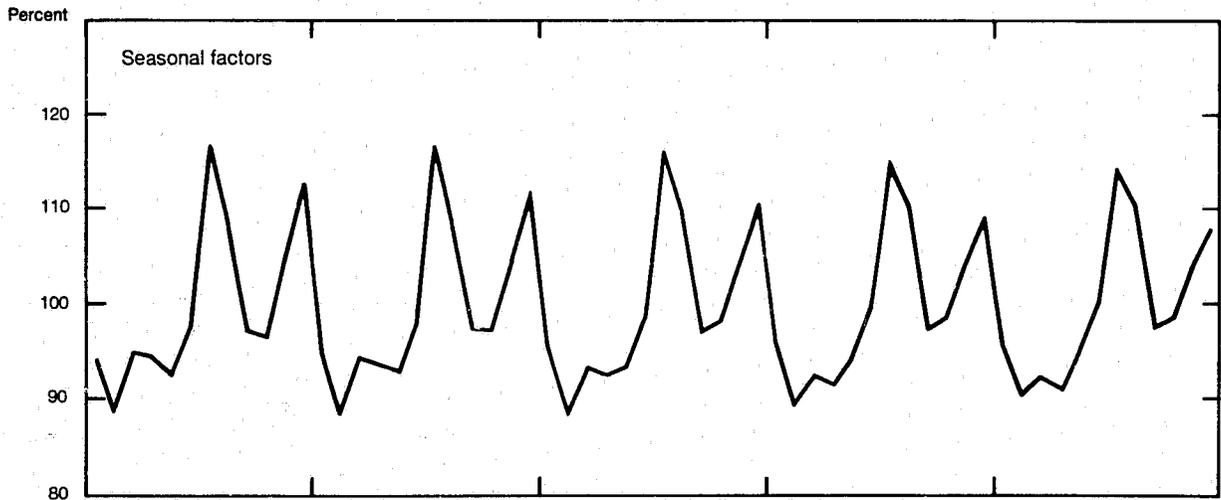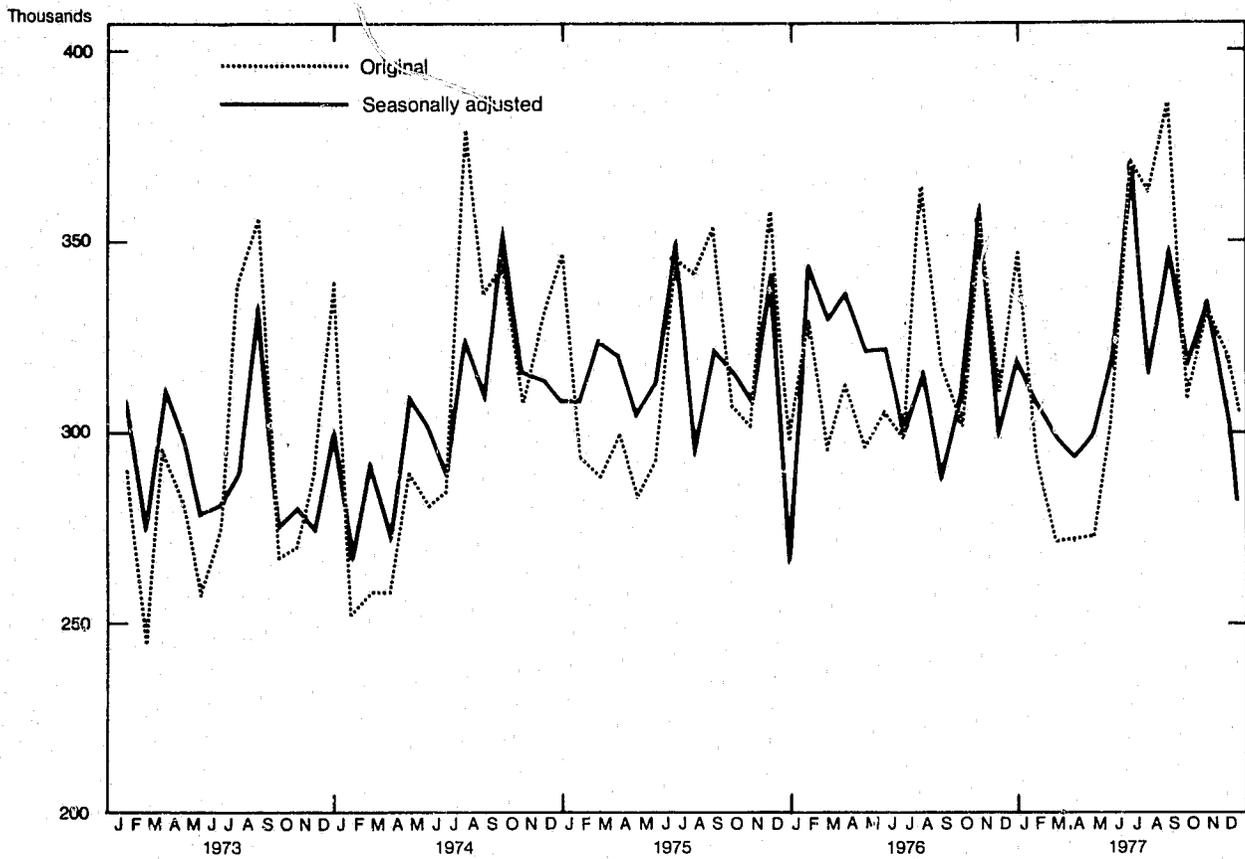
**Figure 8.** Forcible entry, by month, 1973-77.

## Table 8. Series components of forcible entry burglary by month, 1973-77

| | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Month | | | | | |
| | | | | | Seasonally adjusted data (000's) | | | | | | | |
| 1973 | 307 | 276 | 311 | 298 | 279 | 281 | 290 | 332 | 275 | 280 | 275 | 299 |
| 1974 | 267 | 291 | 273 | 309 | 302 | 290 | 324 | 309 | 353 | 316 | 314 | 308 |
| 1975 | 308 | 324 | 320 | 305 | 313 | 350 | 296 | 321 | 316 | 308 | 343 | 269 |
| 1976 | 343 | 330 | 336 | 322 | 323 | 300 | 316 | 288 | 311 | 361 | 300 | 318 |
| 1977 | 308 | 299 | 294 | 300 | 321 | 371 | 318 | 348 | 318 | 334 | 308 | 282 |
| | | | | | Seasonal factors (percent) | | | | | | | |
| 1973 | 94.2 | 88.6 | 94.9 | 94.5 | 92.6 | 97.9 | 116.7 | 108.4 | 97.2 | 96.7 | 105.0 | 112.8 |
| 1974 | 94.8 | 88.7 | 94.5 | 93.8 | 93.0 | 98.2 | 116.5 | 108.9 | 97.3 | 97.3 | 104.7 | 112.2 |
| 1975 | 95.5 | 88.8 | 93.6 | 92.7 | 93.6 | 98.8 | 116.1 | 110.2 | 97.2 | 98.3 | 103.9 | 110.7 |
| 1976 | 95.7 | 89.8 | 92.8 | 91.8 | 94.5 | 99.7 | 115.1 | 110.6 | 97.5 | 98.7 | 104.1 | 109.2 |
| 1977 | 95.9 | 90.4 | 92.5 | 91.1 | 95.0 | 100.3 | 114.4 | 110.9 | 97.5 | 98.8 | 104.1 | 108.3 |
| | | | | | Original data (000's) | | | | | | | |
| 1973 | 289 | 244 | 295 | 282 | 258 | 275 | 338 | 360 | 267 | 270 | 289 | 337 |
| 1974 | 253 | 258 | 258 | 289 | 281 | 285 | 378 | 336 | 343 | 307 | 328 | 346 |
| 1975 | 294 | 288 | 299 | 283 | 293 | 346 | 343 | 353 | 307 | 302 | 357 | 298 |
| 1976 | 328 | 296 | 312 | 296 | 305 | 299 | 364 | 318 | 303 | 356 | 312 | 347 |
| 1977 | 295 | 271 | 272 | 273 | 305 | 372 | 364 | 386 | 310 | 330 | 320 | 305 |
| | | | | | Trend data (000's) | | | | | | | |
| 1973 | 297 | 296 | 293 | 291 | 289 | 287 | 284 | 283 | 281 | 280 | 280 | 281 |
| 1974 | 283 | 287 | 291 | 295 | 300 | 304 | 308 | 311 | 313 | 314 | 315 | 316 |
| 1975 | 315 | 315 | 315 | 314 | 314 | 315 | 316 | 318 | 321 | 323 | 326 | 327 |
| 1976 | 328 | 327 | 325 | 322 | 319 | 315 | 312 | 308 | 306 | 304 | 303 | 303 |
| 1977 | 305 | 307 | 310 | 313 | 316 | 318 | 320 | 321 | 322 | 322 | 321 | 321 |

*Forcible entry*—Forcible entry burglary showed less evidence of seasonality than most other theft series. Although it was apparent from the data that the summer months of July and August had a higher than average incidence of forcible entry and the first few months of the year a relatively low incidence, there was also a great deal of irregularity (Table 8). This situation was reflected in the modest value of the test statistic (7.04).

Seasonal factors displayed peaks in July and December and troughs in February and September/October. July factors were approximately 22 percent above average, whereas the factors for February were 15 percent below average.

As indicated in Figure 8, the seasonally adjusted series exhibited much random variation. In fact, 57 percent of the month-to-month change in the original series was attributed to irregularity and 43 percent to seasonality.
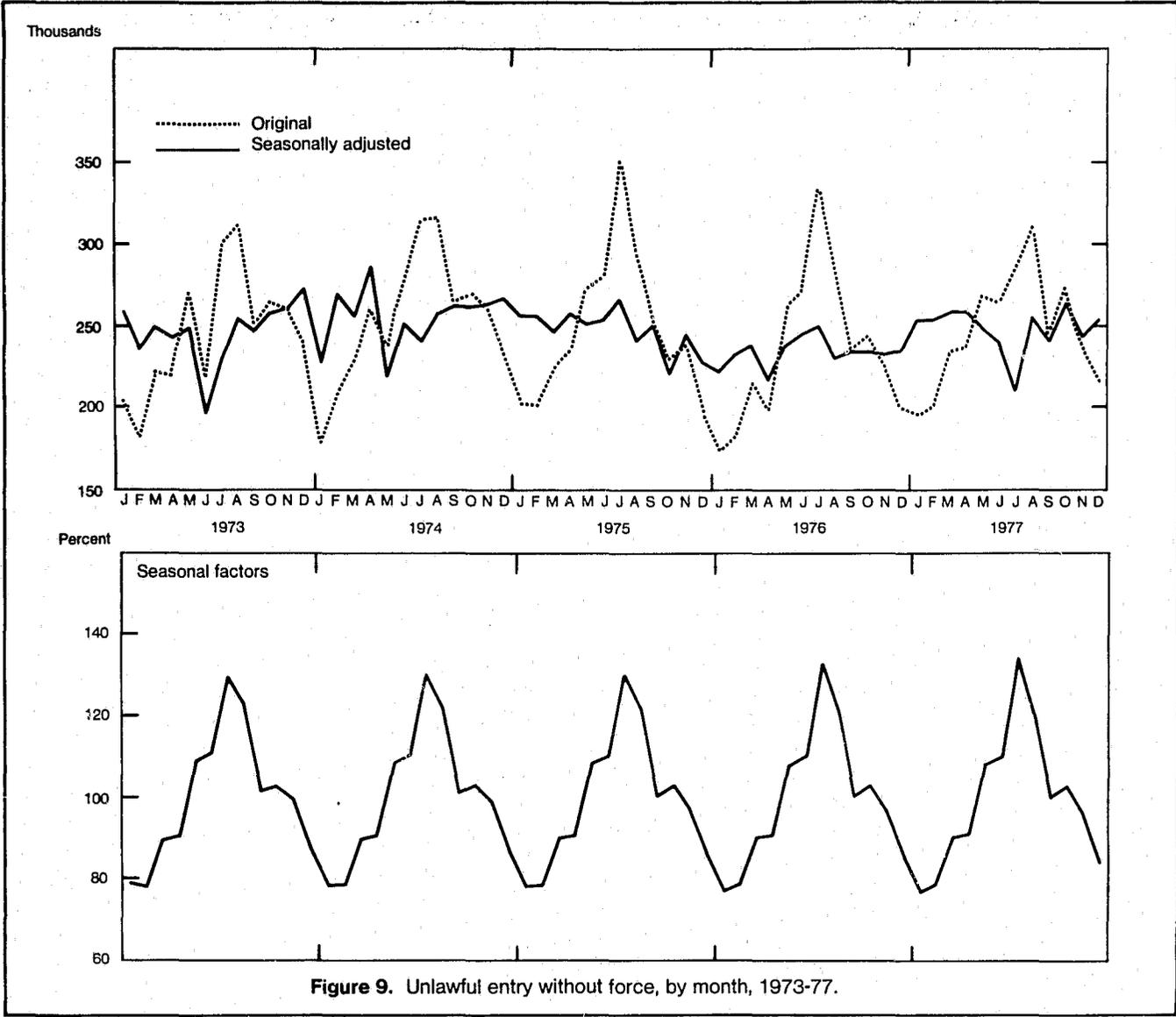
**Figure 9.** Unlawful entry without force, by month, 1973-77.

## Table 9. Series components of unlawful entry without force by month, 1973-77

| | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Seasonally adjusted data (000's)** | | | | | | | | | | | | |
| 1973 | 260 | 235 | 250 | 244 | 249 | 197 | 232 | 255 | 248 | 259 | 262 | 274 |
| 1974 | 229 | 270 | 256 | 287 | 220 | 252 | 241 | 259 | 263 | 262 | 263 | 267 |
| 1975 | 257 | 257 | 247 | 258 | 252 | 254 | 267 | 241 | 250 | 221 | 245 | 228 |
| 1976 | 224 | 233 | 239 | 217 | 239 | 246 | 251 | 231 | 235 | 235 | 233 | 235 |
| 1977 | 254 | 254 | 259 | 259 | 248 | 239 | 211 | 255 | 241 | 264 | 243 | 254 |
| **Seasonal factors (percent)** | | | | | | | | | | | | |
| 1973 | 78.7 | 78.0 | 89.6 | 90.7 | 109.0 | 110.5 | 129.5 | 122.1 | 101.8 | 102.6 | 99.5 | 87.6 |
| 1974 | 78.5 | 78.2 | 89.9 | 90.8 | 108.9 | 110.5 | 130.2 | 122.1 | 101.4 | 103.0 | 98.7 | 87.1 |
| 1975 | 78.3 | 78.5 | 90.5 | 91.1 | 108.7 | 110.2 | 131.1 | 122.4 | 100.6 | 103.8 | 97.6 | 86.5 |
| 1976 | 77.7 | 79.2 | 90.6 | 91.4 | 108.4 | 110.4 | 133.2 | 121.8 | 100.6 | 103.8 | 97.0 | 85.4 |
| 1977 | 77.3 | 79.6 | 90.7 | 91.5 | 108.3 | 110.5 | 134.5 | 121.3 | 100.4 | 103.7 | 96.5 | 84.6 |
| **Original data (000's)** | | | | | | | | | | | | |
| 1973 | 205 | 183 | 224 | 221 | 271 | 218 | 300 | 312 | 252 | 266 | 261 | 240 |
| 1974 | 180 | 211 | 230 | 260 | 239 | 278 | 314 | 316 | 266 | 270 | 260 | 233 |
| 1975 | 201 | 202 | 224 | 235 | 274 | 280 | 350 | 295 | 252 | 230 | 239 | 198 |
| 1976 | 174 | 184 | 216 | 199 | 259 | 272 | 334 | 282 | 237 | 244 | 226 | 201 |
| 1977 | 196 | 202 | 235 | 237 | 268 | 264 | 284 | 310 | 242 | 274 | 235 | 215 |
| **Trend data (000's)** | | | | | | | | | | | | |
| 1973 | 250 | 248 | 246 | 244 | 243 | 243 | 244 | 247 | 252 | 258 | 263 | 266 |
| 1974 | 266 | 264 | 261 | 256 | 253 | 252 | 253 | 255 | 259 | 262 | 263 | 262 |
| 1975 | 259 | 257 | 255 | 255 | 254 | 254 | 252 | 249 | 245 | 240 | 235 | 232 |
| 1976 | 230 | 231 | 233 | 236 | 239 | 241 | 240 | 238 | 236 | 235 | 237 | 242 |
| 1977 | 248 | 253 | 254 | 253 | 250 | 247 | 246 | 247 | 249 | 251 | 252 | 253 |

*Unlawful entry without force*—Unlike the findings for the forcible component of residential burglary, unlawful entry exhibited a definite recurring pattern in the unadjusted series (Figure 9). This pattern was similar to that noted for the parent series—that is, high monthly estimates in midyear and low estimates at the beginning and end of the year. Monthly figures ranged from a low of 191,000 in January to a high of 316,000 in July (Table 9). The test for significant seasonality produced a value of 35.96.

Series amplitude was greater for unlawful entry burglary than most other series. There was an annual swing of 54 percent in the seasonal factors. July, the peak month, was about 32 percent above average, whereas January was 22 percent below average. The pattern exhibited could be accurately described as sharp and single-peaked.

Seasonally adjusted, the unlawful entry series lost much of its variation. In fact, nearly 70 percent of the monthly fluctuation was due to seasonality. When smoothed for irregularity, there was an absence of any noticeable trend or cycle over the 5-year interval.

**Figure 10.** Motor vehicle theft, by month, 1973-77.

# Table 10. Series components of motor vehicle theft by month, 1973-77

| | January | February | March | April | May | June | July | August | September | December | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Seasonally adjusted data (000's) | | | | | | |
| 1973 | 99 | 85 | 104 | 112 | 106 | 123 | 94 | 120 | 137 | 121 | 111 | 125 |
| 1974 | 138 | 113 | 115 | 111 | 111 | 102 | 107 | 104 | 105 | 120 | 107 | 125 |
| 1975 | 110 | 133 | 139 | 124 | 92 | 113 | 126 | 136 | 125 | 118 | 115 | 101 |
| 1976 | 103 | 106 | 92 | 98 | 109 | 107 | 108 | 97 | 102 | 103 | 110 | 99 |
| 1977 | 109 | 87 | 108 | 141 | 103 | 116 | 99 | 106 | 103 | 103 | 123 | 127 |
| | | | | | | Seasonal factors (percent) | | | | | | |
| 1973 | 81.0 | 89.0 | 87.2 | 93.0 | 96.5 | 100.1 | 121.3 | 109.1 | 103.2 | 111.9 | 104.6 | 102.4 |
| 1974 | 80.8 | 89.7 | 86.8 | 93.2 | 97.0 | 101.5 | 120.8 | 108.5 | 102.2 | 110.7 | 106.7 | 102.7 |
| 1975 | 80.6 | 89.4 | 86.4 | 93.6 | 97.3 | 103.6 | 119.4 | 107.6 | 100.3 | 108.6 | 109.8 | 103.6 |
| 1976 | 79.9 | 90.7 | 86.4 | 93.1 | 98.1 | 103.3 | 119.0 | 107.6 | 98.8 | 107.7 | 113.2 | 102.7 |
| 1977 | 79.1 | 91.3 | 86.2 | 92.7 | 98.5 | 103.5 | 118.7 | 107.7 | 98.0 | 106.8 | 115.3 | 102.0 |
| | | | | | | Original data (000's) | | | | | | |
| 1973 | 80 | 76 | 91 | 105 | 103 | 124 | 115 | 131 | 142 | 135 | 116 | 129 |
| 1974 | 111 | 106 | 100 | 104 | 107 | 104 | 129 | 113 | 108 | 133 | 115 | 129 |
| 1975 | 88 | 119 | 120 | 116 | 90 | 117 | 150 | 147 | 125 | 128 | 126 | 104 |
| 1976 | 82 | 96 | 79 | 91 | 107 | 110 | 128 | 104 | 101 | 110 | 124 | 101 |
| 1977 | 87 | 79 | 93 | 103 | 101 | 120 | 117 | 114 | 101 | 110 | 142 | 130 |
| | | | | | | Trend data (000's) | | | | | | |
| 1973 | 100 | 102 | 106 | 109 | 112 | 115 | 117 | 120 | 122 | 123 | 123 | 122 |
| 1974 | 120 | 118 | 115 | 113 | 111 | 109 | 108 | 109 | 110 | 112 | 115 | 118 |
| 1975 | 121 | 123 | 126 | 126 | 127 | 126 | 125 | 122 | 119 | 116 | 113 | 109 |
| 1976 | 107 | 104 | 103 | 102 | 101 | 102 | 102 | 103 | 103 | 103 | 104 | 105 |
| 1977 | 105 | 105 | 105 | 106 | 106 | 107 | 107 | 109 | 110 | 112 | 114 | 115 |

# Motor vehicle theft

On the average, 1.3 million thefts and attempted thefts of cars and other motorized vehicles were committed each year (Table 10). Unadjusted monthly data showed a low incidence of vehicle theft in the first half and a higher incidence in the second half of each year. As a consequence, January's average of 90,000 crimes may be contrasted with the 128,000 incidents for July and the 125,000 for November. The outcome of the test for seasonality was less conclusive (7.09) than that for other crimes of theft.

A chart of the seasonal factors shows two peaks in the second half of the year, a major one in July and a minor one in October-November (Figure 10). The amplitude of the seasonal swing varied from January's seasonal factor, which was about 20 percent below average to July's 20 percent above average. Seasonally adjusted, the motor vehicle series displayed a great deal of random movement; in fact, irregularity accounted for more than half of the month-to-month variation. Examination of the final trend series uncovered no evidence of a gradual rise or fall in the incidence of motor vehicle theft.
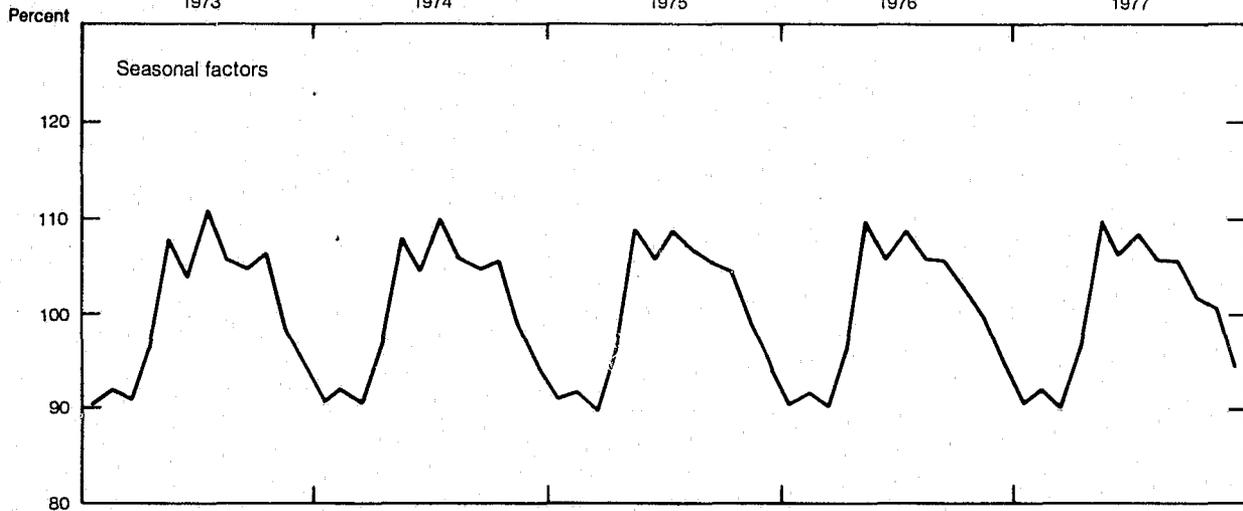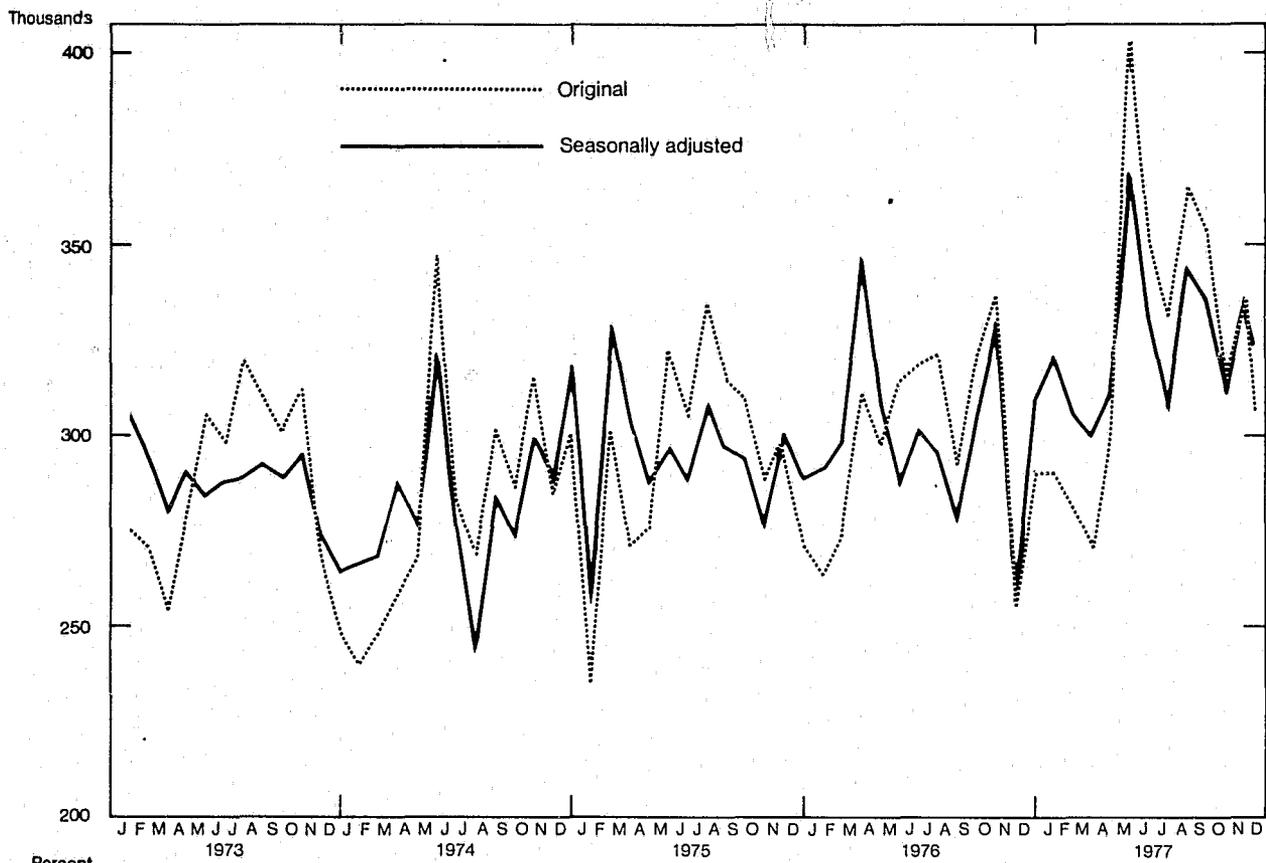
**Figure 11.** Assault, by month, 1973-77.

## Table 11. Series components of assault by month, 1973-77

| | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Seasonally adjusted data (000's) | | | | | | | |
| 1973 | 305 | 293 | 280 | 291 | 284 | 287 | 288 | 293 | 289 | 295 | 274 | 264 |
| 1974 | 266 | 268 | 286 | 277 | 321 | 276 | 244 | 284 | 274 | 298 | 288 | 317 |
| 1975 | 259 | 328 | 302 | 287 | 296 | 289 | 307 | 296 | 294 | 276 | 300 | 288 |
| 1976 | 291 | 298 | 346 | 309 | 287 | 302 | 296 | 277 | 304 | 327 | 256 | 309 |
| 1977 | 321 | 306 | 300 | 312 | 368 | 331 | 307 | 344 | 336 | 311 | 335 | 324 |
| | | | | | Seasonal factors (percent) | | | | | | | |
| 1973 | 90.1 | 92.0 | 91.0 | 96.2 | 107.6 | 103.8 | 110.7 | 105.8 | 104.0 | 106.0 | 98.3 | 94.3 |
| 1974 | 90.4 | 92.0 | 90.6 | 96.3 | 107.9 | 104.3 | 109.9 | 105.8 | 104.4 | 105.4 | 98.6 | 94.2 |
| 1975 | 90.9 | 91.8 | 89.9 | 96.2 | 108.7 | 105.2 | 108.7 | 106.2 | 105.0 | 104.1 | 99.0 | 94.0 |
| 1976 | 90.7 | 91.9 | 90.1 | 96.2 | 109.3 | 105.7 | 108.2 | 105.8 | 105.2 | 102.6 | 99.7 | 94.4 |
| 1977 | 90.8 | 92.0 | 90.1 | 96.1 | 109.5 | 106.0 | 108.0 | 105.6 | 105.4 | 101.6 | 100.1 | 94.4 |
| | | | | | Original data (000's) | | | | | | | |
| 1973 | 275 | 270 | 255 | 280 | 305 | 297 | 318 | 310 | 301 | 312 | 270 | 249 |
| 1974 | 240 | 247 | 259 | 267 | 346 | 288 | 268 | 301 | 286 | 315 | 284 | 299 |
| 1975 | 235 | 301 | 271 | 276 | 322 | 304 | 334 | 314 | 309 | 288 | 297 | 271 |
| 1976 | 264 | 274 | 311 | 297 | 314 | 319 | 321 | 293 | 319 | 336 | 255 | 291 |
| 1977 | 291 | 281 | 270 | 300 | 403 | 351 | 331 | 363 | 354 | 316 | 335 | 306 |
| | | | | | Trend data (000's) | | | | | | | |
| 1973 | 295 | 294 | 292 | 291 | 290 | 288 | 287 | 285 | 283 | 281 | 279 | 277 |
| 1974 | 276 | 274 | 274 | 275 | 276 | 278 | 282 | 285 | 288 | 291 | 294 | 296 |
| 1975 | 298 | 299 | 299 | 298 | 297 | 296 | 294 | 293 | 293 | 293 | 293 | 293 |
| 1976 | 294 | 294 | 295 | 295 | 296 | 297 | 298 | 299 | 301 | 302 | 304 | 307 |
| 1977 | 309 | 312 | 315 | 318 | 320 | 322 | 324 | 326 | 327 | 329 | 330 | 330 |

## Assault

Assault fell into an intermediate position between robbery, where there was no evidence of seasonality, and some of the property crimes, where seasonal influences were readily apparent. The seasonality test produced a value of 7.52 which in terms of the criteria used in this report is considered a modest indication of significant seasonality. The unadjusted data showed a general recurring pattern of a higher incidence of assault in the spring and summer and lower levels in the colder months (Figure 11). There were approximately 3.6 million assault incidents per year over the 5-year period, varying from a January average of 261,000 to a high of 338,000 in May (Table 11). The seasonal factors for assault showed a double peak in May and July and troughs in January and March. The amplitude of this swing varied from 9 percent above average in July to 10 percent below average in March.

With seasonality removed, the adjusted series showed a substantial amount of irregular variation. The X-11 program attributed about three-fourths of the month-to-month variation in the original series to irregular factors and only 25 percent to seasonality. The final trend cycle indicated an upward tendency in assaults since the early part of 1974.
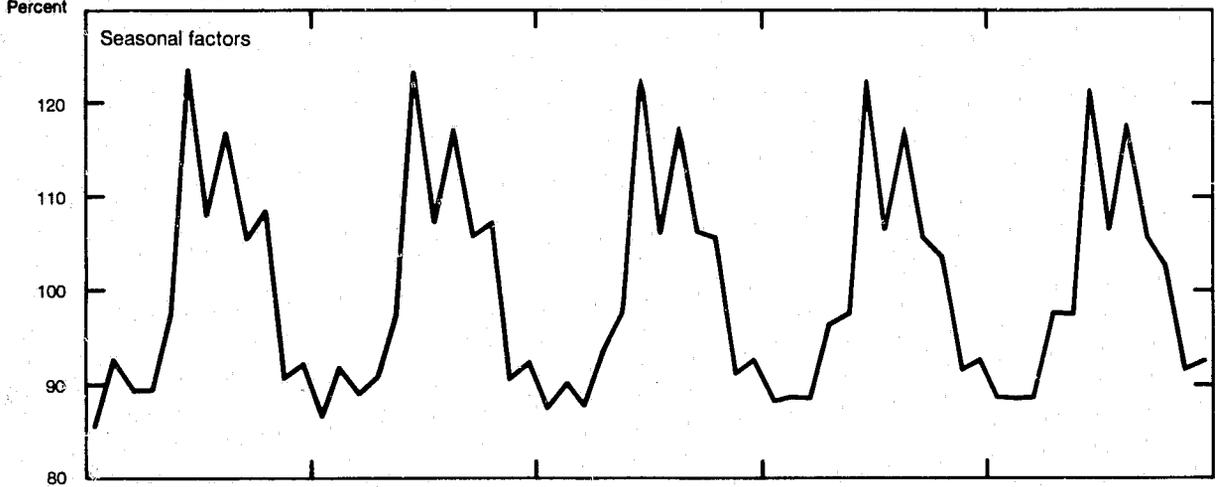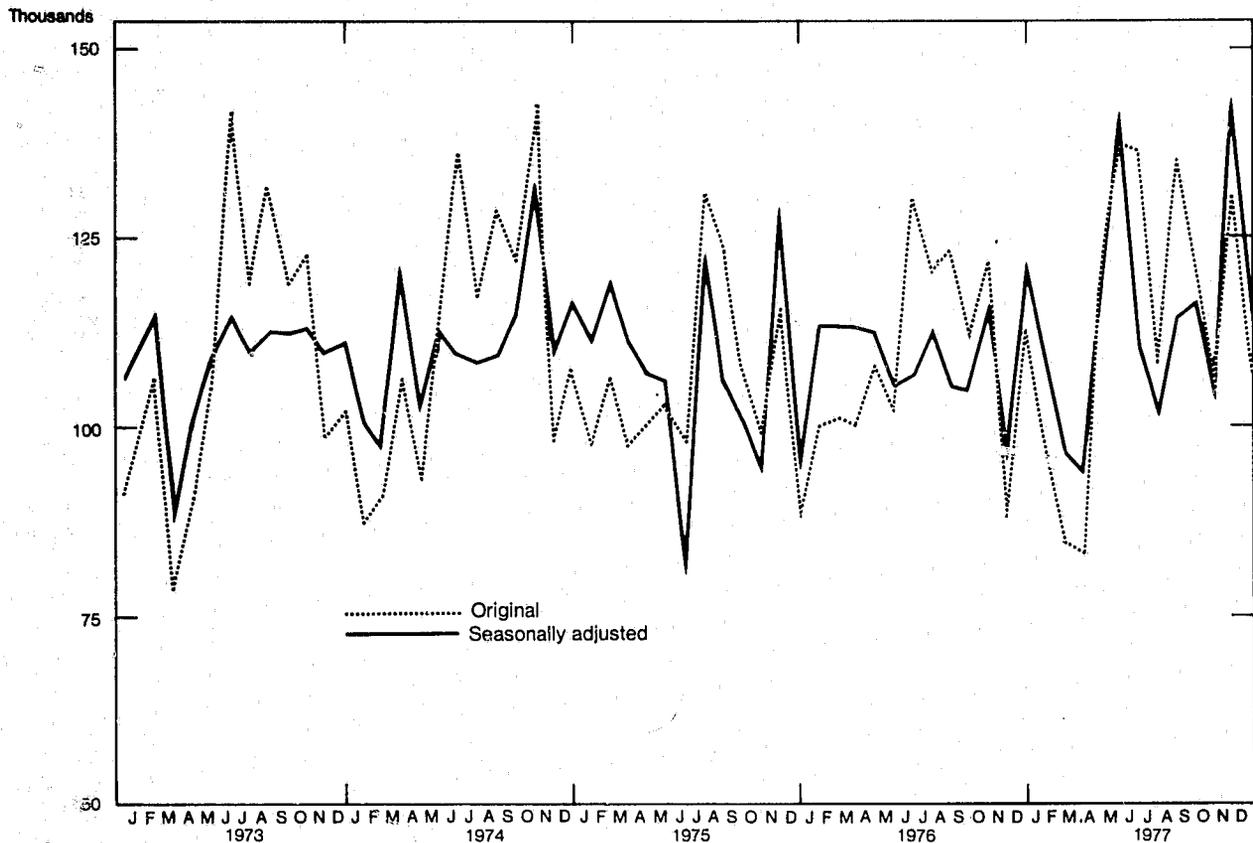
**Figure 12.** Aggravated assault, by month, 1973-77.

# Table 12. Series components of aggravated assault by month, 1973-77

| | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Month | | | | | |
| | | | | | | Seasonally adjusted data (000's) | | | | | | |
| 1973 | 106 | 115 | 88 | 101 | 108 | 114 | 109 | 112 | 112 | 113 | 110 | 111 |
| 1974 | 101 | 97 | 119 | 102 | 113 | 109 | 108 | 109 | 115 | 132 | 109 | 116 |
| 1975 | 111 | 118 | 111 | 107 | 105 | 79 | 122 | 106 | 101 | 94 | 126 | 94 |
| 1976 | 113 | 113 | 113 | 112 | 104 | 106 | 112 | 105 | 104 | 116 | 96 | 120 |
| 1977 | 109 | 96 | 93 | 118 | 140 | 111 | 102 | 114 | 116 | 103 | 142 | 115 |
| | | | | | | Seasonal factors (percent) | | | | | | |
| 1973 | 85.6 | 92.6 | 89.3 | 89.1 | 97.4 | 123.7 | 108.0 | 117.0 | 105.7 | 108.3 | 90.5 | 92.0 |
| 1974 | 86.4 | 91.8 | 88.9 | 90.9 | 97.5 | 123.5 | 107.5 | 117.1 | 105.9 | 107.5 | 90.6 | 92.3 |
| 1975 | 87.4 | 90.0 | 87.9 | 93.8 | 97.7 | 123.3 | 106.3 | 117.4 | 106.2 | 105.5 | 91.1 | 92.8 |
| 1976 | 88.1 | 88.8 | 88.6 | 96.2 | 97.5 | 122.3 | 106.3 | 117.4 | 105.9 | 103.9 | 91.5 | 92.6 |
| 1977 | 88.8 | 88.4 | 88.7 | 97.8 | 97.3 | 121.8 | 106.4 | 117.4 | 105.6 | 102.8 | 91.9 | 92.5 |
| | | | | | | Original data (000's) | | | | | | |
| 1973 | 91 | 106 | 78 | 90 | 105 | 141 | 118 | 131 | 118 | 122 | 99 | 102 |
| 1974 | 87 | 89 | 106 | 93 | 110 | 135 | 116 | 128 | 122 | 142 | 99 | 107 |
| 1975 | 97 | 106 | 97 | 100 | 103 | 97 | 130 | 124 | 107 | 99 | 115 | 88 |
| 1976 | 100 | 101 | 100 | 108 | 102 | 129 | 120 | 123 | 111 | 121 | 88 | 112 |
| 1977 | 97 | 84 | 83 | 116 | 136 | 135 | 108 | 134 | 123 | 106 | 130 | 107 |
| | | | | | | Trend data (000's) | | | | | | |
| 1973 | 105 | 107 | 107 | 108 | 108 | 109 | 109 | 110 | 110 | 109 | 109 | 108 |
| 1974 | 108 | 107 | 107 | 108 | 108 | 110 | 111 | 112 | 113 | 114 | 114 | 114 |
| 1975 | 113 | 112 | 111 | 109 | 107 | 106 | 105 | 104 | 104 | 104 | 105 | 106 |
| 1976 | 107 | 108 | 109 | 109 | 109 | 109 | 109 | 108 | 107 | 107 | 106 | 106 |
| 1977 | 106 | 106 | 107 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 |

*Aggravated assault*—Over the 5-year period, the more serious form of assault showed substantial variation from month to month, from a low average of 93,000 in March to a high value of 128,000 in August (Table 12). The unadjusted data indicated seasonal variations generally similar to those for assault as a whole, with highs in the warmer months and lows in the winter (Figure 12).

A diagram of the seasonal factors indicated a fairly consistent double peak in June and August and a trough usually in January, with February and March also well below average. The amplitude of the swings of the seasonal factors for aggravated assault was greater than for all assaults. The factors for June exceeded the overall average by 23 percent, while in January they were down by 13 percent. The measure of seasonality registered a figure of 5.80, slightly below that for total assault.

The seasonally adjusted series indicated the presence of irregular factors, which accounted for 64 percent of the monthly variation. The final trend cycle showed no significant underlying movement over the period under study.
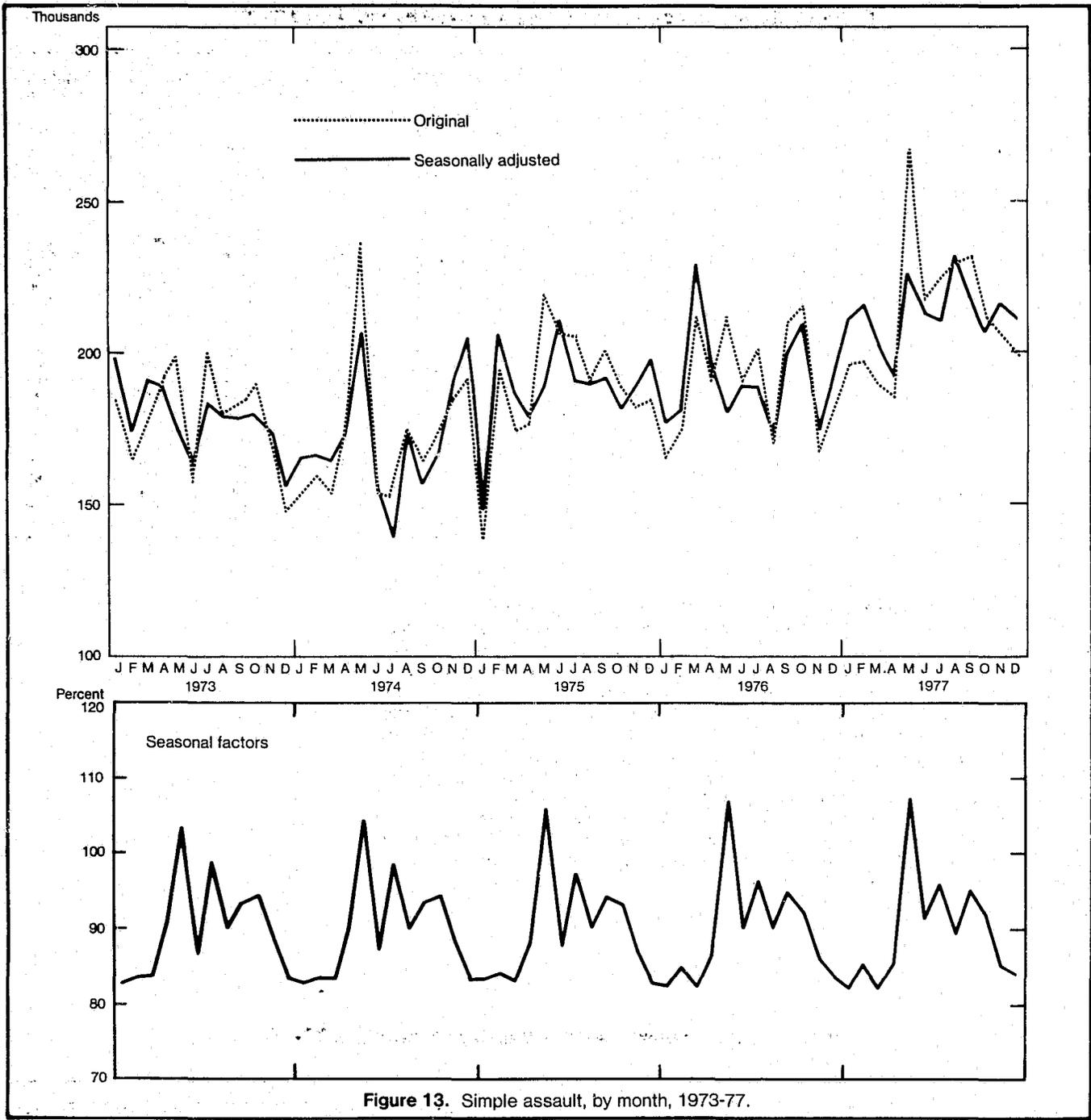
**Figure 13.** Simple assault, by month, 1973-77.

# Table 13. Series components of simple assault by month, 1973-77

| | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Seasonally adjusted data (000's)** | | | | | | | | | | | | |
| 1973 | 199 | 175 | 189 | 188 | 176 | 162 | 184 | 179 | 177 | 183 | 172 | 157 |
| 1974 | 165 | 168 | 164 | 174 | 206 | 157 | 140 | 173 | 158 | 166 | 189 | 206 |
| 1975 | 148 | 207 | 187 | 179 | 188 | 211 | 190 | 189 | 192 | 182 | 187 | 197 |
| 1976 | 177 | 182 | 228 | 195 | 181 | 189 | 188 | 169 | 199 | 209 | 174 | 191 |
| 1977 | 211 | 215 | 203 | 192 | 226 | 213 | 210 | 230 | 218 | 206 | 215 | 211 |
| **Seasonal factors (percent)** | | | | | | | | | | | | |
| 1973 | 92.9 | 93.5 | 93.7 | 100.9 | 113.7 | 96.5 | 108.9 | 100.0 | 103.3 | 104.3 | 98.7 | 93.4 |
| 1974 | 92.9 | 93.7 | 93.5 | 100.1 | 114.5 | 97.1 | 108.5 | 100.0 | 103.8 | 104.3 | 98.1 | 93.2 |
| 1975 | 93.2 | 94.1 | 93.1 | 98.3 | 116.2 | 98.0 | 107.8 | 100.6 | 104.6 | 103.7 | 97.2 | 93.0 |
| 1976 | 92.5 | 95.2 | 92.6 | 96.9 | 117.3 | 100.3 | 106.8 | 100.2 | 105.1 | 102.7 | 96.4 | 94.0 |
| 1977 | 92.2 | 95.8 | 92.4 | 95.9 | 117.9 | 101.6 | 106.2 | 99.9 | 105.7 | 102.3 | 95.6 | 94.3 |
| **Original data (000's)** | | | | | | | | | | | | |
| 1973 | 184 | 164 | 177 | 190 | 200 | 156 | 201 | 179 | 183 | 190 | 170 | 147 |
| 1974 | 153 | 158 | 153 | 174 | 236 | 153 | 152 | 173 | 164 | 173 | 185 | 192 |
| 1975 | 138 | 195 | 174 | 176 | 219 | 207 | 205 | 190 | 201 | 188 | 182 | 184 |
| 1976 | 164 | 174 | 211 | 189 | 212 | 190 | 201 | 169 | 209 | 215 | 167 | 180 |
| 1977 | 195 | 197 | 188 | 184 | 267 | 216 | 223 | 229 | 231 | 211 | 205 | 199 |
| **Trend data (000's)** | | | | | | | | | | | | |
| 1973 | 188 | 186 | 184 | 182 | 181 | 179 | 177 | 176 | 174 | 173 | 171 | 170 |
| 1974 | 168 | 166 | 165 | 164 | 164 | 165 | 166 | 168 | 171 | 174 | 177 | 181 |
| 1975 | 184 | 187 | 189 | 191 | 191 | 192 | 191 | 191 | 190 | 189 | 188 | 187 |
| 1976 | 187 | 186 | 186 | 186 | 186 | 187 | 188 | 190 | 191 | 193 | 195 | 198 |
| 1977 | 201 | 204 | 206 | 209 | 211 | 213 | 214 | 215 | 216 | 216 | 216 | 216 |

*Simple assault*—Incidents of simple assault varied from a mean of 167,000 in January to 227,000 in May (Table 13). Like aggravated assault, the peaks and troughs were associated with warm and cold months, respectively.

Examination of the seasonal factors indicated different peak months from those described for aggravated assault (Figure 13). The high month was May, with lesser peaks in July and in either September or October. Although January had the lowest values, December, February, and March were also well below average. The amplitude of the seasonal swings was much less than it was for aggravated assault: 7 percent below average in January to 16 percent above in May. Significant seasonality was relatively low at 4.79. Although the irregular component was strongly in evidence in the seasonally adjusted series and was the major contributor to the variance in the original series over a 12-month span (60 percent), there was a long-term rise in simple assault incidents beginning in the spring of 1974.

# Table 14. Series components of robbery by month, 1973-77

| | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Original data (000's)** | | | | | | | | | | | | |
| 1973 | 77 | 89 | 106 | 63 | 77 | 66 | 68 | 103 | 76 | 73 | 78 | 73 |
| 1974 | 73 | 95 | 79 | 64 | 69 | 70 | 91 | 94 | 84 | 90 | 92 | 96 |
| 1975 | 86 | 76 | 81 | 81 | 82 | 81 | 90 | 81 | 83 | 72 | 75 | 92 |
| 1976 | 94 | 69 | 63 | 77 | 69 | 76 | 75 | 87 | 74 | 85 | 84 | 90 |
| 1977 | 67 | 54 | 61 | 64 | 75 | 75 | 80 | 81 | 75 | 89 | 70 | 109 |

## Robbery

In contrast to the other crimes analyzed in this report, robbery incidents occurring in the 1973 to 1977 period did not exhibit sufficient regularity of movement within each year to meet the requirements for seasonality. (The statistic for robbery was 2.15.) There were an average of 950,000 robbery incidents per year during this period, with the raw data indicating higher estimates in the second half of the year than in the first, but no consistently high and low months (Table 14). The weighted monthly estimates for robbery were too small to permit an examination of any subcategories of this crime.
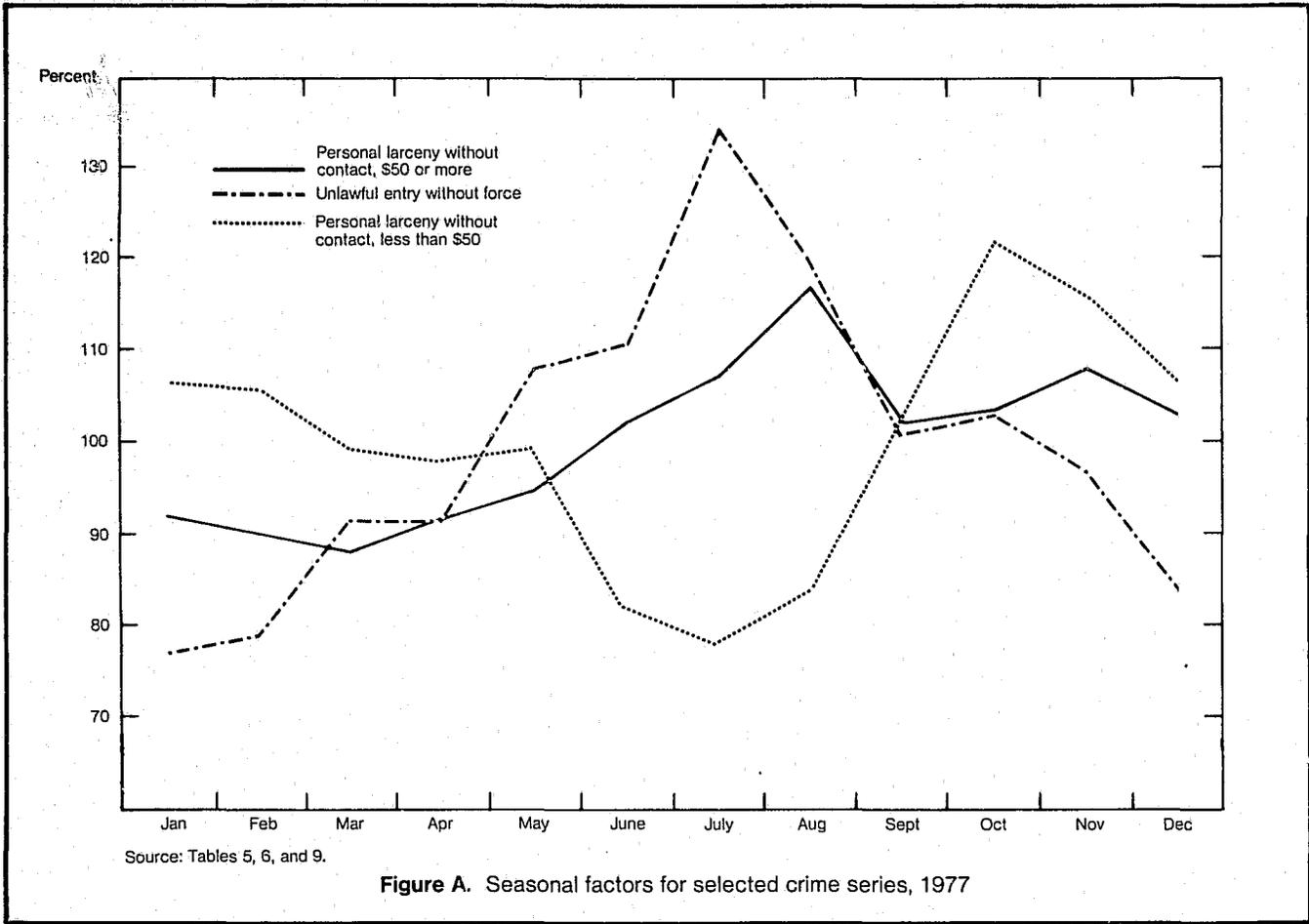
**Figure A.** Seasonal factors for selected crime series, 1977

Source: Tables 5, 6, and 9.

## Summary findings

A preliminary examination of monthly data for a number of surveyed crimes revealed that for most of them there was a significant amount of seasonality present. Certain series, personal larceny of less than $50, unlawful entry burglary, and both types of household larceny, showed striking evidence of regular annual fluctuations. On the other hand, robbery exhibited no evidence of seasonality, and such crimes as simple assault and motor vehicle theft had relatively weak seasonal components. It is likely, given the relative rarity of these acts and the small number of cases enumerated, that sampling variability was responsible, in part, for the random movements which appear to dominate these time series.

Of those crimes which exhibited a recurring ebb and flow, most displayed a similar pattern, highlighted by a peak period during the summer months. A striking exception to this pattern was personal larceny without contact, less than $50, which reached its nadir during the same interval when other series, including the more costly personal larcenies, were cresting (Figure A). Household larcenies, on the other hand, displayed the same general seasonal movements, regardless of the amount of loss.

Finally, when adjusted for seasonality and irregularity, two crimes, household and personal larcenies of $50 or more, displayed a noticeable long-term trend. The incidence of both crimes increased over the 5-year interval.

## Evidence from the NCS on causation

The foregoing examination of seasonality in the NCS has provided some data with which to make a preliminary assessment of the applicability of the factors which were offered earlier as causes for seasonal variation in the economic area.

This exploratory effort suggests a probable link between school vacation and seasonality in personal larceny without contact. More specifically, there is reason to believe that the low level of minor personal larceny (less than $50 stolen) in the summer months—a characteristic distinguishing this series from most others—is attributable to school vacation.

That school theft is an important component of minor larceny without contact is evident from the accompanying table (Table A). In 1977, approximately three-tenths of these incidents occurred inside school, a proportion second only to that for outside locales. Furthermore, this proportion does not include incidents taking place on school property but outside school buildings. Without a doubt, the addition of this component, which will be possible beginning with 1979 data, will enhance the proportion of school-related larceny. Only 5 percent of all serious personal larceny without contact ($50 or more stolen) took place inside schools.

Written summaries of in-school larcenies show that many were petty crimes involving theft or attempted theft of school supplies, gym equipment, or other school-related items from desks or lockers. Not surprisingly, few of these incidents were ever reported to the police.

Criminologists have stressed the importance of opportunity in the commission of many types of theft. The restricting of opportunity, resulting from the shutdown of facilities during the summer, very possibly may account for the 15- to 20-percent reduction in petty larceny regularly occurring during the months of June, July, and August.

Variations in opportunity possibly play a part in explaining the fluctuations within the academic year—the peak in October followed by the gradual decline through the month of May. Youthful malefactors may take advantage of the wealth of opportunity present in the early part of the school year, when security is lax and new supplies and equipment are in abundance, to commit a large number of thefts. However, it is likely these easy op-

portunities diminish as the school year wears on.

With regard to weather, findings from the crime survey contradict results from early studies and thus cast doubt upon the validity of the climatic principle as originally enunciated. Whereas violence showed some evidence of a summer orientation, a majority of crimes of theft examined were also most prevalent in the summer and least prevalent in the winter.

Although the classical theory linking theft with cold weather is now suspect, the association between crime and climate may still be valid. A more appropriate link, however, appears to be environmental opportunity. A high incidence of summertime theft may be associated with changes in living patterns brought about by climate, which in turn enhance criminal opportunity. To illustrate, household security may deteriorate during the warm weather, when doors and windows remain open or unlocked and household possessions, such as lawn furniture, bicycles, toys, etc., are more likely to be left out in the open. Vulnerability to theft may well be reduced in the winter when families spend less time out of doors and easy access to the home is reduced.

Survey data on time of occurrence are not complete enough to permit an examination of the relationship between the amount of daylight and its impact on crime. The new NCS schedule, introduced in January 1979, includes a question on the presence or absence of daylight, in addition to the inquiry on time of occurrence. This new question will no doubt elicit useful temporal information for certain crimes, such as violent personal attacks, but will probably not be effective for many types of household

thefts. This is because many victimized householders, if they have been away from home for an extended period of time, have no idea when a particular crime took place. Until more complete information is available, it can only be noted that most series peaked in those months with relatively more daylight hours and bottomed out in months with the shorter days.

The data from the survey indicate that there may be some relationship between length of month and amount of crime. In most of the series investigated, for example, February accounted for a lesser number of offenses. The X-11 program can adjust for this differential; a special run for one crime suggests that the impact of length of month is very slight. Possibly more important is the number of workdays versus the total of Saturdays, Sundays, and holidays in a month—a topic which will be investigated in the future.

## Conclusion

This initial report was intended to identify and describe seasonal fluctuations in a number of crime series. Much additional work needs to be done in data analysis and technical development. On the analysis side, attention needs to be given to the other important components in the series, the trend and the irregular component, examining their potential relationships to a number of socioeconomic and demographic factors. As an initial strategy for approaching seasonality and crime, methods developed for economic time series were used in this analysis. However, other techniques need to be investigated to determine if they provide better methods for seasonal adjustment.

Table A: Percent distribution of incidents, by type of crime and place of occurrence, 1977.

| Type of crime | Inside or near own home | Inside non-residential building | Inside school | On street or in park, playground, school property and parking lot | Elsewhere |
|---|---|---|---|---|---|
| Crimes of violence* | 22.4 | 16.0 | 6.4 | 44.0 | 11.3 |
| Robbery | 21.7 | 7.6 | 4.1 | 59.8 | 6.8 |
| Assault | 22.2 | 18.1 | 7.0 | 40.7 | 1.2 |
| Personal larceny without contact** | NA | 15.8 | 19.4 | 51.5 | 13.1 |
| Under $50 | NA | 16.8 | 28.2 | 43.5 | 11.4 |
| $50 or more | NA | 16.3 | 5.1 | 60.8 | 17.6 |

*Includes rape not shown separately.
**Includes attempts and amount not available.
NA Not applicable.

# Appendix

# Technical note

The data on which this report is based were gathered by means of a nationwide sample survey of persons age 12 and over living in households and in certain group quarters, such as dormitories, rooming houses, and religious group dwellings. A complete description of the sample design and estimation procedure for the National Crime Survey may be found in one of the standard publications.[1] This note will be confined to a general discussion of the seasonal adjustment procedure utilized in this report.

The X-11 seasonal adjustment program was developed at the Bureau of the Census in the 1950's. It is an adaptation for high speed computers of linear smoothing techniques for seasonally adjusting time series which originated at the National Bureau of Economic Research. Although generally used to reduce an economic time series to its component elements, i.e. the trend-cycle, seasonal movements and irregular fluctuations, the technique has been utilized in the demographic area and, therefore, it seems appropriate to consider its applicability to crime statistics.

Users of the X-11 program can select an option that assumes the main components of a time series are related multiplicatively or one that assumes an additive relationship, but not any combination of the two. Most users assume that the multiplicative model best represents the way the various elements of their data are related, although as Dagum has pointed out in the case of labor force data, the multiplicative model is appropriate for some series and the additive is better for others.[2] There are also situations where it makes no difference which model is selected. For this initial examination of seasonality and crime rates, the monthly data were run through the X-11 program using both the multiplicative and additive models. For the crimes selected, there was no substantial difference between the two. The data in the report are based on the multiplicative model.

One important byproduct of the X-11 program is an F-test for stable

seasonality. Stable seasonality exists when the data fluctuations do not change from year to year, as opposed to moving seasonality where the patterns, although clearly seasonal, change over the period under observation. The F-test is an analysis of variance ratio which tests the null hypothesis that all 12 months have the same mean value for a given series after adjustment for trend and irregular factors. A large F-ratio indicates that the differences between the mean values for the 12 months are large compared with the differences from year to year for the same month. In this report, we are using the F-ratio as an indicator of significant seasonality. A ratio of 2.34 or greater usually indicates that there is a less than 1 percent probability that the differences between the monthly means are due to chance. As mentioned in the text, we have adopted an additional requirement that ratios between 2.34 and 10 should be regarded as tentative indications of seasonality, whereas those above 10 show strong evidence of seasonal patterns. Such caution is warranted because the NCS is a stratified, clustered sample; because it has a panel design, so that observations from one year to the next are not entirely independent; and because this study is based on a relatively limited number of observations—60 months.

The F-test is the only statistical test utilized in this report. The purpose of this initial investigation was to ascertain whether there was a substantial seasonal element in data for selected crimes over time. The F-ratio meets this requirement by testing whether or not the patterns identified represent something more than random fluctuations.[3]

To give the reader a measure of the precision of the victimization series, the table at the end of this appendix gives the approximate standard error for each monthly value in the original data table for each type of crime. These standard errors reflect the sampling variability present in survey data. Before similar standard errors can be estimated for the seasonal factors or other components of the series, further analysis of the time series is needed.

## Series incidents

This report does not include series incidents for the same reason they are excluded from other NCS publications.

Series incidents occur when respondents are unable to remember the details of three or more very similar events that took place during the six-month reference period. Instead, an estimate of the number of incidents in the series is obtained and an indication of the season (or seasons) of the year in which they occurred. Until January 1979, it was not possible to assign a specific number of incidents to a particular season if the series spanned two seasons or more. Questionnaire modifications introduced at that time will permit allocation of series events by season, but not by individual month. An examination of series incidents by season of occurrence, which takes no account of the number of incidents involved, suggests that seasonal patterns exist in these data, but a more precise estimate will have to await the accumulation of data from the revised questionnaire.

## Telescoping of events

One source of error in a retrospective survey such as the NCS is the tendency for some respondents to report a crime event as occurring within the reference period when it actually occurred earlier, or to place an event in the wrong month within the reference period. The former problem is minimized by a bounding procedure which uses the initial interview to establish a reference point so that in the next interview any reports of incidents which appear to duplicate those reported previously can be eliminated.

Reporting incidents in the wrong month within the reference period can affect measurement of seasonality if, for example, respondents "bunch" together events that occurred during the summer months. One study, which compared burglary data from the LEAA cities surveys with that reported to the FBI, concluded that there was evidence of "bunching" in the summer months in cities with distinct variations in climate.[4] The NCS probably diminishes, if it does not entirely eliminate, this kind of error by utilizing a shorter reference period than the cities surveys (6 months rather than 12) and by forming its estimates of victimization for any given month equally from incidents occurring one month before the interview, 2 months before, etc.—up to 6 months before.

[1] For example, *Criminal Victimization in the United States—A Description of Trends from 1973 to 1977*, Law Enforcement Assistance Administration, National Criminal Justice Information and Statistics Service, Report SD-NCS-N-10, December 1979.

[2] Estela B. Dagum, op. cit., pp. 54-56.

[3] For a more complete description of the X-11 program, see J. Shiskin, A. Young and J. Musgrave: "The X-11 Variant of the Census Method II Seasonal Adjustment," Technical Paper No. 15, Bureau of the Census, U.S. Department of Commerce, 1967.

[4] Anne Schneider and David Sumi, "Patterns of Forgetting and Telescoping in LEAA Survey Victimization Data," Institute of Policy Analysis, Eugene, Oregon, November 1977.

# Standard errors for original data
## (thousands)

| | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Month | | | | | |
| | | | | | | Household larceny | | | | | | |
| 1973 | 39 | 32 | 33 | 34 | 35 | 35 | 35 | 37 | 33 | 34 | 33 | 34 |
| 1974 | 33 | 36 | 35 | 36 | 36 | 39 | 39 | 41 | 37 | 37 | 35 | 36 |
| 1975 | 32 | 32 | 35 | 35 | 37 | 39 | 43 | 41 | 39 | 38 | 35 | 38 |
| 1976 | 34 | 34 | 35 | 36 | 38 | 41 | 42 | 41 | 37 | 37 | 37 | 37 |
| 1977 | 33 | 32 | 35 | 37 | 39 | 41 | 42 | 43 | 38 | 40 | 37 | 39 |
| | | | | | Household larceny less than $50 | | | | | | | |
| 1973 | 31 | 25 | 27 | 28 | 27 | 27 | 29 | 29 | 27 | 28 | 26 | 28 |
| 1974 | 27 | 30 | 28 | 28 | 28 | 31 | 32 | 32 | 29 | 30 | 27 | 29 |
| 1975 | 26 | 25 | 27 | 28 | 29 | 31 | 32 | 31 | 30 | 31 | 27 | 31 |
| 1976 | 26 | 27 | 27 | 28 | 30 | 32 | 32 | 31 | 29 | 29 | 28 | 30 |
| 1977 | 26 | 24 | 26 | 28 | 29 | 31 | 31 | 33 | 29 | 31 | 28 | 31 |
| | | | | | Household larceny $50 or more | | | | | | | |
| 1973 | 20 | 16 | 15 | 16 | 18 | 18 | 18 | 20 | 17 | 16 | 17 | 16 |
| 1974 | 16 | 15 | 18 | 18 | 18 | 20 | 20 | 22 | 20 | 20 | 19 | 18 |
| 1975 | 16 | 17 | 19 | 18 | 20 | 22 | 25 | 24 | 22 | 20 | 20 | 19 |
| 1976 | 19 | 18 | 19 | 20 | 20 | 23 | 24 | 23 | 20 | 19 | 20 | 19 |
| 1977 | 16 | 17 | 19 | 21 | 22 | 23 | 25 | 24 | 21 | 21 | 21 | 21 |
| | | | | | Personal larceny without contact | | | | | | | |
| 1973 | 59 | 53 | 49 | 48 | 45 | 40 | 42 | 41 | 46 | 47 | 48 | 47 |
| 1974 | 47 | 47 | 46 | 44 | 43 | 44 | 43 | 44 | 49 | 52 | 52 | 49 |
| 1975 | 48 | 48 | 46 | 47 | 47 | 45 | 44 | 46 | 48 | 51 | 49 | 49 |
| 1976 | 48 | 48 | 47 | 47 | 48 | 46 | 46 | 47 | 48 | 51 | 50 | 50 |
| 1977 | 49 | 48 | 49 | 48 | 48 | 46 | 46 | 48 | 51 | 52 | 53 | 52 |
| | | | | | Personal larceny without contact less than $50 | | | | | | | |
| 1973 | 50 | 47 | 42 | 41 | 38 | 32 | 33 | 32 | 39 | 40 | 40 | 39 |
| 1974 | 41 | 40 | 38 | 37 | 35 | 34 | 34 | 33 | 39 | 43 | 43 | 41 |
| 1975 | 40 | 40 | 38 | 36 | 38 | 36 | 33 | 35 | 39 | 41 | 40 | 39 |
| 1976 | 38 | 38 | 37 | 37 | 38 | 34 | 34 | 34 | 37 | 41 | 40 | 38 |
| 1977 | 38 | 38 | 39 | 37 | 37 | 34 | 33 | 36 | 40 | 41 | 42 | 41 |
| | | | | | Personal larceny without contact $50 or more | | | | | | | |
| 1973 | 26 | 22 | 23 | 22 | 22 | 21 | 22 | 23 | 22 | 22 | 24 | 23 |
| 1974 | 22 | 21 | 22 | 22 | 23 | 26 | 25 | 26 | 26 | 25 | 27 | 25 |
| 1975 | 22 | 24 | 23 | 23 | 25 | 25 | 26 | 28 | 25 | 27 | 27 | 26 |
| 1976 | 25 | 26 | 25 | 26 | 26 | 27 | 28 | 29 | 26 | 26 | 26 | 28 |
| 1977 | 27 | 25 | 26 | 27 | 26 | 27 | 29 | 29 | 29 | 29 | 30 | 29 |
| | | | | | | | Burglary | | | | | |
| 1973 | 38 | 33 | 34 | 32 | 31 | 28 | 32 | 33 | 30 | 31 | 31 | 32 |
| 1974 | 28 | 29 | 30 | 32 | 31 | 32 | 35 | 34 | 33 | 32 | 33 | 32 |
| 1975 | 30 | 30 | 31 | 31 | 32 | 34 | 35 | 34 | 32 | 31 | 33 | 30 |
| 1976 | 30 | 30 | 31 | 30 | 32 | 32 | 36 | 33 | 31 | 33 | 31 | 32 |
| 1977 | 30 | 29 | 30 | 30 | 32 | 34 | 34 | 36 | 32 | 34 | 33 | 32 |

|  | | | | | | Month | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | January | February | March | April | May | June | July | August | September | October | November | December |
| **Forcible entry burglary** | | | | | | | | | | | | |
| 1973 | 29 | 25 | 26 | 24 | 21 | 31 | 24 | 25 | 21 | 22 | 23 | 25 |
| 1974 | 21 | 22 | 22 | 23 | 23 | 23 | 26 | 25 | 25 | 24 | 24 | 25 |
| 1975 | 23 | 23 | 23 | 23 | 23 | 25 | 25 | 25 | 24 | 23 | 25 | 23 |
| 1976 | 24 | 23 | 24 | 23 | 24 | 23 | 26 | 24 | 23 | 25 | 24 | 25 |
| 1977 | 23 | 22 | 22 | 22 | 24 | 26 | 26 | 27 | 24 | 25 | 25 | 25 |
| **Unlawful entry without force** | | | | | | | | | | | | |
| 1973 | 25 | 22 | 22 | 21 | 22 | 19 | 22 | 23 | 21 | 22 | 22 | 21 |
| 1974 | 18 | 20 | 20 | 22 | 21 | 22 | 24 | 24 | 22 | 22 | 22 | 21 |
| 1975 | 19 | 19 | 20 | 21 | 22 | 23 | 25 | 23 | 21 | 20 | 21 | 19 |
| 1976 | 18 | 18 | 20 | 19 | 22 | 22 | 25 | 23 | 21 | 21 | 20 | 19 |
| 1977 | 19 | 19 | 21 | 21 | 22 | 22 | 23 | 24 | 21 | 23 | 21 | 21 |
| **Motor vehicle theft** | | | | | | | | | | | | |
| 1973 | 16 | 14 | 14 | 14 | 14 | 14 | 14 | 15 | 16 | 15 | 14 | 15 |
| 1974 | 14 | 14 | 14 | 14 | 14 | 14 | 15 | 14 | 14 | 16 | 14 | 15 |
| 1975 | 13 | 15 | 15 | 15 | 13 | 15 | 17 | 16 | 15 | 15 | 15 | 14 |
| 1976 | 12 | 13 | 12 | 13 | 14 | 14 | 15 | 14 | 14 | 14 | 15 | 14 |
| 1977 | 13 | 12 | 13 | 14 | 14 | 15 | 15 | 15 | 14 | 15 | 17 | 16 |
| **Assault** | | | | | | | | | | | | |
| 1973 | 29 | 26 | 24 | 24 | 23 | 22 | 23 | 23 | 23 | 23 | 22 | 21 |
| 1974 | 21 | 21 | 22 | 22 | 25 | 23 | 22 | 23 | 23 | 24 | 23 | 23 |
| 1975 | 21 | 23 | 22 | 22 | 24 | 24 | 25 | 24 | 24 | 23 | 23 | 22 |
| 1976 | 22 | 22 | 24 | 23 | 24 | 24 | 24 | 23 | 24 | 25 | 22 | 23 |
| 1977 | 23 | 23 | 22 | 23 | 27 | 25 | 25 | 26 | 26 | 25 | 26 | 25 |
| **Aggravated assault** | | | | | | | | | | | | |
| 1973 | 16 | 17 | 13 | 13 | 14 | 15 | 14 | 15 | 14 | 15 | 13 | 14 |
| 1974 | 13 | 13 | 14 | 13 | 14 | 16 | 15 | 15 | 15 | 16 | 13 | 14 |
| 1975 | 13 | 14 | 13 | 14 | 14 | 13 | 15 | 15 | 14 | 13 | 14 | 13 |
| 1976 | 13 | 14 | 14 | 14 | 14 | 15 | 15 | 15 | 14 | 15 | 13 | 14 |
| 1977 | 13 | 12 | 12 | 15 | 16 | 16 | 14 | 16 | 15 | 14 | 16 | 15 |
| **Simple assault** | | | | | | | | | | | | |
| 1973 | 24 | 20 | 20 | 19 | 19 | 16 | 18 | 17 | 18 | 18 | 17 | 16 |
| 1974 | 17 | 17 | 17 | 18 | 21 | 17 | 17 | 18 | 17 | 18 | 18 | 19 |
| 1975 | 16 | 19 | 18 | 18 | 20 | 19 | 19 | 19 | 19 | 19 | 18 | 18 |
| 1976 | 17 | 18 | 20 | 19 | 20 | 19 | 19 | 18 | 19 | 20 | 17 | 18 |
| 1977 | 19 | 19 | 18 | 18 | 22 | 20 | 20 | 21 | 21 | 20 | 20 | 20 |
| **Robbery** | | | | | | | | | | | | |
| 1973 | 15 | 15 | 15 | 11 | 12 | 10 | 11 | 13 | 11 | 11 | 12 | 12 |
| 1974 | 11 | 13 | 12 | 11 | 11 | 11 | 13 | 13 | 12 | 13 | 13 | 13 |
| 1975 | 13 | 12 | 12 | 12 | 12 | 12 | 13 | 12 | 12 | 11 | 12 | 13 |
| 1976 | 13 | 11 | 11 | 12 | 11 | 12 | 12 | 13 | 12 | 12 | 12 | 13 |
| 1977 | 11 | 10 | 11 | 11 | 12 | 12 | 12 | 12 | 12 | 13 | 12 | 15 |

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