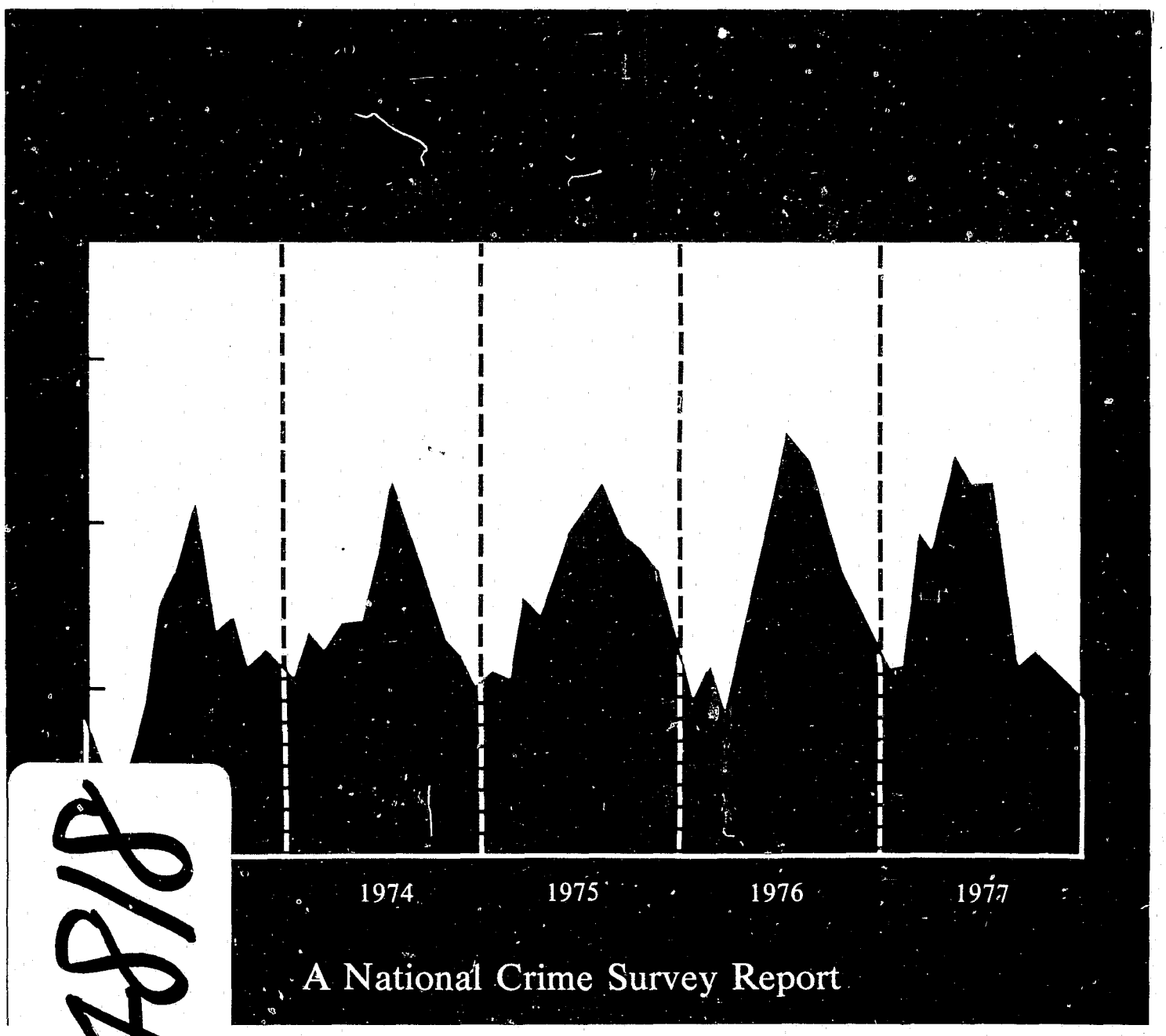
U.S. Department of Justice
Bureau of Justice Statistics

Crime and Seasonality



A National Crime Survey Report

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National Crime Survey Report
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Bureau of Justice Statistics

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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

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[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.

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[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.

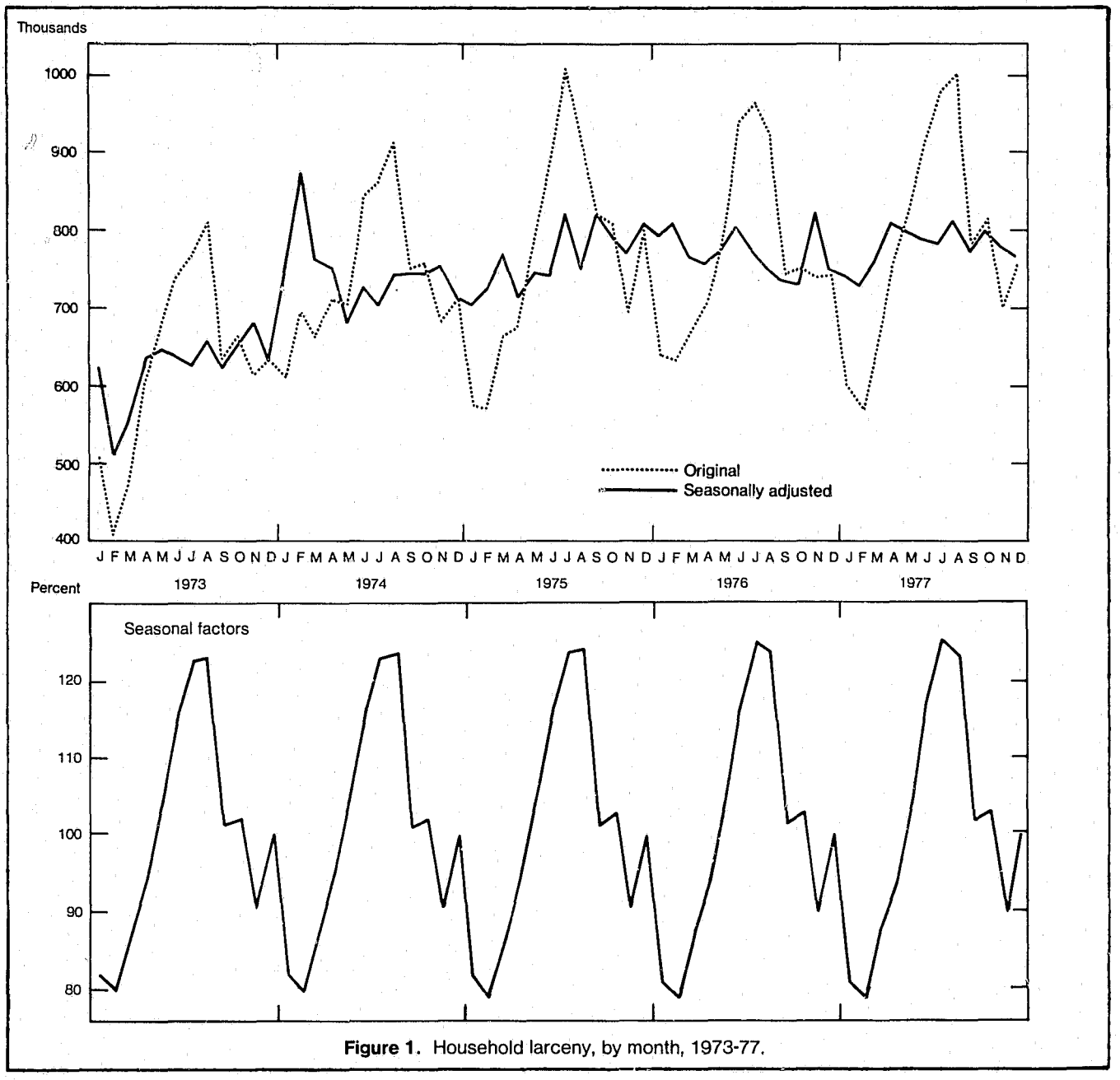


Figure 1. Household larceny, by month, 1973-77.

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

	Month											
	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.

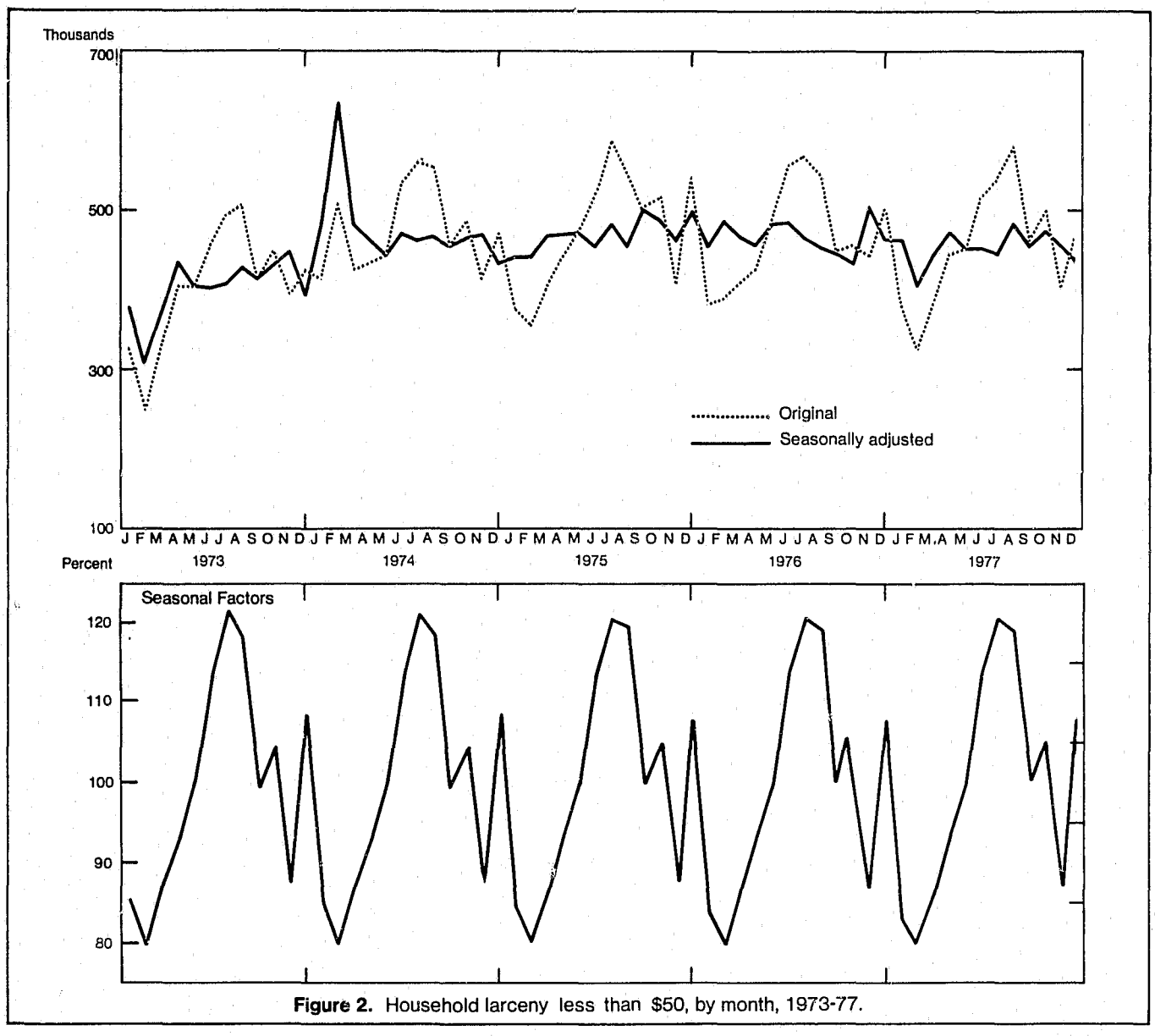


Figure 2. Household larceny less than $50, by month, 1973-77.

Table 2. Series components of household larceny less than $50 by month, 1973–77

	Month											
	January	February	March	April	May	June	July	August	September	October	November	December
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.

[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.

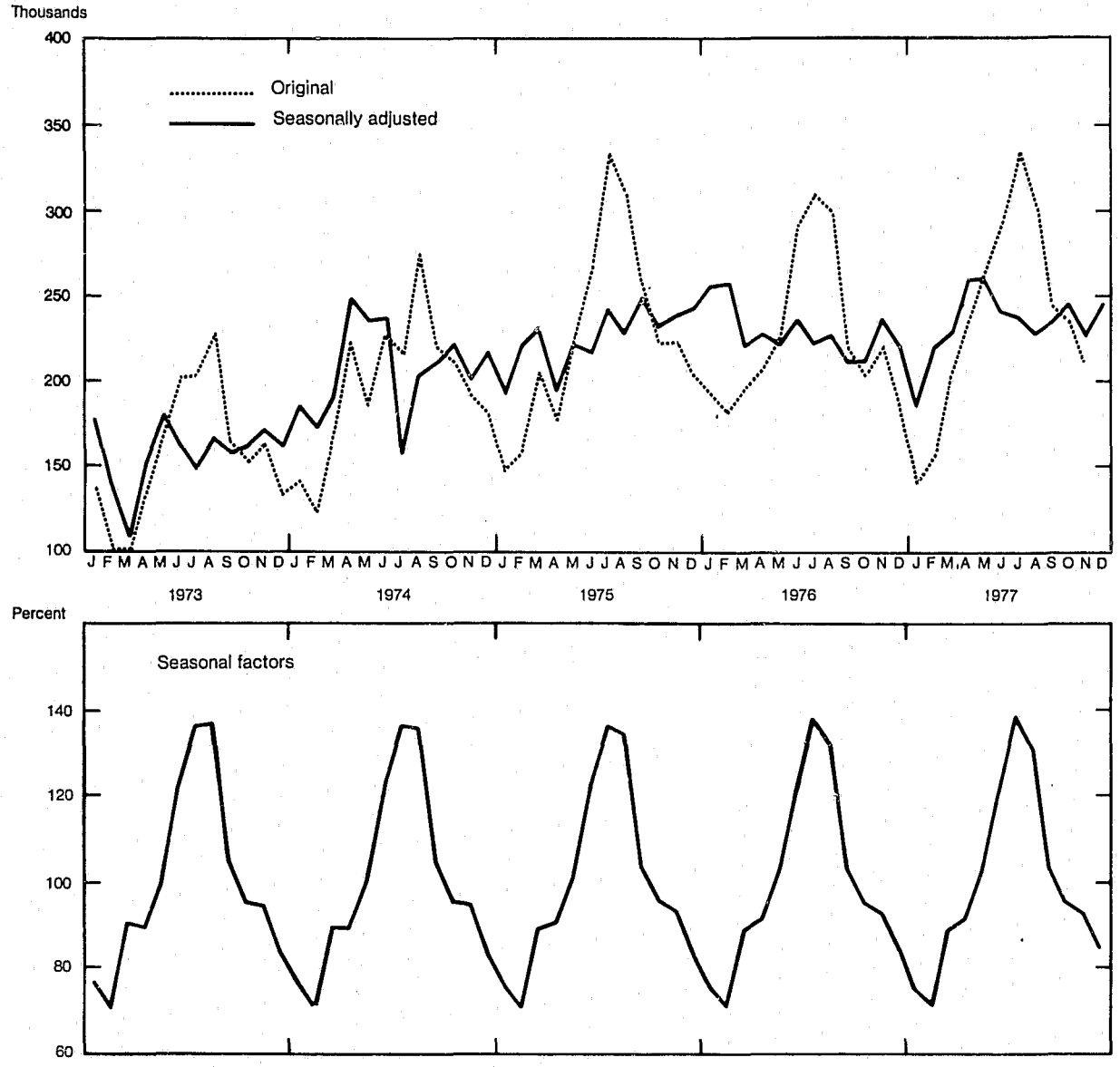


Figure 3. Household larceny $50 or more, by month, 1973-77.

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

	Month											
	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	266	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.

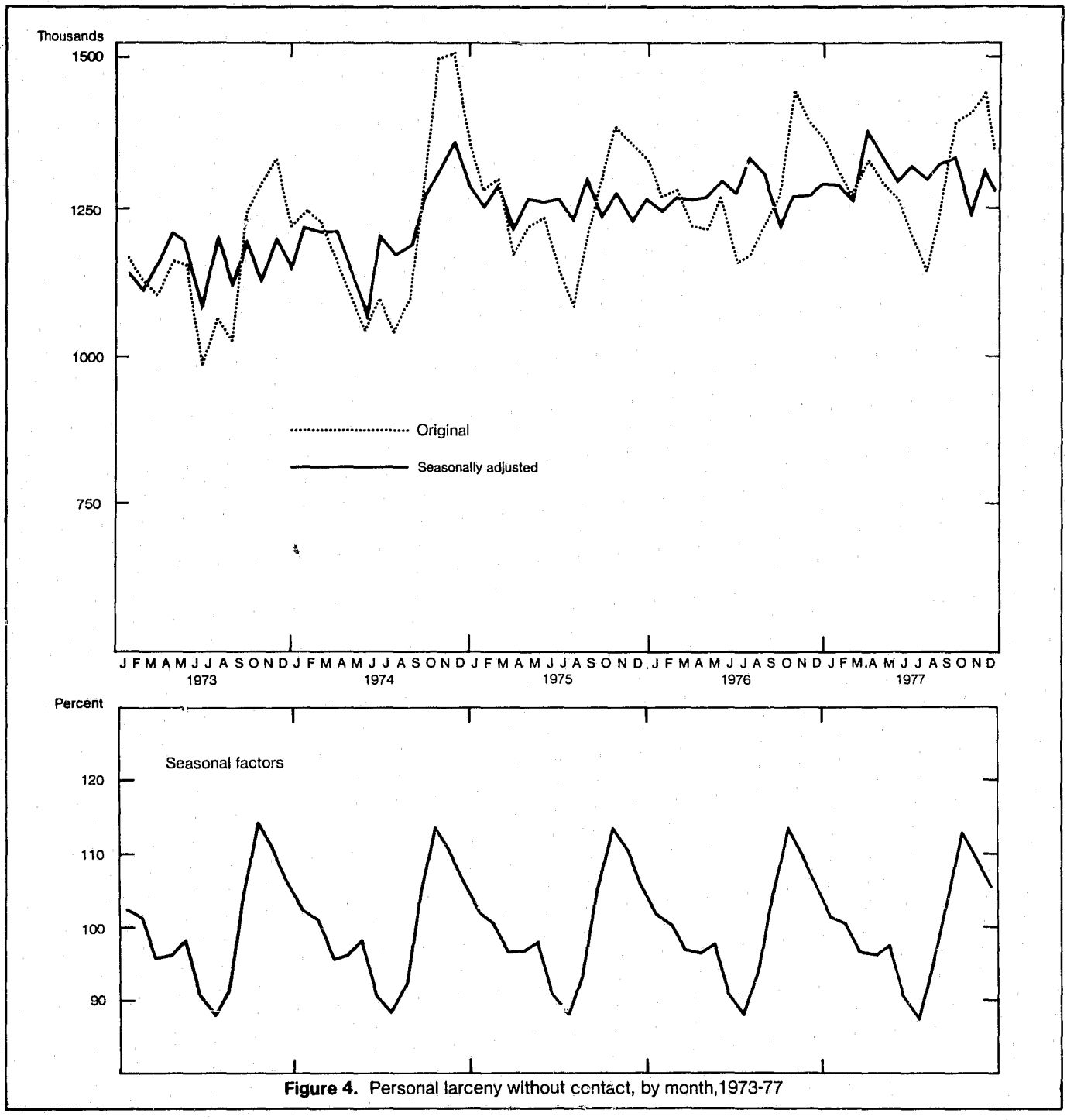


Figure 4. Personal larceny without contact, by month,1973-77

Table 4. Series components of personal larceny without contact by month, 1973-77

	Month											
	January	February	March	April	May	June	July	August	September	October	November	December
						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	1,261	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.

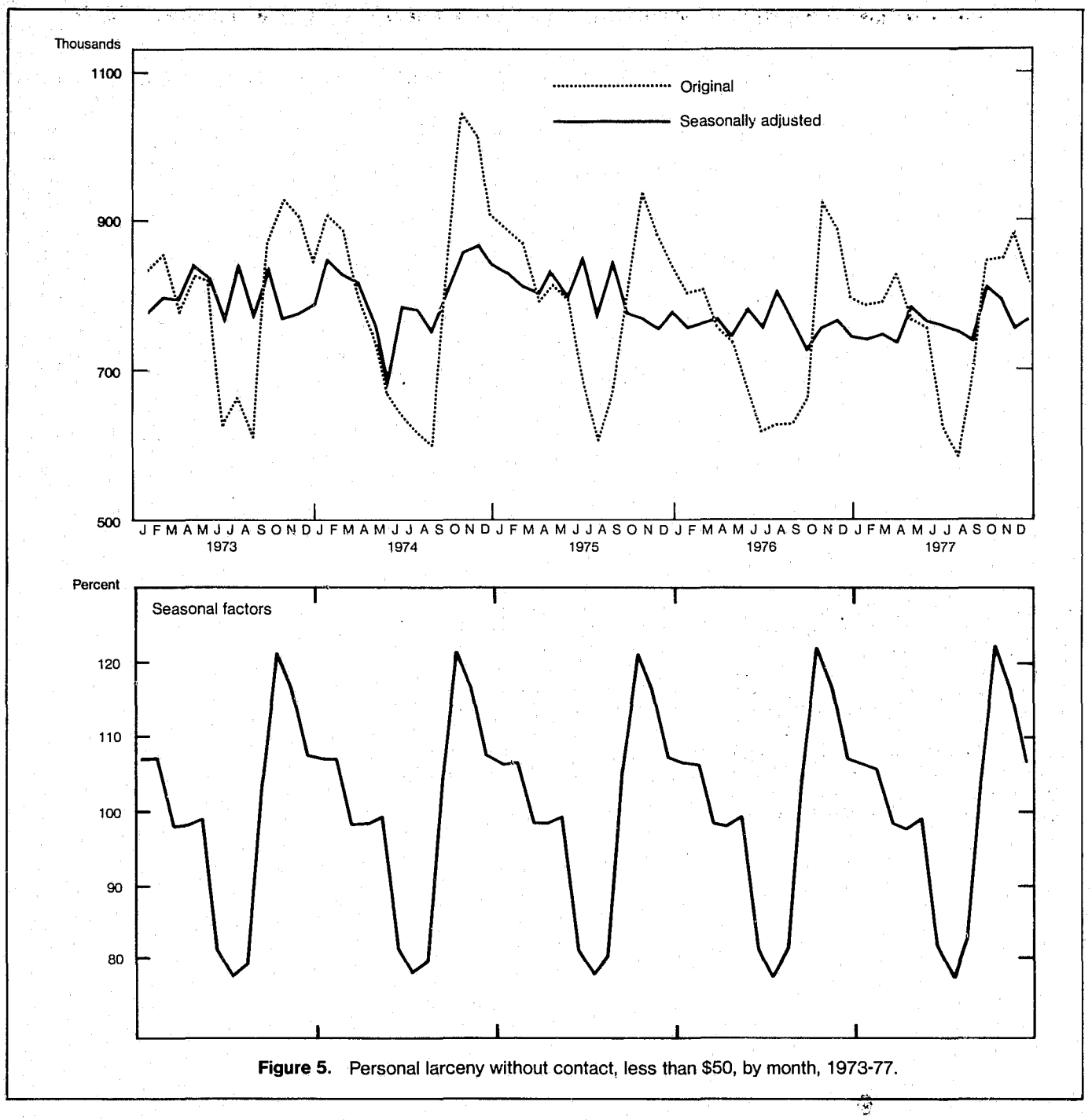


Figure 5. Personal larceny without contact, less than $50, by month, 1973-77.

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

	Month											
	January	February	March	April	May	June	July	August	September	October	November	December
						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.

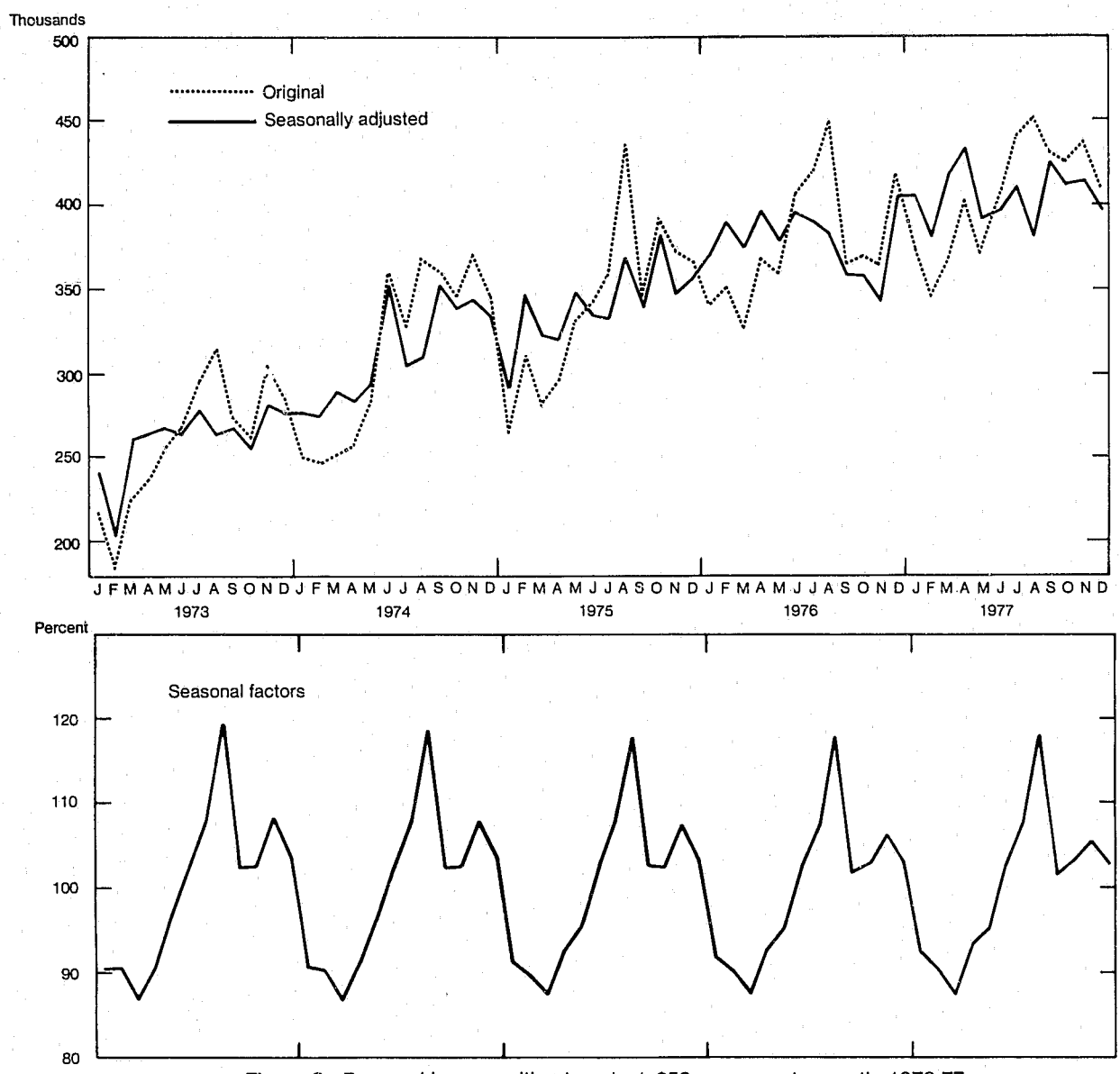


Figure 6. Personal larceny without contact $50 or more, by month, 1973-77.

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

	Month											
	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.

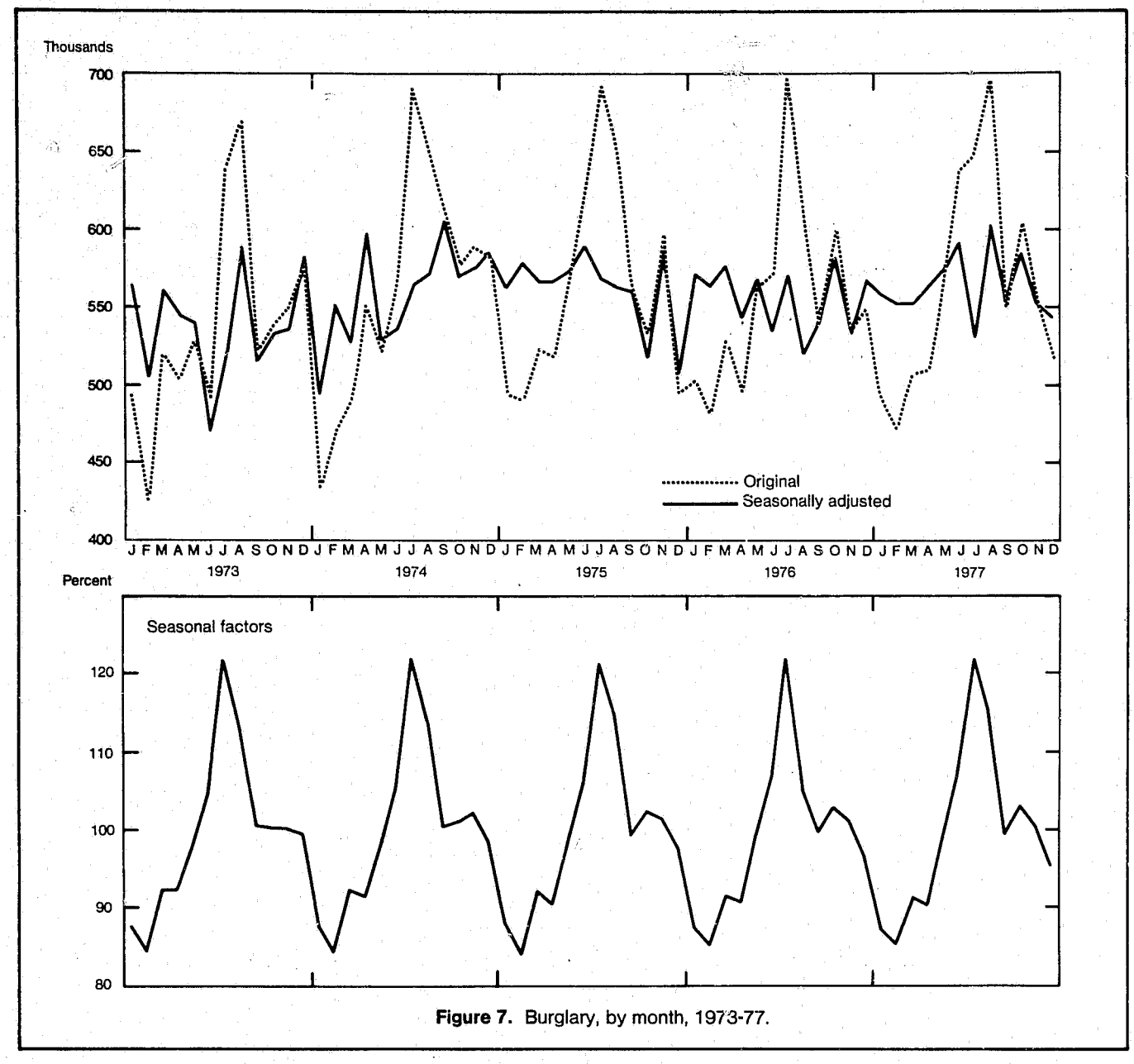


Figure 7. Burglary, by month, 1973-77.

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

	Month											
	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.

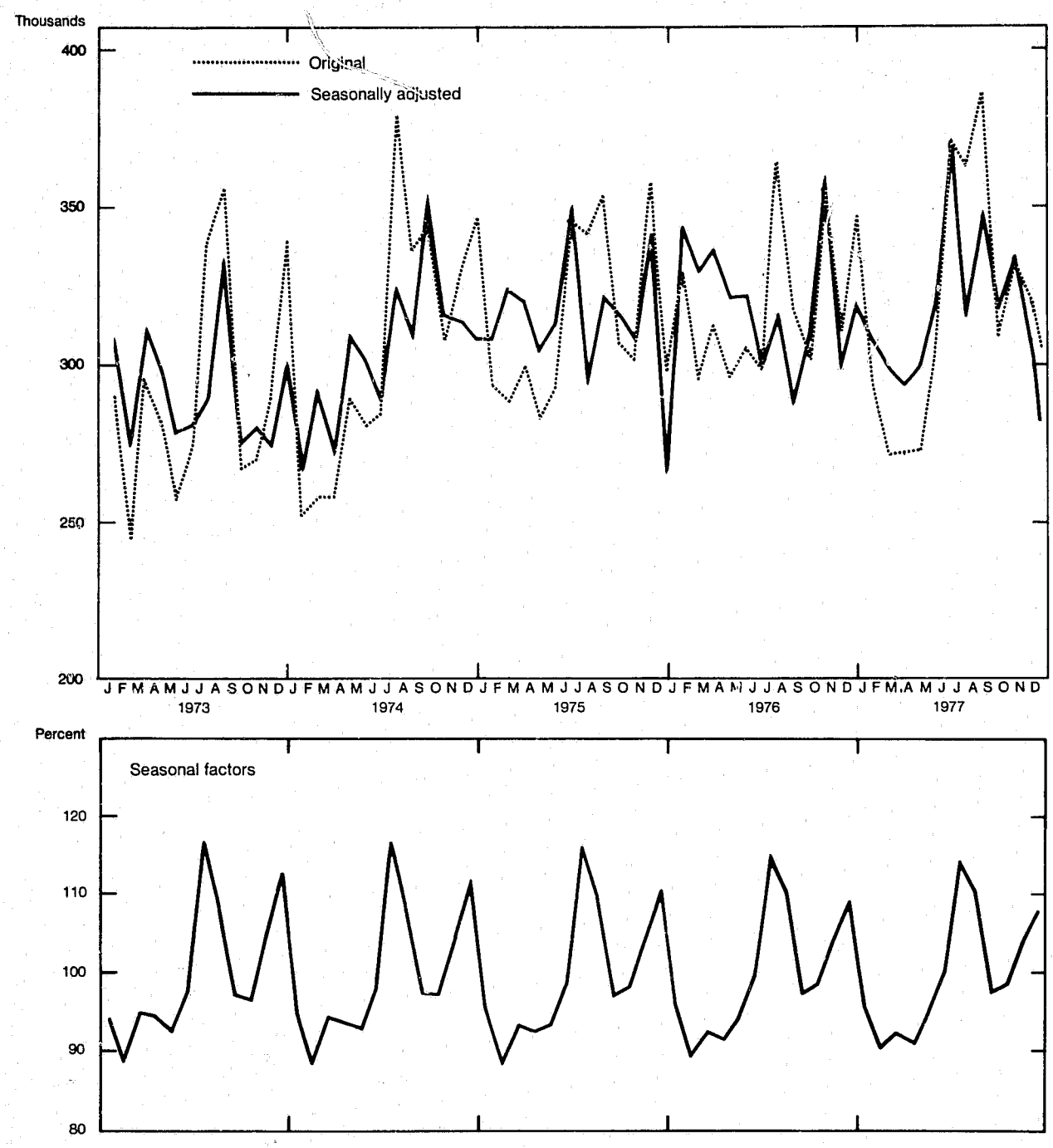


Figure 8. Forcible entry, by month, 1973-77.

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

	Month											
	January	February	March	April	May	June	July	August	September	October	November	December
						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.

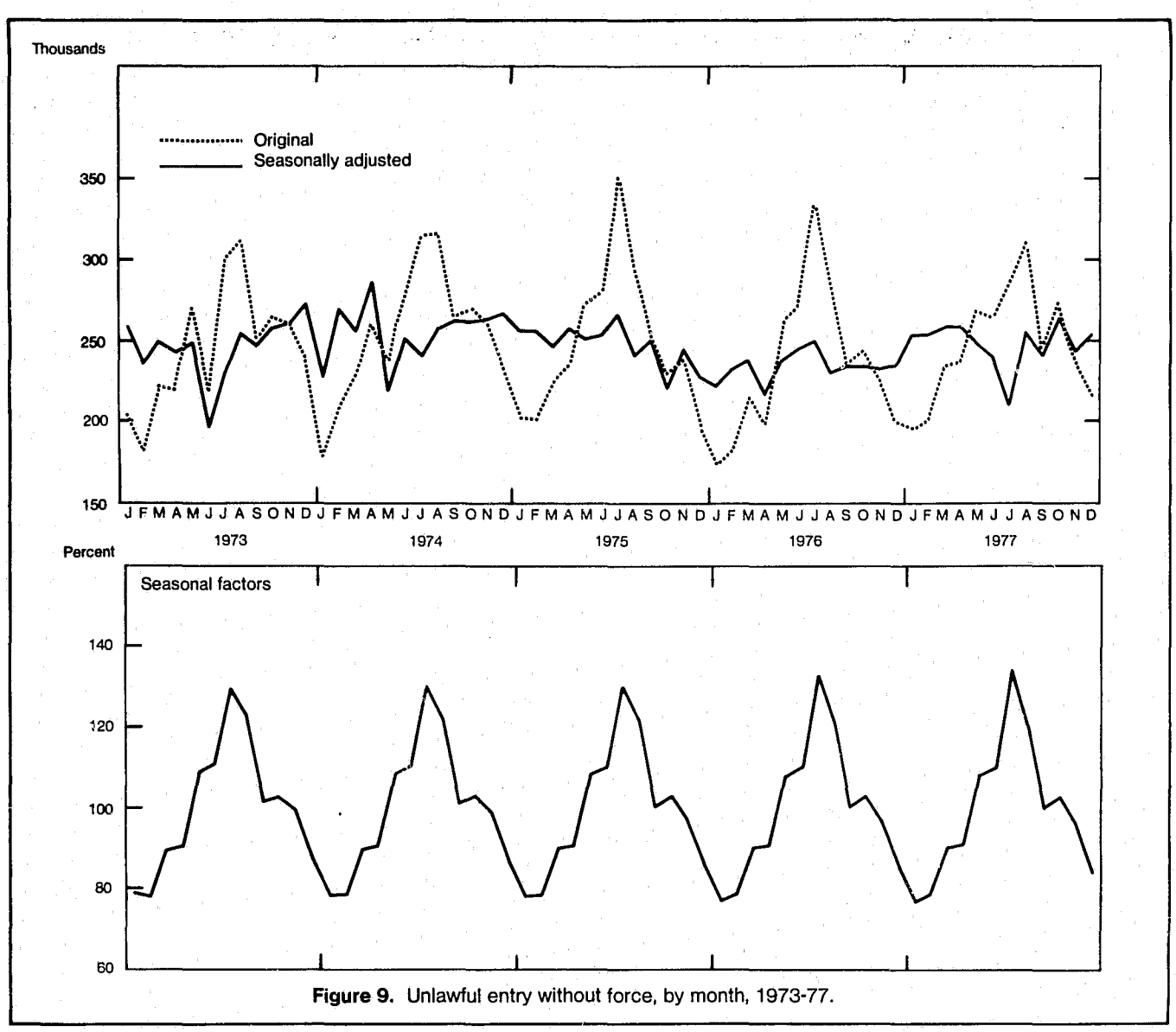


Figure 9. Unlawful entry without force, by month, 1973-77.

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

	Month											
	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.

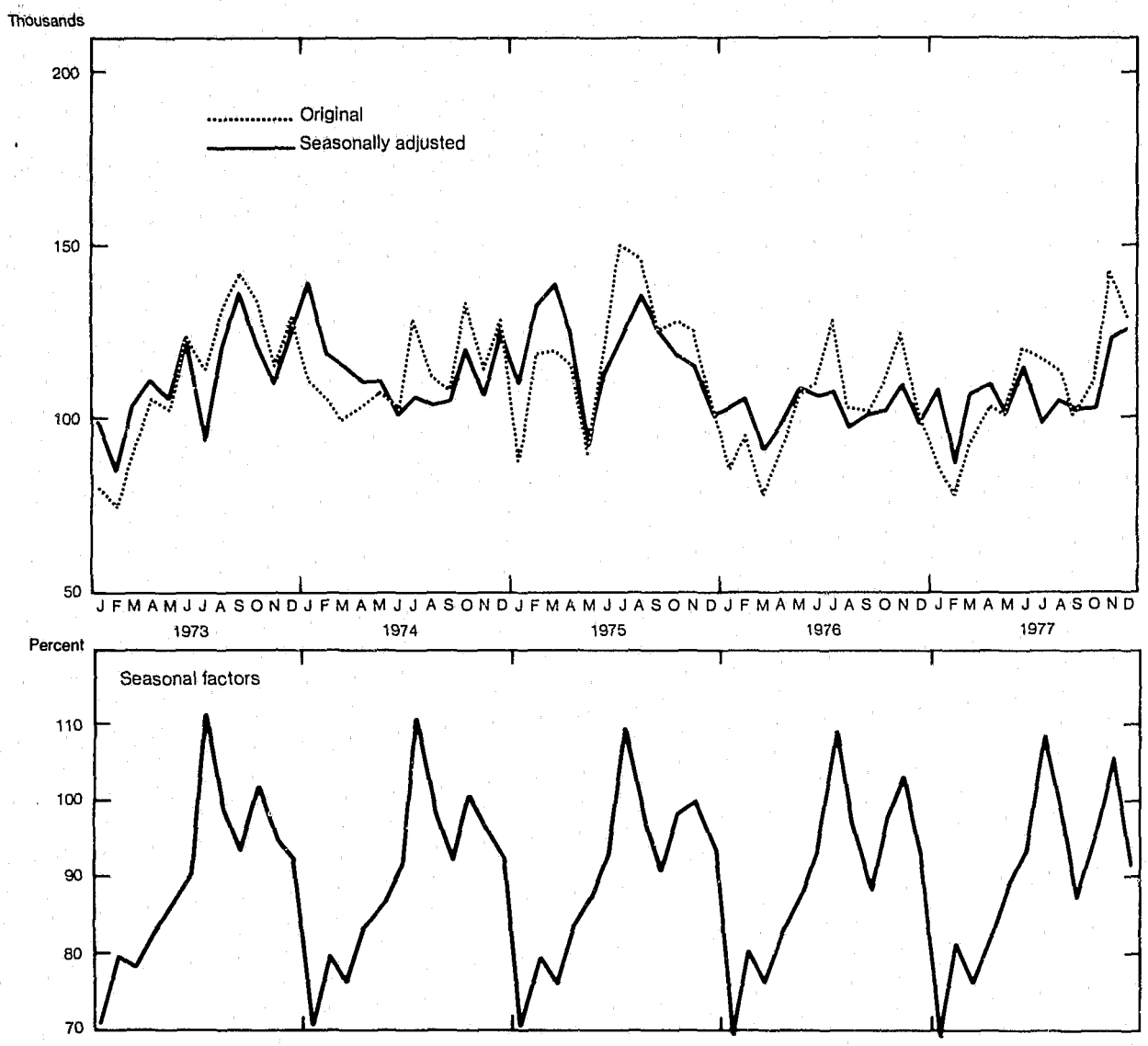


Figure 10. Motor vehicle theft, by month, 1973-77.

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

	Month											
	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.

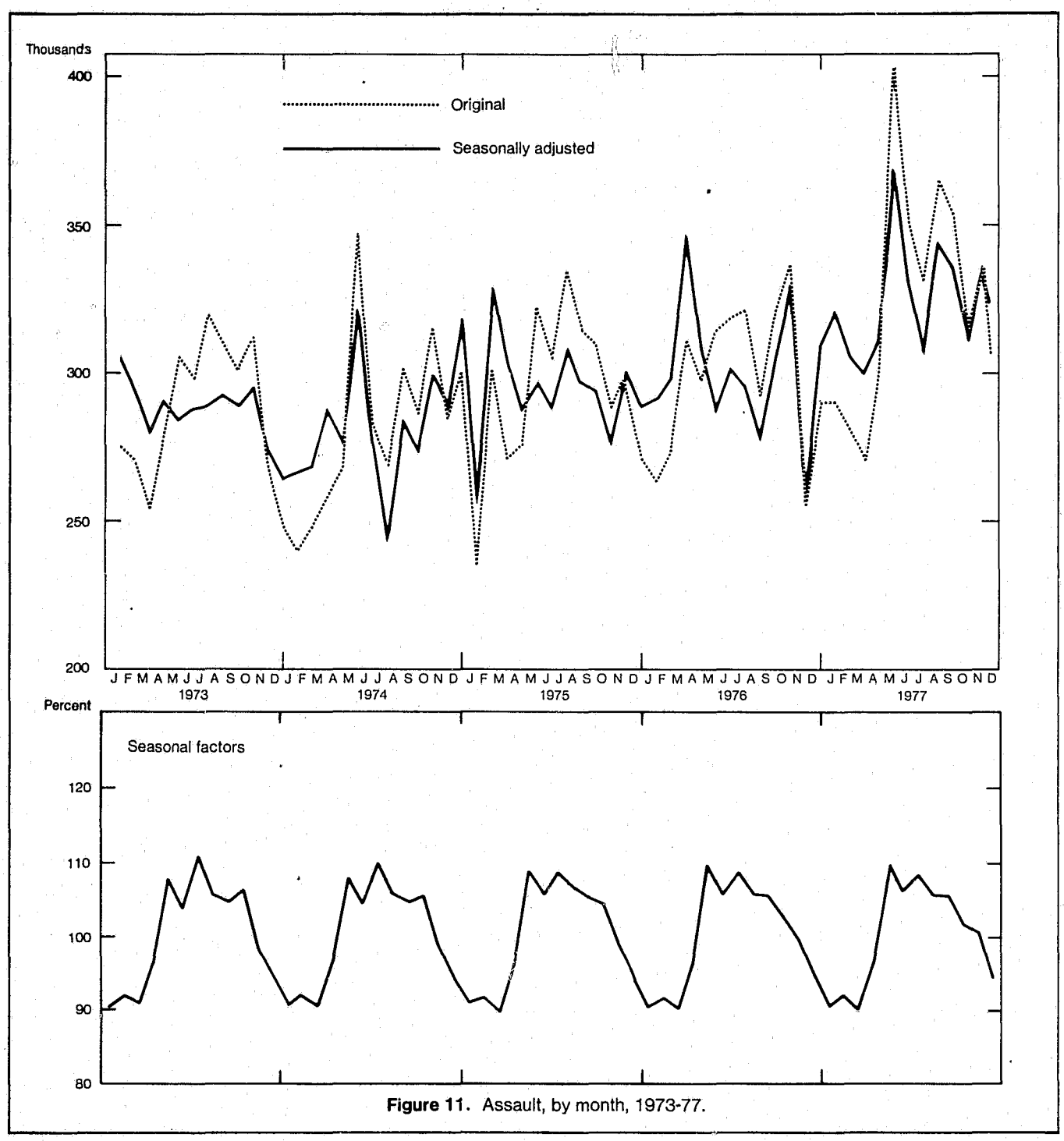


Figure 11. Assault, by month, 1973-77.

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

	Month											
	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.

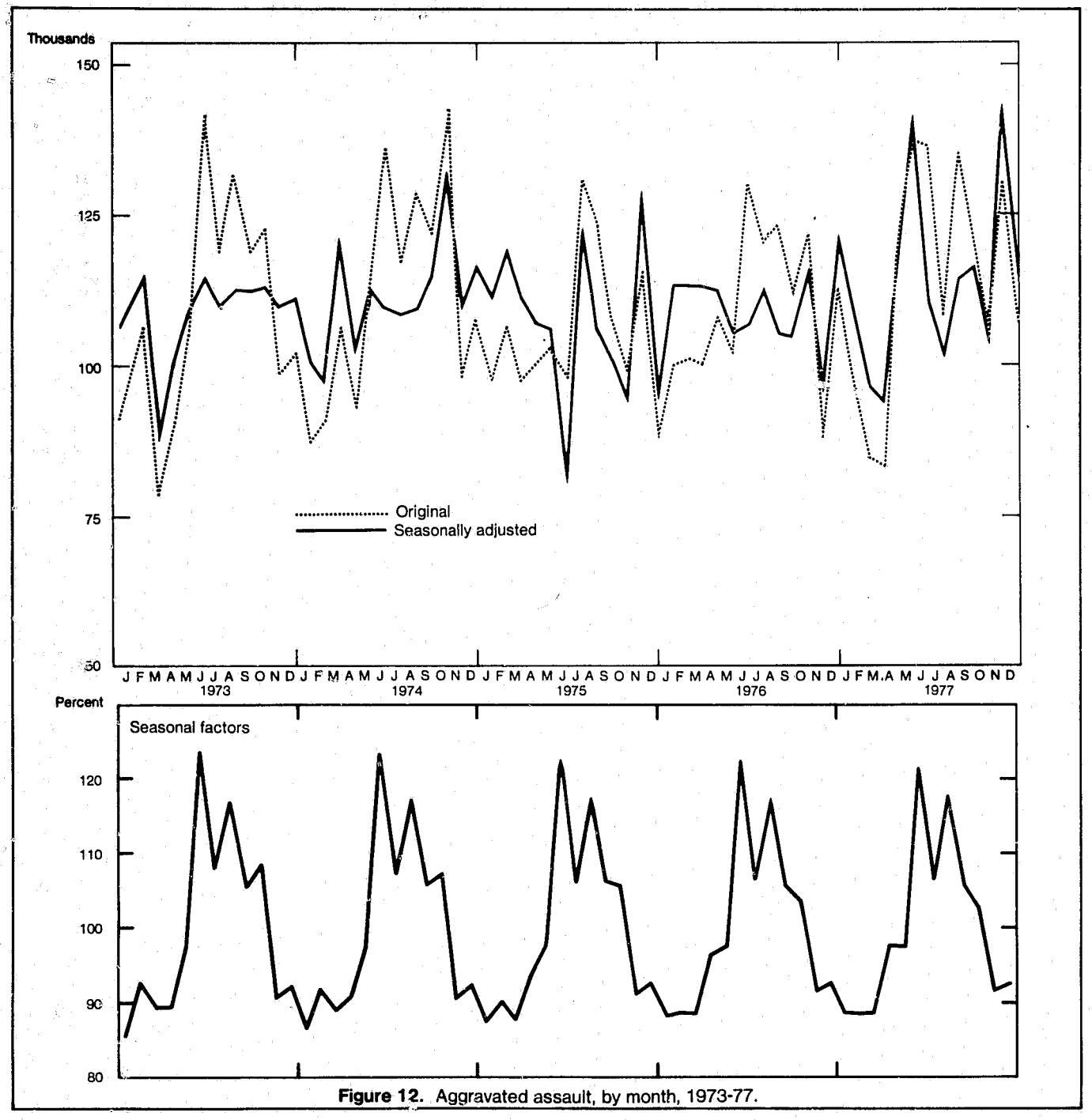


Figure 12. Aggravated assault, by month, 1973-77.

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

	Month											
	January	February	March	April	May	June	July	August	September	October	November	December
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.

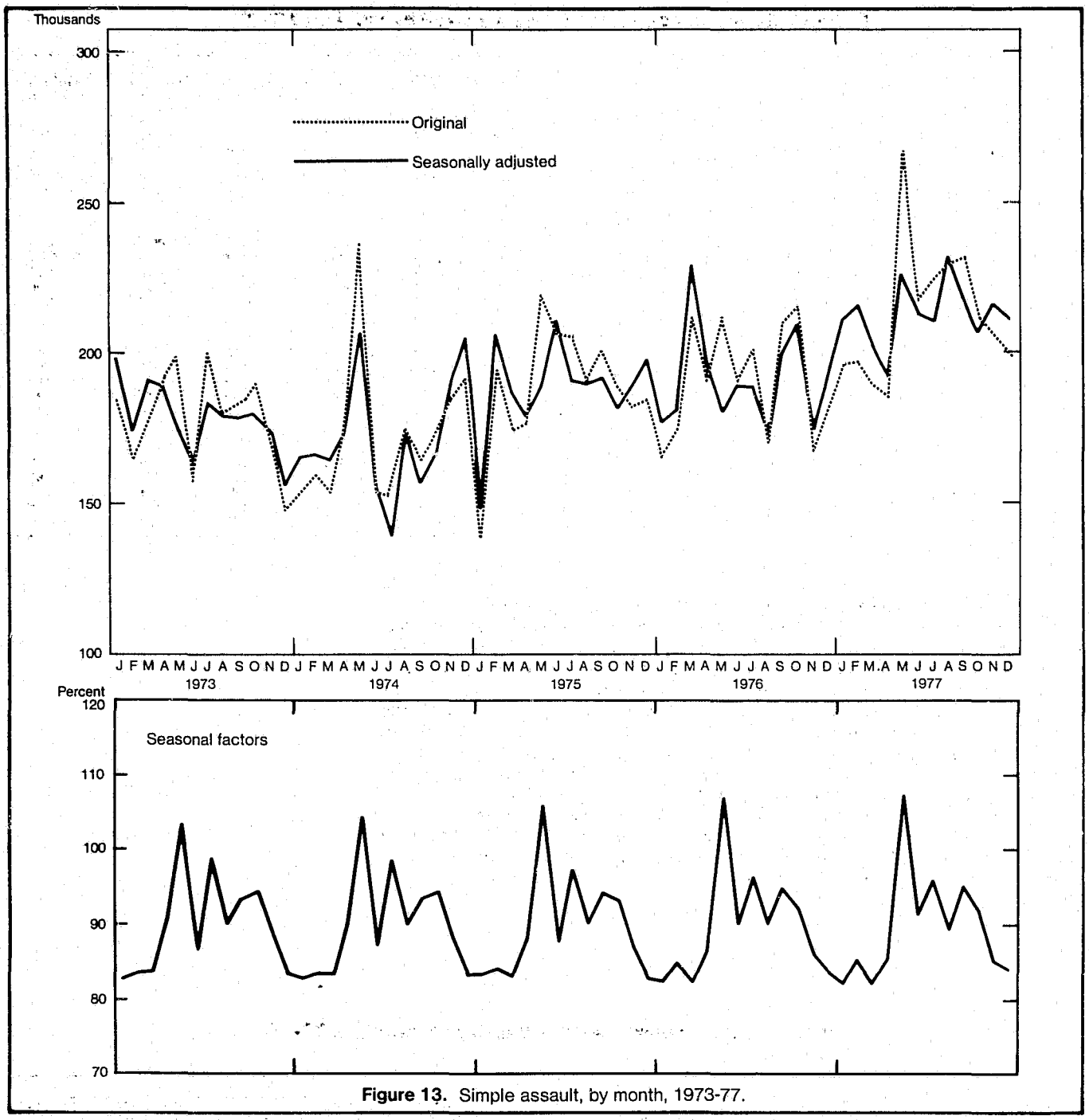


Figure 13. Simple assault, by month, 1973-77.

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

	Month											
	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.

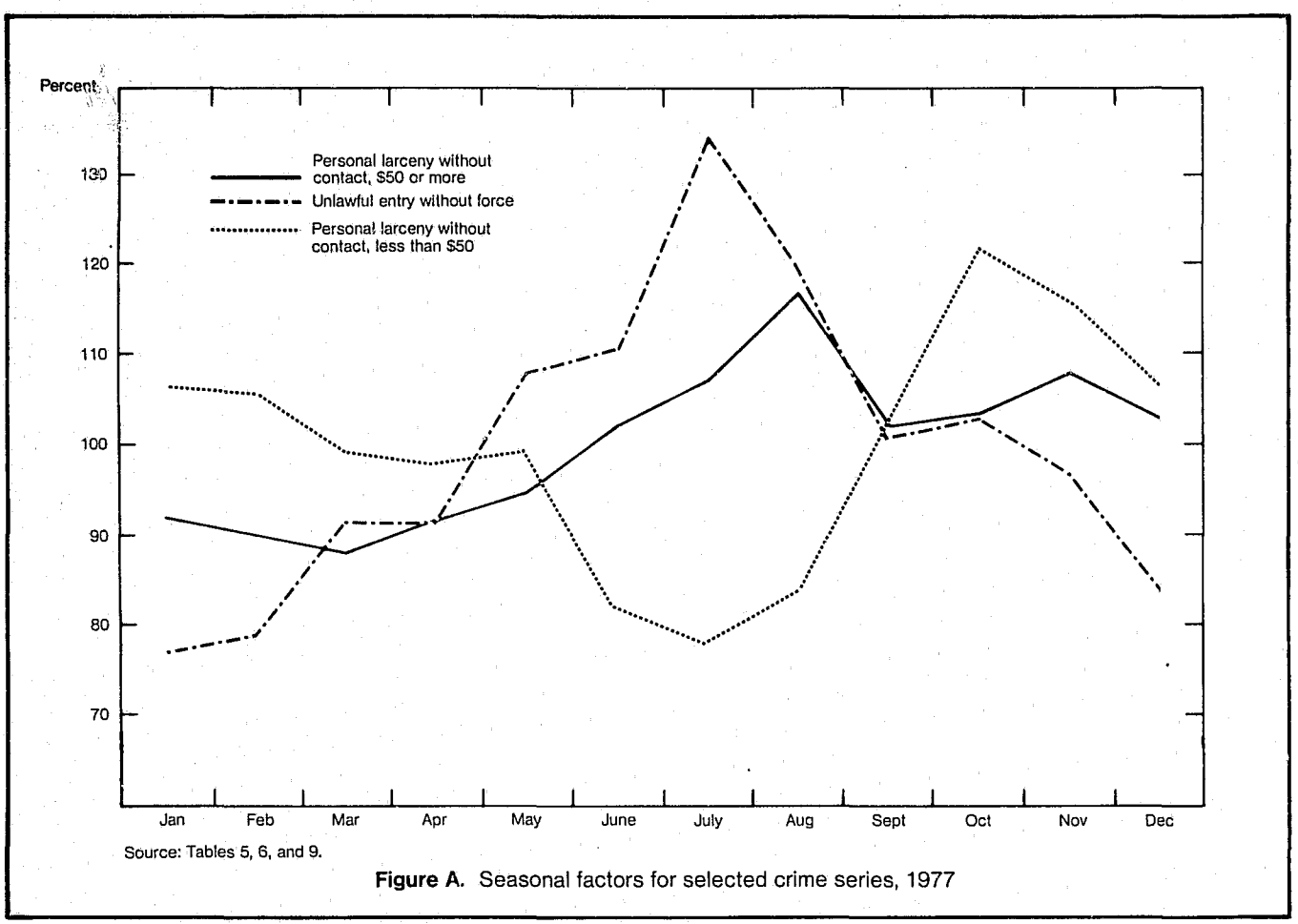
Examination of the seasonal factors indicated different peak months from those described for aggravated assault (Figure 13). The high month was May, with lesser peaks in July and in either September or October. Although January had the lowest values, December, February, and March were also well below 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

	Month											
	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.



Source: Tables 5, 6, and 9.

Figure A. Seasonal factors for selected crime series, 1977

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.

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.

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 opportunities 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.

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.

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[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)

	Month											
	January	February	March	April	May	June	July	August	September	October	November	December
						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	20	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	38	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

Standard errors for original data—continued
(thousands)

	Month											
	January	February	March	April	May	June	July	August	September	October	November	December
Forcible entry burglary												
1973	29	25	26	24	21	21	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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NCJ-64818, SD-NCS-N-15

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