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THE X-11 VARIANT OF THE CENSUS METHOD II SEASONAL ADJUSTMENT PROGRAM

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CONTENTS

		Page
I.	History of Census Seasonal Adjustment Methods	1
II.	Summary of Improvements in X-11	2
III.	Trading-Day Adjustment	3
IV.	Moving Averages	3
V.	Graduated Treatment of Extremes	4
VI.	New Tests and Summary Measures	5
VII.	Comparison of X-11 With Earlier Variants of Method II	6
VIII.	Specifications and Sample Printouts	7
IX.	Selection of Options and Data Format	50
X.	General Information About the Fortran Programs	57
XI.	References	58
Appendixes		
A.	X-11 Test for the Existence of Stable Seasonality	59
B.	Moving-Average Weights	61

I. HISTORY OF CENSUS SEASONAL ADJUSTMENT METHODS

There are various and sundry methods for seasonally adjusting economic time series, all of which are based on the premise that seasonal fluctuations can be measured in an original series (O) and separated from trend, cyclical, trading-day, and irregular fluctuations. The seasonal component (S) is defined as the intrayear pattern of variation which is repeated constantly or in an evolving fashion from year to year. The trend-cycle component (C) includes the long-term trend and the business cycle. The trading-day component (TD) consists of variations which are attributed to the composition of the calendar. The irregular component (I) is composed of residual variations, such as the sudden impact of some political events, the effect of strikes, unseasonable weather conditions, reporting and sampling errors, etc. The seasonally adjusted series (CI) consists of the trend-cycle and irregular components. Experience has indicated that the seasonal, trend-cycle, trading-day, and irregular components are related in a multiplicative fashion (O = S x C x TD x I) for most national economic time series.

The seasonal-adjustment method in the most widespread use today is the ratio-to-moving-average method, which was developed during the 1920's by Frederick R. Macaulay at the National Bureau of Economic Research (NBER). It has the advantages of relatively precise measurement of the components and flexibility concerning the types of series which may be well adjusted by it.

In 1954, the Bureau of the Census introduced the first electronic computer program for seasonally adjusting economic time series, making the application of the ratio-to-moving-average method on a large-scale basis possible for the first time. Variants of the Census Method are now in widespread use throughout the world for adjusting series at the company, industry, and national-aggregate levels.

In 1955, the original Census Bureau program was replaced with a revised procedure called Census Method II. Since that time, the Census Bureau has conducted an extensive research program designed to improve seasonal adjustment methods. This program has moved forward on two fronts. First, there has been a major effort to improve the ratio-to-moving-average method. This effort has been directed primarily to methods of improving the moving averages used to compute seasonal-factor and trend-cycle curves, the moving-average weights used for computing the ends of these curves, the estimation of trading-day variation from monthly data, and the handling of extreme values. In addition, research intended to exploit parametric methods using multiple regression techniques has been undertaken. Regression analysis allows for explicit functional specifications of the seasonal and trend-cycle components which lend themselves to conventional statistical analysis more readily than the estimates provided by the ratio-to-moving-average method. However, such techniques are presently not as desirable as the moving-average methods in practice, since no regression models have yet been demonstrated empirically to provide sufficiently accurate estimates of the trend-cycle and the seasonal, particularly in the current period.

From time to time, experimental variants of Method II which incorporate the results of this research are introduced. They are identified with the letter "X" and a sequence number. The first such variant to be made available to the public (1960) was X-3. It differed from the original Method II in the method of replacing extreme values and the method of computing the seasonal factors for the most recent years. The latest variants to be introduced (1961) were X-9, which was used as the standard program, and X-10, which was used to adjust more erratic series. X-10 contains a variable seasonal-factor curve routine, which selects a seasonal-factor moving average whose length depends on the relative amplitudes of the irregular and seasonal fluctuations in a given month. Thus, it is able to fit more stable seasonal curves to highly irregular series than previous variants of Method II.

In October 1965, the X-11 version of Method II replaced the X-9 and X-10 versions as the standard program at the Bureau of the Census and is now available to other users. It includes several improvements over earlier versions. Several of the new features in X-11 provide additional tools for the time series analyst. While the computations in the standard program are sufficient for most applications, the analyst can select optional features peculiar to his own needs. For example, he may choose between the additive and multiplicative versions and between the full seasonal-adjustment routine and one limited to the calculation of summary measures computed from seasonally adjusted data obtained from other sources; the σ limits for identifying extreme values may be varied, providing for contingencies such as strikes; and he may specify the moving averages to be used in estimating the trend-cycle and seasonal components. Another possibility is to take into account both the absolute and relative relations among the seasonal, trend-cycle, and irregular components of time series by making additive and multiplicative adjustments sequentially. As a result of the availability of these options, X-11 is an instrument, not only for the massive seasonal adjustment of time series, but also for seasonally adjusting unusual series, for research into new techniques of time series analysis, and for studies of the relations among different types of fluctuations. [1]

The major improvements in X-11 are summarized in section II and described in sections III to VI. X-11 is compared with earlier versions of Method II in section VII. Specifications and sample printouts are given in section VIII. A list of available options and operating instructions are provided in sections IX and X. Section XI contains a list of references for further study in the field of seasonal adjustment of economic time series.

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[1] For the advantages of time series analysis with the types of adjustments made by this program, see Electronic Computers and Business Indicators by Julius Shiskin, National Bureau of Economic Research, Occasional Paper 57, New York, 1957.

II. SUMMARY OF IMPROVEMENTS IN X-11

Quarterly Program

In addition to the monthly seasonal adjustment program, a program (X-11Q) is now available to adjust quarterly series. The operations in the quarterly program are analogous to those in the monthly program.

Additive Programs

Both X-11 and X-11Q contain options which enable the user to make additive as well as multiplicative adjustments. As in earlier versions of Method II, an option is available to compute summary measures of the trend-cycle and irregular components from seasonally adjusted input data.

Fortran Coding

The X-11 and X-11Q programs are available in Fortran IV, a simplified programming language which can be used on many different computers. The selection of Fortran makes X-11 readily available for use on many medium- and large-scale electronic computers. Program modifications can easily be made to adapt the computations or selection of output tables to specific uses.

Trading-Day Routine

A technique for estimating trading-day variation from information contained in the monthly data is included in X-11. The monthly irregular values are regressed upon a calendar that contains the number of times each day of the week occurs in each particular month in order to estimate seven daily weights. The user has the choice of basing a trading-day adjustment solely on the internally computed estimates, combining the internal estimates with a priori information that may be available or basing the adjustment solely on a priori information as in earlier versions of Method II. More information concerning the new trading-day routine is given in section III.

Variable Trend-Cycle Moving-Average Routine

A choice of several moving averages is available in X-11 for estimating the trend-cycle component. The appropriate moving average of the seasonally adjusted series is chosen on the basis of a preliminary estimate of the $\bar{I}/\bar{C}$ ratio, which relates the average absolute month-to-month percent change in the irregular to that in the trend-cycle. While the trend-cycle moving average selected for most series will be about the same as that in previous versions of the program, where a weighted 15-term average was applied regardless of the I/C ratio, more appropriate moving averages will be selected for highly irregular and very smooth series. In this manner, the range of series which can be adequately adjusted by Method II is extended. For special purposes, the user can specify the moving average to be applied rather than accept the selection provided by the program. More details are given in section IV.

Graduated Treatment of Extremes

An improved treatment of extreme values is introduced. Rather than designating values in the irregular component that fall more than 2 standard deviations (σ's) from 100 as "extreme" and assigning them a "weight" of zero as was done in earlier variants, a graduated scheme is used. Values outside 2.5 σ are considered definitely extreme and receive zero weight. Weights for values between 1.5 and 2.5 σ are graduated linearly from full weight at 1.5 σ to zero weight at 2.5 σ. Values within 1.5 σ receive full weight. Iteration, based upon a modified original series where irregular values beyond 1.5 σ are modified with the graduated weights, is used to reduce the effect of large irregular values upon the final estimates of the seasonal and trend-cycle components. More details are given in section V.

Additional Tests and Summary Measures

New tests and summary measures have been added as analytical aids. Included are the following:

1. New summary measures.—Estimates of the percent contributions of S, C, I, TD, and P (prior adjustment factors, such as holiday adjustments) to the variation in O are given as additional summary measures. These measures give the user a better appreciation of the importance of each component than did the previous technique of presenting ratios of average absolute month-to-month percent changes ($\bar{I}/\bar{C}$, $\bar{I}/\bar{S}$, $\bar{S}/\bar{O}$, etc.). $\bar{I}/\bar{C}$ is now shown for 1- to 12-month spans instead of the previous 1- to 5-month spans, although MCD (months for cyclical dominance) is still shown as "6" when $\bar{I}/\bar{C} \geq 1.0$ over the 5-month span. Also, other summary measures such as $\bar{I}$, $\bar{CI}$, etc., are computed over spans other than 1 month. In addition to measures of average percent change without regard to sign ($\bar{I}$, $\bar{C}$, etc.), the average percent change with regard to sign and the standard deviations of the percent changes in O, I, C, S, CI and MCD (the MCD-span moving average of CI) over several monthly spans are shown.

2. X-11 test for stable seasonality.—This consists of an analysis-of-variance F-test for stable seasonality. The F-test is applied to the S-I ratios to determine whether seasonality is present in the unadjusted series.

3. Test for the existence of trading-day variation.—An analysis-of-variance F-test may be applied to determine whether trading-day variation is present in the unadjusted series. Since this method also tests the significance of the daily weights which may be computed internally from the data, the F-ratio may be used to decide whether or not to apply the computed daily weights.

4. Standard errors.—Estimates of standard errors of the trading-day weights and monthly adjustment factors are included to aid the user in assessing the significance of trading-day variation in the series.

More details on these tests and summary measures are given in section VI.

III. TRADING-DAY ADJUSTMENT

An option in X-11 provides for a trading-day adjustment based upon the actual variations in the data. Seven daily weights are estimated by regressing the irregular series upon the number of times each day of the week occurs in each particular month. From these seven weights, monthly factors are constructed and divided into the data to remove trading-day variation. A trading-day adjustment based upon the information contained in the data rather than upon a priori information concerning the daily pattern of activity has the following advantages:

1. It is less expensive than attempting to establish independently the pattern of daily activity for each individual series.

2. It often provides a better adjustment because allowance is made for the net effect of several factors related to the calendar, some of which (such as the effect of bookkeeping practices) may not be possible to determine a priori.

In general, when the irregular component of the series has an average absolute month-to-month change ($\bar{I}$) of less than about 8 percent, the estimates provided from the data are adequate for the removal of trading-day variation. When the data are more irregular, the routine will not provide useful estimates. Standard tests of significance are provided to help appraise the reliability of the estimates for a given series and to determine whether trading-day variation (or residual trading-day variation if a prior adjustment has been made) is present in the original series.

In addition to the option of estimating seven daily weights from the data, two other options are available:

1. Rather than basing an adjustment upon estimates made from the data, seven daily weights from which the computer constructs monthly adjustment factors can be supplied by the user. This option is useful when there is reliable a priori information concerning trading-day variation or when the user wants to apply the same weights as those used in another adjustment.

2. Seven daily weights can be supplied by the user; and, if they do not entirely explain the trading-day variation found in the data, they can be corrected on the basis of the internal evidence and the modified weights can be used to make the trading-day adjustment.

In addition to these new techniques which use seven daily weights, an option of supplying a set of monthly adjustment factors which the computer divides into the unadjusted data is available. This option can be used in place of the new techniques to adjust for trading-day variation; or it can be used with or without the new techniques to adjust for holidays, strikes, etc.

In computing monthly trading-day adjustment factors from a set of seven daily weights (a priori or those computed by X-11), an option is available to include a length-of-month adjustment in the monthly adjustment factors.[2] The seasonally adjusted series will be virtually the same whether or not this option is used, since length-of-month variation will be included in the seasonal factors if allowance is not made for it in the trading-day factors.

The theoretical base and mathematical exposition of the Census trading-day adjustment method, together with the results of extensive tests of the method, may be found in a technical paper by Young (20).[3] The exact steps in the X-11 trading-day routine are given in section VIII.

IV. MOVING AVERAGES

Variable Trend-Cycle Curve Routine

In X-11, the moving average used to estimate the trend-cycle component is selected on the basis of the amplitude of irregular variations in the data relative to the amplitude of long-term systematic variations. This routine selects a moving average that provides a suitable compromise between the need to smooth the irregular with a long-term inflexible moving average and the need to accurately reproduce the systematic element with a short-term flexible moving average. For many series, the average chosen in X-11 has about the same smoothing power as those used in earlier versions of Method II. For highly irregular or very smooth series, a more appropriate average is chosen, thereby extending the range of series which can be well adjusted by Method II.

The selection of the appropriate moving average for estimating the trend-cycle component is made on the basis of a preliminary estimate of the $\bar{I}/\bar{C}$ ratio (the ratio of the average absolute month-to-month change in the irregular to that in the trend-cycle). A 13-term Henderson average of the preliminary seasonally adjusted series is used as the preliminary estimate of the trend-cycle, and the ratio of the preliminary seasonally adjusted series to the 13-term average is used as the preliminary estimate of the irregular. The appropriate average selected for a given value of $\bar{I}/\bar{C}$ is given in the following table:

[2] "Length-of-month variation" is defined as variation attributable to the number of days in a particular month, while "trading-day variation" is defined as variation attributable to the number of Mondays, Tuesdays, etc., in a particular month.

[3] See references in section XI.

$\bar{I}/\bar{C}$	Length of moving average selected
0.00-0.99	9-term Henderson
1.00-3.49	13-term Henderson
3.50 and over	23-term Henderson

The three new weighted moving averages in the variable trend-cycle routine replace the weighted 15-term Spencer average used in earlier versions of Method II. They were developed by Robert Henderson and are described in Macaulay (7). The new averages meet the same criterion of smoothness as the 15-term Spencer average; i.e., they minimize the sum of squares of the third differences of the curve. The distinctive feature in X-11 is the introduction of a 9-term moving average for smooth series and a 23-term moving average for highly irregular series. (A 5-term Henderson average is used for all quarterly series.)

Seasonal-Factor Curve Routine

The S-I ratios for each month are smoothed by a 3x5-term moving average (a 3-term average of a 5-term average) to estimate final seasonal factors. In the X-9 version, S-I ratios were smoothed with a 3x3- or a 3x5-term average depending on the value of $\bar{I}$. The weights for extending the 3x5 average at the ends of series in X-11 are the same as those used in X-9. The X-11 technique of using the same moving average regardless of the value of $\bar{I}$ reduces revisions in seasonal factors when additional data are added to series.

Optionally, the user may specify any of the following seasonal factor curves to compute final seasonal factors for any particular month: 3-, 3x3-, 3x5-, 3x9-, n-term, where "n" is the number of years of data in a particular month (i.e., a stable seasonal).

Plans for Future Research

The X-11 moving averages were selected on the basis of experience with earlier versions of Method II. For the great majority of economic time series, the trend-cycle and seasonal-factor moving averages accurately separate the systematic signals from the short-term irregular noise. The following is a list of suggested areas of research designed to further improve these averages.

1. The end weights for the seasonal-factor and the trend-cycle moving-average curves are similar to those used in earlier versions of Method II. These weights assume that the future seasonal or trend-cycle values will be at approximately the same level as the most recent values. While these weights give satisfactory results for most economic series, further research may yield end weights which are more suitable for series which have rapidly changing seasonal or cyclical patterns.

2. The use of the centered 12-term moving average as a preliminary estimate of the trend-cycle curve is continued in X-11. Some investigators, including Bongard (2, 3,) and Hannan (5), have experimented with moving averages which separate the trend-cycle from the seasonal but do not possess some of the limitations of the centered 12-term moving average, such as its inability to reach into peaks and troughs. Such moving averages may eliminate the need for the iterative methods which have been used thus far. When further experimentation with these new averages bears fruit, changes may be introduced.

3. The assumption of smooth, continuous change in the seasonal-factor curves is not appropriate for all series. For example, the individual withholding tax filing date was changed from March 15 to April 15 in 1955. Similarly, abrupt changes in plant-wide vacation schedules have sharply changed the seasonal patterns of production for some industries. Currently, there are no well-developed techniques for detecting such discontinuities. There seems to be no substitute, in such instances, for a thorough inspection of the empirical data and a study of the causal factors of seasonality. With such knowledge, it is sometimes possible to devise a satisfactory ad hoc technique, such as breaking the series at the discontinuity and processing the two segments separately.

V. GRADUATED TREATMENT OF EXTREMES

Many economic series contain extreme values which must be modified or removed before adequate estimates of the seasonal, trading-day, and trend-cycle components can be made. These extremes may reflect economic developments, such as strikes; reactions to unexpected political events; unseasonable weather; errors of measurement; etc. In many instances, allowance for extremes can be made by the user before the data are submitted for seasonal adjustment. However, it is generally more feasible to rely upon the computerized statistical tests provided in Method II to detect and remove extremes.

Previous versions of Method II computed preliminary estimates of S and the standard deviation of I and designated as extreme those S-I ratios which fell 2 or more σ's beyond the estimates of S. The σ's were computed separately for each month. Values designated as extreme were replaced in the original version of Method II with an average of the extreme value and the ratios for that month in the preceding and following years. In X-3, X-9, and X-10, the extremes were replaced with an average of the two nearest nonextreme S-I ratios on either side of the extreme for that month.

The previous techniques are replaced in X-11 with a new scheme that tests each value of a preliminary irregular component against a standard deviation computed over a moving 5-year period (60 months or 20 quarters). For example, the irregulars in 1952 are tested for extremeness

by comparing them with a σ computed from 1950 to 1954. A preliminary σ is computed, values beyond 2.5 σ are removed, and σ is recomputed. Values outside 2.5 σ are considered extreme and are assigned a zero (0.0) weight. Values inside 1.5 σ receive full weight (1.0). Values between 2.5 and 1.5 σ receive partial weight, graduated linearly from zero at 2.5 σ to full weight at 1.5 σ.

The choice of 1.5 and 2.5 as σ limits is optional. For some purposes other limits may be desirable. Lower limits are sometimes better for highly irregular series or series substantially affected by strikes, where a greater portion of the series may be regarded as extreme. Likewise, higher limits are sometimes better for very smooth series.

Iteration is used in the following ways to improve the designation of extremes:

1. The computation of σ is iterated by computing a preliminary σ, removing extremes beyond 2.5 σ and recomputing σ.

2. The process of developing a preliminary irregular component in which extremes are identified involves iteration by (a) modifying values in the original series corresponding to months where less than full weight was assigned to an irregular, (b) reestimating the trend-cycle and seasonal components and deriving a new preliminary irregular component, and (c) reidentifying extremes and modifying the original series again. After modifying the original series for the second time, final estimates of the trend-cycle and seasonal are developed.

This new technique of identifying extremes results in the following improvements:

1. It modifies the original series rather than the S-I ratios, thereby taking account of the effect of extremes upon the trend-cycle.

2. Assigning a graduated weight pattern to near-extreme values removes the all-or-nothing decision in earlier versions of Method II, where a value might receive full weight in one adjustment and zero weight in a subsequent adjustment containing additional data. This phenomenon had, at times, contributed to substantial revisions in the seasonal factors.

3. Computing the σ limits over all 12 months makes it possible to identify more extremes in a single month.

4. Computing the σ limits over moving 5-year periods substantially abates the effect of additional data upon revisions in the seasonal factors for the early years of the series.

In estimating trading-day variation, a less complex technique is used to identify extremes than that described above. A "trading-day standard deviation" is computed, extremes beyond 2.5 σ are removed, and σ is recomputed. For the entire period included in the trading-day regression, irregular values beyond 2.5 σ limits are excluded from the regression.

The X-11 technique is a refinement of that introduced in 1964 by the Bureau of Labor Statistics (BLS) (19). It combines the iterative procedure with the variable trend-cycle moving average and trading-day routines. Also, the Census Bureau procedure of developing a modified original series allows for the contigency that several consecutive values may be regarded as extreme, as in the case of a prolonged strike. The limits of 1.5 and 2.5 σ are optional in X-11, whereas the BLS procedure uses fixed limits of 1.0 and 2.8 σ.

VI. NEW TESTS AND SUMMARY MEASURES

X-11 Test for the Existence of Stable Seasonality

A test for the existence of stable seasonality (available optionally in X-9 and X-10) is performed on the final unmodified S-I ratios in X-11. It consists of computing the ratio of the "between months" variance to the residual variance. If this F-ratio is above a given tabled value, a message is printed that stable seasonality is present. The theoretical basis of the test is explained in appendix A.

Some caveats in interpreting the results of the X-11 test are given below:

1. The test may not be completely reliable when the variance of the irregular is very large or very small relative to the variance of the seasonal. In such cases, the user may find it necessary to examine $\bar{I}$ and $\bar{S}$ before making a decision.

2. When the variance of the seasonal is sufficiently small in absolute value or small relative to the variance in the other systematic components (trend-cycle and trading-day), there may be a case for not making a seasonal adjustment even though the tests show that the seasonal is significant relative to the irregular.

3. The existence of moving seasonality may reduce the "between months" variance in the stable seasonality test so that the test may find no evidence of stable seasonality when in fact a pronounced seasonal pattern is present.

4. Special problems arise when a series contains discontinuities in the seasonal pattern or when parts of a series contain no seasonal pattern. These conditions may be ascertained by an inspection of the seasonal factors and their charts. When a series contains an abrupt change in the seasonal pattern, it is best to break the series at the change and test and adjust the two parts of the series separately. When the amount of seasonal

variation in a series has been declining over time, it would be well to analyze only the most recent years and to base decisions concerning adjustment of current data on this analysis.

Tests for the Existence of Trading-Day Variation

As part of the trading-day routine in X-11, tests for the existence of trading-day variation are provided as follows:

An F-test is performed to test for the significance of the trading-day regression. If prior daily weights (or monthly factors) are applied to the original series, this test determines the adequacy of the prior adjustment. If not, this test determines the existence of trading-day variation in the unadjusted data. In addition, t-tests are provided to determine whether each of seven computed daily weights is significantly different from the corresponding prior weight and/or 1.0 (no trading-day variation is represented by all seven weights equal to 1.0). As an option, the user may make the decision as to whether to apply the estimated weights according to the value of the F-ratio.

Also, standard errors of the daily weights and monthly adjustment factors are supplied to aid the user in assessing the significance of trading-day variation.

New Summary Measures

As a set of new summary measures, estimates of the percent contributions of S, C, I, TD and P to the variation in O are given. For example, the percent contribution of S would be

$$\frac{\bar{S}^2}{\bar{S}^2+\bar{C}^2+\bar{I}^2+\overline{TD}^2+\bar{P}^2},$$

where $\bar{S}$, $\bar{C}$, $\bar{I}$, $\overline{TD}$ and $\bar{P}$ are as defined in sections I and II. The theoretical basis for these percent measures comes from the approximation

$$\bar{O}^2 \doteq \bar{S}^2+\bar{C}^2+\bar{I}^2+\overline{TD}^2+\bar{P}^2,$$

which was derived by Joseph Bongard of the Organization for Economic Cooperation and Development(4.) In practice, $\bar{O}^2$ may be slightly less than the sum of the right-hand side of the preceding equation. To give a measure of the closeness of this approximation, the ratio

$$\frac{\bar{O}^2}{\bar{S}^2+\bar{C}^2+\bar{I}^2+\overline{TD}^2+\bar{P}^2}$$

is presented with the percent contributions.

The measures of average percent change without regard to sign ($\bar{I}$, $\bar{C}$, etc.), which are computed over 1-month spans in earlier versions of Method II, are now computed over longer spans. $\bar{O}$, $\overline{CI}$, $\bar{I}$, $\bar{C}$, $\bar{S}$, $\bar{P}$ and $\overline{TD}$ are computed and printed out over 1- to 6- and 7-, 9-, 11-, 12-month spans. Also, measures of the average percent changes with regard to sign and the standard deviations of the percent changes for O, I, C, S, CI and MCD over the same spans are given to facilitate applications of statistical tests to the components. The $\bar{I}/\bar{C}$ ratio is now printed out for 1- to 12-month spans, although months for cyclical dominance (MCD) is still designated as "6" when $\bar{I}/\bar{C} \geq 1.0$ over the 5-month span as in earlier versions of Method II.

VII. COMPARISON OF X-11 WITH EARLIER VARIANTS OF METHOD II

The sample printouts in section VIII illustrate many of the improvements introduced in X-11. The trading-day routine and the new tests and summary measures are shown in the first sample printout (U.S. Retail Sales). The quarterly and additive variants are illustrated in the second sample printout (Short-Term Bank Balances, U.S. Capital).

It is to be noted that only a few of the innovations in X-11 apply to the seasonal adjustment process itself. Most concern prior adjustments of the data and add further measures for analyzing and interpreting the seasonally adjusted series. Experience in developing X-11 (and earlier variants of Census Method II) has demonstrated that we find it difficult to make improvements in our method of seasonal adjustment. We feel that while X-11 has much to contribute to time series analysis in the broad sense, it represents only a small step forward so far as seasonal adjustment is concerned.

Highly irregular series may be more adequately adjusted by X-11 because of the graduated treatment of extremes and the choice of several moving averages to estimate the trend-cycle. Revisions between preliminary and final seasonal-factor estimates for early years of a series have been virtually eliminated in X-11. Limited evidence indicates that current year revisions in X-11 are about the same as those in X-9 and X-10. When widespread experience with this variant is acquired by our staff and other users, a systematic evaluation of these changes will be made.

VIII. SPECIFICATIONS AND SAMPLE PRINTOUTS

This section includes specifications for the X-11 program and two sample printouts: The full multiplicative printout for monthly series and the standard printout for quarterly series. Tables that appear in the printouts are noted in the specifications section. A single asterisk (*) indicates that the table appears in the standard printouts (monthly or quarterly) while a double asterisk (**) indicates that the tables appear in the long printouts (monthly or quarterly). See section IX for the various options and tables available.

As an aid in following the specifications, each step is shown symbolically as well as described in text form. The symbolic notation is not elegantly precise in an algebraic or statistical sense. The symbols used in the notation are as follows:

Description	Multiplicative	Additive
Original series (O) composed of trend-cycle (C), seasonal (S), trading-day (D), and irregular (I″) variations.	$O = C\ S\ I''\ D$; $D = D_p\ D_r$; D_p = Prior trading-day adjustment factors; D_r = Any residual trading-day variation left after applying D_p (or all trading-day variation if no prior trading-day factors are used);	$O = C+S+I''+D$; $D = D_r$; D_r = All trading-day variation;
Irregular variations (I″) include holiday variation, major strikes, etc., which may be removed by prior adjustment factors (P), plus extremes (E) and residual or "true" irregular (I). Extremes are defined as irregular values falling outside 2.5 standard deviations (σ's). For the purpose of fitting curves in parts C and D, the unmodified irregular (I) values are assigned linearly graduated weights varying between 0.0 and 1.0 for values between 2.5σ and 1.5σ. Values within 1.5σ receive full weight.	$I'' = P\ E\ I$; $I' = E\ I$, where $E = \lvert I'-1.0\rvert > 2.5\sigma_{I'}$; $I^w = 1.0 + w\ (I'-1.0)$; where $w = 0.0$ when $\lvert I'-1.0\rvert > 2.5\sigma_{I'}$ $= 1.0$ when $\lvert I'-1.0\rvert < 1.5\sigma_{I'}$ $= 2.5 - \lvert I'-1.0\rvert/\sigma_{I'}$ when $1.5\sigma_{I'} \le \lvert I'-1.0\rvert \le 2.5\sigma_{I'}$.	$I'' = P+E+I$; $I' = E+I$, where $E = \lvert I'\rvert > 2.5\sigma_{I'}$; $I^w = I'\ w$, where $w = 0.0$ when $\lvert I'\rvert > 2.5\sigma_{I'}$ $= 1.0$ when $\lvert I'\rvert < 1.5\sigma_{I'}$ $= 2.5 - \lvert I'\rvert/\sigma_{I'}$ when $1.5\sigma_{I'} \le \lvert I'\rvert \le 2.5\sigma_{I'}$.
The selection of 1.5 and 2.5 as σ limits is optional. For special purposes other limits may be advisable. See section IX for their selection.	In general, if U = upper σ limit and L = lower σ limit, $w = \frac{U}{U-L} - \frac{1.0}{U-L}\left[\lvert I'-1.0\rvert/\sigma_{I'}\right]$ when $L\sigma_{I'} \le \lvert I'-1.0\rvert \le U\sigma_{I'}$. M_i /Y/ represents a moving average of length i computed from series Y. NOTE: The irregular (I) is presented here as having a mean of 1.000 although it is shown in the computer printout as a percentage with a mean of 100.0. Seasonal, trading-day, and prior factors are also shown as percentages.	In general, if U = upper σ limit and L = lower σ limit, $w = \frac{U}{U-L} - \frac{1.0}{U-L}\left[\lvert I'\rvert/\sigma_{I'}\right]$ when $L\sigma_{I'} \le \lvert I'\rvert \le U\sigma_{I'}$. M_i /Y/ represents a moving average of length i computed from series Y.

Specifications--Monthly X-11

PART A. OPTIONAL

Before any seasonal adjustment is performed on the monthly data, various prior adjustments can be made using factors supplied by the user. If no prior adjustments are made, the computations start with those described in part B.

Table number and title	Multiplicative and additive	Symbolic notation	
		Multiplicative	Additive
	NOTE: Additive descriptions are (underlined).		
*A1. Original series	Original monthly time series.	$O = C\ S\ I''\ D.\ P.$	$O = C+S+I''+D_r.\ P.$
*A2. Prior monthly adjustment factors	To adjust for the effect of certain holidays, change the level of the series, etc., the user may supply monthly adjustment factors.		
*A3. Original series adjusted by prior monthly adjustment factors	Divide the A2 factors into (subtract the A2 factors from) the original data (A1).	$O/P = C\ S\ I'D.$	$O-P = C+S+I'+D_r.$
*A4. Prior trading-day adjustment factors	To adjust for trading-day variation, the user may supply seven daily weights from which the computer constructs monthly adjustment factors that are divided into (A1) or (A3). The computer adjusts the seven daily weights to total 7.000. For the multiplicative case, the monthly calendar factors are computed by the formula: $M_i = \frac{X_{1i}(Dp_1) + X_{2i}(Dp_2) + \ldots + X_{7i}(Dp_7)}{N_i}$, where M_i is the monthly factor for month i; X_{ji} is the number of times that day-of-the-week j occurs in month i; Dp_j is the prior daily weight for day-of-the-week j; N_i is 31, 30, or 28.25 depending upon whether month i is a 31- or 30-day month or February. If length-of-month variation is to be included in the trading-day factors, N_i is 30.4375 for all months. See section III for more details and section IX for the selection of this option. This option is not available for the additive case. The result is printed in table B1. A similar trading-day adjustment can be based upon factors estimated from the data in parts B and C, below.	$D_p.$	NA
		$\frac{C\ S\ I'D}{D_p} = C\ S\ I\ D_r.$	NA

PART B. PRELIMINARY ESTIMATION OF TRADING-DAY VARIATION AND WEIGHTS

Preliminary trading-day adjustment factors and weights for reducing the effect of extreme or near-extreme irregular values are developed from the data. These estimates are refined in part C, where final estimates are developed.

Table number and title	Multiplicative and additive	Symbolic notation	
		Multiplicative	Additive
*B1. Prior adjusted original series or original series	Either the original series or the original series adjusted by the prior factors shown in A2 and/or A4 is shown.	$C\ S\ I'D_r.$	$C+S+I'+D_r.$
**B2. Trend-cycle	Compute a centered 12-term moving average (a 2-term average of a 12-term average) of (B1) as an estimate of the trend-cycle.	$M_C[C\ S\ I'D_r] = C_1.$	$M_C[C+S+I'+D_r] = C_1.$
B3. Unmodified S-I ratios (differences)	Divide (B2) into (B1) (subtract (B2) from (B1)) to obtain seasonal-irregular (S-I) ratios (differences).	$C\ S\ I'D_r/C_1 = S\ I'D_r.$	$(C+S+I'+D_r)-C_1 = S+I'+D_r.$

Table number and title	Multiplicative and additive	Symbolic notation	
		Multiplicative	Additive
B4. Replacement values for extreme S-I ratios (differences)	To the B3 S-I ratios (differences), apply a weighted 5-term moving average separately to each month to estimate preliminary seasonal factors. See appendix B for the weights for the 5-term (3x3) average.	$M_S[S\ I'D_r] = S.$	$M_S[S+I'+D_r] = S.$
	Compute a centered 12-term moving average of the preliminary factors for the entire series. To obtain the six missing values at either end of this average, repeat the first (last) available moving average value six times. Adjust the factors to sum to 12.000 (0.000) (approximately) over any 12-month period by dividing (subtracting) the centered 12-term average into (from) the factors.		
	Divide the seasonal factor estimates into the S-I ratios (subtract the seasonal factor estimates from the S-I differences) to obtain an estimate of the irregular component.	$S\ I'D_r/S = I'D_r.$	$(S+I'+D_r)-S = I'+D_r.$
	Compute a moving 5-year standard deviation (σ) of the estimates of the irregular component and test the irregulars in the central year of the 5-year period against 2.5σ. Remove values beyond 2.5σ as extreme and recompute the moving 5-year σ.		
	Assign a zero weight to irregulars beyond 2.5σ and a weight of 1.0 (full weight) to irregulars within 1.5σ. Assign a linearly graduated weight between 0.0 and 1.0 to irregulars between 2.5σ and 1.5σ.		
	For values receiving less than full weight, the corresponding S-I ratios (differences) are replaced with an average of the ratio (difference) times its weight and the two nearest preceding and two nearest following full-weight ratios (differences) for that month.	$I' = I^W$ for $\lvert I'-1.0\rvert > 1.5\sigma_{I'}.$	$I' = I^W$ for $\lvert I'\rvert > 1.5\sigma_{I'}.$
	For the first two years, the σ limits computed for the third year are used; and for the last two years, the σ limits computed for the third-from-end year are used. To replace an extreme ratio (difference) in either of the two beginning or ending years, the average of the ratio (difference) times its weight and the three nearest full-weight ratios (differences) for that month is taken.		
	The moving 5-year σ's and the replacement values for the extreme S-I ratios (differences) are shown in table B4.	$S\ I^W\ D_r.$	$S+I^W+D_r.$
B5. Seasonal factors	To the B3 S-I ratios (differences) with extreme values replaced by the corresponding B4 values, apply a weighted 5-term average to each month separately to estimate preliminary seasonal factors.	$M_S[S\ I^W\ D_r] = S_1.$	$M_S[S+I^W+D_r] = S_1.$
	Adjust the factors to sum to 12.000 using a centered 12-term moving average (see second paragraph in B4).		
	To obtain factors for the six missing values at either end of the series due to the use of the centered 12-term trend-cycle moving average in step B2, repeat the nearest available factor for that particular month.		

Table number and title	Multiplicative and additive	Symbolic notation	
		Multiplicative	Additive
B6. Seasonally adjusted series	Divide (B5) into (B1) (Subtract (B5) from (B1)) to obtain a preliminary seasonally adjusted series.	$C\ S\ I'D_r/S_1 = C\ I'D_r$.	$(C+S+I'+D_r)-S_1 = C+I'+D_r$.
B7. Trend-cycle	Apply the variable trend-cycle curve routine (modified so that the weighted 13-term average is selected for $\bar{I}/\bar{C} > 0.99$) to (B6). See note at the end of these specifications for details of the variable trend-cycle curve routine.	$M_C[C\ I'D_r] = C_2$.	$M_C[C+I'+D_r] = C_2$.
	Adjustment of Trend-Cycle for Strikes (optional).--The effects of extreme values on the B7 trend-cycle component are reduced by the optional computations in the remainder of step B7, below. These computations can be of use when adjusting series affected by major prolonged strikes or similar irregular occurrences. See section IX for the selection of this option.		
	Divide (subtract) the trend-cycle estimates provided by the variable trend-cycle curve routine into (from) the seasonally adjusted series to obtain an estimate of the irregular.	$C\ I'D_r/C = I'D_r$.	$(C+I'+D_r)-C = I'+D_r$.
	Compute a moving 5-year standard deviation of the monthly estimates of the irregular component and test the irregulars in the central year of the 5-year period against 2.5σ limits. Remove values beyond 2.5σ and recompute σ.		
	Assign a zero weight to irregulars beyond $2.5\ \sigma$ and a weight of 1.0 (full weight) to irregulars within $1.5\ \sigma$. Assign a linearly graduated weight between 0.0 and 1.0 to irregulars between $2.5\ \sigma$ and $1.5\ \sigma$.		
	For values receiving less than full weight, the corresponding seasonally adjusted values are replaced with an average of the value times its weight and the two nearest full-weight preceding and two nearest full-weight following seasonally adjusted values.	$I' = I^W$ for $\lvert I'-1.0\rvert > 1.5\sigma_{I'}$.	$I' = I^W$ for $\lvert I'\rvert > 1.5\sigma_{I'}$.
	For the first two years, the σ limits computed for the third year are used; and for the last two years, the σ limits computed for the third-from-end year are used. To replace an extreme value in either of the two beginning or ending months, the average of the value times its weight and three nearest full-weight values is taken.	$C\ I^W\ D_r$.	$C+I^W+D_r$.
	To the seasonally adjusted values modified for extremes, apply the variable trend-cycle curve routine to estimate a preliminary trend-cycle which is shown in B7.	$M_C[C\ I^W\ D_r] = C_2$.	$M_C[C+I^W+D_r] = C_2$.
B8. Unmodified S-I ratios (differences)	Same as B3 except that B7 trend-cycle values are used.	$C\ S\ I'D_r/C_2 = S\ I'D_r$.	$(C+S+I'+D_r)-C_2 = S+I'+D_r$.
B9. Replacement values for extreme S-I ratios (differences)	Same as B4 except that B8 S-I ratios (differences) are used and that a weighted 7-term average is applied to estimate seasonal factors. See appendix B for the weights for the 7-term (3x5) average.	$M_S[S\ I'D_r] = S$. $S\ I'D_r/S = I'D_r$. $I' = I^W$ for $\lvert I'-1.0\rvert > 1.5\sigma_{I'}$. $S\ I^W\ D_r$.	$M_S[S+I'+D_r] = S$. $(S+I'+D_r)-S = I'+D_r$. $I' = I^W$ for $\lvert I'\rvert > 1.5\sigma_{I'}$. $S+I^W+D_r$.

Table number and title	Multiplicative and additive	Symbolic notation	
		Multiplicative	Additive
**B10. Seasonal factors	To the B8 S-I ratios (differences) with extreme values replaced by the corresponding B9 values, apply the weighted 7-term average to each month separately to estimate preliminary seasonal factors. Adjust the factors to sum to 12.000 using a centered 12-term moving average. (See second paragraph in B4.)	$M_S[S\ I^W D_r] = S_2$.	$M_S[S+I^W+D_r] = S_2$.
B11. Seasonally adjusted series	Same as B6 except that B10 seasonal factors are used.	$C\ S\ I' D_r / S_2 = C\ I' D_r$.	$(C+S+I'+D_r)-S_2 = C+I'+D_r$.
B12. Not used			
**B13. Irregular series	Divide (B7) into (subtract (B7) from) (B11) to obtain a preliminary irregular series.	$C\ I' D_r / C_2 = I' D_r$.	$(C+I'+D_r)-C_2 = I'+D_r$.
	Adjustment for Trading-Day Variation (optional).--Steps B14 to B16 and B18 to B19 are included only when a trading-day adjustment based upon the information in the monthly series is desired. To adjust for trading days on the basis of external information, table A4 is used. Various combinations of these options are described in sections III and IX.		
**B14. Extreme irregular values excluded from trading-day regression	Sort B13 irregulars for 31-day months into seven groups depending upon the day of the week the month begins. Likewise, sort 30-day months into seven groups. For February, separate leap years from non-leap years. For 31- and 30-day months and non-leap-year Februaries, compute the mean of each group and the squared deviations of the values from their respective means. From these, compute a "trading-day" variance (σ_T^2) over the entire series, which is used to identify extremes. Identify and remove values beyond 2.5 σ_T limits. (The built-in σ limit is 2.5, but a different limit for identifying extremes may be specified in the option card. See section IX.) Recompute the means and σ_T and re-identify and remove extremes beyond 2.5 σ_T. For leap-year Februaries, throw out values that deviate from 1.0 (0.0) by more than 2.5 σ_T. Values removed as extremes are shown in table B14. They are not included in the trading-day regression in B15.	For $\lvert I'-1.0 \rvert > 2.5\ \sigma_T$, $I'\ D_r$ removed from regression.	For $\lvert I' \rvert > 2.5\ \sigma_T$, $[I'+D_r]$ removed from regression.
**B15. Preliminary trading-day regression	Estimate by least squares seven daily weights from the B13 irregular (with extremes omitted) using the specification: Multiplicative: $(I\ D_r)_i - 1.0 = \frac{X_{1i}B_1+X_{2i}B_2+\cdots+X_{7i}B_7+I_i}{N_i}$; where $(I\ D_r)_i$ is the irregular component for month i with residual trading-day variation; Additive: $[I+D_r]_i = X_{1i}B_1+X_{2i}B_2+\cdots+X_{7i}B_7+I_i$;	$[I\ D_r] \rightarrow D_r$.	$[I+D_r] \rightarrow D_r$.

Table number and title	Multiplicative and additive	Symbolic notation	
		Multiplicative	Additive
**B15. (Continued)	where $[I+D_r]_i$ is the irregular component for month i with residual trading-day variation; X_{ji} is the number of times that day-of-the-week j occurs in month i; Monday = 1, ---, Sunday = 7; B_j's are the seven "true" daily weights, where $\sum_1^7 B_j = 0$; N_i is either 31, 30, or 28.25, if no prior adjustment was made, depending upon whether month i is a 31- or 30-day month or February. N_i is equal to the sum of the prior daily weights (Dp) for all the days of the month if a prior adjustment was made; I_i is the "true" irregular for month i. Let b_j denote the least-squares estimate of B_j and $\hat{\sigma}_j$ the standard error of b_j. Multiplicative: If prior weights (D_{p_j}) are used, combine with regression weights by the formula: $D_j = b_j + D_{p_j}$, where D_j are the combined weights. If no prior weights are available, use 1.0 for all D_p. Compute $t_j(p) = b_j/\hat{\sigma}_j$ and $t_j(1)$ $(D_j-1.0)/\hat{\sigma}_j$ (j = 1,---,7) which are the t-ratios for testing whether combined weight D_j is significantly different from prior weight D_{p_j} and 1.0, respectively. $\hat{\sigma}_j$ is also the standard error for D_j. Additive: $D_j = b_j$ and $t_j(0) = D_j/\hat{\sigma}_j$ (j = 1,---,7), where $t_j(0)$ is the t-ratio for testing whether D_j is significantly different from 0.0. If the computed t-ratios are greater than the tabled 1 percent level (2.62), messages of significance are printed. Compute $F = \sigma_D^2/\sigma_R^2$, where σ_D^2 and σ_R^2 are the variance explained by the regression and the residual variance, respectively. If the computed F-ratio is greater than the tabled 1 percent level (2.95), a message that significant trading-day variation is present is printed.		
B16. Trading-day adjustment factors derived from regression coefficients	Construct monthly calendar adjustment factors by the formula: Multiplicative: $M_i = \frac{X_{1i}(b_1+1.0)+X_{2i}(b_2+1.0)+\text{----}+X_{7i}(b_7+1.0)}{N_i}$; Additive: $M_i = X_{1i}b_1+X_{2i}b_2+\text{----}+X_{7i}b_7$; where M_i is the monthly factor for month i;		

Table number and title	Multiplicative and additive	Symbolic notation	
		Multiplicative	Additive
B16. (Continued)	N_i is 31 or 30 where month i is a 31- or 30-day month. N_i is 28.25 for February if no prior adjustment was made. N_i is 29 or 28 for leap year and nonleap year February if a prior adjustment was made.		
	Print out monthly factors in table B16. Divide these factors into (B13) (subtract these factors from (B13)) to obtain an irregular component without trading-day variation.	$I' D_r/D_r = I'.$	$[I'+D_r]-D_r = I'.$
B17. Preliminary weights for irregular component	Compute a moving 5-year σ of the irregular in B16 (or B13 if a trading-day adjustment is not made) and test the irregulars in the central year of the 5-year period against 2.5 σ. For the first two years, the σ limits computed for the third year are used; and for the last two years, the σ limits computed for the third-from-end year are used. Remove values beyond 2.5 σ and recompute the moving 5-year σ.		
	Assign a zero weight to irregulars beyond 2.5 σ and a weight of 1.0 (full weight) to irregulars within 1.5 σ. Assign a linearly graduated weight between 0.0 and 1.0 to irregulars between 2.5 σ and 1.5 σ. Print out the moving 5-year σ's and the weights for the irregular component in table B17.	$[I'] = w.$	$[I'] = w.$
B18. Trading-day factors derived from combined daily weights	Construct monthly trading-day factors from the combined prior and estimated trading-day factors developed in B15 using the same formula as shown in step B16 except that D_j is substituted for $(b_j+1.0)$.	$D = D_p D_r.$	
B19. Original series adjusted for trading-day and prior variation	Divide (subtract) (B18) into (from) (A3) (or (A1) or (B1) if A3 does not appear).	$C S I'D/D = C S I'.$	$[C+S+I'+D_r]-D_r = C+S+I'.$

PART C. FINAL ESTIMATION OF TRADING-DAY VARIATION AND IRREGULAR WEIGHTS

The original series adjusted for trading-day variation is modified for extreme and near-extreme values with the B17 weights, and improved trend-cycle and seasonal estimates are obtained. These improved estimates are divided into (subtracted from) the original series, and final trading-day factors and weights are estimated from the resulting irregular.

Table number and title	Multiplicative and additive	Symbolic notation	
		Multiplicative	Additive
**C1. Original series modified by preliminary weights and adjusted for trading-day and prior variation	Modify the original series adjusted for trading-day and prior variation (B19 or B1 if the trading-day option is not used) for extreme values by reducing the irregular variations where less than full weight was assigned to the irregular in B17.	$\frac{C S I'[1.0+w(I'-1.0)]}{I'}$ $= C S I^W.$	$[C+S+I']-I'(1.0-w)$ $= C+S+I^W.$

Table number and title	Multiplicative and additive	Symbolic notation	
		Multiplicative	Additive
C2. Trend-cycle	Compute a centered 12-term moving average of (C1) as an estimate of the trend-cycle.	$M_C[C\ S\ I^W] = C_3$.	$M_C[C+S+I^W] = C_3$.
C3. Not used			
C4. Modified S-I ratios (differences)	Divide (C2) into (C1) to obtain S-I ratios (subtract (C2) from (C1) to obtain S-I differences).	$C\ S\ I^W/C_3 = S\ I^W$.	$[C+S+I^W]-C_3 = S+I^W$.
C5. Seasonal factors	Same as B5 except that C4 ratios (differences) are used.	$M_S[S\ I^W] = S_3$.	$M_S[S+I^W] = S_3$.
C6. Seasonally adjusted series	Divide (C5) into (C1) (subtract (C5) from (C1)) to obtain a preliminary seasonally adjusted series.	$C\ S\ I^W/S_3 = C\ I^W$.	$[C+S+I^W]-S_3 = C+I^W$.
**C7. Trend-cycle	Apply the variable trend-cycle curve routine to (C6) to estimate a preliminary trend-cycle.	$M_C[C\ I^W] = C_4$.	$M_C[C+I^W] = C_4$.
C8. Not used			
C9. Modified S-I ratios (differences)	Divide (C7) into (C1) to obtain S-I ratios (subtract (C7) from (C1) to obtain S-I differences).	$C\ S\ I^W/C_4 = S\ I^W$.	$[C+S+I^W]-C_4 = S+I^W$.
**C10. Seasonal factors	Same as B10 except that C9 S-I ratios (differences) are used.	$M_S[S\ I^W] = S_4$.	$M_S[S+I^W] = S_4$.
C11. Seasonally adjusted series	Reintroduce trading-day variation and extreme and near-extreme values by dividing (B1) by (C10) (subtracting (C10) from (B1)).	$C\ S\ I'D_r/S_4 = C\ I'D_r$.	$[C+S+I'+D_r]-S_4 = C+I'+D_r$.
C12. Not used			
**C13. Irregular series	Divide (C11) by (C7) (subtract (C7) from (C11)) to obtain an estimate of the irregular.	$C\ I'\ D_r/C_4 = I'D_r$.	$[C+I'+D_r]-C_4 = I'+D_r$.

Adjustment for Trading-Day Variation (optional).--When the trading-day routine is applied in B14 to B16 and B18 to B19, it is reapplied in C14 to C16 and C18 to C19 to obtain improved estimates.

*C14. Extreme irregular values excluded from trading-day regression	In reapplying the trading-day routine, the variance is computed using the 22 types of monthly trading-day factors shown in B16 instead of the means of the 31- and 30-day months and non-leap-year Februaries. This improves the treatment of extremes, particularly for leap-year Februaries. Extremes beyond 2.5 σ_I are shown in C14.	For $\lvert I'-1.0\rvert > 2.5\sigma_I$, $I'\ D_r$ removed from regression.	For $\lvert I'\rvert > 2.5\sigma_I$, $I'+D_r$ removed from regression.
*C15. Final trading-day regression	Same as B15 except that the computations are based on C13 (with extremes omitted). Using the standard errors of the seven daily weights, compute estimates of the standard errors of the monthly calendar adjustment factors M_i as follows: Multiplicative: 31-day months beginning on day-of-the-week j: $\hat{\sigma}_{M_{31}} = \frac{1}{31}[\hat{\sigma}^2_j+\hat{\sigma}^2_{j+1}+\hat{\sigma}^2_{j+2}$ $+2(\hat{\sigma}_{j,j+1}+\hat{\sigma}_{j,j+2}+\hat{\sigma}_{j+1,j+2})]^{\frac{1}{2}}$,	$[I\ D_r] \rightarrow D_r$.	$[I+D_r] \rightarrow D_r$.

Table number and title	Multiplicative and additive	Symbolic notation	
		Multiplicative	Additive
*C15. (Continued)	30-day months beginning on day-of-the-week j: $\hat{\sigma}_{M_{30}} = \frac{1}{30}[\hat{\sigma}_j^2+\hat{\sigma}_{j+1}^2+2\hat{\sigma}_{j,j+1}]^{\frac{1}{2}}$; Leap-year Februaries: $\hat{\sigma}_{M_{29}} = \frac{1}{29}\hat{\sigma}_j$; Non-leap-year Februaries: $\hat{\sigma}_{M_{28}} = 0$; where $\hat{\sigma}_{j+7} = \hat{\sigma}_j$. If a length-of-month adjustment is included in the trading-day factors, the denominator of all $\hat{\sigma}_M$'s is 30.4375. Since the $\hat{\sigma}_M$'s, for each length month, are almost equal in practice, only one estimate is shown for each of the seven $\hat{\sigma}_{M_{31}}$'s, $\hat{\sigma}_{M_{30}}$'s and $\hat{\sigma}_{M_{29}}$'s. Additive: Same as multiplicative except that the denominator of σ_M's is 1.0 in all cases rather than 31, 30, 29 or 30.4375.		
*C16. Final trading-day adjustment factors derived from regression coefficients	Same as B16 except that the factors are divided into (subtracted from) (C13).	$I' D_r/D_r = I'$.	$[I'+D_r]-D_r = I'$.
*C17. Final weights for irregular component	Same as B17 except that C16 [or C13 if the trading-day option is not used] is used.	$[I'] = w$.	$[I'] = w$.
*C18. Final trading-day factors derived from combined daily weights	Same as B18 except that the final residual weights estimated in C15 are used. If length-of-month variation is included with the trading-day factors, N_i is 30.4375 for all months. This option is not available with an additive adjustment.	$D = D_p D_r$.	
*C19. Original series adjusted for trading-day and prior variation	Divide (subtract) (C18) into (from) (A3) [or (B1) if A3 does not appear].	$C S I'D/D = C S I'$.	$[C+S+I'+D_r]-D_r = C+S+I'$.

PART D. FINAL ESTIMATION OF SEASONAL FACTORS, TREND-CYCLE, IRREGULAR, AND SEASONALLY ADJUSTED SERIES

The original series adjusted for trading-day variation is modified for extreme and near-extreme values by the C17 final weights and final estimates of the seasonal, trend-cycle, and irregular are derived.

Table number and title	Multiplicative and additive	Symbolic notation	
		Multiplicative	Additive
**D1. Original series modified by final weights and adjusted for trading-day and prior variation	Same as C1 except that C17 weights and C19 adjusted series are used.	$\frac{C S I'[1.0+w(I'-1.0)]}{I'} = C S I^W$.	$[C+S+I']-I'(1.0-w)$ $C+S+I^W$.
D2. Trend-cycle	Compute a centered 12-term moving average of (D1) as an estimate of the trend-cycle.	$M_0[C S I^W] = C_5$.	$M_0[C+S+I^W] = C_5$.

Table number and title	Multiplicative and additive	Symbolic notation	
		Multiplicative	Additive
D3. Not used			
D4. Modified S-I ratios (differences)	Divide (D2) into (D1) to obtain S-I ratios (subtract (D2) from (D1) to obtain S-I differences).	$C\ S\ I^W/C_5 = S\ I^W$.	$[C+S+I^W]-C_5 = S+I^W$.
D5. Seasonal factors	Same as B5 except that D4 ratios (differences) are used.	$M_S[S\ I^W] = S_5$.	$M_S[S+I^W] = S_5$.
D6. Seasonally adjusted series	Divide (D5) into (D1) (subtract (D5) from (D1)) to obtain a preliminary seasonally adjusted series.	$C\ S\ I^W/S_5 = C\ I^W$.	$[C+S+I^W]-S_5 = C+I^W$.
**D7. Trend-cycle	Same as B7 except that D6 is used.	$M_C[C\ I^W] = C_6$.	$M_C[C+I^W] = C_6$.
*D8. Final unmodified S-I ratios (differences)	Divide (D7) into (C19) (subtract (D7) from (C19)) [or (B1) if the trading-day option is not used] to obtain final unmodified S-I ratios (differences). Perform an analysis of variance of the S-I ratios (differences) to determine whether the original series contains significant stable seasonality. See appendix A for the details of this test.	$C\ S\ I'/C_6 = S\ I'$.	$[C+S+I']-C_6 = S+I'$.
*D9. Final replacement values for extreme S-I ratios (differences)	Divide (D7) into (D1) (subtract (D7) from (D1)) to obtain S-I ratios (differences) modified for extreme and near-extreme values. Print out values not identical to the corresponding entries in D8. For each month, compute and print out the average year-to-year percent change (difference) in estimates of the irregular ($\bar{I}'$) and the seasonal ($\bar{S}'$) and their ratio ($\bar{I}'/\bar{S}'$ = MSR = moving seasonality ratio), where S is an unweighted 7-term average of the D8 and D9 S-I ratios (differences) and I is obtained by dividing S into the ratios (subtracting S from the differences). The MSR may be used as an indicator of the amount of moving seasonality present in a particular month.[1]	$C\ S\ I^W/C_6 = S\ I^W$.	$[C+S+I^W]-C_6 = S+I^W$.
*D10. Final seasonal factors	Same as B10 except that D8 and D9 S-I ratios (differences) are used. Compute estimates of seasonal factors one year ahead by the formula $S_{n+1}=S_n+\frac{1}{2}[S_n-S_{n-1}]$.	$M_S[S\ I^W] = S_6$.	$M_S[S+I^W] = S_6$.
*D11. Final seasonally adjusted series	Divide (D10) into (C19) (subtract (D10) from (C19)) or (B1) to obtain the final seasonally adjusted series.	$C\ S\ I'/S_6 = C\ I'$.	$[C+S+I']-S_6 = C+I'$.

[1]On the basis of the MSR's, the user may wish to specify shorter or longer moving averages in a subsequent adjustment of the series. The averages which were selected automatically by the X-10 variant on the basis of the MSR's are given below:

MSR ($\bar{I}'/\bar{S}'$)	Moving Average
0 to 1.49	3 - term
1.50 to 2.49	3x3 - term
2.50 to 4.49	3x5 - term
4.50 to 6.49	3x9 - term
6.50 to 8.49	3x15 - term
8.50 and over	n - term (stable seasonal)

See also Marris (8) for a discussion of the X-10 selection technique.

Table number and title	Multiplicative and additive	Symbolic notation	
		Multiplicative	Additive
*D12. Final trend-cycle	Divide (D1) by (D10) (subtract (D10) from (D1)) to obtain a modified seasonally adjusted series. Apply the variable trend-cycle curve routine to the modified seasonally adjusted series to obtain the final trend-cycle.	$M_C[C\ I^W] = C_7$.	$M_C[C+I^W] = C_7$.
*D13. Final irregular	Divide (D12) into (D11) (subtract (D12) from (D11)) to obtain the final irregular. Compute the standard deviation for each year, each month, and the entire series.	$C\ I'/C_7 = I'$.	$[C+I']-C_7 = I'$.

PART E. MODIFIED ORIGINAL, SEASONALLY ADJUSTED, AND IRREGULAR SERIES

The original and seasonally adjusted series and the irregular are modified for extremes (beyond 2.5 σ). Tables E4, E5, and E6 provide aids to interpreting the quality of the seasonal adjustment.

Table number and title	Multiplicative and additive	Symbolic notation	
		Multiplicative	Additive
*E1. Original series	Replace those values in the original series (A1 or B1) where a zero weight was assigned in C17 (beyond 2.5 σ) with the product (sum) of the trend-cycle, seasonal, trading-day and prior adjustment components shown in D12, D10, C18, and A2 to obtain an original series modified for extremes.	Where w = 0.0, I' set equal to 1.0; i.e., C S I"D = C S P D.	Where w = 0.0, I' set equal to 0.0; i.e., $C+S+I''+D_r = C+S+P+D_r$.
*E2. Modified seasonally adjusted series	Replace those values in the final seasonally adjusted series (D11) where a zero weight was assigned in C17 with the D12 final trend-cycle values.	Where w = 0.0, I' set equal to 1.0; i.e., C I' = C.	Where w = 0.0, I'set equal to 0.0; i.e., C+I' = C.
*E3. Modified irregular series	Replace those values in the final irregular series (D13) with 1.0 (0.0) where a zero weight was assigned in C17. Compute the standard deviation for each year, each month, and the entire series.	Where w = 0.0, I'set equal to 1.0.	Where w = 0.0, I'set equal to 0.0.
*E4. Ratios (differences) of annual totals	Compute the ratios (differences) of the annual totals of (between) (a) the original (B1) to (and) the final seasonally adjusted (D11) series and (b) the modified original (E1) to (and) the modified seasonally adjusted (E2) series.		
*E5. Percent changes (differences) in original series	Compute and print out the individual month-to-month percent changes (differences) in B1.		
*E6. Percent changes (differences) in final seasonally adjusted series	Compute and print out the individual month-to-month percent changes (differences) in D11.		

PART F. MCD MOVING AVERAGE AND SUMMARY MEASURES

Table number and title	Multiplicative and additive	Symbolic notation	
		Multiplicative	Additive
*F1. MCD moving average	Compute an unweighted moving average of the final seasonally adjusted series (D11) with number of terms equal to MCD (see F2 for computation of MCD). When an even number of terms is used (MCD = 2,4,6), the moving average value is shown one-half-month after the central position; e.g., a 2-term average of March and April is printed in the April position and a 4-term average of March-June is printed in May.	$M_{MCD}[C\,I'] = C_{MCD}$.	$M_{MCD}[C+I'] = C_{MCD}$.
*F2. Summary measures	Average Percent Changes (Differences) Without Regard to Sign Over Selected Spans and MCD Compute the average without regard to sign of the percent changes (differences) for the following series over spans of 1, 2, 3, 4, 5, 6, 7, 9, 11 and 12 months: Table No. — Symbol — Series A1 (B1) — $\overline{O}_t$ — Original series; D11 — $\overline{CI}_t$ — Final seasonally adjusted series; D13 — $\overline{I}_t$ — Final irregular series; D12 — $\overline{C}_t$ — Final trend-cycle; D10 — $\overline{S}_t$ — Final seasonal factors; A2 — $\overline{P}_t$ — Prior monthly adjustment factors; C18 — $\overline{TD(*)}_t$ — Final trading-day adjustment factors; E1 — $\overline{O}^M_t$ — Modified original series; E2 — $\overline{CI}^M_t$ — Modified seasonally adjusted series; E3 — $\overline{I}^M_t$ — Modified irregular series; where t designates the span (t = 1, ..., 7, 9, 11, 12) and (*) designates whether allowance for length-of-month variation is made in the trading-day factors (* denotes no allowance for length-of-month variation and ** denotes allowance for length-of-month variation). For each of the above series, average the percent changes (differences) for each span t without regard to sign and print out the average with the table number of the series from which the percent changes (differences) were computed and the symbol assigned above. Compute and print out $\overline{I}_t/\overline{C}_t$ for t = 1, ..., 12. Designate as the MCD span the shortest span for which $\overline{I}_t/\overline{C}_t < 1.0$. If $\overline{I}_t/\overline{C}_t \geq 1.0$ at the 5-month span, designate MCD as "6".		

Table number and title	Multiplicative and additive
*F2. (Continued)	Relative Contributions of Components to Percent Changes (Differences) in Original Series Compute the relative contribution of each component to the percent changes (differences) in the original series over each span t using the relationship $\overline{O}_t^2 \doteq \overline{I}_t^2 + \overline{C}_t^2 + \overline{S}_t^2 + \overline{P}_t^2 + \overline{TD}_t^2$. Since the sum of squares of the percent changes (differences) does not equal $\overline{O}_t^2$ exactly, substitute $(\overline{O}_t')^2$, where $(\overline{O}_t')^2 = \overline{I}_t^2 + \overline{C}_t^2 + \overline{S}_t^2 + \overline{P}_t^2 + \overline{TD}_t^2$. Then compute the ratios $\overline{I}_t^2/(\overline{O}_t')^2, \ldots, \overline{TD}_t^2/(\overline{O}_t')^2$, which express the relative importance of the changes in each component. Also, compute the ratio $(\overline{O}_t')^2/\overline{O}_t^2$ as an indicator of how well the approximation $(\overline{O}_t')^2 \doteq \overline{O}_t^2$ holds. Average Duration of Run Compute average duration of run (the average number of consecutive monthly changes in the same direction; "no change" is counted as a change in the same direction as the preceding change) for the following series: Table No. — Symbol — Series D11 — CI — Final seasonally adjusted series; D13 — I — Final irregular series; D12 — C — Final trend-cycle; F1 — MCD — MCD moving average. Means and Standard Deviations of Percent Changes (Differences) Compute the mean and standard deviation of the percent changes (differences) for O, I, C, S, CI and MCD over each span t (t = 1, ..., 6, 7, 9, 11, 12). Print out the means and standard deviations of the percent changes (differences) with the symbol and table number of the series from which the measures were computed.

PART G. CHARTS

Charts G1 and G2 are available as part of the standard printout. G3 and G4 are available optionally. The user may also specify that no charts are to be printed. See section IX for further details.

Table number and title	Multiplicative and additive
*G1. Charts	Plot the final seasonally adjusted series and final trend-cycle (D11 and D12, respectively).
*G2. Charts	Plot the final S-I ratios (differences) with extremes, final S-I ratios (differences) without extremes, and final seasonal factors (D8, D9, and D10, respectively).
G3. Charts	Plot in calendar order the final S-I ratios (differences) with extremes, final S-I ratios (differences) without extremes, and final seasonal factors (D8, D9, and D10, respectively).

Table number and title	Multiplicative and additive
G4. Charts	Plot the final irregular and final modified irregular (D13 and E3, respectively). Scales on Charts Multiplicative: The scales for the charts in G1 are semi-log. The program selects one of the six following semi-log scales so as to maximize the space utilized by the charts themselves: 5-cycle - largest value is 100,000 times the smallest value on the scale; 4-cycle - largest value is 10,000 times the smallest; 2-cycle - largest value is 100 times the smallest; 1-cycle - largest value is 10 times the smallest; "half-cycle" - largest value is 4 times the smallest; "quarter-cycle" - largest value is twice the smallest. The scales for the charts in G2, G3 and G4 are arithmetic. They are chosen so as to maximize the space utilized by the charts themselves. Additive: The scales for all charts are arithmetic and are chosen so as to maximize the space utilized by the charts themselves.

Specifications--Variable Trend-Cycle Curve Routine

The steps in the variable trend-cycle curve routine are as follows:

1. As a preliminary estimate of C, compute a 13-term Henderson moving average of the seasonally adjusted series. Do not extend to ends of series.

2. As a preliminary estimate of I, divide (subtract) the 13-term moving average into (from) the seasonally adjusted series.

3. Compute the average month-to-month percent change (difference) without regard to sign in the preliminary estimates of the irregular ($\bar{I}$) and the trend-cycle ($\bar{C}$). Compute their ratio ($\bar{I}/\bar{C}$) to obtain an estimate of the importance of the irregular variations relative to the movements in the trend-cycle.

$\bar{I}/\bar{C}$	Moving average
0.00 to 0.99	9-term Henderson
1.00 to 3.49	13-term Henderson
3.50 and over	23-term Henderson

For the weight patterns for the Henderson moving averages and the weights used for extending the averages at the ends of the series, see appendix B.

Specifications--Quarterly Program (Multiplicative or Additive, X-11Q)

The steps in the quarterly program are analogous to those in the monthly program with the following changes:

1. Part A is not applicable.

2. The tables dealing with trading-day variation (B14 to B16, B18 to B19, C14 to C16, C18 to C19) are not applicable.

3. The available options are slightly different from the X-11 options. See section IX for further details.

4. The estimates of the trend-cycle are derived by a centered 4-term moving average (tables B2, C2, D2) and a weighted 5-term Henderson moving average (tables B7, C7, D7, D12). The weights for the 5-term Henderson average are given in appendix B.

5. The seasonal factor estimates are adjusted to sum to 4.000 using a centered 4-term moving average (tables B4, B5, B9, B10, C5, C10, D5, D10).

6. In step B7, replace an extreme value with the average of the value times its weight and the nearest full-weight value on either side. To replace a value in the first (last) quarter, replace the extreme value with average of the value times its weight and the nearest full-weight value.

7. In table F2, the P and TD summary measures are not applicable. Summary measures are shown over 1- to 4-quarter spans. Table F1 is quarters for cyclical dominance (QCD) moving average. When $\overline{I/C} \geq 1.0$ at the 3-quarter span, QCD is designated as "4"

Specifications--Summary Measures Routine (Multiplicative or Additive, Monthly or Quarterly)

In this routine, the input is seasonally adjusted. The program tests for residual seasonality and trading-day variation by completing the standard X-11 steps in parts B and C and steps D1 to D10 and computes the summary measures shown in table F2 (the "percentage contributions to O" part of this table is not applicable).

Part A and tables E2, E4, and E6 are not applicable. Only the tables in the standard printout and chart G1 are shown. The computations are the same as those for the seasonal program except that table D11 is the same as B1 and the final trend-cycle moving average is applied to table D1.

U.S. TOTAL RETAIL SALES, 1953 TO 1964.—X-11 monthly multiplicative adjustment, full printout. Trading-day weights are computed internally. All charts are printed.

This series is shown for purposes of illustration only. It is <u>not</u> directly comparable to the official published series which is a sum of seasonally adjusted component series containing special adjustments for the effect of varying dates such as certain holidays (for example, Easter) and the introduction of new automobile models.

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                                X-11 SEASONAL ADJUSTMENT PROGRAM
                                  U.S. BUREAU OF THE CENSUS
                              ECONOMIC RESEARCH AND ANALYSIS DIVISION
                                       OCTOBER 1, 1966
THE X-11 PROGRAM IS DIVIDED INTO SEVEN MAJOR PARTS-
     PART      DESCRIPTION
       A. PRIOR ADJUSTMENTS, IF ANY
       B. PRELIMINARY ESTIMATES OF IRREGULAR COMPONENT WEIGHTS
            AND REGRESSION TRADING-DAY FACTORS
       C. FINAL ESTIMATES OF ABOVE
       D. FINAL ESTIMATES OF SEASONAL, TREND-CYCLE AND IRREGULAR COMPONENTS
       E. ANALYTICAL TABLES
       F. SUMMARY MEASURES
       G. CHARTS
TABLES ARE IDENTIFIED BY THEIR PART LETTER AND SEQUENCE WITHIN THE PART. A GIVEN TABLE HAS THE SAME
IDENTIFICATION IN THE STANDARD, LONG AND FULL PRINTOUTS. THE SAME NUMBER IS GIVEN TO CORRESPONDING
TABLES IN PARTS B, C AND D. THUS, TABLES B10., C10. AND D10. ARE ALL TABLES OF SEASONAL FACTORS.
WHERE NO CORRESPONDING TABLE EXISTS THE SEQUENCE NO. IS NOT USED IN THE PART. THUS, B8. AND D8. ARE
TABLES OF UNMODIFIED SI RATIOS BUT THERE IS NO C8.

                                    THIS SERIES RUN  OCT 1966
SERIES TITLE- U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS                    SERIES NO.   P204
                                    PERIOD COVERED-  1/53 TO 12/64
                          TYPE OF RUN - MULTIPLICATIVE SEASONAL ADJUSTMENT
                                    FULL PRINTOUT.       ALL CHARTS.
TRADING DAY REGRESSION COMPUTED STARTING 1953 EXCLUDING IRREGULAR VALUES OUTSIDE 2.5-SIGMA LIMITS.
                        TRADING DAY REGRESSION ESTIMATES APPLIED STARTING 1953 IF SIGNIFICANT.
                          SIGMA LIMITS FOR GRADUATING EXTREME VALUES ARE 1.5 AND 2.5.
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OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS — P. 1, SERIES P204

B 1. ORIGINAL SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	12903.	12198.	13711.	14115.	14520.	14442.	14250.	14045.	13952.	14819.	13828.	16314.	169097.
1954	12213.	11948.	13576.	14025.	14116.	14533.	14259.	13771.	14012.	14538.	14401.	17738.	169130.
1955	13147.	12642.	14609.	15450.	15333.	15600.	15261.	15481.	15765.	15685.	15751.	19124.	183848.
1956	13727.	13551.	15527.	15074.	16109.	16579.	15382.	16187.	15582.	16130.	16493.	19380.	189721.
1957	14741.	14058.	15945.	16285.	17205.	17114.	16864.	17490.	16373.	16949.	17133.	19844.	200001.
1958	15286.	13783.	15464.	16362.	17364.	16603.	16596.	17000.	16326.	17360.	17039.	21174.	200357.
1959	16225.	14961.	16967.	17821.	18600.	18708.	18332.	18054.	17570.	19095.	17635.	21454.	215422.
1960	16312.	15829.	17632.	18973.	18548.	18918.	18066.	18153.	17848.	18648.	18385.	22153.	219465.
1961	15803.	15071.	17714.	17618.	18532.	18907.	17922.	18325.	18158.	18761.	19224.	22881.	218916.
1962	17007.	16042.	19193.	19097.	20226.	20254.	19138.	19920.	18863.	20576.	20911.	24127.	235354.
1963	18261.	17087.	19653.	20518.	21228.	20737.	20540.	21018.	19267.	21528.	21494.	25104.	246435.
1964	19154.	18758.	20502.	21186.	22508.	22242.	22145.	21778.	21313.	22605.	21720.	27719.	261630.
AVGE	15398.	14661.	16708.	17210.	17857.	17886.	17396.	17602.	17086.	18058.	17834.	21418.	
	TABLE TOTAL-		2509376.		MEAN-	17426.		STD. DEVIATION-		2847.			

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS — P. 2, SERIES P204

B 2. TREND CYCLE- CENTERED 12-TERM MOVING AVERAGE

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	*******	*******	*******	*******	*******	*******	14063.	14023.	14007.	13998.	13977.	13964.	84034.
1954	13969.	13958.	13949.	13939.	13952.	14035.	14133.	14201.	14273.	14375.	14485.	14581.	169849.
1955	14667.	14780.	14924.	15045.	15149.	15263.	15345.	15407.	15483.	15506.	15522.	15595.	182685.
1956	15641.	15676.	15697.	15708.	15758.	15799.	15852.	15916.	15954.	16022.	16118.	16186.	190329.
1957	16270.	16386.	16474.	16541.	16601.	16647.	16689.	16701.	16669.	16652.	16662.	16648.	198941.
1958	16615.	16583.	16561.	16576.	16589.	16641.	16736.	16824.	16935.	17059.	17171.	17310.	201602.
1959	17470.	17587.	17682.	17807.	17904.	17940.	17955.	17995.	18059.	18135.	18181.	18187.	214902.
1960	18185.	18178.	18194.	18187.	18199.	18260.	18268.	18215.	18187.	18134.	18076.	18075.	218156.
1961	18069.	18070.	18090.	18108.	18147.	18213.	18293.	18384.	18486.	18609.	18741.	18868.	220078.
1962	18975.	19092.	19188.	19293.	19439.	19561.	19665.	19761.	19824.	19902.	20003.	20065.	234766.
1963	20143.	20247.	20310.	20367.	20431.	20496.	20573.	20680.	20785.	20848.	20930.	21046.	246856.
1964	21175.	21274.	21391.	21521.	21575.	21694.	*******	*******	*******	*******	*******	*******	128629.
AVGE	17380.	17439.	17496.	17554.	17613.	17686.	17052.	17101.	17151.	17204.	17261.	17321.	
	TABLE TOTAL-		2290827.										

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P. 3, SERIES P204

B 3. UNMODIFIED SI RATIOS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1953	*******	*******	*******	*******	*******	*******	101.3	100.2	99.6	105.9	98.9	116.8	103.8
1954	87.4	85.6	97.3	100.6	101.2	103.5	100.9	97.0	98.2	101.1	99.4	121.7	99.5
1955	89.6	85.5	97.9	102.7	101.2	102.2	99.5	100.5	101.8	101.2	101.5	122.6	100.5
1956	87.8	86.4	98.9	96.0	102.2	104.9	97.0	101.7	97.7	100.7	102.3	119.7	99.6
1957	90.6	85.8	96.8	98.5	103.6	102.8	101.0	104.7	98.2	101.8	102.8	119.2	100.5
1958	92.0	83.1	93.4	98.7	104.7	99.8	99.2	101.0	96.4	101.8	99.2	122.3	99.3
1959	92.9	85.1	96.0	100.1	103.9	104.3	102.1	100.3	97.3	105.3	97.0	118.0	100.2
1960	89.7	87.1	96.9	104.3	101.9	103.6	98.9	99.7	98.1	102.8	101.7	122.6	100.6
1961	87.5	83.4	97.9	97.3	102.1	103.8	98.0	99.7	98.2	100.8	102.6	121.3	99.4
1962	89.6	84.0	100.0	99.0	104.1	103.5	97.3	100.8	95.2	103.4	104.5	120.2	100.1
1963	90.7	84.4	96.8	100.7	103.9	101.2	99.8	101.6	92.7	103.3	102.7	119.3	99.8
1964	90.5	88.2	95.8	98.4	104.3	102.5	*******	*******	*******	*******	*******	*******	96.6
AVGE	89.8	85.3	97.1	99.7	103.0	102.9	99.5	100.7	97.6	102.5	101.2	120.3	

TABLE TOTAL- 13196.2

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P. 4, SERIES P204

B 4. REPLACEMENT VALUES FOR EXTREME SI RATIOS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	S.D.
1953	*******	*******	*******	*******	*******	*******	*******	*******	*******	101.6	*******	120.8	1.3
1954	*******	*******	*******	*******	*******	*******	*******	100.1	*******	*******	*******	*******	1.3
1955	*******	*******	*******	99.6	*******	*******	*******	*******	98.8	*******	*******	*******	1.3
1956	*******	*******	*******	99.3	*******	*******	99.6	*******	*******	*******	*******	*******	1.3
1957	*******	*******	*******	*******	*******	*******	*******	101.5	*******	*******	*******	*******	1.3
1958	*******	84.8	96.6	*******	*******	103.5	*******	*******	*******	*******	*******	*******	1.3
1959	90.9	*******	*******	*******	*******	*******	*******	*******	*******	102.9	101.2	120.7	1.3
1960	*******	84.9	*******	99.6	*******	*******	*******	*******	*******	*******	*******	*******	1.3
1961	90.1	*******	*******	99.5	*******	*******	*******	*******	*******	102.4	*******	*******	1.2
1962	*******	*******	97.4	*******	*******	*******	*******	*******	*******	*******	*******	*******	1.2
1963	*******	*******	*******	*******	*******	*******	*******	*******	96.4	*******	*******	*******	1.2
1964	*******	84.3	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	1.2

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P. 5, SERIES P204

B 5. SEASONAL FACTORS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1953	88.5	85.8	98.0	100.1	101.5	103.3	100.9	100.3	99.0	101.4	99.7	121.6	100.0
1954	88.5	85.8	98.0	100.1	101.5	103.3	100.6	100.5	98.7	101.3	100.2	121.5	100.0
1955	88.7	85.9	97.9	99.7	101.8	103.3	100.2	100.7	98.4	101.1	101.0	121.1	100.0
1956	89.2	85.8	97.7	99.2	102.4	103.5	99.9	101.0	97.9	101.1	101.5	120.6	100.0
1957	90.1	85.5	97.1	98.9	103.1	103.4	100.1	101.0	97.5	101.5	101.4	120.4	100.0
1958	90.6	85.1	96.7	99.0	103.5	103.5	100.1	100.7	97.2	101.9	101.0	120.9	100.0
1959	90.7	84.8	96.6	99.3	103.3	103.6	100.0	100.3	97.4	102.3	101.1	121.3	100.0
1960	90.3	84.5	97.0	99.5	102.9	103.7	99.2	100.1	97.4	102.6	101.8	121.5	100.0
1961	90.1	84.2	97.3	99.6	102.9	103.4	98.7	100.2	97.2	102.9	102.7	121.0	100.0
1962	90.1	84.1	97.2	99.6	103.4	103.0	98.4	100.6	96.6	103.1	103.3	120.6	100.0
1963	90.3	84.2	96.8	99.6	103.9	102.5	98.5	101.0	96.3	103.2	103.5	120.1	100.0
1964	90.4	84.3	96.6	99.5	104.2	102.2	98.5	101.0	96.3	103.2	103.5	120.1	100.0

TABLE TOTAL- 14400.5

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P. 6, SERIES P204

B 6. SEASONALLY ADJUSTED SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	14582.	14212.	13997.	14101.	14306.	13974.	14121.	14003.	14095.	14609.	13869.	13414.	169284.
1954	13802.	13921.	13859.	14011.	13908.	14062.	14179.	13709.	14195.	14355.	14371.	14596.	168969.
1955	14816.	14724.	14917.	15492.	15068.	15098.	15234.	15373.	16020.	15507.	15588.	15792.	183631.
1956	15392.	15802.	15890.	15192.	15733.	16025.	15400.	16028.	15922.	15950.	16252.	16070.	189656.
1957	16363.	16446.	16418.	16471.	16681.	16557.	16851.	17316.	16790.	16706.	16891.	16488.	199976.
1958	16878.	16189.	15997.	16530.	16770.	16035.	16581.	16874.	16793.	17038.	16877.	17519.	200081.
1959	17896.	17644.	17572.	17941.	18011.	18060.	18329.	18003.	18042.	18659.	17442.	17692.	215291.
1960	18072.	18733.	18185.	19061.	18024.	18241.	18213.	18144.	18323.	18168.	18065.	18229.	219459.
1961	17549.	17903.	18215.	17680.	18015.	18281.	18161.	18288.	18679.	18236.	18724.	18905.	218636.
1962	18880.	19072.	19749.	19181.	19560.	19665.	19459.	19796.	19520.	19960.	20250.	20014.	235106.
1963	20220.	20300.	20293.	20602.	20436.	20237.	20849.	20815.	20014.	20856.	20770.	20900.	246291.
1964	21179.	22247.	21231.	21284.	21608.	21758.	22479.	21568.	22139.	21899.	20988.	23077.	261457.
AVGE	17136.	17266.	17193.	17295.	17343.	17333.	17488.	17493.	17544.	17662.	17507.	17725.	

TABLE TOTAL- 2507836.

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P. 7, SERIES P204

B 7. TREND CYCLE - HENDERSON CURVE
13-TERM MOVING AVERAGE SELECTED. I/C RATIO IS 3.58

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	14325.	14261.	14196.	14138.	14093.	14098.	14133.	14147.	14114.	14041.	13950.	13862.	169359.
1954	13804.	13807.	13860.	13929.	13977.	13991.	14007.	14059.	14149.	14265.	14408.	14572.	168828.
1955	14740.	14886.	14993.	15084.	15169.	15259.	15365.	15472.	15561.	15639.	15681.	15670.	183518.
1956	15647.	15632.	15632.	15644.	15663.	15706.	15768.	15845.	15936.	16026.	16116.	16216.	189833.
1957	16303.	16368.	16442.	16534.	16643.	16758.	16849.	16908.	16921.	16870.	16756.	16623.	199973.
1958	16503.	16412.	16356.	16340.	16385.	16469.	16567.	16682.	16826.	17009.	17211.	17396.	200155.
1959	17551.	17694.	17816.	17904.	17992.	18087.	18159.	18152.	18087.	18005.	17975.	18026.	215448.
1960	18150.	18296.	18409.	18452.	18414.	18317.	18246.	18211.	18182.	18142.	18086.	18002.	218907.
1961	17932.	17896.	17900.	17952.	18035.	18130.	18226.	18325.	18425.	18535.	18666.	18828.	218850.
1962	19006.	19178.	19331.	19444.	19508.	19556.	19606.	19678.	19783.	19900.	20015.	20135.	235139.
1963	20230.	20296.	20363.	20427.	20482.	20515.	20531.	20531.	20565.	20677.	20857.	21065.	246538.
1964	21257.	21418.	21527.	21612.	21722.	21802.	21856.	21894.	21913.	21935.	21996.	22078.	261011.
AVGE	17121.	17179.	17235.	17288.	17340.	17391.	17443.	17492.	17539.	17587.	17643.	17706.	

TABLE TOTAL- 2507557.

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P. 8, SERIES P204

B 8. UNMODIFIED SI RATIOS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1953	90.1	85.5	96.6	99.8	103.0	102.4	100.8	99.3	98.9	105.5	99.1	117.7	99.9
1954	88.5	86.5	98.0	100.7	101.0	103.9	101.8	98.0	99.0	101.9	100.0	121.7	100.1
1955	89.2	84.9	97.4	102.4	101.1	102.2	99.3	100.1	101.3	100.3	100.4	122.0	100.1
1956	87.7	86.7	99.3	96.4	102.8	105.6	97.5	102.2	97.8	100.6	102.3	119.5	99.9
1957	90.4	85.9	97.0	98.5	103.4	102.1	100.1	103.4	96.8	100.5	102.3	119.4	100.0
1958	92.6	84.0	94.5	100.1	106.0	100.8	100.2	101.9	97.0	102.1	99.0	121.7	100.0
1959	92.4	84.6	95.2	99.5	103.4	103.4	101.0	99.5	97.1	106.1	98.1	119.0	99.9
1960	89.9	86.5	95.8	102.8	100.7	103.3	99.0	99.7	98.2	102.8	101.7	123.1	100.3
1961	88.1	84.2	99.0	98.1	102.8	104.3	98.3	100.0	98.5	101.2	103.0	121.5	99.9
1962	89.5	83.6	99.3	98.2	103.7	103.6	97.6	101.2	95.4	103.4	104.5	119.8	100.0
1963	90.3	84.2	96.5	100.4	103.6	101.1	100.0	102.4	93.7	104.1	103.1	119.2	99.9
1964	90.1	87.6	95.2	98.0	103.6	102.0	101.3	99.5	97.3	103.1	98.7	125.6	100.2
AVGE	89.9	85.4	97.0	99.6	102.9	102.9	99.8	100.6	97.6	102.6	101.0	120.9	

TABLE TOTAL- 14400.8

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P. 9, SERIES P204

B 9. REPLACEMENT VALUES FOR EXTREME SI RATIOS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	S.D.
1953	*******	*******	*******	*******	*******	*******	*******	*******	*******	101.1	*******	120.3	1.3
1954	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	1.3
1955	*******	*******	*******	100.1	*******	*******	*******	*******	98.5	*******	*******	*******	1.3
1956	89.7	*******	97.2	99.6	*******	102.8	99.8	*******	*******	*******	*******	*******	1.4
1957	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	1.5
1958	*******	*******	*******	*******	103.6	*******	*******	*******	*******	*******	*******	*******	1.5
1959	*******	*******	*******	*******	*******	*******	*******	*******	*******	101.8	101.1	*******	1.4
1960	*******	*******	*******	99.4	102.8	*******	*******	*******	*******	*******	*******	*******	1.5
1961	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	1.4
1962	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	1.5
1963	*******	*******	*******	*******	*******	*******	*******	*******	96.4	*******	*******	*******	1.5
1964	*******	84.5	*******	*******	*******	*******	*******	*******	*******	103.2	120.6		1.5

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.10, SERIES P204

B10. SEASONAL FACTORS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1953	89.4	85.9	97.4	100.2	102.0	103.0	100.7	99.7	98.8	101.1	100.3	121.2	100.0
1954	89.6	86.0	97.4	100.1	102.2	102.9	100.6	100.0	98.6	101.1	100.5	121.0	100.0
1955	89.8	85.9	97.2	100.0	102.3	102.7	100.4	100.6	98.3	101.1	100.8	121.0	100.0
1956	90.2	85.6	96.8	99.8	102.6	102.5	100.3	101.1	97.9	101.1	101.0	120.7	100.0
1957	90.8	85.5	96.4	99.7	102.9	102.5	100.2	101.4	97.6	101.3	101.1	120.7	100.0
1958	90.9	85.3	96.3	99.5	103.2	102.6	100.0	101.3	97.5	101.5	101.3	120.7	100.0
1959	90.8	85.1	96.5	99.3	103.3	102.8	99.7	101.0	97.5	101.9	101.6	120.9	100.0
1960	90.5	84.8	96.8	99.2	103.3	103.0	99.4	100.7	97.4	102.3	102.0	120.9	100.0
1961	90.1	84.7	97.1	99.1	103.3	103.0	99.2	100.6	97.2	102.6	102.5	120.8	100.0
1962	89.8	84.5	97.3	99.0	103.4	102.9	99.3	100.7	97.1	102.9	103.1	120.6	100.0
1963	89.6	84.3	97.3	98.8	103.4	102.7	99.4	100.8	96.9	103.1	103.4	120.5	100.0
1964	89.7	84.1	97.3	98.8	103.5	102.5	99.5	100.9	96.7	103.2	103.5	120.1	100.0

TABLE TOTAL- 14401.5

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.11, SERIES P204

B11. SEASONALLY ADJUSTED SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	14427.	14195.	14072.	14080.	14234.	14026.	14157.	14091.	14128.	14651.	13785.	13462.	169307.
1954	13634.	13892.	13936.	14007.	13818.	14123.	14178.	13766.	14216.	14383.	14323.	14662.	168940.
1955	14634.	14711.	15024.	15450.	14985.	15186.	15195.	15390.	16039.	15511.	15621.	15809.	183554.
1956	15211.	15826.	16035.	15106.	15704.	16169.	15333.	16011.	15914.	15951.	16332.	16054.	189646.
1957	16242.	16436.	16533.	16333.	16721.	16704.	16833.	17257.	16769.	16725.	16942.	16443.	199938.
1958	16808.	16152.	16062.	16447.	16832.	16184.	16594.	16781.	16737.	17099.	16817.	17543.	200056.
1959	17866.	17573.	17591.	17942.	18008.	18191.	18385.	17878.	18027.	18739.	17362.	17743.	215305.
1960	18029.	18661.	18208.	19123.	17958.	18360.	18170.	18025.	18331.	18236.	18020.	18323.	219444.
1961	17539.	17799.	18241.	17778.	17939.	18351.	18057.	18223.	18682.	18281.	18751.	18941.	218583.
1962	18941.	18979.	19717.	19298.	19570.	19682.	19278.	19790.	19429.	19996.	20280.	19998.	234957.
1963	20379.	20274.	20201.	20767.	20524.	20197.	20666.	20857.	19884.	20881.	20790.	20838.	246258.
1964	21364.	22304.	21073.	21448.	21745.	21691.	22263.	21588.	22048.	21907.	20989.	23072.	261493.
AVGE	17089.	17234.	17224.	17315.	17337.	17405.	17426.	17472.	17517.	17697.	17501.	17741.	

TABLE TOTAL- 2507482.

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.12, SERIES P204

B13. IRREGULAR SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	S.D.
1953	100.7	99.5	99.1	99.6	101.0	99.5	100.2	99.6	100.1	104.3	98.8	97.1	1.6
1954	98.8	100.6	100.5	100.6	98.9	100.9	101.2	97.9	100.5	100.8	99.4	100.6	1.0
1955	99.3	98.8	100.2	102.4	98.8	99.5	98.9	99.5	103.1	99.2	99.6	100.9	1.4
1956	97.2	101.2	102.6	96.6	100.3	103.0	97.2	101.0	99.9	99.5	101.3	99.0	2.0
1957	99.6	100.4	100.5	98.8	100.5	99.7	99.9	102.1	99.1	99.1	101.1	98.9	.9
1958	101.8	98.4	98.2	100.7	102.7	98.3	100.2	100.6	99.5	100.5	97.7	100.8	1.5
1959	101.8	99.3	98.7	100.2	100.1	100.6	101.2	98.5	99.7	104.1	96.6	98.4	1.8
1960	99.3	102.0	98.9	103.6	97.5	100.2	99.6	99.0	100.8	100.5	99.6	101.8	1.6
1961	97.8	99.5	101.9	99.0	99.5	101.2	99.1	99.4	101.4	98.6	100.5	100.6	1.2
1962	99.7	99.0	102.0	99.2	100.3	100.6	98.3	100.6	98.2	100.5	101.3	99.3	1.1
1963	100.7	99.9	99.2	101.7	100.2	98.4	100.7	101.6	96.7	101.0	99.7	98.9	1.4
1964	100.5	104.1	97.9	99.2	100.1	99.5	101.9	98.6	100.6	99.9	95.4	104.5	2.4
S.D.	1.4	1.6	1.5	1.8	1.2	1.2	1.3	1.3	1.5	1.9	1.9	1.8	

TABLE TOTAL- 14399.2 MEAN- 100.0 STD. DEVIATION- 1.6

B14. EXTREME IRREGULAR VALUES EXCLUDED FROM TRADING DAY REGRESSION
(OUTSIDE 2.5-SIGMA LIMIT)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1953	******	******	******	******	******	******	******	******	******	104.3	******	97.1	*******
1954	******	******	******	******	******	******	******	******	******	******	******	******	*******
1955	******	******	******	******	******	******	******	******	******	******	******	******	*******
1956	******	******	******	******	******	******	******	******	******	******	******	******	*******
1957	******	******	******	******	******	******	******	******	******	******	******	******	*******
1958	******	******	******	******	******	******	******	******	******	******	******	******	*******
1959	******	******	******	******	******	******	******	******	******	104.1	******	******	*******
1960	******	******	******	******	******	******	******	******	******	******	******	******	*******
1961	******	******	******	******	******	******	******	******	******	******	******	******	*******
1962	******	******	******	******	******	******	******	******	******	******	******	******	*******
1963	******	******	******	******	******	******	******	******	******	******	******	******	*******
1964	******	104.1	******	******	******	******	******	******	******	******	95.4	104.5	*******

B15. PRELIM TRADING DAY REGRESSION

	COMBINED WEIGHT	PRIOR WEIGHT	REGRESSION COEFF.	ST.ERROR (COMB.WT.)	T (1)	T (PRIOR WT.)
MONDAY	.984	1.000	-.016	.057	-.272	-.272
TUESDAY	1.019	1.000	.019	.056	.337	.337
WEDNESDAY	.984	1.000	-.016	.057	-.275	-.275
THURSDAY	.999	1.000	-.001	.058	-.015	-.015
FRIDAY	1.324	1.000	.324	.058	5.534*	5.534**
SATURDAY	1.219	1.000	.219	.058	3.783*	3.783**
SUNDAY	.470	1.000	-.530	.058	-9.207*	-9.207**

* COMBINED WT. SIGNIFICANTLY DIFFERENT FROM 1 AT 1 PER CENT LEVEL
** COMBINED WT. SIGNIFICANTLY DIFFERENT FROM PRIOR WEIGHT AT 1 PER CENT LEVEL

SOURCE OF VARIANCE	SUM OF SQUARES	DGRS.OF FREEDOM	MEAN SQUARE	F
REGRESSION	14.497	6.	2.416	40.711***
ERROR	7.834	132.	.059	
TOTAL	22.330	138.		

*** RESIDUAL TRADING DAY VARIATION PRESENT AT THE 1 PER CENT LEVEL

STANDARD ERRORS OF TRADING DAY ADJUSTMENT FACTORS DERIVED FROM REGRESSION COEFFICIENTS

31-DAY MONTHS-	.17
30-DAY MONTHS-	.18
29-DAY MONTHS-	.20
28-DAY MONTHS-	.00

B16. TRADING DAY ADJUSTMENT FACTORS DERIVED FROM REGRESSION COEFFICIENTS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1953	101.7	99.1	98.3	99.9	100.0	100.0	101.0	98.9	100.0	101.7	98.2	100.0	99.9
1954	100.0	99.1	100.0	101.1	98.9	100.0	101.7	98.3	99.9	100.0	100.0	101.0	100.0
1955	98.9	99.1	100.0	101.8	98.3	99.9	100.0	100.0	101.1	98.9	100.0	101.7	100.0
1956	98.3	102.6	101.7	98.2	100.0	101.8	98.3	101.0	99.0	100.0	101.1	98.9	100.1
1957	100.0	99.1	100.0	100.0	101.0	99.0	100.0	101.7	98.2	100.0	101.8	98.3	99.9
1958	101.0	99.1	98.9	100.0	101.7	98.2	100.0	100.0	100.0	101.0	99.0	100.0	99.9
1959	101.7	99.1	98.3	99.9	100.0	100.0	101.0	98.9	100.0	101.7	98.2	100.0	99.9
1960	100.0	102.6	100.0	101.8	98.3	99.9	100.0	100.0	101.1	98.9	100.0	101.7	100.4
1961	98.3	99.1	101.0	99.0	100.0	101.1	98.9	100.0	101.8	98.3	99.9	100.0	99.8
1962	100.0	99.1	101.7	98.2	100.0	101.8	98.3	101.0	99.0	100.0	101.1	98.9	99.9
1963	100.0	99.1	100.0	100.0	101.0	99.0	100.0	101.7	98.2	100.0	101.8	98.3	99.9
1964	101.0	103.4	98.3	99.9	100.0	100.0	101.0	98.9	100.0	101.7	98.2	100.0	100.2

TABLE TOTAL- 14400.0

B17. PRELIM WEIGHTS FOR IRREGULAR COMPONENT
GRADUATION RANGE FROM 1.5 TO 2.5 SIGMA

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	S.D.
1953	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	100.0	.0	.8
1954	89.3	58.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.8
1955	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	1.1	100.0	100.0	100.0	.8
1956	100.0	83.5	100.0	42.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.8
1957	100.0	83.7	100.0	94.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.8
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	89.5	100.0	.8
1959	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	20.3	26.3	.7
1960	100.0	100.0	84.9	.0	100.0	100.0	100.0	100.0	100.0	12.0	100.0	100.0	.7
1961	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.8
1962	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.8
1963	100.0	100.0	100.0	34.8	100.0	100.0	100.0	100.0	51.9	100.0	.0	100.0	.8
1964	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	9.8	.0	.0	.8

B18. TRADING-DAY ADJUSTMENT FACTORS FROM COMBINED DAILY WEIGHTS
(SAME AS TABLE B16.)

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.18, SERIES P204

B19. ADJUSTED* ORIGINAL SERIES
*ADJUSTED BY...TRADING DAY ADJUSTMENT FACTORS DERIVED FROM REGRESSION COEFFICIENTS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	12681.	12307.	13948.	14123.	14514.	14440.	14110.	14194.	13950.	14564.	14084.	16313.	169229.
1954	12208.	12055.	13581.	13876.	14266.	14531.	14014.	14009.	14020.	14532.	14399.	17564.	169055.
1955	13287.	12755.	14608.	15175.	15598.	15609.	15255.	15487.	15597.	15852.	15749.	18795.	183766.
1956	13964.	13208.	15260.	15353.	16108.	16284.	15648.	16028.	15745.	16136.	16317.	19586.	189638.
1957	14740.	14184.	15938.	16283.	17036.	17293.	16871.	17189.	16676.	16948.	16828.	20187.	200173.
1958	15136.	13906.	15628.	16360.	17066.	16911.	16595.	16993.	16324.	17190.	17217.	21182.	200508.
1959	15946.	15095.	17260.	17831.	18592.	18706.	18152.	18246.	17568.	18767.	17962.	21452.	215576.
1960	16305.	15428.	17631.	18636.	18868.	18928.	18058.	18160.	17658.	18846.	18383.	21772.	218674.
1961	16076.	15206.	17540.	17802.	18539.	18706.	18113.	18323.	17835.	19085.	19235.	22871.	219332.
1962	17014.	16185.	18863.	19451.	20224.	19894.	19469.	19725.	19060.	20584.	20688.	24384.	235541.
1963	18259.	17240.	19645.	20516.	21020.	20954.	20548.	20657.	19624.	21526.	21112.	25538.	246638.
1964	18966.	18136.	20856.	21198.	22499.	22239.	21928.	22010.	21311.	22217.	22122.	27717.	261197.
AVGE	15382.	14642.	16730.	17217.	17861.	17875.	17397.	17585.	17114.	18021.	17841.	21447.	

TABLE TOTAL- 2509326. MEAN- 17426. STD. DEVIATION- 2841.

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.19, SERIES P204

C 1. ADJUSTED* ORIGINAL SERIES MODIFIED BY PRELIM WEIGHTS
*ADJUSTED BY...TRADING DAY ADJUSTMENT FACTORS DERIVED FROM REGRESSION COEFFICIENTS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	12681.	12307.	13948.	14123.	14514.	14440.	14110.	14194.	13950.	14202.	14084.	16800.	169354.
1954	12225.	11980.	13581.	13876.	14266.	14531.	14014.	14009.	14020.	14532.	14399.	17564.	168997.
1955	13287.	12755.	14608.	15175.	15598.	15609.	15255.	15487.	15299.	15852.	15749.	18795.	183468.
1956	13964.	13237.	15260.	15503.	16108.	16284.	15648.	16028.	15745.	16136.	16317.	19586.	189817.
1957	14740.	14154.	15938.	16294.	17036.	17293.	16871.	17189.	16676.	16948.	16828.	20187.	200154.
1958	15136.	13906.	15628.	16360.	17066.	16911.	16595.	16993.	16324.	17190.	17241.	21182.	200531.
1959	15946.	15095.	17260.	17831.	18592.	18706.	18152.	18246.	17568.	18347.	18197.	21706.	215646.
1960	16305.	15428.	17660.	18307.	18868.	18928.	18058.	18160.	17658.	18587.	18383.	21772.	218116.
1961	16076.	15206.	17540.	17802.	18539.	18706.	18113.	18323.	17835.	19085.	19235.	22871.	219332.
1962	17014.	16185.	18863.	19451.	20224.	19894.	19469.	19725.	19060.	20584.	20688.	24384.	235541.
1963	18259.	17240.	19645.	20298.	21020.	20954.	20548.	20657.	19769.	21526.	21563.	25538.	247017.
1964	18966.	18136.	20856.	21198.	22499.	22239.	21928.	22010.	21311.	22593.	22763.	26525.	261022.
AVGE	15383.	14636.	16732.	17185.	17861.	17875.	17397.	17585.	17101.	17965.	17954.	21409.	

TABLE TOTAL- 2508992.

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.20, SERIES P204

C 2. TREND CYCLE- CENTERED 12-TERM MOVING AVERAGE

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	*******	*******	*******	*******	*******	*******	14094.	14061.	14032.	14007.	13986.	13980.	84160.
1954	13979.	13968.	13963.	13979.	14006.	14051.	14127.	14204.	14279.	14376.	14485.	14586.	170004.
1955	14682.	14796.	14911.	15019.	15130.	15238.	15317.	15366.	15413.	15454.	15489.	15538.	182351.
1956	15582.	15621.	15663.	15693.	15728.	15785.	15850.	15921.	15987.	16049.	16120.	16201.	190201.
1957	16294.	16393.	16480.	16553.	16608.	16654.	16696.	16702.	16679.	16669.	16673.	16658.	199060.
1958	16631.	16611.	16588.	16584.	16611.	16669.	16745.	16828.	16945.	17075.	17200.	17338.	201824.
1959	17478.	17595.	17699.	17799.	17887.	17949.	17985.	18014.	18045.	18081.	18113.	18134.	214778.
1960	18139.	18131.	18132.	18145.	18163.	18174.	18167.	18148.	18134.	18108.	18073.	18050.	217563.
1961	18043.	18052.	18066.	18094.	18151.	18232.	18317.	18397.	18493.	18616.	18755.	18875.	220090.
1962	18981.	19096.	19205.	19319.	19442.	19565.	19680.	19776.	19853.	19921.	19989.	20066.	234893.
1963	20155.	20239.	20308.	20376.	20452.	20537.	20614.	20681.	20769.	20857.	20956.	21071.	247015.
1964	21182.	21296.	21416.	21525.	21620.	21711.	*******	*******	*******	*******	*******	*******	128750.
AVGE	17377.	17436.	17494.	17553.	17618.	17688.	17054.	17100.	17148.	17201.	17258.	17318.	

TABLE TOTAL- 2290688.

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.21, SERIES P204

C 4. MODIFIED SI RATIOS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1953	*******	*******	*******	*******	*******	*******	100.1	100.9	99.4	101.4	100.7	120.2	103.8
1954	87.4	85.8	97.3	99.3	101.9	103.4	99.2	98.6	98.2	101.1	99.4	120.4	99.3
1955	90.5	86.2	98.0	101.0	103.1	102.4	99.6	100.8	99.3	102.6	101.7	121.0	100.5
1956	89.6	84.7	97.4	98.8	102.4	103.2	98.7	100.7	98.5	100.5	101.2	120.9	99.7
1957	90.5	86.3	96.7	98.4	102.6	103.8	101.0	102.9	100.0	101.7	100.9	121.2	100.5
1958	91.0	83.7	94.2	98.7	102.7	101.4	99.1	101.0	96.3	100.7	100.2	122.2	99.3
1959	91.2	85.8	97.5	100.2	103.9	104.2	100.9	101.3	97.4	101.5	100.5	119.7	100.3
1960	89.9	85.1	97.4	100.9	103.9	104.2	99.4	100.1	97.4	102.6	101.7	120.6	100.3
1961	89.1	84.2	97.1	98.4	102.1	102.6	98.9	99.6	96.4	102.5	102.6	121.2	99.6
1962	89.6	84.8	98.2	100.7	104.0	101.7	98.9	99.7	96.0	103.3	103.5	121.5	100.2
1963	90.6	85.2	96.7	99.6	102.8	102.0	99.7	99.9	95.2	103.2	102.9	121.2	99.9
1964	89.5	85.2	97.4	98.5	104.1	102.4	*******	*******	*******	*******	*******	*******	96.2
AVGE	89.9	85.2	97.1	99.5	103.0	102.9	99.6	100.5	97.6	101.9	101.4	120.9	

TABLE TOTAL- 13194.9

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.22, SERIES P204

C 5. SEASONAL FACTORS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1953	89.2	85.9	97.7	100.0	102.6	103.1	99.8	100.1	99.0	101.6	100.5	120.6	100.0
1954	89.2	85.9	97.7	100.0	102.6	103.1	99.6	100.1	98.9	101.6	100.6	120.7	100.0
1955	89.6	85.8	97.5	99.7	102.6	103.0	99.5	100.5	98.9	101.6	100.9	120.8	100.0
1956	90.0	85.4	97.0	99.3	102.6	103.0	99.5	101.0	98.7	101.4	101.0	121.1	100.0
1957	90.5	85.3	96.5	99.0	102.7	103.0	99.9	101.5	98.5	101.3	100.8	121.1	100.0
1958	90.6	85.0	96.2	99.2	103.1	103.1	100.0	101.4	97.8	101.3	100.7	121.0	100.0
1959	90.5	85.0	96.6	99.6	103.3	103.3	100.0	101.0	97.3	101.7	100.9	120.7	100.0
1960	90.1	84.9	97.2	100.0	103.4	103.2	99.5	100.3	96.9	102.2	101.7	120.9	100.0
1961	89.9	84.9	97.5	99.9	103.3	102.9	99.3	100.0	96.5	102.7	102.4	121.0	100.0
1962	89.8	84.9	97.6	99.8	103.4	102.4	99.2	99.8	96.1	103.0	102.9	121.3	100.0
1963	90.0	85.0	97.4	99.5	103.4	102.2	99.3	99.8	95.8	103.2	103.1	121.4	100.0
1964	90.0	85.1	97.3	99.4	103.6	102.2	99.3	99.8	95.8	103.2	103.1	121.4	100.0

TABLE TOTAL- 14401.3

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.23, SERIES P204

C 6. SEASONALLY ADJUSTED SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	14216.	14332.	14274.	14118.	14147.	14007.	14142.	14180.	14089.	13976.	14016.	13933.	169429.
1954	13704.	13951.	13899.	13871.	13905.	14096.	14073.	13995.	14175.	14304.	14308.	14556.	168837.
1955	14836.	14868.	14975.	15215.	15210.	15150.	15332.	15411.	15463.	15603.	15604.	15556.	183223.
1956	15523.	15491.	15726.	15614.	15696.	15807.	15723.	15872.	15949.	15921.	16159.	16175.	189656.
1957	16290.	16595.	16517.	16458.	16581.	16789.	16892.	16931.	16939.	16735.	16687.	16670.	200083.
1958	16703.	16361.	16242.	16485.	16552.	16396.	16596.	16757.	16697.	16971.	17121.	17500.	200380.
1959	17617.	17752.	17864.	17902.	18002.	18102.	18157.	18071.	18048.	18044.	18027.	17976.	215564.
1960	18096.	18173.	18174.	18311.	18243.	18334.	18140.	18101.	18221.	18184.	18080.	18014.	218071.
1961	17891.	17911.	17984.	17819.	17950.	18181.	18231.	18327.	18474.	18581.	18782.	18899.	219029.
1962	18944.	19066.	19334.	19483.	19558.	19433.	19627.	19765.	19838.	19975.	20097.	20101.	235220.
1963	20298.	20280.	20171.	20393.	20323.	20511.	20699.	20696.	20639.	20864.	20911.	21043.	246828.
1964	21070.	21306.	21434.	21330.	21724.	21769.	22089.	22052.	22248.	21898.	22075.	21856.	260851.
AVGE	17099.	17174.	17216.	17250.	17324.	17381.	17475.	17513.	17565.	17588.	17655.	17690.	

TABLE TOTAL- 2507171.

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.24, SERIES P204

C 7. TREND CYCLE - HENDERSON CURVE
13-TERM MOVING AVERAGE SELECTED. I/C RATIO IS 1.16

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	14277.	14246.	14212.	14175.	14143.	14121.	14109.	14096.	14069.	14022.	13965.	13909.	169345.
1954	13870.	13861.	13878.	13908.	13950.	13994.	14036.	14089.	14168.	14272.	14406.	14567.	168998.
1955	14736.	14888.	15014.	15113.	15189.	15258.	15334.	15412.	15479.	15530.	15559.	15567.	183079.
1956	15571.	15585.	15612.	15652.	15699.	15746.	15795.	15847.	15915.	16005.	16112.	16225.	189764.
1957	16329.	16419.	16500.	16583.	16672.	16761.	16830.	16871.	16873.	16824.	16735.	16634.	200031.
1958	16541.	16465.	16421.	16412.	16438.	16493.	16573.	16678.	16812.	16987.	17191.	17395.	200405.
1959	17580.	17738.	17862.	17954.	18022.	18069.	18092.	18087.	18066.	18041.	18032.	18048.	215590.
1960	18091.	18151.	18206.	18243.	18254.	18244.	18223.	18196.	18160.	18119.	18071.	18012.	217969.
1961	17952.	17909.	17900.	17934.	18002.	18098.	18214.	18345.	18478.	18605.	18729.	18866.	219033.
1962	19010.	19149.	19278.	19390.	19485.	19570.	19652.	19742.	19850.	19965.	20070.	20149.	235309.
1963	20203.	20244.	20289.	20345.	20417.	20499.	20587.	20672.	20748.	20830.	20920.	21019.	246773.
1964	21127.	21244.	21368.	21515.	21677.	21838.	21965.	22040.	22067.	22054.	22024.	21987.	260906.
AVGE	17107.	17158.	17212.	17269.	17329.	17391.	17451.	17506.	17557.	17605.	17651.	17698.	

TABLE TOTAL- 2507202.

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.25, SERIES P204

C 9. MODIFIED SI RATIOS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1953	88.8	86.4	98.1	99.6	102.6	102.3	100.0	100.7	99.2	101.3	100.9	120.8	100.1
1954	88.1	86.4	97.9	99.8	102.3	103.8	99.8	99.4	99.0	101.8	100.0	120.6	99.9
1955	90.2	85.7	97.3	100.4	102.7	102.3	99.5	100.5	98.8	102.1	101.2	120.7	100.1
1956	89.7	84.9	97.7	99.0	102.6	103.4	99.1	101.1	98.9	100.8	101.3	120.7	99.9
1957	90.3	86.2	96.6	98.3	102.2	103.2	100.2	101.9	98.8	100.7	100.6	121.4	100.0
1958	91.5	84.5	95.2	99.7	103.8	102.5	100.1	101.9	97.1	101.2	100.3	121.8	100.0
1959	90.7	85.1	96.6	99.3	103.2	103.5	100.3	100.9	97.2	101.7	100.9	120.3	100.0
1960	90.1	85.0	97.0	100.4	103.4	103.8	99.1	99.8	97.2	102.6	101.7	120.9	100.1
1961	89.5	84.9	98.0	99.3	103.0	103.4	99.4	99.9	96.5	102.6	102.7	121.2	100.0
1962	89.5	84.5	97.8	100.3	103.8	101.7	99.1	99.9	96.0	103.1	103.1	121.0	100.0
1963	90.4	85.2	96.8	99.8	103.0	102.2	99.8	99.9	95.3	103.3	103.1	121.5	100.0
1964	89.8	85.4	97.6	98.5	103.8	101.8	99.8	99.9	96.6	102.4	103.4	120.6	100.0
AVGE	89.9	85.3	97.2	99.5	103.0	102.8	99.7	100.5	97.6	102.0	101.6	121.0	

TABLE TOTAL- 14400.9

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.26, SERIES P204

C10. SEASONAL FACTORS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1953	89.1	86.0	97.7	99.8	102.5	102.9	99.7	100.3	98.9	101.6	100.7	120.6	100.0
1954	89.3	86.0	97.7	99.7	102.5	102.9	99.7	100.5	98.9	101.5	100.8	120.7	100.0
1955	89.6	85.8	97.4	99.5	102.6	103.0	99.7	100.7	98.8	101.4	100.8	120.9	100.0
1956	89.9	85.5	97.0	99.4	102.7	103.0	99.8	101.0	98.6	101.3	100.8	120.9	100.0
1957	90.3	85.3	96.7	99.4	102.9	103.1	99.8	101.1	98.2	101.4	100.8	121.0	100.0
1958	90.4	85.2	96.7	99.4	103.0	103.2	99.8	101.1	97.8	101.5	101.0	121.0	100.0
1959	90.4	85.0	96.8	99.5	103.2	103.2	99.7	100.8	97.4	101.8	101.3	121.0	100.0
1960	90.2	85.0	97.0	99.7	103.3	103.0	99.7	100.5	96.9	102.2	101.7	121.0	100.0
1961	90.1	84.9	97.3	99.8	103.4	102.8	99.5	100.1	96.5	102.5	102.2	121.0	100.0
1962	90.0	85.0	97.5	99.7	103.4	102.6	99.5	100.0	96.3	102.8	102.7	121.1	100.0
1963	89.8	85.0	97.5	99.5	103.4	102.3	99.5	99.9	96.2	102.9	103.0	121.1	100.0
1964	89.8	85.0	97.5	99.5	103.4	102.1	99.5	99.9	96.0	102.9	103.1	121.1	100.0

TABLE TOTAL- 14400.8

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.27, SERIES P204

C11. SEASONALLY ADJUSTED SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	14478.	14190.	14028.	14146.	14164.	14039.	14300.	14001.	14101.	14592.	13728.	13522.	169289.
1954	13679.	13898.	13896.	14071.	13768.	14119.	14309.	13709.	14163.	14327.	14293.	14696.	168928.
1955	14678.	14734.	14995.	15521.	14945.	15144.	15310.	15374.	15952.	15463.	15626.	15816.	183558.
1956	15268.	15842.	16005.	15168.	15688.	16095.	15419.	16032.	15810.	15916.	16367.	16024.	189635.
1957	16327.	16479.	16481.	16387.	16722.	16598.	16900.	17298.	16673.	16723.	16993.	16401.	199982.
1958	16901.	16182.	15996.	16466.	16857.	16093.	16626.	16817.	16689.	17105.	16870.	17500.	200103.
1959	17953.	17597.	17533.	17905.	18025.	18134.	18379.	17906.	18046.	18760.	17411.	17728.	215379.
1960	18076.	18631.	18179.	19031.	17962.	18362.	18127.	18067.	18422.	18247.	18072.	18307.	219482.
1961	17547.	17748.	18214.	17656.	17930.	18393.	18007.	18301.	18816.	18300.	18806.	18916.	218634.
1962	18906.	18869.	19687.	19155.	19569.	19746.	19233.	19929.	19587.	20016.	20354.	19924.	234976.
1963	20334.	20109.	20159.	20612.	20530.	20273.	20640.	21040.	20036.	20923.	20864.	20725.	246245.
1964	21330.	22075.	21030.	21295.	21763.	21780.	22245.	21801.	22192.	21967.	21067.	22894.	261439.
AVGE	17123.	17196.	17184.	17284.	17327.	17398.	17458.	17523.	17541.	17695.	17537.	17704.	

TABLE TOTAL- 2507649.

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.28, SERIES P204

C13. IRREGULAR SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	S.D.
1953	101.4	99.6	98.7	99.8	100.1	99.4	101.4	99.3	100.2	104.1	98.3	97.2	1.7
1954	98.6	100.3	100.1	101.2	98.7	100.9	101.9	97.3	100.0	100.4	99.2	100.9	1.2
1955	99.6	99.0	99.9	102.7	98.4	99.3	99.8	99.8	103.1	99.6	100.4	101.6	1.4
1956	98.1	101.6	102.5	96.9	99.9	102.2	97.6	101.2	99.3	99.4	101.6	98.8	1.8
1957	100.0	100.4	99.9	98.8	100.3	99.0	100.4	102.5	98.8	99.4	101.5	98.6	1.1
1958	102.2	98.3	97.4	100.3	102.5	97.6	100.3	100.8	99.3	100.7	98.1	100.6	1.6
1959	102.1	99.2	98.2	99.7	100.0	100.4	101.6	99.0	99.9	104.0	96.6	98.2	1.9
1960	99.9	102.6	99.8	104.3	98.4	100.6	99.5	99.3	101.4	100.7	100.0	101.6	1.7
1961	97.7	99.1	101.8	98.4	99.6	101.6	98.9	99.8	101.8	98.4	100.4	100.3	1.3
1962	99.5	98.5	102.1	98.8	100.4	100.9	97.9	100.9	98.7	100.3	101.4	98.9	1.3
1963	100.6	99.3	99.4	101.3	100.6	98.9	100.3	101.8	96.6	100.4	99.7	98.6	1.3
1964	101.0	103.9	98.4	99.0	100.4	99.7	101.3	98.9	100.6	99.6	95.7	104.1	2.2
S.D.	1.4	1.7	1.5	1.9	1.1	1.2	1.4	1.4	1.6	1.8	1.9	1.8	

TABLE TOTAL- 14402.4 MEAN- 100.0 STD. DEVIATION- 1.6

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.29, SERIES P204

C14. EXTREME IRREGULAR VALUES EXCLUDED FROM TRADING DAY REGRESSION
(OUTSIDE 2.5-SIGMA LIMIT)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1953	******	******	******	******	******	******	******	******	******	104.1	******	97.2	*******
1954	******	******	******	******	******	******	******	******	******	******	******	******	*******
1955	******	******	******	******	******	******	******	******	103.1	******	******	******	*******
1956	******	******	******	******	******	******	******	******	******	******	******	******	*******
1957	******	******	******	******	******	******	******	******	******	******	******	******	*******
1958	******	******	******	******	******	******	******	******	******	******	******	******	*******
1959	******	******	******	******	******	******	******	******	******	104.0	******	98.2	*******
1960	******	******	******	104.3	******	******	******	******	******	100.7	******	******	*******
1961	******	******	******	******	******	******	******	******	******	******	******	******	*******
1962	******	******	******	******	******	******	******	******	******	******	******	******	*******
1963	******	******	******	******	******	******	******	******	******	******	99.7	******	*******
1964	******	******	******	******	******	******	******	******	******	99.6	95.7	104.1	*******

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.30, SERIES P204

C15. FINAL TRADING DAY REGRESSION

	COMBINED WEIGHT	PRIOR WEIGHT	REGRESSION COEFF.	ST.ERROR (COMB.WT.)	T (1)	T (PRIOR WT.)
MONDAY	.946	1.000	-.054	.041	-1.334	-1.334
TUESDAY	1.061	1.000	.061	.040	1.526	1.526
WEDNESDAY	.964	1.000	-.036	.041	-.896	-.896
THURSDAY	1.024	1.000	.024	.042	.570	.570
FRIDAY	1.349	1.000	.349	.042	8.268*	8.268**
SATURDAY	1.252	1.000	.252	.041	6.154*	6.154**
SUNDAY	.405	1.000	-.595	.041	-14.456*	-14.456**

* COMBINED WT. SIGNIFICANTLY DIFFERENT FROM 1 AT 1 PER CENT LEVEL
** COMBINED WT. SIGNIFICANTLY DIFFERENT FROM PRIOR WEIGHT AT 1 PER CENT LEVEL

SOURCE OF VARIANCE	SUM OF SQUARES	DGRS.OF FREEDOM	MEAN SQUARE	F
REGRESSION	17.608	6.	2.935	99.903***
ERROR	3.731	127.	.029	
TOTAL	21.339	133.		

*** RESIDUAL TRADING DAY VARIATION PRESENT AT THE 1 PER CENT LEVEL

STANDARD ERRORS OF TRADING DAY ADJUSTMENT FACTORS DERIVED FROM REGRESSION COEFFICIENTS

31-DAY MONTHS-	.12
30-DAY MONTHS-	.13
29-DAY MONTHS-	.14
28-DAY MONTHS-	.00

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.31, SERIES P204

C16. TRADING DAY ADJUSTMENT FACTORS DERIVED FROM REGRESSION COEFFICIENTS

C16A. REGRESSION COEFFICIENTS - MON TUE WED THUR FRI SAT SUN
.946 1.061 .964 1.024 1.349 1.252 .405

C16B. REGRESSION TRADING DAY ADJUSTMENT FACTORS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1953	102.0	99.1	98.1	100.0	100.0	100.0	101.1	98.7	100.1	102.0	97.8	100.2	99.9
1954	100.0	99.1	99.9	101.2	98.7	100.1	102.0	98.1	100.0	100.0	100.0	101.1	100.0
1955	98.7	99.1	100.2	102.0	98.1	100.0	100.0	99.9	101.2	98.7	100.1	102.0	100.0
1956	98.1	102.5	102.0	97.8	100.2	102.0	98.1	101.1	98.9	99.9	101.2	98.7	100.0
1957	100.2	99.1	100.0	100.0	101.1	98.9	99.9	102.0	97.8	100.2	102.0	98.1	99.9
1958	101.1	99.1	98.7	100.1	102.0	97.8	100.2	100.0	100.0	101.1	98.9	99.9	99.9
1959	102.0	99.1	98.1	100.0	100.0	100.0	101.1	98.7	100.1	102.0	97.8	100.2	99.9
1960	100.0	102.5	100.2	102.0	98.1	100.0	100.0	99.9	101.2	98.7	100.1	102.0	100.4
1961	98.1	99.1	101.1	98.9	99.9	101.2	98.7	100.2	102.0	98.1	100.0	100.0	99.8
1962	99.9	99.1	102.0	97.8	100.2	102.0	98.1	101.1	98.9	99.9	101.2	98.7	99.9
1963	100.2	99.1	100.0	100.0	101.1	98.9	99.9	102.0	97.8	100.2	102.0	98.1	99.9
1964	101.1	103.5	98.1	100.0	100.0	100.0	101.1	98.7	100.1	102.0	97.8	100.2	100.2

TABLE TOTAL- 14400.1

C16C. REGRESSION TRADING DAY ADJUSTMENT FACTORS, ONE YEAR AHEAD

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1965	100.0	99.1	99.9	101.2	98.7	100.1	102.0	98.1	100.0	100.0	100.0	101.1	100.0

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.32, SERIES P204

C17. FINAL WEIGHTS FOR IRREGULAR COMPONENT
GRADUATION RANGE FROM 1.5 TO 2.5 SIGMA

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	S.D.
1953	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	100.0	.0	.6
1954	29.0	65.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.6
1955	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	100.0	100.0	100.0	.6
1956	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.6
1957	100.0	40.7	100.0	50.4	100.0	100.0	100.0	100.0	84.1	100.0	100.0	100.0	.6
1958	65.9	100.0	25.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.6
1959	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	20.2	.0	.6
1960	100.0	100.0	100.0	.0	100.0	100.0	100.0	100.0	100.0	.0	100.0	100.0	.5
1961	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.5
1962	100.0	100.0	100.0	48.9	100.0	27.4	100.0	100.0	100.0	100.0	100.0	100.0	.5
1963	100.0	100.0	100.0	.0	100.0	100.0	100.0	100.0	.0	100.0	.0	100.0	.5
1964	100.0	100.0	100.0	48.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.5

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.33, SERIES P204

C18. TRADING-DAY ADJUSTMENT FACTORS FROM COMBINED DAILY WEIGHTS
(SAME AS TABLE C16.)

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.34, SERIES P204

C19. ADJUSTED* ORIGINAL SERIES
*ADJUSTED BY...TRADING DAY ADJUSTMENT FACTORS DERIVED FROM REGRESSION COEFFICIENTS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	12648.	12307.	13976.	14121.	14518.	14439.	14097.	14228.	13940.	14526.	14134.	16288.	169222.
1954	12211.	12055.	13589.	13853.	14300.	14521.	13977.	14037.	14018.	14536.	14398.	17548.	169041.
1955	13318.	12755.	14586.	15147.	15630.	15606.	15258.	15496.	15572.	15889.	15738.	18746.	183740.
1956	13993.	13217.	15220.	15408.	16083.	16254.	15680.	16013.	15762.	16145.	16291.	19632.	189698.
1957	14718.	14184.	15942.	16281.	17020.	17312.	16880.	17145.	16735.	16922.	16797.	20228.	200164.
1958	15122.	13906.	15665.	16348.	17021.	16971.	16570.	16997.	16322.	17174.	17236.	21194.	200526.
1959	15905.	15095.	17295.	17828.	18597.	18704.	18135.	18289.	17555.	18718.	18025.	21420.	215565.
1960	16309.	15449.	17604.	18601.	18907.	18926.	18063.	18170.	17629.	18890.	18370.	21715.	218633.
1961	16109.	15206.	17524.	17822.	18550.	18675.	18155.	18296.	17802.	19124.	19232.	22877.	219370.
1962	17023.	16185.	18814.	19520.	20194.	19857.	19508.	19706.	19081.	20595.	20654.	24441.	235579.
1963	18232.	17240.	19650.	20513.	21000.	20977.	20559.	20603.	19693.	21494.	21072.	25590.	246623.
1964	18948.	18116.	20899.	21195.	22504.	22237.	21907.	22061.	21295.	22159.	22201.	27675.	261196.
AVGE	15378.	14643.	16730.	17220.	17860.	17873.	17399.	17587.	17117.	18014.	17846.	21446.	
	TABLE TOTAL-	2509356.			MEAN-	17426.		STD. DEVIATION-		2842.			

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.35, SERIES P204

D 1. ADJUSTED* ORIGINAL SERIES MODIFIED BY FINAL WEIGHTS
*ADJUSTED BY...TRADING DAY ADJUSTMENT FACTORS DERIVED FROM REGRESSION COEFFICIENTS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	12648.	12307.	13976.	14121.	14518.	14439.	14097.	14228.	13940.	14240.	14134.	16781.	169429.
1954	12333.	12006.	13589.	13853.	14300.	14521.	13977.	14037.	14018.	14536.	14398.	17548.	169115.
1955	13318.	12755.	14586.	15147.	15630.	15606.	15258.	15496.	15298.	15889.	15738.	18746.	183466.
1956	13993.	13217.	15220.	15408.	16083.	16254.	15680.	16013.	15762.	16145.	16291.	19632.	189698.
1957	14718.	14078.	15942.	16380.	17020.	17312.	16880.	17145.	16709.	16922.	16797.	20228.	200131.
1958	15067.	13906.	15821.	16348.	17021.	16971.	16570.	16997.	16322.	17174.	17236.	21194.	200626.
1959	15905.	15095.	17295.	17828.	18597.	18704.	18135.	18289.	17555.	18363.	18216.	21841.	215822.
1960	16309.	15449.	17604.	18187.	18907.	18926.	18063.	18170.	17629.	18517.	18370.	21715.	217845.
1961	16109.	15206.	17524.	17822.	18550.	18675.	18155.	18296.	17802.	19124.	19232.	22877.	219370.
1962	17023.	16185.	18814.	19423.	20194.	20014.	19508.	19706.	19081.	20595.	20654.	24441.	235640.
1963	18232.	17240.	19650.	20252.	21000.	20977.	20559.	20603.	19952.	21494.	21552.	25590.	247100.
1964	18948.	18116.	20899.	21304.	22504.	22237.	21907.	22061.	21295.	22695.	22706.	26621.	261293.
AVGE	15384.	14630.	16743.	17173.	17860.	17886.	17399.	17587.	17114.	17974.	17944.	21434.	
	TABLE TOTAL-	2509533.											

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.36, SERIES P204

D 2. TREND CYCLE- CENTERED 12-TERM MOVING AVERAGE

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	*******	*******	*******	*******	*******	*******	14106.	14080.	14052.	14024.	14004.	13998.	84264.
1954	13997.	13984.	13979.	13995.	14018.	14061.	14134.	14206.	14279.	14374.	14484.	14584.	170095.
1955	14683.	14797.	14911.	15021.	15133.	15239.	15317.	15364.	15410.	15447.	15477.	15523.	182323.
1956	15568.	15607.	15648.	15678.	15711.	15771.	15838.	15904.	15970.	16041.	16121.	16204.	190060.
1957	16298.	16395.	16482.	16553.	16607.	16653.	16692.	16699.	16687.	16681.	16680.	16665.	199092.
1958	16638.	16619.	16597.	16591.	16620.	16679.	16754.	16838.	16949.	17072.	17200.	17337.	201895.
1959	17475.	17594.	17699.	17800.	17890.	17958.	18002.	18034.	18061.	18089.	18117.	18139.	214859.
1960	18145.	18137.	18135.	18145.	18158.	18159.	18145.	18127.	18113.	18095.	18065.	18039.	217465.
1961	18033.	18042.	18054.	18087.	18148.	18232.	18319.	18398.	18492.	18613.	18748.	18872.	220039.
1962	18985.	19100.	19212.	19326.	19447.	19571.	19687.	19781.	19860.	19929.	19998.	20071.	234968.
1963	20155.	20236.	20310.	20384.	20459.	20544.	20622.	20688.	20776.	20872.	20979.	21094.	247119.
1964	21203.	21319.	21436.	21542.	21640.	21731.	*******	*******	*******	*******	*******	*******	128872.
AVGE	17380.	17439.	17497.	17557.	17621.	17691.	17056.	17102.	17150.	17204.	17261.	17321.	
	TABLE TOTAL-	2291050.											

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.37, SERIES P204

D 4. MODIFIED SI RATIOS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1953	*******	*******	*******	*******	*******	*******	99.9	101.0	99.2	101.5	100.9	119.9	103.8
1954	88.1	85.9	97.2	99.0	102.0	103.3	98.9	98.8	98.2	101.1	99.4	120.3	99.3
1955	90.7	86.2	97.8	100.8	103.3	102.4	99.6	100.9	99.3	102.9	101.7	120.8	100.5
1956	89.9	84.7	97.3	98.3	102.4	103.1	99.0	100.7	98.7	100.6	101.1	121.2	99.7
1957	90.3	85.9	96.7	99.0	102.5	104.0	101.1	102.7	100.1	101.4	100.7	121.4	100.5
1958	90.6	83.7	95.3	98.5	102.4	101.8	98.9	100.9	96.3	100.6	100.2	122.2	99.3
1959	91.0	85.8	97.7	100.2	103.9	104.2	100.7	101.4	97.2	101.5	100.5	120.4	100.4
1960	89.9	85.2	97.1	100.2	104.1	104.2	99.5	100.2	97.3	102.3	101.7	120.4	100.2
1961	89.3	84.3	97.1	98.5	102.2	102.4	99.1	99.4	96.3	102.7	102.6	121.2	99.6
1962	89.7	84.7	97.9	100.5	103.8	102.3	99.1	99.6	96.1	103.3	103.3	121.8	100.2
1963	90.5	85.2	96.7	99.4	102.6	102.1	99.7	99.6	96.0	103.0	102.7	121.3	99.9
1964	89.4	85.0	97.5	98.9	104.0	102.3	*******	*******	*******	*******	*******	*******	96.2
AVGE	89.9	85.1	97.1	99.4	103.0	102.9	99.6	100.5	97.7	101.9	101.3	121.0	

TABLE TOTAL- 13195.0

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.38, SERIES P204

D 5. SEASONAL FACTORS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1953	89.6	85.9	97.6	99.7	102.7	103.0	99.6	100.2	98.9	101.7	100.6	120.4	100.0
1954	89.6	85.9	97.6	99.7	102.7	103.0	99.5	100.2	98.9	101.7	100.7	120.5	100.0
1955	89.9	85.7	97.4	99.5	102.6	103.0	99.5	100.6	99.0	101.7	100.9	120.8	100.0
1956	90.1	85.3	97.1	99.1	102.6	103.0	99.6	101.0	98.8	101.4	100.9	121.2	100.0
1957	90.4	85.1	96.7	99.0	102.7	103.1	99.9	101.5	98.5	101.2	100.7	121.3	100.0
1958	90.4	84.9	96.6	99.2	103.0	103.3	99.9	101.4	97.8	101.2	100.6	121.3	100.0
1959	90.3	85.0	96.9	99.5	103.3	103.4	99.9	101.0	97.3	101.6	100.9	121.0	100.0
1960	90.1	84.9	97.2	99.8	103.5	103.3	99.6	100.4	96.8	102.2	101.7	121.0	100.0
1961	89.9	84.9	97.4	99.7	103.3	103.0	99.5	99.9	96.6	102.7	102.4	121.1	100.0
1962	89.8	84.9	97.4	99.7	103.3	102.5	99.3	99.7	96.3	103.0	102.8	121.4	100.0
1963	89.9	85.0	97.3	99.5	103.3	102.3	99.4	99.6	96.1	103.1	103.0	121.5	100.0
1964	89.9	85.0	97.3	99.4	103.4	102.3	99.4	99.6	96.1	103.1	103.0	121.5	100.0

TABLE TOTAL- 14401.5

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.39, SERIES P204

D 6. SEASONALLY ADJUSTED SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	14114.	14328.	14320.	14157.	14133.	14018.	14156.	14195.	14091.	13996.	14052.	13940.	169500.
1954	13762.	13978.	13923.	13889.	13920.	14098.	14054.	14007.	14177.	14288.	14300.	14558.	168954.
1955	14821.	14877.	14970.	15221.	15228.	15157.	15337.	15410.	15454.	15622.	15598.	15520.	183215.
1956	15533.	15490.	15680.	15541.	15673.	15776.	15744.	15858.	15949.	15924.	16151.	16203.	189522.
1957	16284.	16541.	16484.	16543.	16578.	16795.	16896.	16897.	16960.	16717.	16675.	16677.	200047.
1958	16665.	16383.	16380.	16482.	16524.	16436.	16579.	16766.	16695.	16970.	17127.	17477.	200485.
1959	17604.	17760.	17857.	17918.	18010.	18091.	18149.	18111.	18050.	18072.	18045.	18054.	215720.
1960	18110.	18190.	18113.	18232.	18274.	18319.	18135.	18106.	18207.	18123.	18068.	17948.	217825.
1961	17918.	17904.	17989.	17870.	17956.	18136.	18251.	18310.	18435.	18620.	18789.	18886.	219065.
1962	18952.	19067.	19309.	19480.	19541.	19518.	19639.	19773.	19820.	19993.	20088.	20130.	235308.
1963	20281.	20290.	20185.	20352.	20326.	20508.	20687.	20683.	20756.	20843.	20932.	21059.	246902.
1964	21079.	21302.	21480.	21431.	21755.	21747.	22043.	22147.	22154.	22008.	22053.	21908.	261107.
AVGE	17094.	17176.	17224.	17260.	17326.	17383.	17473.	17522.	17562.	17598.	17657.	17697.	

TABLE TOTAL- 2507649.

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.40, SERIES P204

D 7. TREND CYCLE - HENDERSON CURVE
13-TERM MOVING AVERAGE SELECTED. I/C RATIO IS 1.02

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	14247.	14232.	14214.	14188.	14160.	14136.	14121.	14106.	14082.	14042.	13990.	13939.	169457.
1954	13902.	13892.	13904.	13927.	13960.	13998.	14035.	14085.	14162.	14266.	14399.	14561.	169093.
1955	14731.	14887.	15018.	15119.	15197.	15266.	15340.	15416.	15480.	15529.	15556.	15559.	183097.
1956	15555.	15560.	15579.	15617.	15668.	15723.	15781.	15845.	15919.	16008.	16110.	16219.	189583.
1957	16321.	16414.	16500.	16589.	16681.	16770.	16834.	16868.	16862.	16810.	16727.	16636.	200012.
1958	16555.	16490.	16452.	16441.	16459.	16504.	16576.	16676.	16810.	16984.	17185.	17388.	200521.
1959	17575.	17735.	17861.	17955.	18025.	18073.	18098.	18099.	18087.	18073.	18067.	18076.	215722.
1960	18105.	18147.	18189.	18219.	18232.	18230.	18213.	18183.	18140.	18091.	18041.	17990.	217780.
1961	17943.	17911.	17912.	17946.	18008.	18096.	18207.	18337.	18473.	18605.	18733.	18867.	219037.
1962	19006.	19144.	19274.	19393.	19497.	19587.	19670.	19757.	19859.	19970.	20073.	20153.	235382.
1963	20206.	20245.	20283.	20335.	20408.	20496.	20594.	20689.	20772.	20852.	20938.	21036.	246854.
1964	21149.	21271.	21403.	21549.	21704.	21854.	21972.	22045.	22076.	22072.	22051.	22023.	261169.
AVGE	17108.	17161.	17216.	17273.	17333.	17394.	17453.	17509.	17560.	17608.	17656.	17704.	

TABLE TOTAL- 2507706.

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.41, SERIES P204

D 8. FINAL UNMODIFIED SI RATIOS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1953	88.8	86.5	98.3	99.5	102.5	102.1	99.8	100.9	99.0	103.5	101.0	116.9	99.9
1954	87.8	86.8	97.7	99.5	102.4	103.7	99.6	99.7	99.0	101.9	100.0	120.5	99.9
1955	90.4	85.7	97.1	100.2	102.8	102.2	99.5	100.5	100.6	102.3	101.2	120.5	100.3
1956	90.0	84.9	97.7	98.7	102.7	103.4	99.4	101.1	99.0	100.9	101.1	121.0	100.0
1957	90.2	86.4	96.6	98.1	102.0	103.2	100.3	101.6	99.3	100.7	100.4	121.6	100.0
1958	91.3	84.3	95.2	99.4	103.4	102.8	100.0	101.9	97.1	101.1	100.3	121.9	99.9
1959	90.5	85.1	96.8	99.3	103.2	103.5	100.2	101.0	97.1	103.6	99.8	118.5	99.9
1960	90.1	85.1	96.8	102.1	103.7	103.8	99.2	99.9	97.2	104.4	101.8	120.7	100.4
1961	89.8	84.9	97.8	99.3	103.0	103.2	99.7	99.8	96.4	102.8	102.7	121.3	100.0
1962	89.6	84.5	97.6	100.7	103.6	101.4	99.2	99.7	96.1	103.1	102.9	121.3	100.0
1963	90.2	85.2	96.9	100.9	102.9	102.3	99.8	99.6	96.8	103.1	100.6	121.6	99.8
1964	89.6	85.2	97.6	98.4	103.7	101.8	99.7	100.1	96.5	100.4	100.7	125.7	99.9
AVGE	89.9	85.4	97.2	99.7	103.0	102.8	99.7	100.5	97.7	102.3	101.0	121.0	

TABLE TOTAL- 14400.2

STABLE SEASONALITY TEST

	SUM OF SQUARES	DGRS.OF FREEDOM	MEAN SQUARE	F
BETWEEN MONTHS	9511.609	11	864.692	698.367**
RESIDUAL	163.438	132	1.238	
TOTAL	9675.047	143		

**STABLE SEASONALITY PRESENT AT THE 1 PER CENT LEVEL

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.42, SERIES P204

D 9. FINAL REPLACEMENT VALUES FOR EXTREME SI RATIOS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1953	*******	*******	*******	*******	*******	*******	*******	*******	*******	101.4	*******	120.4	********
1954	88.7	86.4	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	********
1955	*******	*******	*******	*******	*******	*******	*******	*******	98.8	*******	*******	*******	********
1956	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	********
1957	*******	85.8	*******	98.7	*******	*******	*******	*******	99.1	*******	*******	*******	********
1958	91.0	*******	96.2	*******	*******	*******	*******	*******	*******	*******	*******	*******	********
1959	*******	*******	*******	*******	*******	*******	*******	*******	*******	101.6	100.8	120.8	********
1960	*******	*******	*******	99.8	*******	*******	*******	*******	*******	102.4	*******	*******	********
1961	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	********
1962	*******	*******	*******	100.2	*******	102.2	*******	*******	*******	*******	*******	*******	********
1963	*******	*******	*******	99.6	*******	*******	*******	*******	96.1	*******	102.9	*******	********
1964	*******	*******	*******	98.9	*******	*******	*******	*******	*******	102.8	103.0	120.9	********

D 9A. YEAR TO YEAR CHANGE IN IRREGULAR AND SEASONAL COMPONENTS AND MOVING SEASONALITY RATIO

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
I	.548	.590	.590	.571	.578	.704	.497	.542	.439	.435	.507	.358
S	.145	.139	.132	.051	.087	.127	.066	.155	.258	.168	.207	.083
RATIO	3.78	4.24	4.47	11.28	6.65	5.53	7.50	3.51	1.70	2.59	2.45	4.33

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.43, SERIES P204

D10. FINAL SEASONAL FACTORS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1953	89.4	86.0	97.7	99.5	102.6	102.8	99.6	100.4	98.9	101.7	100.8	120.5	100.0
1954	89.5	86.0	97.7	99.5	102.6	102.9	99.6	100.5	98.9	101.6	100.8	120.6	100.0
1955	89.8	85.7	97.5	99.4	102.6	103.0	99.6	100.7	98.9	101.5	100.8	120.9	100.0
1956	90.0	85.4	97.1	99.3	102.7	103.0	99.7	101.0	98.6	101.4	100.7	121.0	100.0
1957	90.3	85.2	96.9	99.3	102.8	103.2	99.8	101.1	98.2	101.3	100.8	121.2	100.0
1958	90.3	85.1	96.9	99.3	103.0	103.2	99.8	101.1	97.8	101.4	100.9	121.2	100.0
1959	90.3	85.0	96.9	99.4	103.2	103.2	99.8	100.8	97.3	101.7	101.2	121.2	100.0
1960	90.2	84.9	97.1	99.6	103.2	103.1	99.7	100.5	96.9	102.1	101.7	121.2	100.0
1961	90.0	84.9	97.2	99.6	103.3	102.9	99.6	100.1	96.5	102.5	102.1	121.1	100.0
1962	89.9	85.0	97.4	99.6	103.3	102.7	99.6	99.9	96.4	102.8	102.6	121.2	100.0
1963	89.8	84.9	97.4	99.5	103.3	102.4	99.6	99.8	96.3	102.9	102.8	121.3	100.0
1964	89.8	84.9	97.4	99.5	103.3	102.3	99.6	99.8	96.2	103.0	102.9	121.3	100.0

TABLE TOTAL- 14401.0 MEAN- 100.0 STD. DEVIATION- 8.2

D10A. SEASONAL FACTORS, ONE YEAR AHEAD

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1965	89.7	84.9	97.4	99.5	103.3	102.2	99.6	99.8	96.2	103.0	102.9	121.2	100.0

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.44, SERIES P204

D11. FINAL SEASONALLY ADJUSTED SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	14151.	14313.	14304.	14185.	14151.	14048.	14158.	14167.	14093.	14285.	14028.	13517.	169400.
1954	13641.	14023.	13913.	13926.	13940.	14117.	14034.	13963.	14168.	14308.	14289.	14550.	168873.
1955	14839.	14875.	14967.	15241.	15231.	15156.	15312.	15383.	15751.	15652.	15617.	15505.	183528.
1956	15551.	15469.	15673.	15521.	15667.	15778.	15720.	15860.	15985.	15924.	16175.	16222.	189544.
1957	16306.	16646.	16449.	16402.	16550.	16782.	16916.	16958.	17035.	16698.	16671.	16696.	200110.
1958	16739.	16345.	16173.	16468.	16531.	16440.	16597.	16816.	16684.	16929.	17075.	17489.	200286.
1959	17621.	17766.	17843.	17935.	18029.	18115.	18178.	18139.	18036.	18400.	17804.	17674.	215539.
1960	18089.	18187.	18137.	18683.	18314.	18352.	18117.	18088.	18196.	18493.	18065.	17921.	218641.
1961	17895.	17904.	18022.	17888.	17950.	18148.	18231.	18279.	18438.	18658.	18828.	18890.	219131.
1962	18927.	19039.	19315.	19597.	19543.	19340.	19591.	19730.	19791.	20033.	20129.	20159.	235194.
1963	20308.	20298.	20172.	20614.	20323.	20486.	20649.	20642.	20448.	20879.	20490.	21099.	246407.
1964	21111.	21333.	21451.	21304.	21781.	21747.	21998.	22107.	22132.	21519.	21578.	22823.	260884.
AVGE	17098.	17183.	17202.	17314.	17334.	17376.	17458.	17511.	17563.	17648.	17562.	17712.	

TABLE TOTAL- 2507537. MEAN- 17413. STD. DEVIATION- 2348.

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.45, SERIES P204

D12. FINAL TREND CYCLE - HENDERSON CURVE
13-TERM MOVING AVERAGE SELECTED. I/C RATIO IS 1.12

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	14255.	14242.	14224.	14199.	14172.	14147.	14127.	14106.	14076.	14032.	13981.	13931.	169490.
1954	13899.	13896.	13913.	13939.	13970.	14001.	14030.	14075.	14151.	14257.	14396.	14563.	169090.
1955	14736.	14893.	15023.	15122.	15195.	15261.	15335.	15414.	15483.	15538.	15567.	15567.	183132.
1956	15556.	15553.	15567.	15604.	15656.	15715.	15779.	15850.	15931.	16026.	16129.	16232.	189599.
1957	16323.	16400.	16475.	16562.	16663.	16767.	16848.	16892.	16889.	16832.	16738.	16634.	200023.
1958	16542.	16471.	16432.	16428.	16457.	16512.	16588.	16683.	16807.	16973.	17170.	17375.	200437.
1959	17569.	17737.	17871.	17971.	18045.	18095.	18117.	18108.	18080.	18051.	18036.	18046.	215725.
1960	18086.	18147.	18206.	18245.	18258.	18248.	18220.	18181.	18130.	18076.	18027.	17980.	217804.
1961	17938.	17913.	17919.	17954.	18011.	18093.	18202.	18335.	18479.	18616.	18743.	18874.	219077.
1962	19009.	19142.	19270.	19386.	19483.	19565.	19644.	19735.	19850.	19979.	20095.	20181.	235339.
1963	20231.	20260.	20287.	20328.	20390.	20470.	20565.	20664.	20760.	20858.	20959.	21064.	246835.
1964	21175.	21290.	21411.	21547.	21692.	21835.	21951.	22028.	22068.	22076.	22068.	22055.	261196.
AVGE	17110.	17162.	17217.	17274.	17333.	17392.	17450.	17506.	17559.	17609.	17659.	17708.	

TABLE TOTAL- 2507745. MEAN- 17415. STD. DEVIATION- 2349.

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.46, SERIES P204

D13. FINAL IRREGULAR SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	S.D.
1953	99.3	100.5	100.6	99.9	99.9	99.3	100.2	100.4	100.1	101.8	100.3	97.0	1.1
1954	98.1	100.9	100.0	99.9	99.8	100.8	100.0	99.2	100.1	100.4	99.3	99.9	.7
1955	100.7	99.9	99.6	100.8	100.2	99.3	99.9	99.8	101.7	100.7	100.3	99.6	.7
1956	100.0	99.5	100.7	99.5	100.1	100.4	99.6	100.1	100.3	99.4	100.3	99.9	.4
1957	99.9	101.5	99.8	99.0	99.3	100.1	100.4	100.4	100.9	99.2	99.6	100.4	.7
1958	101.2	99.2	98.4	100.2	100.5	99.6	100.1	100.8	99.3	99.7	99.5	100.7	.8
1959	100.3	100.2	99.8	99.8	99.9	100.1	100.3	100.2	99.8	101.9	98.7	97.9	.9
1960	100.0	100.2	99.6	102.4	100.3	100.6	99.4	99.5	100.4	102.3	100.2	99.7	1.0
1961	99.8	99.9	100.6	99.6	99.7	100.3	100.2	99.7	99.8	100.2	100.5	100.1	.3
1962	99.6	99.5	100.2	101.1	100.3	98.8	99.7	100.0	99.7	100.3	100.2	99.9	.5
1963	100.4	100.2	99.4	101.4	99.7	100.1	100.4	99.9	98.5	100.1	97.8	100.2	.9
1964	99.7	100.2	100.2	98.9	100.4	99.6	100.2	100.4	100.3	97.5	97.8	103.5	1.5
S.D.	.7	.6	.6	1.0	.3	.6	.3	.4	.8	1.3	1.0	1.5	

TABLE TOTAL- 14399.3 MEAN- 100.0 STD. DEVIATION- .8

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.47, SERIES P204

E 1. ORIGINAL SERIES MODIFIED FOR EXTREMES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	12903.	12198.	13711.	14115.	14520.	14442.	14250.	14045.	13952.	14557.	13828.	16813.	169334.
1954	12213.	11948.	13576.	14025.	14116.	14533.	14259.	13771.	14012.	14538.	14401.	17738.	169130.
1955	13147.	12642.	14609.	15450.	15333.	15600.	15261.	15481.	15497.	15685.	15751.	19124.	183580.
1956	13727.	13551.	15527.	15074.	16109.	16579.	15382.	16187.	15582.	16130.	16493.	19380.	189721.
1957	14741.	14058.	15945.	16285.	17205.	17114.	16864.	17490.	16373.	16949.	17133.	19844.	200001.
1958	15286.	13783.	15464.	16362.	17364.	16603.	16596.	17000.	16326.	17360.	17039.	21174.	200357.
1959	16225.	14961.	16967.	17821.	18600.	18708.	18332.	18054.	17570.	18733.	17635.	21905.	215511.
1960	16312.	15829.	17632.	18528.	18548.	18918.	18066.	18153.	17848.	18228.	18385.	22153.	218599.
1961	15803.	15071.	17714.	17618.	18532.	18907.	17922.	18325.	18158.	18761.	19224.	22881.	218916.
1962	17007.	16042.	19193.	19097.	20226.	20254.	19138.	19920.	18863.	20576.	20911.	24127.	235354.
1963	18261.	17087.	19653.	20233.	21228.	20737.	20540.	21018.	19560.	21528.	21985.	25104.	246935.
1964	19154.	18758.	20502.	21186.	22508.	22242.	22145.	21778.	21313.	23190.	22213.	26786.	261776.
AVGE	15398.	14661.	16708.	17149.	17857.	17886.	17396.	17602.	17088.	18020.	17917.	21419.	

TABLE TOTAL- 2509215. MEAN- 17425. STD. DEVIATION- 2845.

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.48, SERIES P204

E 2. MODIFIED SEASONALLY ADJUSTED SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	14151.	14313.	14304.	14185.	14151.	14048.	14158.	14167.	14093.	14032.	14028.	13931.	169562.
1954	13641.	14023.	13913.	13926.	13940.	14117.	14034.	13963.	14168.	14308.	14289.	14550.	168873.
1955	14839.	14875.	14967.	15241.	15231.	15156.	15312.	15383.	15483.	15652.	15617.	15505.	183261.
1956	15551.	15469.	15673.	15521.	15667.	15778.	15720.	15860.	15985.	15924.	16175.	16222.	189544.
1957	16306.	16646.	16449.	16402.	16550.	16782.	16916.	16958.	17035.	16698.	16671.	16696.	200110.
1958	16739.	16345.	16173.	16468.	16531.	16440.	16597.	16816.	16684.	16929.	17075.	17489.	200286.
1959	17621.	17766.	17843.	17935.	18029.	18115.	18178.	18139.	18036.	18051.	17804.	18046.	215562.
1960	18089.	18187.	18137.	18245.	18314.	18352.	18117.	18088.	18196.	18076.	18065.	17921.	217785.
1961	17895.	17904.	18022.	17888.	17950.	18148.	18231.	18279.	18438.	18658.	18828.	18890.	219131.
1962	18927.	19039.	19315.	19597.	19543.	19340.	19591.	19730.	19791.	20033.	20129.	20159.	235194.
1963	20308.	20298.	20172.	20328.	20323.	20486.	20649.	20642.	20760.	20879.	20959.	21099.	246901.
1964	21111.	21333.	21451.	21304.	21781.	21747.	21998.	22107.	22132.	22076.	22068.	22055.	261163.
AVGE	17098.	17183.	17202.	17253.	17334.	17376.	17458.	17511.	17567.	17610.	17642.	17714.	

TABLE TOTAL- 2507372. MEAN- 17412. STD. DEVIATION- 2351.

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.49, SERIES P204

E 3. MODIFIED IRREGULAR SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	S.D.
1953	99.3	100.5	100.6	99.9	99.9	99.3	100.2	100.4	100.1	100.0	100.3	100.0	.4
1954	98.1	100.9	100.0	99.9	99.8	100.8	100.0	99.2	100.1	100.4	99.3	99.9	.7
1955	100.7	99.9	99.6	100.8	100.2	99.3	99.9	99.8	100.0	100.7	100.3	99.6	.5
1956	100.0	99.5	100.7	99.5	100.1	100.4	99.6	100.1	100.3	99.4	100.3	99.9	.4
1957	99.9	101.5	99.8	99.0	99.3	100.1	100.4	100.4	100.9	99.2	99.6	100.4	.7
1958	101.2	99.2	98.4	100.2	100.5	99.6	100.1	100.8	99.3	99.7	99.5	100.7	.8
1959	100.3	100.2	99.8	99.8	99.9	100.1	100.3	100.2	99.8	100.0	98.7	100.0	.4
1960	100.0	100.2	99.6	100.0	100.3	100.6	99.4	99.5	100.4	100.0	100.2	99.7	.4
1961	99.8	99.9	100.6	99.6	99.7	100.3	100.2	99.7	99.8	100.2	100.5	100.1	.3
1962	99.6	99.5	100.2	101.1	100.3	98.8	99.7	100.0	99.7	100.3	100.2	99.9	.5
1963	100.4	100.2	99.4	100.0	99.7	100.1	100.4	99.9	100.0	100.1	100.0	100.2	.3
1964	99.7	100.2	100.2	98.9	100.4	99.6	100.2	100.4	100.3	100.0	100.0	100.0	.4
S.D.	.7	.6	.6	.6	.3	.6	.3	.4	.4	.4	.5	.3	

TABLE TOTAL- 14397.8 MEAN- 100.0 STD. DEVIATION- .5

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.50, SERIES P204

E 4. RATIOS OF ANNUAL TOTALS: ORIGINAL AND ADJUSTED SERIES

YEAR	UNMODIFIED	MODIFIED
1953	99.8	99.9
1954	100.2	100.2
1955	100.2	100.2
1956	100.1	100.1
1957	99.9	99.9
1958	100.0	100.0
1959	99.9	100.0
1960	100.4	100.4
1961	99.9	99.9
1962	100.1	100.1
1963	100.0	100.0
1964	100.3	100.2

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.51, SERIES P204

E 5. MONTH-TO-MONTH CHANGES IN ORIGINAL SERIES

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1953	******	-5.5	12.4	2.9	2.9	-.5	-1.3	-1.4	-.7	6.2	-6.7	18.0	2.4
1954	-25.1	-2.2	13.6	3.3	.6	3.0	-1.9	-3.4	1.8	3.8	-.9	23.2	1.3
1955	-25.9	-3.8	15.6	5.8	-.8	1.7	-2.2	1.4	1.8	-.5	.4	21.4	1.3
1956	-28.2	-1.3	14.6	-2.9	6.9	2.9	-7.2	5.2	-3.7	3.5	2.3	17.5	.8
1957	-23.9	-4.6	13.4	2.1	5.6	-.5	-1.5	3.7	-6.4	3.5	1.1	15.8	.7
1958	-23.0	-9.8	12.2	5.8	6.1	-4.4	-.0	2.4	-4.0	6.3	-1.8	24.3	1.2
1959	-23.4	-7.8	13.4	5.0	4.4	.6	-2.0	-1.5	-2.7	8.7	-7.6	21.7	.7
1960	-24.0	-3.0	11.4	7.6	-2.2	2.0	-4.5	.5	-1.7	4.5	-1.4	20.5	.8
1961	-28.7	-4.6	17.5	-.5	5.2	2.0	-5.2	2.2	-.9	3.3	2.5	19.0	1.0
1962	-25.7	-5.7	19.6	-.5	5.9	.1	-5.5	4.1	-5.3	9.1	1.6	15.4	1.1
1963	-24.3	-6.4	15.0	4.4	3.5	-2.3	-.9	2.3	-8.3	11.7	-.2	16.8	.9
1964	-23.7	-2.1	9.3	3.3	6.2	-1.2	-.4	-1.7	-2.1	6.1	-3.9	27.6	1.5
AVGE	-25.1	-4.7	14.0	3.0	3.7	.3	-2.7	1.2	-2.7	5.5	-1.2	20.1	

TABLE TOTAL- 161.1

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.52' SERIES P204

E 6. MONTH-TO-MONTH CHANGES IN FINAL SEASONALLY ADJUSTED SERIES (D11.)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVGE
1953	*******	1.1	-.1	-.8	-.2	-.7	.8	.1	-.5	1.4	-1.8	-3.6	-.4
1954	.9	2.8	-.8	.1	.1	1.3	-.6	-.5	1.5	1.0	-.1	1.8	.6
1955	2.0	.2	.6	1.8	-.1	-.5	1.0	.5	2.4	-.6	-.2	-.7	.5
1956	.3	-.5	1.3	-1.0	.9	.7	-.4	.9	.8	-.4	1.6	.3	.4
1957	.5	2.1	-1.2	-.3	.9	1.4	.8	.2	.5	-2.0	-.2	.2	.2
1958	.3	-2.4	-1.0	1.8	.4	-.5	1.0	1.3	-.8	1.5	.9	2.4	.4
1959	.8	.8	.4	.5	.5	.5	.3	-.2	-.6	2.0	-3.2	-.7	.1
1960	2.3	.5	-.3	3.0	-2.0	.2	-1.3	-.2	.6	1.6	-2.3	-.8	.1
1961	-.1	.1	.7	-.7	.3	1.1	.5	.3	.9	1.2	.9	.3	.4
1962	.2	.6	1.4	1.5	-.3	-1.0	1.3	.7	.3	1.2	.5	.1	.5
1963	.7	-.0	-.6	2.2	-1.4	.8	.8	-.0	-.9	2.1	-1.9	3.0	.4
1964	.1	1.1	.6	-.7	2.2	-.2	1.2	.5	.1	-2.8	.3	5.8	.7
AVGE	.7	.5	.1	.6	.1	.3	.4	.3	.3	.5	-.5	.7	
	TABLE TOTAL-		49.0										

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.53' SERIES P204

F 1. MCD MOVING AVERAGE
MCD IS 3

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	*******	14256.	14267.	14214.	14128.	14119.	14124.	14139.	14182.	14135.	13943.	13729.	155237.
1954	13727.	13859.	13954.	13926.	13994.	14030.	14038.	14055.	14146.	14255.	14383.	14559.	168928.
1955	14754.	14893.	15028.	15146.	15209.	15233.	15284.	15482.	15595.	15673.	15591.	15558.	183447.
1956	15508.	15564.	15554.	15620.	15655.	15722.	15786.	15855.	15923.	16028.	16107.	16234.	189558.
1957	16391.	16467.	16499.	16467.	16578.	16749.	16885.	16970.	16897.	16801.	16689.	16702.	200096.
1958	16593.	16419.	16329.	16391.	16480.	16523.	16618.	16699.	16810.	16896.	17164.	17395.	200316.
1959	17625.	17743.	17848.	17936.	18026.	18107.	18144.	18117.	18191.	18080.	17959.	17856.	215633.
1960	17983.	18137.	18336.	18378.	18450.	18261.	18186.	18134.	18259.	18251.	18160.	17960.	218494.
1961	17907.	17940.	17938.	17953.	17995.	18109.	18219.	18316.	18459.	18642.	18792.	18882.	219152.
1962	18952.	19094.	19317.	19485.	19493.	19491.	19554.	19704.	19851.	19984.	20107.	20199.	235232.
1963	20255.	20259.	20361.	20370.	20474.	20486.	20592.	20580.	20656.	20606.	20823.	20900.	246362.
1964	21181.	21298.	21363.	21512.	21610.	21842.	21951.	22079.	21919.	21743.	21973.	*******	238472.
AVGE	17353.	17161.	17233.	17283.	17341.	17389.	17448.	17511.	17574.	17591.	17641.	17270.	
	TABLE TOTAL-		2470925.										

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.54' SERIES P204

F 2. SUMMARY MEASURES

AVERAGE PER CENT CHANGE WITHOUT REGARD TO SIGN OVER INDICATED SPAN

SPAN IN MONTHS	B1 0	D11 CI	D13 I	D12 C	D10 S	A2 P	C18 TD*	F1 MCD	E1 MOD.O	E2 MOD.CI	E3 MOD.I
1	7.40	.97	.84	1.42	6.72	.00	1.85	.55	7.30	.72	.57
2	9.01	1.37	.96	1.84	8.75	.00	1.74	1.00	9.07	1.10	.65
3	10.32	1.67	.89	1.25	9.87	.00	1.07	1.44	10.29	1.42	.57
4	9.90	1.99	.84	1.66	9.41	.00	1.78	1.83	9.93	1.77	.54
5	9.22	2.38	.83	2.06	8.75	.00	1.50	2.21	9.18	2.17	.54
6	9.07	2.69	.79	2.44	8.07	.00	1.24	2.58	9.04	2.56	.55
7	10.11	3.04	.82	2.82	8.66	.00	1.86	2.94	10.07	2.87	.53
9	11.43	3.72	.90	3.53	10.20	.00	1.05	3.62	11.39	3.57	.57
11	9.33	4.32	.79	4.18	7.41	.00	1.46	4.23	9.22	4.22	.53
12	4.91	4.61	.82	4.48	.14	.00	1.40	4.50	4.83	4.58	.60

RELATIVE CONTRIBUTIONS OF COMPONENTS TO VARIANCE IN ORIGINAL SERIES

SPAN IN MONTHS	B13 I	D12 C	D10 S	A2 P	C18 TD*	TOTAL	RATIO (X100)
1	1.44	.35	91.32	.00	6.89	100.00	90.51
2	1.14	.86	94.29	.00	3.71	100.00	99.84
3	.78	1.55	96.53	.00	1.14	100.00	94.82
4	.73	2.89	93.06	.00	3.32	100.00	97.12
5	.82	5.05	91.45	.00	2.68	100.00	98.58
6	.85	8.16	88.90	.00	2.09	100.00	89.00
7	.76	9.12	86.15	.00	3.97	100.00	85.11
9	.68	10.52	87.87	.00	.93	100.00	90.68
11	.84	23.21	73.13	.00	2.82	100.00	86.33
12	2.96	88.36	.08	.00	8.60	100.00	94.33

AVERAGE DURATION OF RUN

CI	I	C	MCD
2.20	1.64	13.00	4.03

I/C RATIO FOR MONTHS SPAN

1	2	3	4	5	6	7	8	9	10	11	12
2.03	1.15	.71	.50	.40	.32	.29	.26	.25	.22	.19	.18

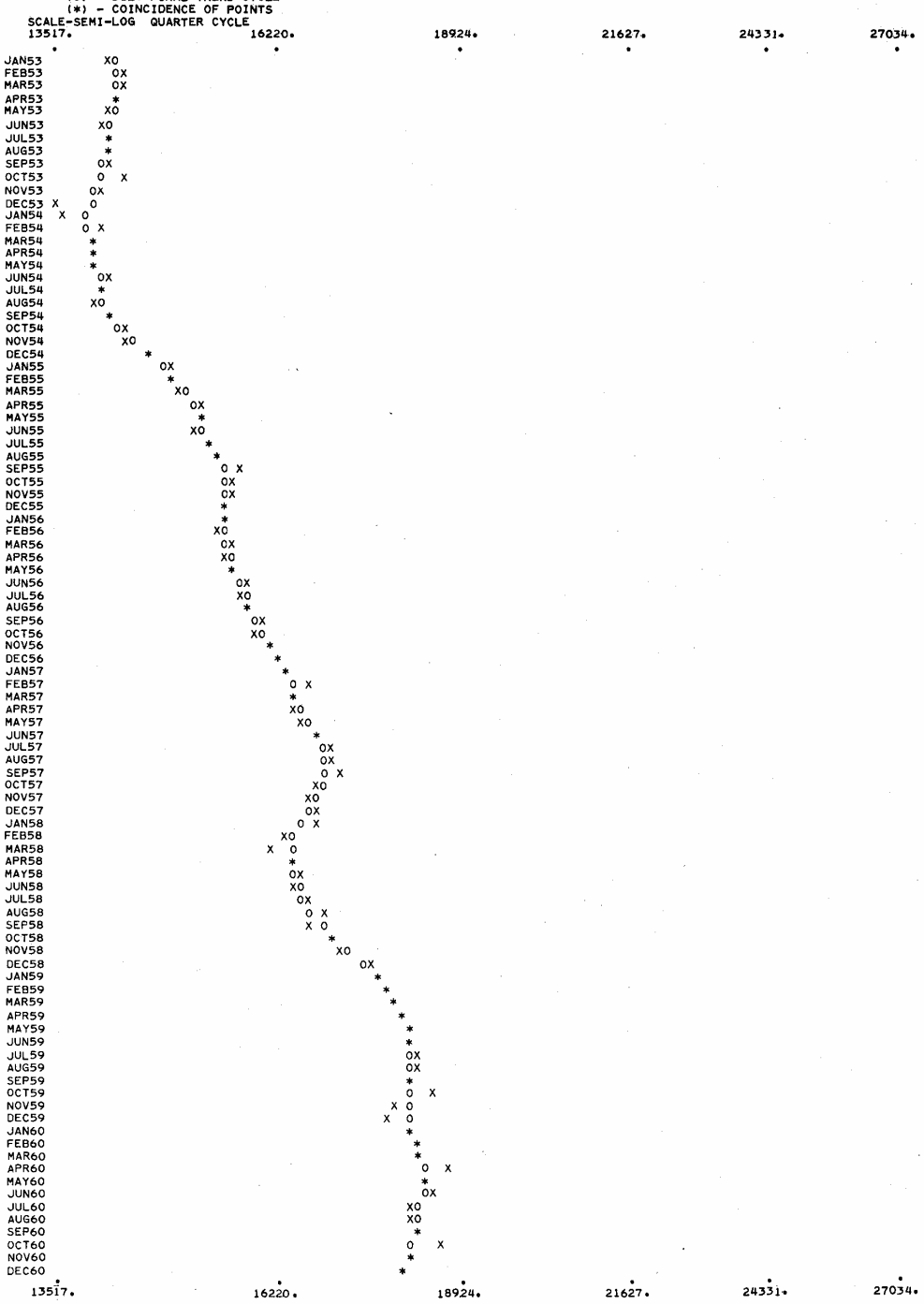
MONTHS FOR CYCLICAL DOMINANCE 3

AVERAGE PER CENT CHANGE WITH REGARD TO SIGN AND STANDARD DEVIATION OVER INDICATED SPAN

SPAN IN MONTHS	B1 0 AVGE	B1 0 S.D.	D13 I AVGE	D13 I S.D.	D12 C AVGE	D12 C S.D.	D10 S AVGE	D10 S S.D.	D11 CI AVGE	D11 CI S.D.	F1 MCD AVGE	F1 MCD S.D.
1	1.13	10.62	.04	1.18	.31	.39	.77	10.26	.34	1.25	.31	.58
2	1.74	12.10	.02	1.33	.62	.78	1.12	11.95	.64	1.59	.62	1.03
3	2.14	12.99	-.01	1.19	.94	1.15	1.18	12.72	.94	1.74	.94	1.41
4	2.37	12.44	-.00	1.15	1.27	1.50	1.08	12.07	1.27	2.00	1.28	1.71
5	2.57	11.61	.00	1.17	1.61	1.83	.94	11.16	1.61	2.27	1.62	1.99
6	2.85	11.01	.01	1.08	1.95	2.13	.87	10.49	1.96	2.48	1.96	2.26
7	3.26	11.43	.00	1.11	2.30	2.41	.93	10.74	2.30	2.74	2.31	2.53
9	4.23	13.74	-.01	1.20	2.99	2.89	1.21	13.00	2.99	3.24	2.99	3.02
11	4.63	13.20	-.02	1.09	3.70	3.24	.89	12.20	3.69	3.57	3.72	3.34
12	4.11	4.16	-.00	1.09	4.06	3.37	-.00	.18	4.07	3.65	4.09	3.42

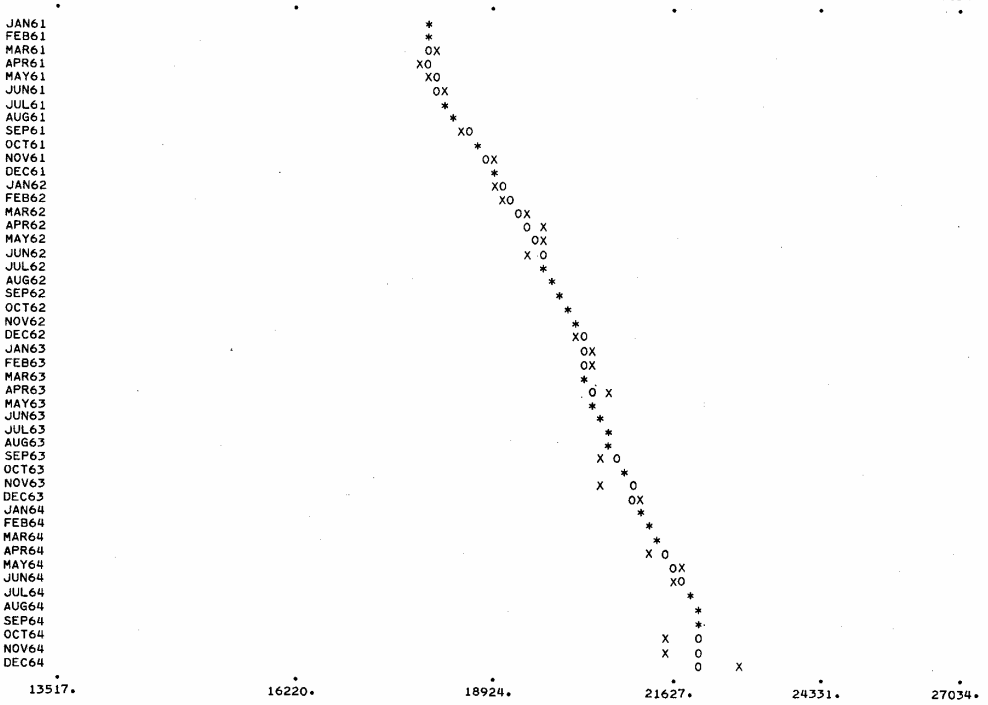
*(TRADING DAY ADJUSTMENT FACTORS WITHOUT LENGTH OF MONTH ADJUSTMENT)

G 1. CHART
(X) - D11. FINAL SEASONALLY ADJUSTED SERIES
(O) - D12. FINAL TREND CYCLE
(*) - COINCIDENCE OF POINTS
SCALE-SEMI-LOG QUARTER CYCLE



OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.55, SERIES P204

G 1. CHART
(X) - D11. FINAL SEASONALLY ADJUSTED SERIES
(O) - D12. FINAL TREND CYCLE
(*) - COINCIDENCE OF POINTS
SCALE-SEMI-LOG QUARTER CYCLE



OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.56, SERIES P204

```
G 2. CHART
       (X) - D 8. FINAL UNMODIFIED SI RATIOS
       (O) - D 9. FINAL SI RATIOS      MODIFIED FOR EXTREMES
       (+) - D10. FINAL SEASONAL FACTORS
       (*) - COINCIDENCE OF POINTS
  SCALE-ARITHMETIC
     84.       88.       92.       96.      100.      104.      108.      112.      116.      120.      124.      128.
      .         .         .         .         .         .         .         .         .         .         .         .
JANUARY
 1953              *+
 1954            X O +
 1955               + *
 1956                *
 1957                *+
 1958                 + *
 1959                 *
 1960                *
 1961               *+
 1962               *+
 1963               + *
 1964               *
 1965               +
      .         .         .         .         .         .         .         .         .         .         .         .
     84.       88.       92.       96.      100.      104.      108.      112.      116.      120.      124.      128.
```

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.57, SERIES P204

```
G 2. CHART
       (X) - D 8. FINAL UNMODIFIED SI RATIOS
       (O) - D 9. FINAL SI RATIOS      MODIFIED FOR EXTREMES
       (+) - D10. FINAL SEASONAL FACTORS
       (*) - COINCIDENCE OF POINTS
  SCALE-ARITHMETIC
     84.       88.       92.       96.      100.      104.      108.      112.      116.      120.      124.      128.
      .         .         .         .         .         .         .         .         .         .         .         .
FEBRUARY
 1953      +*
 1954      +OX
 1955     *
 1956   * +
 1957    +O X
 1958  * +
 1959   +*
 1960   +*
 1961   *
 1962  * +
 1963   +*
 1964   +*
 1965   +
      .         .         .         .         .         .         .         .         .         .         .         .
     84.       88.       92.       96.      100.      104.      108.      112.      116.      120.      124.      128.
```

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.58, SERIES P204

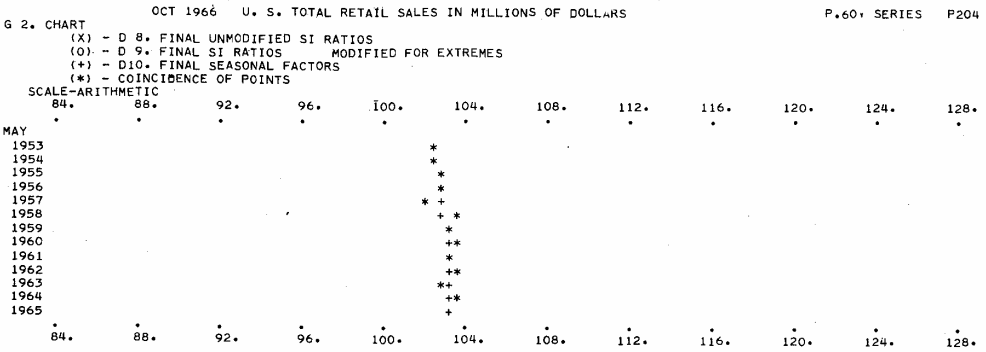
```
G 2. CHART
       (X) - D 8. FINAL UNMODIFIED SI RATIOS
       (O) - D 9. FINAL SI RATIOS      MODIFIED FOR EXTREMES
       (+) - D10. FINAL SEASONAL FACTORS
       (*) - COINCIDENCE OF POINTS
  SCALE-ARITHMETIC
     84.       88.       92.       96.      100.      104.      108.      112.      116.      120.      124.      128.
      .         .         .         .         .         .         .         .         .         .         .         .
MARCH
 1953                                + *
 1954                                *
 1955                               *+
 1956                               +*
 1957                              *
 1958                          X O +
 1959                              *
 1960                             *+
 1961                              + *
 1962                               *
 1963                              * +
 1964                               *
 1965                               +
      .         .         .         .         .         .         .         .         .         .         .         .
     84.       88.       92.       96.      100.      104.      108.      112.      116.      120.      124.      128.
```

OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.59, SERIES P204

```
G 2. CHART
       (X) - D 8. FINAL UNMODIFIED SI RATIOS
       (O) - D 9. FINAL SI RATIOS      MODIFIED FOR EXTREMES
       (+) - D10. FINAL SEASONAL FACTORS
       (*) - COINCIDENCE OF POINTS
  SCALE-ARITHMETIC
     84.       88.       92.       96.      100.      104.      108.      112.      116.      120.      124.      128.
      .         .         .         .         .         .         .         .         .         .         .         .
APRIL
 1953                                   *
 1954                                   *
 1955                                  + *
 1956                                 *+
 1957                              X O+
 1958                                 +*
 1959                                 *+
 1960                                  +O    X
 1961                                 *+
 1962                                  +O X
 1963                                  *  X
 1964                                XO +
 1965                                   +
      .         .         .         .         .         .         .         .         .         .         .         .
     84.       88.       92.       96.      100.      104.      108.      112.      116.      120.      124.      128.
```

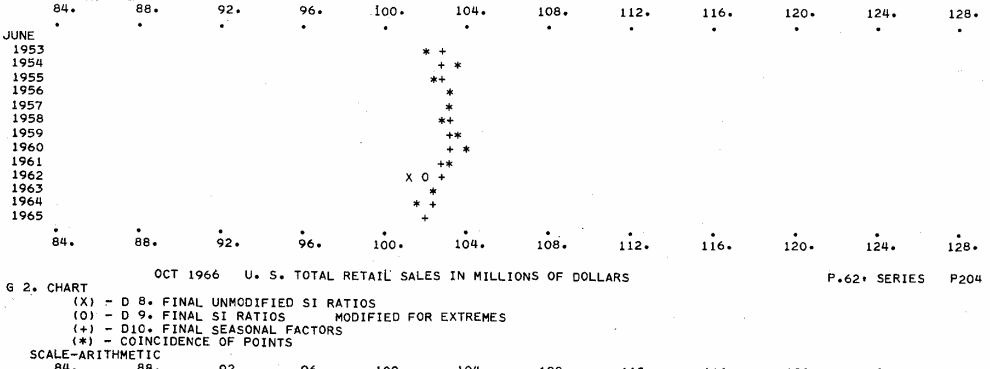
OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.60, SERIES P204

G 2. CHART
(X) - D 8. FINAL UNMODIFIED SI RATIOS
(O) - D 9. FINAL SI RATIOS MODIFIED FOR EXTREMES
(+) - D10. FINAL SEASONAL FACTORS
(*) - COINCIDENCE OF POINTS
SCALE-ARITHMETIC



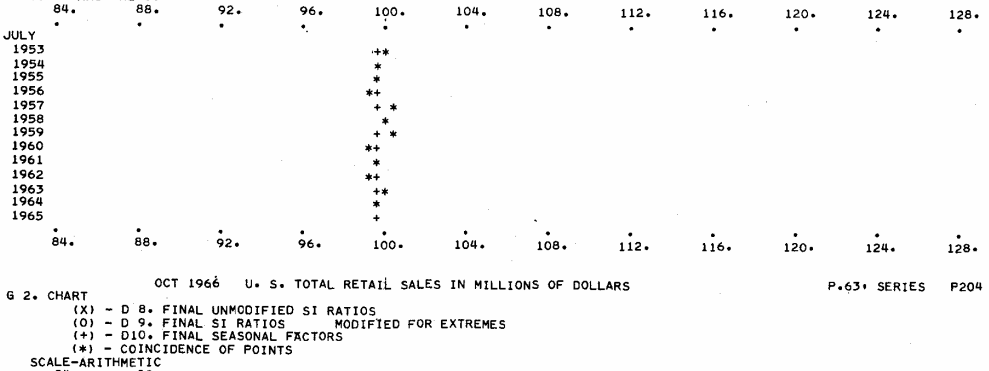
OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.61, SERIES P204

G 2. CHART
(X) - D 8. FINAL UNMODIFIED SI RATIOS
(O) - D 9. FINAL SI RATIOS MODIFIED FOR EXTREMES
(+) - D10. FINAL SEASONAL FACTORS
(*) - COINCIDENCE OF POINTS
SCALE-ARITHMETIC



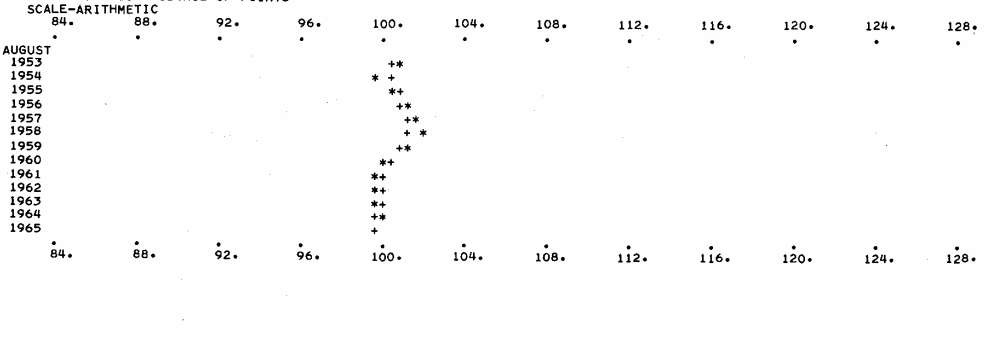
OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.62, SERIES P204

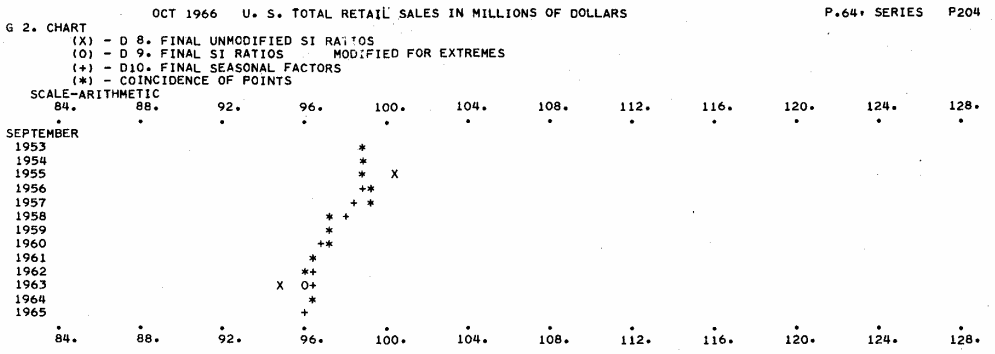
G 2. CHART
(X) - D 8. FINAL UNMODIFIED SI RATIOS
(O) - D 9. FINAL SI RATIOS MODIFIED FOR EXTREMES
(+) - D10. FINAL SEASONAL FACTORS
(*) - COINCIDENCE OF POINTS
SCALE-ARITHMETIC



OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.63, SERIES P204

G 2. CHART
(X) - D 8. FINAL UNMODIFIED SI RATIOS
(O) - D 9. FINAL SI RATIOS MODIFIED FOR EXTREMES
(+) - D10. FINAL SEASONAL FACTORS
(*) - COINCIDENCE OF POINTS
SCALE-ARITHMETIC




OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.64, SERIES P204
G 2. CHART
(X) - D 8. FINAL UNMODIFIED SI RATIOS
(O) - D 9. FINAL SI RATIOS MODIFIED FOR EXTREMES
(+) - D10. FINAL SEASONAL FACTORS
(*) - COINCIDENCE OF POINTS
SCALE-ARITHMETIC
84. 88. 92. 96. 100. 104. 108. 112. 116. 120. 124. 128.
SEPTEMBER
1953
1954
1955
1956
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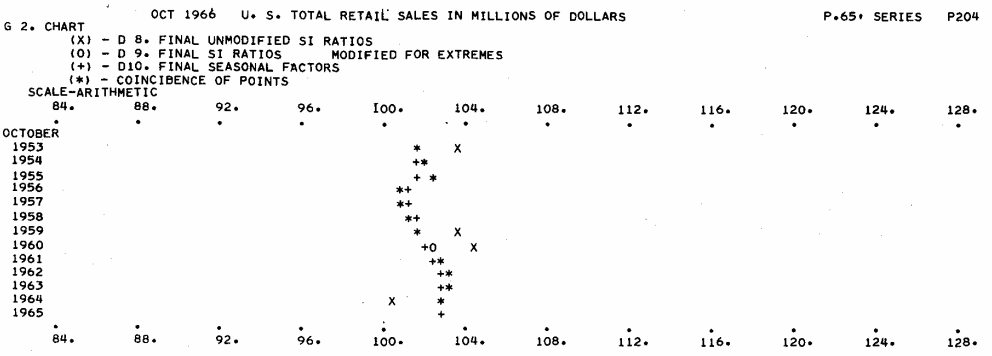
1963
1964
1965
84. 88. 92. 96. 100. 104. 108. 112. 116. 120. 124. 128.


OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.65, SERIES P204
G 2. CHART
(X) - D 8. FINAL UNMODIFIED SI RATIOS
(O) - D 9. FINAL SI RATIOS MODIFIED FOR EXTREMES
(+) - D10. FINAL SEASONAL FACTORS
(*) - COINCIBENCE OF POINTS
SCALE-ARITHMETIC
84. 88. 92. 96. 100. 104. 108. 112. 116. 120. 124. 128.
OCTOBER
1953
1954
1955
1956
1957
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1962
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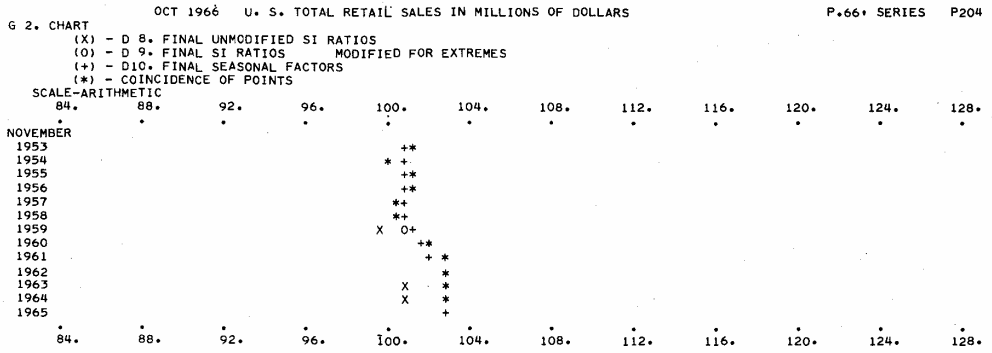
1965
84. 88. 92. 96. 100. 104. 108. 112. 116. 120. 124. 128.


OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.66, SERIES P204
G 2. CHART
(X) - D 8. FINAL UNMODIFIED SI RATIOS
(O) - D 9. FINAL SI RATIOS MODIFIED FOR EXTREMES
(+) - D10. FINAL SEASONAL FACTORS
(*) - COINCIDENCE OF POINTS
SCALE-ARITHMETIC
84. 88. 92. 96. 100. 104. 108. 112. 116. 120. 124. 128.
NOVEMBER
1953
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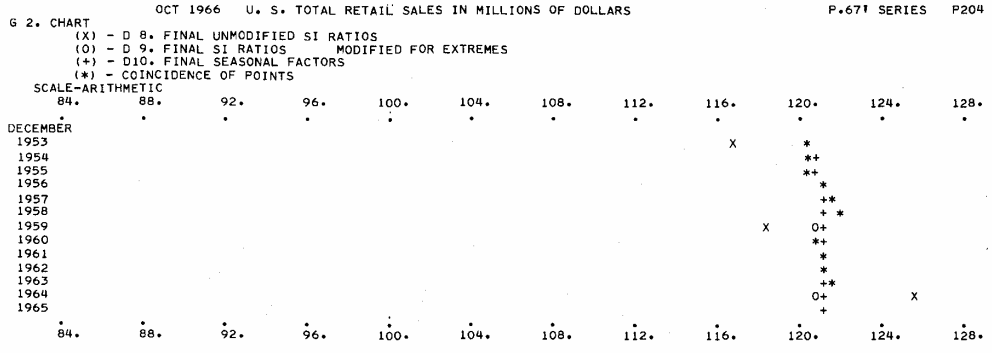
84. 88. 92. 96. 100. 104. 108. 112. 116. 120. 124. 128.


OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.67, SERIES P204
G 2. CHART
(X) - D 8. FINAL UNMODIFIED SI RATIOS
(O) - D 9. FINAL SI RATIOS MODIFIED FOR EXTREMES
(+) - D10. FINAL SEASONAL FACTORS
(*) - COINCIDENCE OF POINTS
SCALE-ARITHMETIC
84. 88. 92. 96. 100. 104. 108. 112. 116. 120. 124. 128.
DECEMBER
1953
1954
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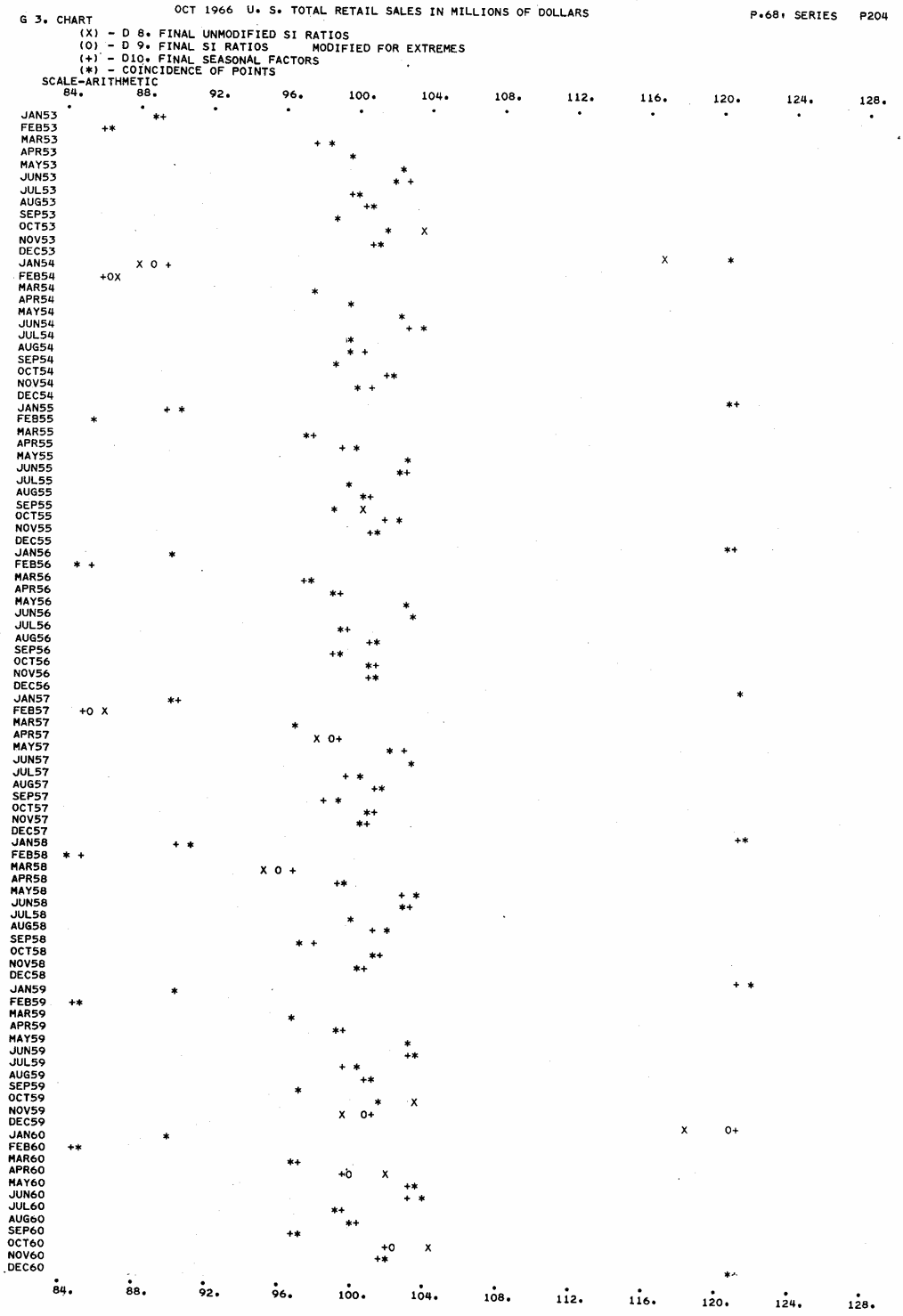
84. 88. 92. 96. 100. 104. 108. 112. 116. 120. 124. 128.


OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS
P.68, SERIES P204
G 3. CHART
(X) - D 8. FINAL UNMODIFIED SI RATIOS
(O) - D 9. FINAL SI RATIOS MODIFIED FOR EXTREMES
(+) - D10. FINAL SEASONAL FACTORS
(*) - COINCIDENCE OF POINTS
SCALE-ARITHMETIC
84. 88. 92. 96. 100. 104. 108. 112. 116. 120. 124. 128.
JAN53
FEB53
MAR53
APR53
MAY53
JUN53
JUL53
AUG53
SEP53
OCT53
NOV53
DEC53
JAN54
FEB54
MAR54
APR54
MAY54
JUN54
JUL54
AUG54
SEP54
OCT54
NOV54
DEC54
JAN55
FEB55
MAR55
APR55
MAY55
JUN55
JUL55
AUG55
SEP55
OCT55
NOV55
DEC55
JAN56
FEB56
MAR56
APR56
MAY56
JUN56
JUL56
AUG56
SEP56
OCT56
NOV56
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OCT59
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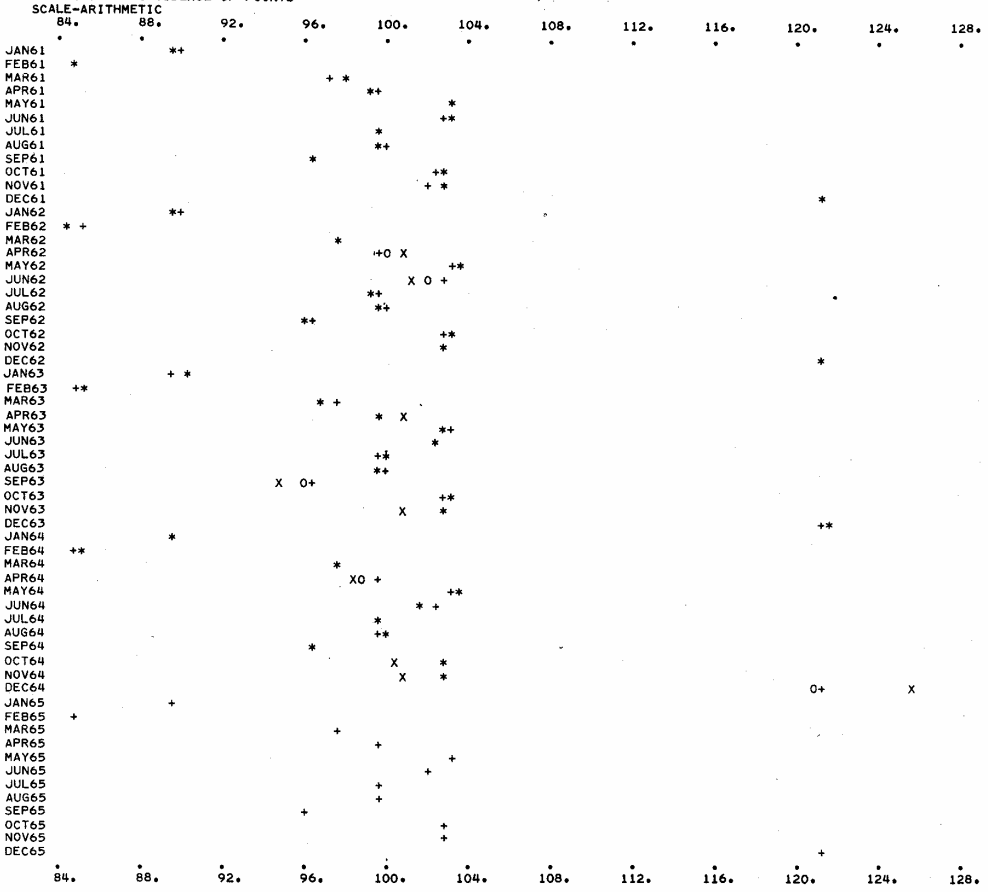
MAY60
JUN60
JUL60
AUG60
SEP60
OCT60
NOV60
DEC60
84. 88. 92. 96. 100. 104. 108. 112. 116. 120. 124. 128.

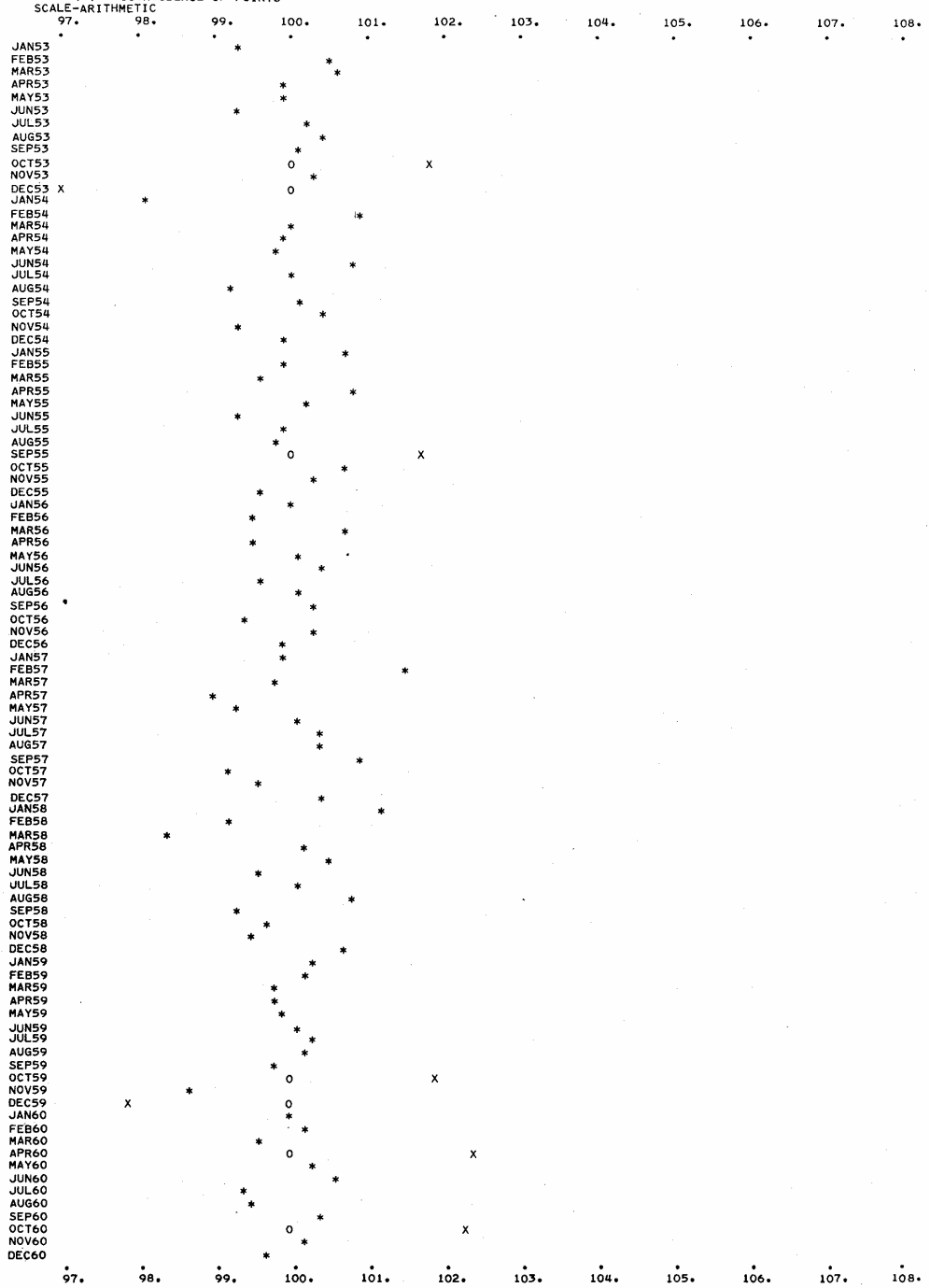
G 3. CHART (CONTINUED)
(X) - D 8. FINAL UNMODIFIED SI RATIOS
(O) - D 9. FINAL SI RATIOS MODIFIED FOR EXTREMES
(+) - D10. FINAL SEASONAL FACTORS
(*) - COINCIDENCE OF POINTS

SCALE-ARITHMETIC



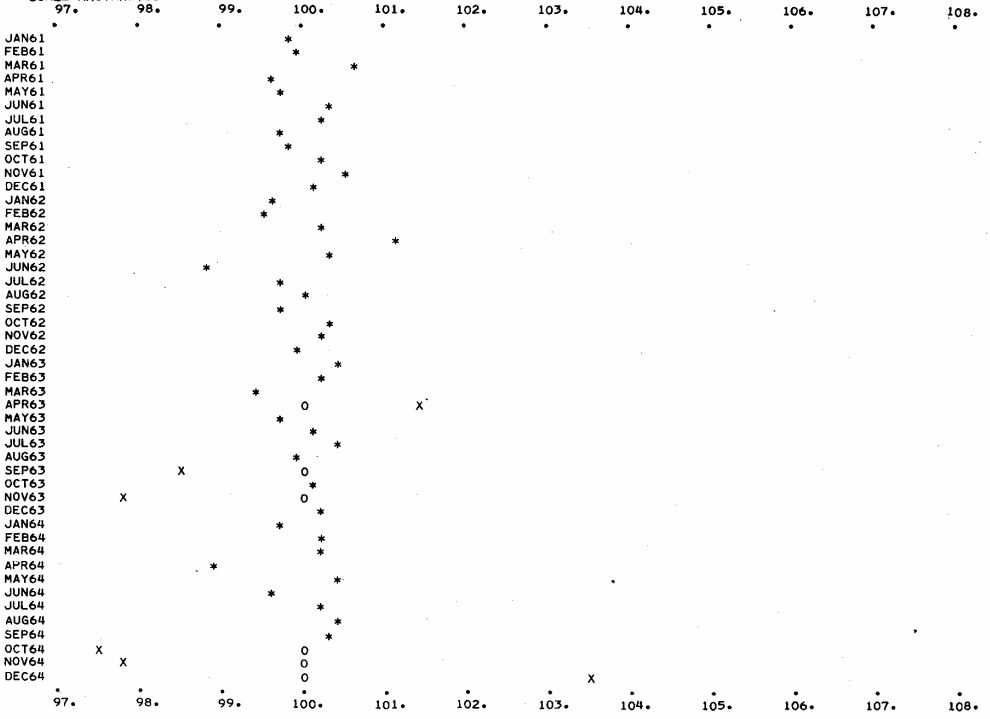
OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.69, SERIES P204

G 4. CHART
(X) - D13. FINAL IRREGULAR SERIES
(O) - E 3. FINAL MODIFIED IRREGULAR SERIES
(*) - COINCIDENCE OF POINTS
SCALE-ARITHMETIC



OCT 1966 U. S. TOTAL RETAIL SALES IN MILLIONS OF DOLLARS P.69, SERIES P204

G 4. CHART (CONTINUED)
(X) - D13. FINAL IRREGULAR SERIES
(O) - E 3. FINAL MODIFIED IRREGULAR SERIES
(*) - COINCIDENCE OF POINTS
SCALE-ARITHMETIC



SHORT-TERM BANK BALANCES, U.S. CAPITAL, FIRST QUARTER 1950 TO THIRD QUARTER 1964.—X-11Q quarterly additive adjustment, standard printout. Specified limits for identifying extreme irregulars are 1.0σ to 2.0σ

This printout is shown for purposes of illustration only and is not directly comparable to the official published series because of differences in the levels of the series.

(SOURCE OF UNADJUSTED DATA: BALANCE OF PAYMENTS DIVISION, OFFICE OF BUSINESS ECONOMICS)

QUARTERLY SEASONAL ADJUSTMENT PROGRAM
U.S. BUREAU OF THE CENSUS
ECONOMIC RESEARCH AND ANALYSIS DIVISION
MARCH 11, 1966

SERIES TITLE- SHORT-TERM BANK BALANCES, U. S. CAPITAL, MIL. OF $ 10/10/66 SERIES NO. U255
PERIOD COVERED- 1ST QUAR,1950 TO 3RD QUAR,1964
TYPE OF RUN - ADDITIVE SEASONAL ADJUSTMENT
STNDRD PRINTOUT
SIGMA LIMITS FOR GRADUATING EXTREME VALUES ARE 1.0 AND 2.0
B7. TREND-CYCLE CURVE COMPUTED WITHOUT MODIFICATION FOR EXTREMES

B 1. ORIGINAL SERIES

YEAR	1ST QUAR	2ND QUAR	3RD QUAR	4TH QUAR	TOTAL
1950	49.	209.	304.	349.	911.
1951	213.	229.	160.	273.	875.
1952	236.	233.	188.	236.	893.
1953	192.	106.	146.	200.	644.
1954	172.	304.	416.	396.	1288.
1955	179.	285.	155.	343.	962.
1956	176.	309.	295.	406.	1186.
1957	425.	233.	151.	237.	1046.
1958	283.	373.	294.	202.	1152.
1959	87.	222.	131.	417.	857.
1960	304.	236.	619.	636.	1795.
1961	556.	359.	213.	797.	1925.
1962	455.	41.	94.	534.	1124.
1963	123.	502.	174.	691.	1490.
1964	609.	731.	112.	********	1452.
AVG	271.	291.	230.	408.	

TABLE TOTAL 17600. MEAN 298. STD. DEVIATION 173.

C13. IRREGULAR SERIES

YEAR	1ST QUAR	2ND QUAR	3RD QUAR	4TH QUAR	S.D.
1950	-48.	4.	11.	8.	25.
1951	-9.	15.	-41.	4.	22.
1952	14.	2.	-11.	-12.	11.
1953	38.	-39.	20.	-6.	29.
1954	-13.	-12.	38.	6.	21.
1955	-60.	58.	-61.	74.	63.
1956	-50.	20.	-11.	-25.	30.
1957	81.	-32.	11.	-37.	47.
1958	4.	17.	56.	-60.	42.
1959	-38.	62.	-14.	12.	38.
1960	-25.	-145.	219.	-114.	144.
1961	22.	-28.	-59.	82.	53.
1962	36.	-162.	42.	25.	87.
1963	-194.	185.	-17.	-11.	134.
1964	-6.	176.	-209.	********	158.
S.D.	62.	91.	85.	48.	

TABLE TOTAL -204. MEAN -3. STD. DEVIATION 74.

C17. FINAL WEIGHTS FOR IRREGULAR SERIES
GRADUATION RANGE FROM 1.0 TO 2.0 SIGMA

YEAR	1ST QUAR	2ND QUAR	3RD QUAR	4TH QUAR	S.D.
1950	.0	100.0	100.0	100.0	20.
1951	100.0	100.0	.0	100.0	20.
1952	100.0	100.0	100.0	100.0	20.
1953	88.7	85.2	100.0	100.0	34.
1954	100.0	100.0	92.1	100.0	36.
1955	54.0	59.9	53.0	21.3	41.
1956	84.0	100.0	100.0	100.0	43.
1957	22.3	100.0	100.0	100.0	45.
1958	100.0	100.0	100.0	93.5	56.
1959	100.0	96.5	100.0	100.0	60.
1960	100.0	.0	.0	32.8	68.
1961	100.0	100.0	100.0	100.0	86.
1962	100.0	11.3	100.0	100.0	86.
1963	.0	.0	100.0	100.0	86.
1964	100.0	.0	.0	********	86.

D 8. FINAL UNMODIFIED SI DIFFERENCES

YEAR	1ST QUAR	2ND QUAR	3RD QUAR	4TH QUAR	TOTAL
1950	-99.	-7.	4.	56.	-46.
1951	-41.	-0.	-61.	44.	-58.
1952	-17.	-7.	-16.	36.	-4.
1953	4.	-44.	14.	39.	12.
1954	-45.	-15.	31.	49.	20.
1955	-98.	51.	-64.	128.	16.
1956	-67.	29.	-35.	31.	-42.
1957	79.	-13.	-29.	20.	57.
1958	-8.	16.	-15.	26.	20.
1959	-36.	41.	-112.	142.	34.
1960	-21.	-185.	105.	93.	-7.
1961	46.	-82.	-231.	305.	39.
1962	32.	-268.	-188.	265.	-159.
1963	-177.	129.	-232.	249.	-31.
1964	48.	121.	-470.	********	-301.
AVG	-27.	-16.	-87.	106.	

TABLE TOTAL -449.

STABLE SEASONALITY TEST

	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F
BETWEEN QUARTERS	280543.200	3	93514.400	8.262**
RESIDUAL	622501.010	55	11318.200	
TOTAL	903044.200	58		

**STABLE SEASONALITY PRESENT AT THE 1 PERCENT LEVEL

D 9. FINAL REPLACEMENT VALUES FOR EXTREME SI DIFFERENCES

YEAR	1ST QUAR	2ND QUAR	3RD QUAR	4TH QUAR	TOTAL
1950	-51.	********	********	********	********
1951	********	********	-20.	********	********
1952	********	********	********	********	********
1953	-1.	-38.	********	********	********
1954	********	********	28.	********	********
1955	-71.	28.	-36.	70.	-9.
1956	-59.	********	********	********	********
1957	16.	********	********	********	********
1958	********	********	********	30.	********
1959	********	39.	********	********	********
1960	********	-39.	-113.	170.	********
1961	********	********	********	********	********
1962	********	-124.	********	********	********
1963	16.	-56.	********	********	********
1964	********	-55.	-261.	********	********

D10. FINAL SEASONAL FACTORS, 3X5 MOVING AVERAGE

YEAR	1ST QUAR	2ND QUAR	3RD QUAR	4TH QUAR	TOTAL
1950	-30.	-9.	-6.	45.	-0.
1951	-30.	-11.	-3.	45.	1.
1952	-31.	-11.	-3.	46.	1.
1953	-35.	-7.	-4.	45.	-0.
1954	-35.	-3.	-8.	45.	-2.
1955	-35.	3.	-12.	41.	-3.
1956	-32.	10.	-25.	46.	-1.
1957	-28.	13.	-43.	57.	-1.
1958	-15.	6.	-72.	88.	6.
1959	-3.	-14.	-102.	129.	11.
1960	8.	-32.	-140.	178.	13.
1961	15.	-51.	-173.	216.	7.
1962	26.	-64.	-203.	245.	4.
1963	34.	-73.	-218.	259.	2.
1964	37.	-76.	-225.	********	-264.

TABLE TOTAL -227.

D10A. SEASONAL FACTORS ONE YEAR AHEAD

YEAR	1ST QUAR	2ND QUAR	3RD QUAR	4TH QUAR	TOTAL
1964	********	********	********	266.	266.
1965	38.	-78.	-228.	********	-267.

D11. FINAL SEASONALLY ADJUSTED SERIES

YEAR	1ST QUAR	2ND QUAR	3RD QUAR	4TH QUAR	TOTAL
1950	79.	218.	310.	304.	911.
1951	243.	240.	163.	228.	874.
1952	267.	244.	191.	190.	892.
1953	227.	113.	150.	155.	644.
1954	207.	307.	424.	351.	1290.
1955	214.	282.	167.	302.	965.
1956	208.	299.	320.	360.	1187.
1957	453.	220.	194.	180.	1047.
1958	298.	367.	366.	114.	1146.
1959	90.	236.	233.	288.	846.
1960	296.	268.	759.	458.	1782.
1961	541.	410.	386.	581.	1918.
1962	429.	105.	297.	289.	1120.
1963	89.	575.	392.	432.	1488.
1964	572.	807.	337.	********	1716.
AVG	281.	313.	313.	302.	

TABLE TOTAL 17827. MEAN 302. STD. DEVIATION 151.

D12. FINAL TREND-CYCLE, 5-TERM HENDERSON CURVE

YEAR	1ST QUAR	2ND QUAR	3RD QUAR	4TH QUAR	TOTAL
1950	150.	216.	300.	299.	964.
1951	258.	227.	214.	230.	929.
1952	259.	240.	198.	201.	898.
1953	190.	151.	133.	160.	634.
1954	210.	319.	396.	350.	1274.
1955	269.	230.	224.	216.	939.
1956	243.	280.	328.	372.	1223.
1957	351.	255.	175.	202.	983.
1958	286.	379.	319.	156.	1139.
1959	110.	195.	255.	269.	829.
1960	315.	417.	519.	556.	1808.
1961	512.	420.	436.	516.	1883.
1962	433.	289.	272.	285.	1279.
1963	307.	363.	398.	450.	1519.
1964	563.	606.	578.	********	1748.
AVG	297.	306.	316.	304.	

TABLE TOTAL 18050. MEAN 306. STD. DEVIATION 121.

D13. FINAL IRREGULAR SERIES

YEAR	1ST QUAR	2ND QUAR	3RD QUAR	4TH QUAR	S.D.
1950	-71.	3.	11.	5.	36.
1951	-15.	14.	-51.	-2.	28.
1952	8.	4.	-8.	-11.	8.
1953	37.	-38.	17.	-6.	28.
1954	-2.	-12.	29.	2.	16.
1955	-55.	53.	-56.	85.	64.
1956	-34.	19.	-8.	-12.	21.
1957	102.	-35.	18.	-22.	56.
1958	12.	-11.	47.	-42.	33.
1959	-20.	40.	-22.	19.	27.
1960	-19.	-148.	240.	-98.	149.
1961	29.	-10.	-50.	65.	44.
1962	-4.	-184.	25.	4.	93.
1963	-218.	212.	-6.	-18.	152.
1964	9.	201.	-241.	********	181.
S.D.	69.	100.	93.	42.	

TABLE TOTAL -223. MEAN -4. STD. DEVIATION 79.

E 1. ORIGINAL SERIES MODIFIED FOR EXTREMES

YEAR	1ST QUAR	2ND QUAR	3RD QUAR	4TH QUAR	TOTAL
1950	120.	209.	304.	349.	982.
1951	213.	229.	211.	273.	926.
1952	236.	233.	188.	236.	893.
1953	192.	106.	146.	200.	644.
1954	172.	304.	416.	396.	1288.
1955	179.	285.	155.	343.	962.
1956	176.	309.	295.	406.	1186.
1957	425.	233.	151.	237.	1046.
1958	283.	373.	294.	202.	1152.
1959	87.	222.	131.	417.	857.
1960	304.	384.	379.	636.	1704.
1961	556.	359.	213.	797.	1925.
1962	455.	41.	94.	534.	1124.
1963	341.	290.	174.	691.	1496.
1964	609.	530.	353.	********	1493.
AVG	290.	274.	234.	408.	

TABLE TOTAL 17678. MEAN 300. STD. DEVIATION 154.

E 2. MODIFIED SEASONALLY ADJUSTED SERIES

YEAR	1ST QUAR	2ND QUAR	3RD QUAR	4TH QUAR	TOTAL
1950	150.	218.	310.	304.	982.
1951	243.	240.	214.	228.	925.
1952	267.	244.	191.	190.	892.
1953	227.	113.	150.	155.	644.
1954	207.	307.	424.	351.	1290.
1955	214.	282.	167.	302.	965.
1956	208.	299.	320.	360.	1187.
1957	453.	220.	194.	180.	1047.
1958	298.	367.	366.	114.	1146.
1959	90.	236.	233.	288.	846.
1960	296.	417.	519.	458.	1691.
1961	541.	410.	386.	581.	1918.
1962	429.	105.	297.	289.	1120.
1963	307.	363.	392.	432.	1495.
1964	572.	606.	578.	********	1757.
AVG	300.	295.	316.	302.	

TABLE TOTAL 17905. MEAN 303. STD. DEVIATION 127.

E 3. MODIFIED IRREGULAR SERIES

YEAR	1ST QUAR	2ND QUAR	3RD QUAR	4TH QUAR	S.D.
1950	0.	3.	11.	5.	6.
1951	-15.	14.	0.	-2.	10.
1952	8.	4.	-8.	-11.	8.
1953	37.	-38.	17.	-6.	28.
1954	-2.	-12.	29.	2.	16.
1955	-55.	53.	-56.	85.	64.
1956	-34.	19.	-8.	-12.	21.
1957	102.	-35.	18.	-22.	56.
1958	12.	-11.	47.	-42.	33.
1959	-20.	40.	-22.	19.	27.
1960	-19.	0.	0.	-98.	50.
1961	29.	-10.	-50.	65.	44.
1962	-4.	-184.	25.	4.	93.
1963	0.	0.	-6.	-18.	10.
1964	9.	0.	0.	********	5.
S.D.	35.	53.	27.	42.	

TABLE TOTAL -146. MEAN -2. STD. DEVIATION 40.

E 4.DIFFERENCES OF ANNUAL TOTALS, ORIGINAL AND SEASONALLY ADJUSTED SERIES

	UNMODIFIED	MODIFIED
1950	-.13	-.13
1951	.63	.63
1952	1.33	1.33
1953	-.42	-.42
1954	-1.81	-1.81
1955	-3.19	-3.19
1956	-1.46	-1.46
1957	-.53	-.53
1958	6.40	6.40
1959	10.69	10.69
1960	12.90	12.90
1961	7.48	7.48
1962	3.88	3.88
1963	1.57	1.57

E 5. QUARTER-TO-QUARTER CHANGES IN ORIGINAL SERIES

YEAR	1ST QUAR	2ND QUAR	3RD QUAR	4TH QUAR	TOTAL
1950	********	160.	95.	45.	300.
1951	-136.	16.	-69.	113.	-76.
1952	-37.	-3.	-45.	48.	-37.
1953	-44.	-86.	40.	54.	-36.
1954	-28.	132.	112.	-20.	196.
1955	-217.	106.	-130.	188.	-53.
1956	-167.	133.	-14.	111.	63.
1957	19.	-192.	-82.	86.	-169.
1958	46.	90.	-79.	-92.	-35.
1959	-115.	135.	-91.	286.	215.
1960	-113.	-68.	383.	17.	219.
1961	-80.	-197.	-146.	584.	161.
1962	-342.	-414.	53.	440.	-263.
1963	-411.	379.	-328.	517.	157.
1964	-82.	122.	-619.	********	-579.
AVG	-122.	21.	-61.	170.	

TABLE TOTAL 63.

E 6. QUARTER-TO-QUARTER CHANGES IN FINAL SEASONALLY ADJUSTED SERIES (D11.)

YEAR	1ST QUAR	2ND QUAR	3RD QUAR	4TH QUAR	TOTAL
1950	********	139.	92.	-7.	224.
1951	-61.	-2.	-77.	65.	-75.
1952	39.	-23.	-54.	-0.	-38.
1953	37.	-114.	37.	4.	-36.
1954	53.	99.	118.	-73.	197.
1955	-137.	68.	-115.	134.	-50.
1956	-93.	91.	21.	40.	59.
1957	93.	-233.	-26.	-14.	-180.
1958	118.	69.	-1.	-252.	-66.
1959	-24.	146.	-3.	56.	174.
1960	8.	-28.	491.	-301.	170.
1961	82.	-131.	-23.	194.	123.
1962	-152.	-324.	192.	-8.	-292.
1963	-200.	486.	-183.	39.	143.
1964	140.	235.	-470.	********	-95.
AVG	-7.	32.	-0.	-9.	

TABLE TOTAL 258.

F 1. QCD MOVING AVERAGE
QCD IS 2

YEAR	1ST QUAR	2ND QUAR	3RD QUAR	4TH QUAR	TOTAL
1950	*******	149.	264.	307.	720.
1951	273.	241.	202.	196.	912.
1952	247.	255.	217.	190.	911.
1953	209.	170.	131.	152.	662.
1954	181.	257.	365.	388.	1191.
1955	283.	248.	225.	234.	990.
1956	255.	254.	310.	340.	1158.
1957	407.	336.	207.	187.	1137.
1958	239.	333.	367.	240.	1179.
1959	102.	163.	234.	261.	759.
1960	292.	282.	514.	609.	1697.
1961	499.	475.	398.	484.	1856.
1962	505.	267.	201.	293.	1266.
1963	189.	332.	484.	412.	1417.
1964	502.	690.	572.	********	1764.
AVG	299.	297.	313.	307.	
	TABLE TOTAL 17619.				

F 2. SUMMARY MEASURES

AVERAGE DIFFERENCE WITHOUT REGARD TO SIGN OVER INDICATED SPAN

SPAN IN	TABLE NO. AND SYMBOL B1 O	D11 CI	D13 I	D12 C	D10 S	F1 QCD	MODIFIED SERIES E1 O	E2 CI	E3 I
QUARTERS									
1	154.43	112.38	88.82	51.09	99.30	67.79	127.83	75.89	47.59
2	160.05	135.57	71.61	86.99	108.03	96.07	160.76	104.31	37.45
3	184.75	141.64	68.18	110.95	102.11	115.72	166.54	126.64	38.56
4	151.09	150.12	76.03	117.75	11.71	126.75	131.55	130.17	43.97

RELATIVE CONTRIBUTIONS OF COMPONENTS TO DIFFERENCE IN ORIGINAL SERIES

SPAN IN	TABLE NO. AND SYMBOL D13 I	D12 C	D10 S	TOTAL	RATIO
QUARTERS					
1	38.75	12.82	48.43	100.00	85.37
2	21.05	31.06	47.90	100.00	95.11
3	16.98	44.95	38.08	100.00	80.23
4	29.22	70.09	.69	100.00	86.66

AVERAGE DURATION OF RUN	CI	I	C	QCD
	1.81	1.32	3.22	2.19

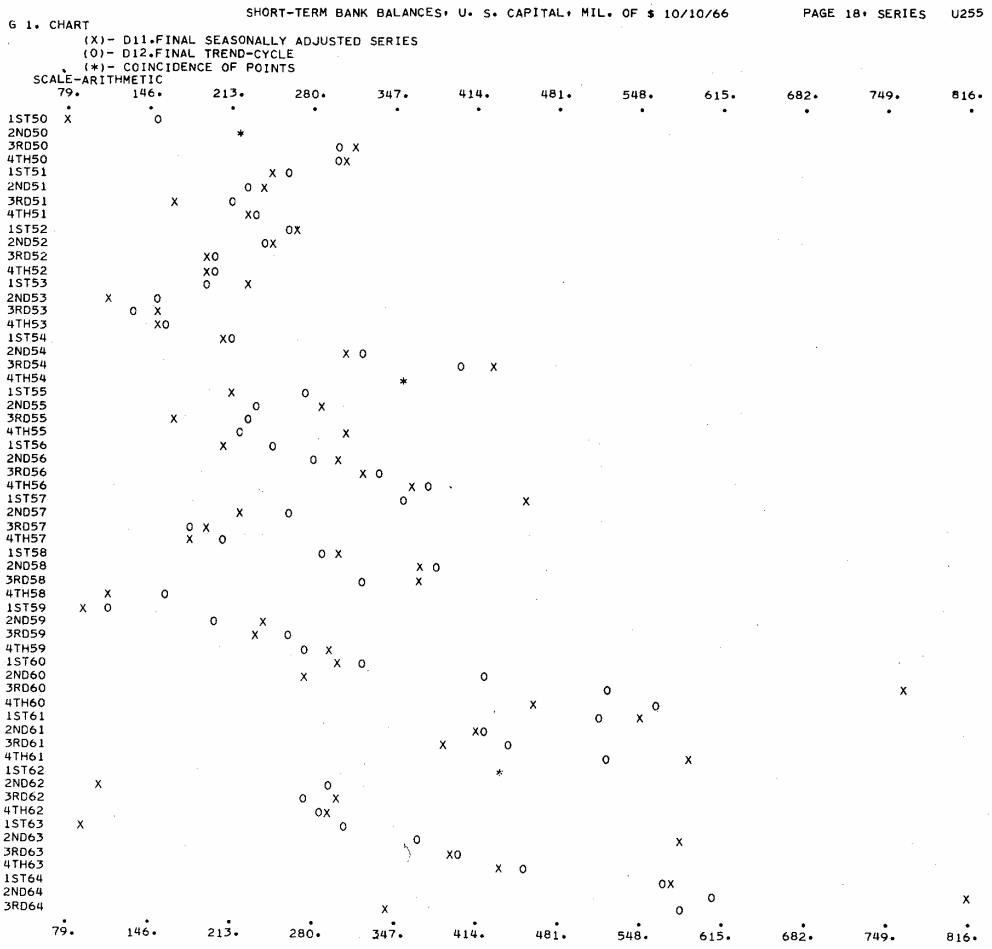
I/C RATIO FOR QUARTERS SPAN

1	2	3	4
1.74	.82	.61	.65

QUARTERS FOR CYCLICAL DOMINANCE 2

AVERAGE DIFFERENCE WITH REGARD TO SIGN AND STANDARD DEVIATION OVER INDICATED SPAN

SPAN IN	B1 O		D13 I		D12 C		D10 S		D11 CI		F1 QCD	
QUARTERS	AVG	S.D.	AVG	S.D.	AVG	S.D.	AVG	S.D.	AVG	S.D.	AVG	S.D.
1	1.09	213.31	-2.94	135.29	7.38	61.85	-3.36	142.09	4.44	161.08	7.43	85.88
2	10.26	221.03	.49	106.16	14.36	106.42	-4.59	146.95	14.86	171.77	15.16	125.78
3	15.89	241.36	.46	95.12	19.33	129.09	-3.90	149.38	19.79	176.06	18.98	140.51
4	22.40	193.19	.05	112.44	22.44	138.26	-.09	17.01	22.49	192.63	21.91	155.44


G 1. CHART
(X)- D11.FINAL SEASONALLY ADJUSTED SERIES
(O)- D12.FINAL TREND-CYCLE
(*)- COINCIDENCE OF POINTS
SCALE-ARITHMETIC
79. 146. 213. 280. 347. 414. 481. 548. 615. 682. 749. 816.
1ST50
2ND50
3RD50
4TH50
1ST51
2ND51
3RD51
4TH51
1ST52
2ND52
3RD52
4TH52
1ST53
2ND53
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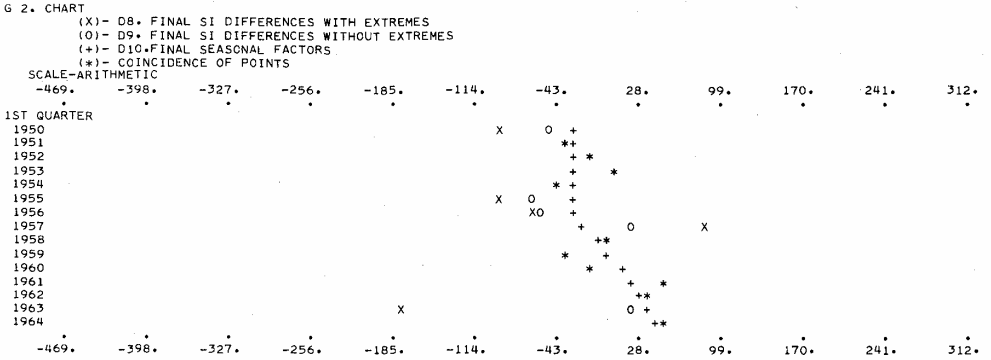
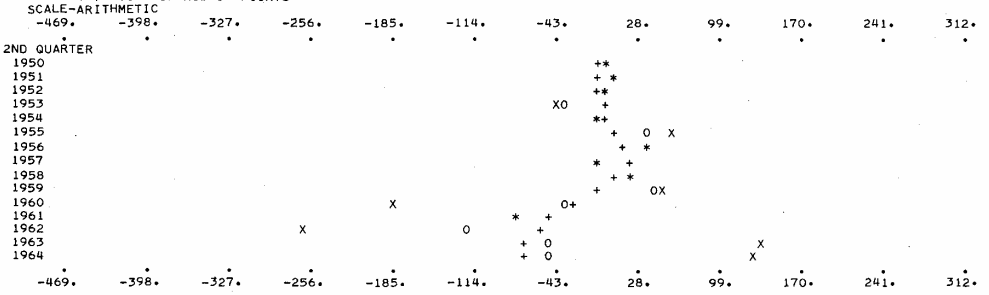
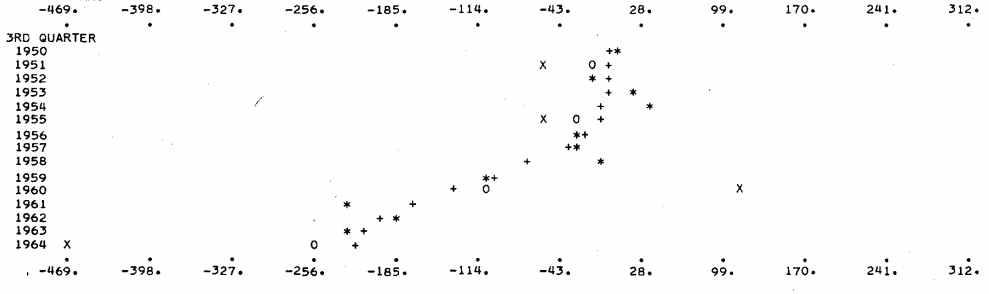

G 2. CHART
(X)- D8. FINAL SI DIFFERENCES WITH EXTREMES
(O)- D9. FINAL SI DIFFERENCES WITHOUT EXTREMES
(+)- D10.FINAL SEASONAL FACTORS
(*)- COINCIDENCE OF POINTS
SCALE-ARITHMETIC
-469. -398. -327. -256. -185. -114. -43. 28. 99. 170. 241. 312.
1ST QUARTER
1950
1951
1952
1953
1954
1955
1956
1957
1958
1959
1960
1961
1962
1963
1964
-469. -398. -327. -256. -185. -114. -43. 28. 99. 170. 241. 312.

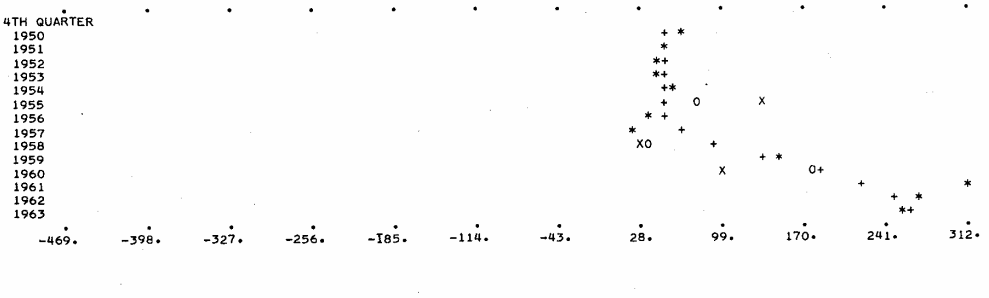
G 2. CHART
(X)- D8. FINAL SI DIFFERENCES WITH EXTREMES
(O)- D9. FINAL SI DIFFERENCES WITHOUT EXTREMES
(+)- D10.FINAL SEASONAL FACTORS
(*)- COINCIDENCE OF POINTS
SCALE-ARITHMETIC



G 2. CHART
(X)- D8. FINAL SI DIFFERENCES WITH EXTREMES
(O)- D9. FINAL SI DIFFERENCES WITHOUT EXTREMES
(+)- D10.FINAL SEASONAL FACTORS
(*)- COINCIDENCE OF POINTS
SCALE-ARITHMETIC



G 2. CHART
(X)- D8. FINAL SI DIFFERENCES WITH EXTREMES
(O)- D9. FINAL SI DIFFERENCES WITHOUT EXTREMES
(+)- D10.FINAL SEASONAL FACTORS
(*)- COINCIDENCE OF POINTS
SCALE-ARITHMETIC



IX. SELECTION OF OPTIONS AND DATA FORMAT

Monthly Program (X-11)

Four types of input cards are required by the program. Three types are control cards and the fourth is for the data. A fifth type is optional and is used only when prior monthly adjustments are to be made by the computer before the seasonal adjustment process. All are on standard 80-column punch cards. The format and function of each type of card is described below:

1. CONTROL CARD 1: OPTION CARD

This card is identified by an H-punch in column 1. Each series of data must begin with an option card. The entries on this card describe to the program the series of data that follows and control the selection of program options. All information in the data description section (columns 1 to 15) must be supplied. To obtain the standard multiplicative seasonal adjustment, the remainder of the card is left blank. Entries in the option section (cols. 16 to 80) select such things as a longer than standard printout or a trading-day adjustment. The format of the option card is as follows:

DATA DESCRIPTION SECTION (REQUIRED)

Card column(s)	Punch	Description
1	H	Required entry. Identifies this as the option card.
2-7	Any	Series identification code. May be numeric, alphabetic or mixed. Must be identical to entries in column 75 to 80 on data cards for this series.
8-9	01-12	Number of the month in which the series starts; i.e., 01 for January, 02 for February,..., 12 for December. The first entry on the first data card must be made in the field corresponding to the month entered here.
10-11	00-99	Last two digits of the year in which the series starts. This date must be the same as the year punched in columns 73 and 74 of the first data card for this series. The first two digits of the year, in this field and all others calling for a year entry, are assumed to be 19.
12-13	01-12	Number of the month in which the series ends. The last data entry on the last data card of the series must be made in the field corresponding to the month entered here.
14-15	00-99	Last two digits of the year in which the series ends. This date must be the same as the year punched in columns 73 and 74 of the last data card for this series.

OPTION SECTION

Option code	Card column(s)	Punch	Description
A	16	-	Number of Decimals on Output Tables. Although no decimal point is punched on the data cards, decimals may be shown on the output tables by entering the number of decimal places desired here. All tables shown in units of the original series will be printed with the number of decimals entered here. Tables of seasonal and irregular components are shown with one decimal in the multiplicative versions and with the number of decimals selected here in the additive versions.
	16	Blank[1]	No decimals.
	16	1	1 decimal.
	16	2	2 decimals.
	16	3	3 decimals.
	16	4	4 decimals.
	16	5	5 decimals.
B	17	-	Type of Adjustment
	17	Blank	Multiplicative adjustment.
	17	1	Additive adjustment.
C	18	-	Type of Program
	18	Blank	Seasonal adjustment.
	18	1	Summary measures. Develops estimates of the trend-cycle, irregular, I/C, MCD and residual trading-day and seasonal variation from a seasonally adjusted input. See section VIII for more details.
D	19	-	Printout
	19	Blank	Standard printout. From 17 to 27 tables are printed depending on which other options are selected. Charts are selected in option E. See section VIII for the tables included in each printout option.
	19	1	Long printout. From 27 to 39 tables are printed.

[1]The option associated with the "Blank" entry in the punch column is the one that will be selected if no entry is made in the designated option card column. A zero (0) punch is equivalent to a "Blank" and may be used if desired.

OPTION SECTION--Continued

Option code	Card column (s)	Punch	Description
	19	2	Full printout. From 44 to 59 tables are printed.
E	20	-	Charts
	20	Blank	Standard charts. 12 monthly seasonal charts and trend-cycle chart are printed.
	20	1	No charts.
	20	2	All charts. 12 monthly seasonal charts and charts of the trend-cycle, irregular and seasonal factors in chronological order are printed.
F	21-48	-	Prior Daily Weights (This option is available only with multiplicative adjustments.) Seven daily weights may be entered in these columns to adjust for trading-day variation prior to the seasonal adjustment process. The seven weights are combined into the Prior Trading-Day Adjustment Factors shown in table A4. Each weight is entered in a 4-digit field with the decimal point assumed to be between the first and second digits. The range of acceptable entries is 0000 to 9999 corresponding to a range in weights of 0.000 to 9.999. The program adjusts the weights to total 7.000. These weights may be corrected on the basis of estimates of trading-day variation made from the data (see option H).
	21-24	0000-9999	Prior daily weight for Monday.
	25-28	0000-9999	Prior daily weight for Tuesday.
	29-32	0000-9999	Prior daily weight for Wednesday.
	33-36	0000-9999	Prior daily weight for Thursday.
	37-40	0000-9999	Prior daily weight for Friday.
	41-44	0000-9999	Prior daily weight for Saturday.
	45-48	0000-9999	Prior daily weight for Sunday.
G	49	-	Length-of-Month Allowance (This option is meaningful only if a prior and/or regression trading-day adjustment is made, and is available only with the multiplicative adjustment.) The option allows the inclusion of variation arising from the length of the month in the seasonal factors or in the trading-day factors. See section III and section VIII, steps B14-B19 and C14-C19, for details.

OPTION SECTION--Continued

Option code	Card column(s)	Punch	Description
	49	Blank	Do not include an allowance for the length of month in the trading-day factors. Length-of-month variations are included with the seasonal factors. Divisors used in the construction of monthly weights from daily weights are 31., 30. and 28.25 for 31-and 30-day months and February, respectively.
	49	1	Include a length-of-month allowance in the trading-day factors rather than in the seasonal factors. Divisor for all months is 30.4375, the average length of month. Tables B16 and C16 do not include the length-of-month allowance.
H	50	-	Trading-Day Regression Estimates of the seven daily trading-day weights may be made from the data. These estimates may be computed and used, not used or used only if they explain significant variation on the basis of an F-test. Prior weights, if supplied, may or may not be corrected by these estimates. See section III and section VIII, steps B14 to B19 and C14 to C19, for more details.
	50	Blank	Exclude the computation of the trading-day regression.
	50	1	Compute the trading-day regression and print the results but do not adjust the series by the factors computed.
	50	2	Compute the trading-day regression, print the results and adjust the series by the regression estimates. If prior factors have been supplied, correct them on the basis of these estimates.
	50	3	Compute the trading-day regression and print the results. In part B, adjust the series by the regression estimates or prior factors corrected by the regression estimates to obtain preliminary weights for the irregular series. In part C, use the regression estimates only if they explain significant variation on the basis of the F-test.
J	51-52	-	Starting Date for Computing Trading-Day Regression (This option is meaningful only if the trading-day regression is computed in option H (1-, 2-, or 3-punch.))
	51-52	Blank	Derive estimates of the trading-day weights using the entire series as input to the regression.

OPTION SECTION--Continued

Option code	Card column(s)	Punch	Description
	51-52	00-99	Derive estimates of the trading-day weights using only the part of the series beginning with January of the year punched here as input to the regression.
K	53-54	-	Starting date for Applying Trading-Day Regression (This option is meaningful only if the trading-day regression is applied in option H (2- or 3-punch.)) The starting date determined by this option is independent of the date selected in option J and may be the same, earlier or later.
	53-54	Blank	Apply the trading-day regression estimates or prior trading-day weights corrected by regression estimates to the entire series.
	53-54	00-99	Apply the trading-day regression estimates only to the part of the series beginning with January of the year punched here. If prior weights are supplied, adjust the part of the series preceding this date by the prior weights only and adjust the part of the series from this date to the end by the prior weights corrected by the regression estimates.
L	55-56	-	Sigma Limit for Excluding Extreme Values from Trading-Day Regression (This option is meaningful only if the trading-day regression is computed in option H (1-, 2-, or 3-punch.)) In estimating trading-day variation from the data, irregular values more than a designated number of standard deviations (σ's) from 1.0 in the multiplicative version (or 0.0 in the additive version) are excluded as extreme. These values are shown in tables B14 and C14. Usually a limit of 2.5 σ is satisfactory. For more details, see sections III and VIII, steps B14-B19 and C14-C19.
	55-56	Blank	Exclude irregular values beyond a σ limit of 2.5
	55-56	01-99	Exclude irregular values beyond a σ limit between 0.1 and 9.9.
M	57-62	-	Prior Monthly Adjustment Factors Series Identification
	57-62	Blank	Do not make a prior monthly adjustment.
	57-62	Not blank	Prior monthly factors follow the data for this series. The factors are identified in cols. 75-80 with the 6-digit code given here. The factors are divided into the original data prior to the multiplicative seasonal adjustment process. They are subtracted from the original series prior to an additive adjustment. See part 5 of this section for a description of the Prior Monthly Adjustment Factor Card.

OPTION SECTION--Continued

Option code	Card column(s)	Punch	Description
N	63-66	-	Sigma Limits for Graduating Extreme Values in Estimating Seasonal and Trend-Cycle Components In estimating the seasonal and trend-cycle components, irregular values are assigned weights which are based on their distance from 1.0 in the multiplicative program or 0.0 in the additive version in number of standard deviations (σ's). Irregulars beyond a specified upper σ limit are assigned a weight of zero. Those below a given lower limit are assigned a full weight of 1.0. Values between these two limits are assigned weights linearly graduated between 0.0 and 1.0. See section V and section VIII, steps B17 and C17, for more details.
	63-64	Blank	Assign full weight to irregular values within the 1.5 σ.
	63-64	01-99	Assign full weight to irregular values within a σ limit between 0.1 and 9.9.
	65-66	Blank	Assign zero weight to irregular values outside the 2.5 σ limit.
	65-66	01-99	Assign zero weight to irregular values outside a σ limit between 0.1 and 9.9.
P	67-78	-	Moving Averages for Seasonal Factor Curves The length of the seasonal factor curve moving average for any month may be selected from the five averages available. If no selection is made, the program will select a 3x3 moving average for the first estimate in each part and a 3x5 average for the second estimate. This option does not allow the selection of different averages for the first and second estimates.
	67	Blank	Use moving averages selected by the program for January.
	67	1	Select a 3-term moving average for January.
	67	2	Select a 3x3 moving average for January.

OPTION SECTION--Continued

Option code	Card column(s)	Punch	Description
	67	3	Select a 3x5 moving average for January.
	67	4	Select a 3x9 moving average for January.
	67	5	Select a stable seasonal (average of all values for the month) for January.
	68	-	Same options as col. 67 for February.
	69	-	Same options as col. 67 for March.
	70	-	Same options as col. 67 for April.
	71	-	Same options as col. 67 for May.
	72	-	Same options as col. 67 for June.
	73	-	Same options as col. 67 for July.
	74	-	Same options as col. 67 for August.
	75	-	Same options as col. 67 for September.
	76	-	Same options as col. 67 for October.
	77	-	Same options as col. 67 for November.
	78	-	Same options as col. 67 for December.
Q	79	-	Moving Average for Variable Trend-Cycle Routine
	79	Blank	The program will select an appropriate moving average from the three listed below.
	79	1	Select a 9-term Henderson curve.
	79	2	Select a 13-term Henderson curve.
	79	3	Select a 23-term Henderson curve.
R	80	-	Adjustment of Trend-Cycle for Strikes In section VIII, step B7, modification of extreme values may be made before computing the trend-cycle estimate. This adjustment for extremes substantially reduces the effect of major, prolonged strikes or similar irregular occurrences on the B7 and subsequent trend-cycle estimates. Care should be exercised in its use, however, since for some series the estimates near sharp business cycle peaks or troughs will be similarly affected.
	80	Blank	Compute the B7 trend-cycle curve without modification for extremes.
	80	1	Modify extreme values before computing the B7 trend-cycle curve.

2. CONTROL CARD 2: TITLE CARD

This card is identified by a T-punch in column 1. The name of the series and a date are entered on this card. This information appears at the top of each page of output. This card must be placed immediately after the option card for every series run whether or not a title is desired. Columns 2 to 80 may be left blank with no effect on the program.

Title card column	Description
	Required entry
1	T must be punched to identify the title card.
	Optional entries
2-13	Date on which series is to be run. This may be in any format desired, such as "11/10/64" or "Nov. 1964" (must not exceed 12 columns).
14-80	Series title. Any identification desired may be used.

3. CONTROL CARD 3: SENTINEL CARD

Following the last data card of the last series to be run (or the last prior monthly adjustment card if present for the last series) there must be a card with a Z-punch in column 1 and no punches in the remainder of the card. This card signifies to the program that the run is completed. Only one sentinel card should be present regardless of the number of series to be processed.

4. DATA CARD

The data cards are placed immediately following the title card. Each data card contains up to 1 calendar year of data. At least 3 data cards (series must be at least 36 months long) and not more than 30 cards may follow the title card. The cards must be in strict calendar order and must agree with the description on the option card; i.e., the series must begin and end on the dates specified and the series identification on each data card must be identical to that given on the option card. The data may begin and end in any month of the year. The series may not start earlier than 1900 nor end later than 1999. If calendar adjustments are to be made, then March 1900 is the earliest permissible date because the internal calendar in the program does not take account of the lack of a February 29 that year.

The data for each month is punched in a 6-digit field. Leading zeros need not be punched. Decimal points are not punched. If a decimal point is desired on the printout, its position can be specified on the option card. Minus signs (allowable only in additive adjustments) may be punched in any column preceding the data and may be followed by blanks or zeros.

Every month of a series to be multiplicatively adjusted must contain a positive, nonzero numeric entry. Negative,

zero, and blank months are not allowed in a multiplicative adjustment. (If the series starts in other than January or ends in other than December, the unused fields on the card must be blank.) For an additive adjustment, any numeric entries are acceptable. Blank months will be treated as zeros in an additive adjustment.

The format of the monthly card is as follows:

Data card column	Description
1-6	Data for January.
7-12	Data for February.
13-18	Data for March.
19-24	Data for April.
25-30	Data for May.
31-36	Data for June.
37-42	Data for July.
43-48	Data for August.
49-54	Data for September.
55-60	Data for October.
61-66	Data for November.
67-72	Data for December.
73-74	Last two digits of the year. The first two digits of the year are assumed to be 19. The cards within a series must be in chronological order with no missing years. The first and last data cards of the series must be the same as the starting and ending years given on the option card.
75-80	Series identification. Any numeric, alphabetic or mixed entry may be used for the series identification. This entry must be identical on all data cards in the series and in the data identification section of the option card.

5. PRIOR MONTHLY ADJUSTMENT FACTOR CARD (OPTIONAL)

If present, these cards are placed immediately behind the data cards with no intervening control cards. The factors must begin and end in the same months as the data. The format of the prior factor cards is the same as the data cards. The sequencing and data format requirements that apply to the data cards also apply to the prior factor cards.

In a multiplicative adjustment, the prior factors vary about 100 and the decimal point is assumed to be between the third and fourth digits of the 6-digit field. (It is never punched.) In the additive version, the prior factors vary about zero and the decimal point is assumed to be in the same position as for the data.

The sequence of cards for a complete monthly run is as follows:

1. Option card for first series.
2. Title card for first series.
3. From 3 to 30 data cards for first series in chronological order.
4. (Optional) From 3 to 30 prior monthly adjustment factor cards for first series in chronological order. (Same number of cards as 3.)
5. Option card for second series.
6. Title card for second series.
7. Data cards for second series.
8. (Optional) Prior monthly adjustment factor cards for second series.

: :
: :

x. Option card for nth series.

x+1. Title card for nth series.

x+2. Data cards for nth series.

x+3. (Optional) Prior monthly adjustment factor cards for nth series.

x+4. Sentinel card.

Quarterly Program (X-11Q)

Three types of input cards are required by the quarterly program. Two types are control cards and the third, the data cards. The format and function of each type follows:

1. CONTROL CARD 1: OPTION AND TITLE CARD

This card is identified by an H-punch in column 1. Each series of data must be preceded by one of these cards. The information in the data description section (cols. 1 to 13) must be supplied. To obtain the standard quarterly multiplicative seasonal adjustment, the option section of the card (cols. 14 to 21) is left blank. Entries made in the title section (cols. 22 to 80) will appear at the top of each page of print but are not required.

DATA DISCRIPTION SECTION (REQUIRED)

Card column(s)	Punch	Description
1	H	Required entry. Identifies this as the option card.
2-7	Any	Series identification code. May be numeric, alphabetic, or mixed. Must be identical to entries in columns 75 to 80 on the data cards for this series.
8	1-4	Number of the quarter in which the series starts. The first entry on the first data card must be made in the field corresponding to the quarter entered here.
9-10	00-99	Last two digits of the year in which the series starts. This data must be the same as the year punched in columns 73 and 74 of the first data card for the series. The first two digits of the year are assumed to be 19.
11	1-4	Number of the quarter in which the series ends. The last data entry on the last data card of the series must be made in the field corresponding to the quarter entered here.
12-13	00-99	Last two digits of the year in which the series ends. This date must be the same as the year punched in columns 73 and 74 of the last data card of the series.

OPTION SECTION

Option code	Card column(s)	Punch	Description
S	14	-	Type of Adjustment
	14	Blank	Multiplicative adjustment.
	14	1	Additive adjustment.
T	15	-	Type of Program
	15	Blank	Seasonal adjustment.
	15	1	Summary measures. Develops estimates of the trend-cycle, irregular, $\overline{I/C}$, MCD and residual seasonal variation from a seasonally adjusted input. See section VIII for more details.
U	16	-	Printout
	16	Blank	Standard printout. 17 tables and 2 charts are printed.
	16	1	Long printout. 27 tables and 4 charts are printed.
	16	2	Full printout. 44 tables and 4 charts are printed.

OPTION SECTION--Continued

Option code	Card column(s)	Punch	Description
V	17-20	-	σ Limits for Graduating Extreme Values in Estimating Seasonal and Trend-Cycle Components In estimating the seasonal and trend-cycle components, irregular values are assigned weights which are based on their distance from 1.0 in the multiplicative program or 0.0 in the additive version in number of standard deviations (σ's). Irregulars beyond a specified upper σ limit are assigned a weight of zero. Those below a given lower limit are assigned a full weight of 1.0. Values between these two limits are assigned weights linearly graduated between 0.0 and 1.0. See section V and section VIII, steps B17 and C17 for more details.
	17-18	Blank	Assign full weight to irregular values within the 1.5 σ limit.
	17-18	01-99	Assign full weight to irregular values within a σ limit between 0.1 and 9.9.
	19-20	Blank	Assign zero weight to irregular values outside the 2.5 σ limit.
	19-20	01-99	Assign zero weight to irregular values outside a σ limit between 0.1 and 9.9.
W	21	-	Adjustment of Trend-Cycle for Strikes In section VIII, step B7, modification of extreme values may be made before computing the trend-cycle estimate. This adjustment for extremes substantially reduces the effect of major, prolonged strikes or similar irregular occurrences on the B7 and subsequent trend-cycle estimates. Care should be exercised in its use, however, since for some series the estimates near sharp business cycle peaks or troughs will be similarly affected.
	21	Blank	Compute the B7 trend-cycle curve without modification for extremes.
	21	1	Modify extreme values before computing the B7 trend-cycle curve.

TITLE SECTION

Option code	Card column(s)	Punch	Description
	22-80	Any	The series title, date run or any identification information may be entered here. This information will appear on the top of each page of printout.

2. CONTROL CARD 2: SENTINEL CARD.

Following the last data card of the last series to be run, there must be a card with a Z-punch in column 1 and no punches in the remainder of the card. This card signifies to the program that the run is completed. Only one sentinel card should be present regardless of the number of series to be processed.

3. DATA CARD.

The data cards are placed immediately following the option card. Each data card contains up to one calendar year of data. At least 3 data cards (series must be at least 12 quarters long) and not more than 30 cards may follow the option card. The cards must be in strict calendar order and must agree with the description on the option card, i.e., the series must begin and end in the quarters specified and the series identification on each card must be identical to that given on the option card. The data may begin and end in any quarter of the year. The series may not begin earlier than 1900 nor end later than 1999.

The data for each quarter is punched in a 6-digit field. Leading zeros need not be punched. Decimal points are not punched. Minus signs (allowable only in additive adjustments) may be punched in any column preceding the data and may be followed by blanks or zeros.

Every quarter of a series to be multiplicatively adjusted must contain a positive, nonzero numeric entry. Negative, zero and blank quarters are not allowed in a multiplicative adjustment. (If the series begins in other than the first quarter or ends in other than the last quarter, the unused fields on the card must be blank.) For an additive adjustment, any numeric entries are acceptable. Blank quarters will be treated as zeros in an additive adjustment.

The format of the quarterly card is as follows:

Data card column	Description
1-12	Not used.
13-18	Data for first quarter.
19-30	Not used.
31-36	Data for second quarter.
37-48	Not used.
49-54	Data for third quarter.
55-66	Not used.
67-72	Data for fourth quarter.
73-74	Last two digits of the year. The first two digits of the year are assumed to be 19. The cards in the series must be in chronological order with no missing years. The first and last data cards of the series must be the same as the starting and ending years given on the option card.
75-80	Series identification. Any numeric, alphabetic, or mixed entry may be used for the series identification. This entry must be identical on all data cards in the series and in the data identification section of the option card.

The sequence of cards for a complete quarterly run is as follows:

1. Option and Title Card for first series.
2. From 3 to 30 data cards for first series in chronological order.
3. Option and Title Card for second series.
4. Data cards for second series.

: :

: :

x. Option and Title card for nth series.

x+1. Data cards for nth series.

x+2. Sentinel card.

X. GENERAL INFORMATION ABOUT THE FORTRAN PROGRAMS

The X-11 and X11Q programs[4] are written in FORTRAN IV and are run at the Bureau of the Census on a UNIVAC 1107 computer under the EXEC I executive control system. The X-11 program contains about 2,500 FORTRAN source statements and the X-11Q about 1,400 statements.

The programs will process any number of series. Each series may be from 36 months (12 quarters) to 30 calendar years in length. A typical seasonal adjustment of a 12-year monthly series requires about 30 seconds of central computer time. A quarterly series runs in one-third the time required for a monthly series of the same length.

Copies of the source decks for these programs are available from the Census Bureau at cost. Information on obtaining the programs and their exact cost may be obtained by writing to Julius Shiskin, Chief Economic Statistician, Bureau of the Census, Washington, D.C. 20233.

For those interested in obtaining a copy of the program, the following information may be useful in determining whether or not the Census Bureau programs are suitable for adaptation to your computer. It is also suggested that you write to the above address before purchasing the program, as the Bureau may be able to provide additional information on adapting the programs to specific computers. The Bureau would also appreciate learning about your adaptation when you accomplish it.

The X-11 program consists of a main program and 13 separately assembled subprograms. The largest of these contains 500 FORTRAN source statements. The entire program and all intermediate results remain in core memory throughout the computations. On the 1107, which is a 36-bit word, single-address-instruction computer, 23,000 words of core memory are required. About half of this number is for the program instructions and half for data storage. The X-11Q program consists of a main program and 13 subroutines, the largest of which contains 400 FORTRAN statements. The X-11Q program requires 15,000 words of core memory.

One input and three output units are required by each program. Two of the output units are used for the final table output, the program switching from one to the other when about 17,500 records have been written. A log of the computer run is listed on the third output unit. The log identifies each series adjusted. Series failing to pass the edit, to which all option and data cards are subjected, are identified on the log as having been rejected. Self-explanatory messages are listed giving the reason for and location of the edit failure.

The input and output units are designated in the program by integer variables which are assigned numeric values in the first DATA statement of the main program. In the X-11 program, the variable NR designates the input unit; NW and NWS, the table output and alternate output units; and NP, the log output unit. In the X-11Q program, the variables are IR, NR, LR and JO, respectively. No other input, output, or other auxiliary storage (such as drum, disc, etc.) is used by either program.

The records on the log output unit are printed single-spaced, the first character of each FORMAT statement being a blank. In the X-11 program, the first character of the first record on each page is the variable NEWPAG. This variable is assigned a value in the second DATA statement of the main program. Assigned to this variable is the carriage control symbol which causes the printer to skip to a new page before printing the line. In the same DATA statement is the variable SPC. This variable is written as the first character of each line in each monthly table. The value assigned here causes the printer to skip a line before printing (in the sample printout shown in this paper, the tables were single spaced to conserve space). The charts are always printed single spaced. In the X-11Q program, the carriage control characters are the variables NEWPG and SPACE.

The FORTRAN IV used in both programs is limited to those features of the language which are common to the 1107 FORTRAN as described in the "UNIVAC 1107 FORTRAN Reference Manual U-3569" and the IBM 7090 FORTRAN as described in "Form C28-6390-1, IBM 7090/7094 IBSYS Operating System, Version 13, FORTRAN IV Language".

A complete list of the types of FORTRAN statements used by the programs follows. In this list the letter "i" represents an integer variable, "n" represents either an integer or an integer variable, "v" is any variable, "s" is a statement number, and "a" an arithmetic expression.

FORTRAN Statement	Comments
REAL INTEGER	Arrays are dimensioned in REAL and INTEGER list. No COMPLEX, LOGICAL or DOUBLE PRECISION variables are used. No EXTERNAL functions.
COMMON	Labelled COMMON. Arrays are dimensioned in COMMON list.
DIMENSION	Maximum of 2 dimensions used.
EQUIVALENCE	
DATA	FORMAT statements are compiled as DATA and altered at execution time.
FORMAT	
READ (i,s) List	Only type of input statement.
WRITE (i,s) List	Only type of output statement
CALL Name (v_1,v_2, v_3...v_n)	Subroutine call.
SUBROUTINE Name (v_1,v_2,v_3,...,v_n)	Multiple RETURNS. No multiple entry.
v = a	No mixed mode arithmetic.
IF (a) s_1,s_2,s_3	No logical IF's
DO s n_1,n_2,n_3	No zero or negative arguments.
CONTINUE	

[4] Morton Somer wrote the X-11 program and prepared this section. Norman Bakka wrote the X-11Q program.

FORTRAN Statement	Comments
GO TO s	
GO TO $(s_1,s_2,s_3,\ldots,s_n)$, i	
GO TO v, $(s_1,s_2,s_3,\ldots,s_n)$	
ASSIGN s TO v	
RETURN	
REWIND i	
STOP	
END	

Subscripts are all of one of the following forms where "c" and "k" represent unsigned integer constants and "v" an unsigned nonsubscripted integer variable: v, c, v+c, v-c, c*v, c*v+k, c*v-k.

All variable are single precision real or fixed point. No logical operators are used.

Four built-in functions are called by the programs. They are ABS, which returns the absolute value of a real expression; AINT, which truncates a real value; ALOG10, which computes base 10 logarithms of real arguments; and SQRT, which computes the square root of a real number.

XI. REFERENCES

The references cited below indicate sources for further reading on time series analysis in general and the work which forms the basis for X-11 in particular. References which deal with the problem of seasonal adjustment as it relates to the analysis of current economic conditions are 9, 14, and 15. Early works on seasonality and seasonal adjustment methods are 1, 6, and 7. Works dealing with the history of Census seasonal adjustment methods are 8, 11, 15, 17, and 18. Alternative methods of adjustment are described in 3, 5, 10, and 12.

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17. ., Tests and Revisions of Bureau of the Census Methods of Seasonal Adjustments, U.S. Bureau of the Census Technical Paper No. 5, 1961.

18. and Harry Eisenpress, "Seasonal Adjustments by Electronic Computer Methods", Journal of the American Statistical Association, December 1957, pp. 415-449, republished as NBER Technical Paper No. 12, 1958.

19. U.S. Bureau of Labor Statistics, The BLS Seasonal Factor Method (1964), 1964.

20. Young, Allan, Estimating Trading-Day Variation in Monthly Economic Time Series, U.S. Bureau of the Census Technical Paper No. 12, 1965.

APPENDIX A. X-11 TEST FOR THE EXISTENCE OF STABLE SEASONALITY

An analysis-of-variance F-test for the existence of stable seasonality is applied to the final unmodified S-I ratios (table D8). The theoretical basis for the F-test is given in Scheffé (13). Aids to interpreting the results of the test are given in section VI.

Monthly Stable Seasonality Test

Let SI_{ij} $(i = 1, ---, N_j;\ j = 1, ---, 12)$ denote the final unmodified S-I ratios, where N_j is the number of years of available data for month j.

Let $\hat{SI}_j$ denote the monthly means of the S-I ratios; i.e.,

$$\hat{SI}_j = \frac{1}{N_j} \sum_{1}^{N_j} SI_{ij} \quad (j = 1, ---, 12),$$

Let $\hat{\hat{SI}}$ denote the grand mean of the S-I ratios; i.e.,

$$\hat{\hat{SI}} = \frac{1}{N} \sum_{1}^{12} \sum_{1}^{N_j} SI_{ij},$$ where N is the total number of months of available data.

Calculate the "between months" variance

$$\sigma_M^2 = \frac{1}{11} \sum_{1}^{12} N_j (\hat{SI}_j - \hat{\hat{SI}})^2,$$

the "residual" variance

$$\sigma_R^2 = \frac{1}{N-12} \sum_{1}^{12} \sum_{1}^{N_j} (SI_{ij} - \hat{SI}_j)^2,$$

and the "total" variance

$$\sigma_T^2 = \frac{1}{N-1} \sum_{1}^{12} \sum_{1}^{N_j} (SI_{ij} - \hat{\hat{SI}})^2.$$

Compute $F = \sigma_M^2/\sigma_R^2$ and compare with the tabled F-distribution for the appropriate degrees of freedom. If the computed F is greater than the tabled F at the percent level, "Stable Seasonality Present at the Percent Level" is printed out. In the X-11 program, the computed F is compared to 2.41 (the 1 percent value for a 10-year series) regardless of the length of the series, since the differences in tabled F for series of different lengths are minuscule.

Print out the following analysis-of-variance table:

Source of variation	Sum of squares (SS)	Degrees of freedom (DF)	Mean square (variance = σ^2)	F
Between months	$\sum_{1}^{12} N_j(\hat{SI}_j - \hat{\hat{SI}})^2$	11	$SS_M/DF_M = \sigma_M^2$	σ_M^2/σ_R^2
Residual	$\sum_{1}^{12} \sum_{1}^{N_j} (SI_{ij} - \hat{SI}_j)^2$	N-12	$SS_R/DF_R = \sigma_R^2$	-----
Total	$\sum_{1}^{12} \sum_{1}^{N_j} (SI_{ij} - \hat{\hat{SI}})^2$		------	-----

The F-test is based on the following assumptions:

(1) $SI_{ij} = \hat{SI}_j + I_{ij}$ $(i=1,---,N_j;\ j=1,---,12)$, where $\hat{SI}_j$ represents the stable seasonal for month j and I_{ij} represents the irregular for month j and year i;

(2) $E[SI_{ij}] = \hat{SI}_j$ $(i=1, ---, N_j;\ j=1, ---, 12)$;

(3) $V[I_{ij}] = \sigma^2$ $(i=1, ---, N_j;\ j=1, ---, 12)$, where σ^2 is the variance of the irregular; i.e., the irregular is homoscedastic;

(4) $C[I_{ij}I_{(ij)'}] = 0$ $(ij \neq (ij)';\ i=1,---,N_j;\ j=1,---,12)$; i.e., the irregular is a random series;

(5) The I_{ij} are normally distributed.

The F-test tests the hypothesis that

H_M: $\hat{SI}_1 = \hat{SI}_2 = --- = \hat{SI}_{12} = \hat{\hat{SI}}$

against the alternative that the $\hat{SI}_j$ are not all equal.

Experience has shown that assumptions 2 to 5 are not seriously violated, since the F-test is relatively robust against violations of these assumptions. Assumption 1 may be slightly violated when S and I are related multiplicatively, but the disparity between SI = S+I and SI* = S·I is relatively small when S and I are in the 90 to 110 range. However, assumption 1 is seriously violated when the seasonal pattern changes over time. In such instances, the hypothesis H_M is not appropriate for testing for the existence of seasonality. Research is presently underway to develop a moving seasonality test as a companion to the X-11 stable seasonality test.

Quarterly Stable Seasonality Test

This test is completely analogous to the monthly test with DF_Q (between quarters) = 3 and DF_R = N-4. The hypothesis tested is H_Q: $\hat{SI}_1 = \hat{SI}_2 = \hat{SI}_3 = \hat{SI}_4 = \hat{\hat{SI}}$ against the alternative that the $\hat{SI}_j$ are not all equal. The assumptions are the same as for the monthly test and the caveats given in the last paragraph and in section VI also apply. The computed F is compared to the tabled 1 percent value of 4.20.

APPENDIX B. MOVING-AVERAGE WEIGHTS

Seasonal-Factor Curve Weights

The following tables give the weight patterns for four of the five seasonal-factor curve moving averages available in X-11, the weights for extending the averages at the ends of series, and the implicit weights for year-ahead seasonal factors. The fifth average, the stable seasonal, uses an unweighted average of all available S-I ratios for all seasonal factors (including those at the ends) and the year-ahead factors. "N" is the last year for which an S-I ratio is available, and the weights for year "N+1" represent the implicit weights for the year-ahead seasonal factors.

Table 1. Seasonal-Factor Curve Moving Average Weights

A. 3-Term Moving Average

Factor for year	Weight given S-I ratios in year		
	N-2	N-1	N
N+1.....	-.167	.419	.749
N.....	0	.390	.610
N-1.....	.333	.333	.333

B. 3x3 Moving Average

Factor for year	Weight given S-I ratios in year				
	N-4	N-3	N-2	N-1	N
N+1.....	0	-.056	.148	.426	.481
N.....	0	0	.185	.407	.407
N-1.....	0	.111	.259	.370	.259
N-2.....	.111	.222	.333	.222	.111

C. 3x5 Moving Average

Factor for year	Weight given S-I ratios in year						
	N-6	N-5	N-4	N-3	N-2	N-1	N
N+1.....	0	0	-.034	.134	.300	.300	.300
N.....	0	0	0	.150	.283	.283	.283
N-1.....	0	0	.067	.183	.250	.250	.250
N-2.....	0	.067	.133	.217	.217	.217	.150
N-3.....	.067	.133	.200	.200	.200	.133	.067

D. 3x9 Moving Average

Factor for year	Weight given S-I ratios in year										
	N-10	N-9	N-8	N-7	N-6	N-5	N-4	N-3	N-2	N-1	N
N+1....	0	0	0	0	-.014	.031	.096	.180	.208	.236	.265
N.....	0	0	0	0	0	.051	.112	.173	.197	.221	.246
N-1....	0	0	0	0	.028	.092	.144	.160	.176	.192	.208
N-2....	0	0	0	.032	.079	.123	.133	.143	.154	.163	.173
N-3....	0	0	.034	.075	.113	.117	.123	.128	.132	.137	.141
N-4....	0	.034	.073	.111	.113	.114	.116	.117	.118	.120	.084
N-5....	.037	.074	.111	.111	.111	.111	.111	.111	.111	.074	.037

Since a seasonal factor curve moving average may be applied to a series with fewer available S-I ratios than the number of terms in the average, special sets of weights for short series must be supplied. These weights are given in the following tables:

Table 2. Seasonal-Factor Curve Moving Average Weights for Short Series

A. 3-year series—3x3 moving average

Factor for year	Weight given S-I ratios in year		
	N-2	N-1	N
N+1.....	.111	.444	.444
N.....	.185	.407	.407
N-1.....	.333	.333	.333

B. 4-year series-3x3 moving average

Factor for year	Weight given S-I ratios in year			
	N-3	N-2	N-1	N
N+1.....	-.056	.148	.426	.481
N.....	0	.185	.407	.407
N-1.....	.111	.259	.370	.259

C. 3-year series-3x5 moving average

Factor for year	Weight given S-I ratios in year		
	N-2	N-1	N
N+1.....	.333	.333	.333
N.....	.333	.333	.333
N-1.....	.333	.333	.333

D. 4-year series—3x5 moving average

Factor for year	Weight given S-I ratios in year			
	N-3	N-2	N-1	N
N+1.....	.100	.300	.300	.300
N.....	.150	.283	.283	.283
N-1.....	.250	.250	.250	.250

E. 5-year series—3x5 moving average

Factor for year	Weight given S-I ratios in year				
	N-4	N-3	N-2	N-1	N
N+1.....	-.034	.134	.300	.300	.300
N.....	0	.150	.283	.283	.283
N-1.....	.067	.183	.250	.250	.250
N-2.....	.200	.200	.200	.200	.200

F. 6-year series—3x5 moving average

Factor for year	Weight given S-I ratios in year					
	N-5	N-4	N-3	N-2	N-1	N
N+1.....	0	-.034	.134	.300	.300	.300
N.....	0	0	.150	.283	.283	.283
N-1.....	0	.067	.183	.250	.250	.250
N-2.....	.067	.133	.217	.217	.217	.150

G. 3-year series—3x9 moving average

Factor for year	Weight given S-I ratios in year		
	N-2	N-1	N
N+1.....	.333	.333	.333
N.....	.333	.333	.333
N-1.....	.333	.333	.333

H. 4-year series—3x9 moving average

Factor for year	Weight given S-I ratios in year			
	N-3	N-2	N-1	N
N+1.....	.250	.250	.250	.250
N.....	.250	.250	.250	.250
N-1.....	.250	.250	.250	.250

I. 5-year series—3x9 moving average

Factor for year	Weight given S-I ratios in year				
	N-4	N-3	N-2	N-1	N
N+1.....	.200	.200	.200	.200	.200
N.....	.200	.200	.200	.200	.200
N-1.....	.200	.200	.200	.200	.200
N-2.....	.200	.200	.200	.200	.200

J. 6-year series—3x9 moving average

Factor for year	Weight given S-I ratios in year					
	N-5	N-4	N-3	N-2	N-1	N
N+1.....	-.007	.085	.176	.212	.248	.286
N.....	.051	.112	.173	.197	.221	.246
N-1.....	.167	.167	.167	.167	.167	.167
N-2.....	.167	.167	.167	.167	.167	.167

K. 7-year series—3x9 moving average

Factor for year	Weight given S-I ratios in year						
	N-6	N-5	N-4	N-3	N-2	N-1	N
N+1.....	-.014	.031	.096	.180	.208	.236	.265
N.....	0	.051	.112	.173	.197	.221	.246
N-1.....	.028	.092	.144	.160	.176	.192	.208
N-2.....	.143	.143	.143	.143	.143	.143	.143
N-3.....	.143	.143	.143	.143	.143	.143	.143

L. 8-year series—3x9 moving average

Factor for year	Weight given S-I ratios in year							
	N-7	N-6	N-5	N-4	N-3	N-2	N-1	N
N+1.....	0	-.014	.031	.096	.180	.208	.236	.265
N.....	0	0	.051	.112	.173	.197	.221	.246
N-1.....	0	.028	.092	.144	.160	.176	.192	.208
N-2.....	.032	.079	.123	.133	.143	.154	.163	.173
N-3.....	.125	.125	.125	.125	.125	.125	.125	.125

M. 9-year series—3x9 moving average

Factor for year	Weight given S-I ratios in year								
	N-8	N-7	N-6	N-5	N-4	N-3	N-2	N-1	N
N+1....	0	0	-.014	.031	.096	.180	.208	.236	.265
N.....	0	0	0	.051	.112	.173	.197	.221	.246
N-1....	0	0	.028	.092	.144	.160	.176	.192	.208
N-2....	0	.032	.079	.123	.133	.143	.154	.163	.173
N-3....	.034	.075	.113	.117	.123	.128	.132	.137	.141
N-4....	.111	.111	.111	.111	.111	.111	.111	.111	.111

N. 10-year series—3x9 moving average

Factor for year	Weight given S-I ratios in year									
	N-9	N-8	N-7	N-6	N-5	N-4	N-3	N-2	N-1	N
N+1.....	0	0	0	-.014	.031	.096	.180	.208	.236	.265
N.....	0	0	0	0	.051	.112	.173	.197	.221	.246
N-1.....	0	0	0	.028	.092	.144	.160	.176	.192	.208
N-2.....	0	0	.032	.079	.123	.133	.143	.154	.163	.173
N-3.....	0	.034	.075	.113	.117	.123	.128	.132	.137	.141
N-4.....	.034	.073	.111	.113	.114	.116	.117	.118	.120	.084

Trend-Cycle Curve Weights

The following tables give the weight patterns for the trend-cycle average used in the quarterly routine (5-term Henderson curve), the three averages available in the variable trend-cycle curve routine (9-, 13-, and 23-term Henderson curves), and the weights for extending the averages at the ends of series. "N" is the last month for which a value in the seasonally adjusted series is available.

Table 3. Trend-Cycle Curve Moving Average Weights

A. 5-Term Henderson

C value for month	Weight given CI values in month				
	N-4	N-3	N-2	N-1	N
N.....	0	0	-.073	.403	.670
N-1.....	0	-.073	.294	.522	.257
N-2.....	-.073	.294	.558	.294	-.073

B. 9-Term Henderson

C value for month	Weight given CI values in month								
	N-8	N-7	N-6	N-5	N-4	N-3	N-2	N-1	N
N.....	0	0	0	0	-.156	-.034	.185	.424	.581
N-1....	0	0	0	-.049	-.011	.126	.282	.354	.298
N-2....	0	0	-.022	0	.120	.259	.315	.242	.086
N-3....	0	-.031	-.004	.120	.263	.324	.255	.102	-.029
N-4....	-.041	-.010	.119	.267	.330	.267	.119	-.010	-.041

C. 13-Term Henderson

C value for month	Weight given CI values in month												
	N-12	N-11	N-10	N-9	N-8	N-7	N-6	N-5	N-4	N-3	N-2	N-1	N
N.....	0	0	0	0	0	0	-.092	-.058	.012	.120	.244	.353	.421
N-1.....	0	0	0	0	0	-.043	-.038	.002	.080	.174	.254	.292	.279
N-2.....	0	0	0	0	-.016	-.025	.003	.068	.149	.216	.241	.216	.148
N-3.....	0	0	0	-.009	-.022	.004	.066	.145	.208	.230	.201	.131	.046
N-4.....	0	0	-.011	-.022	.003	.067	.145	.210	.235	.205	.136	.050	-.018
N-5.....	0	-.017	-.025	.001	.066	.147	.213	.238	.212	.144	.061	-.006	-.034
N-6.....	-.019	-.028	0	.066	.147	.214	.240	.214	.147	.066	0	-.028	-.019

D. 23-Term Henderson

C value for month	Weight given CI values in month											
	N-22	N-21	N-20	N-19	N-18	N-17	N-16	N-15	N-14	N-13	N-12	N-11
N.....	0	0	0	0	0	0	0	0	0	0	0	-.077
N-1.....	0	0	0	0	0	0	0	0	0	0	-.046	-.041
N-2.....	0	0	0	0	0	0	0	0	0	-.022	-.025	-.025
N-3.....	0	0	0	0	0	0	0	0	-.008	-.014	-.018	-.015
N-4.....	0	0	0	0	0	0	0	-.001	-.008	-.013	-.012	-.003
N-5.....	0	0	0	0	0	0	.003	-.006	-.011	-.011	-.002	.015
N-6.....	0	0	0	0	0	.002	-.006	-.012	-.011	-.003	.015	.039
N-7.....	0	0	0	0	.001	-.007	-.013	-.011	-.003	.015	.039	.068
N-8.....	0	0	0	-.002	-.007	-.013	-.013	-.003	.014	.039	.068	.097
N-9.....	0	0	-.003	-.010	-.015	-.014	-.005	.014	.040	.069	.097	.122
N-10.....	0	-.004	-.011	-.016	-.015	-.005	.013	.039	.068	.097	.122	.138
N-11.....	-.004	-.011	-.016	-.015	-.005	.013	.039	.068	.097	.122	.138	.148

D. 23-Term Henderson--Continued

C value for month	Weight given CI values in month										
	N-10	N-9	N-8	N-7	N-6	N-5	N-4	N-3	N-2	N-1	N
N.....	-.064	-.049	-.028	.002	.039	.084	.133	.182	.227	.263	.288
N-1.....	-.035	-.024	-.004	.025	.061	.101	.141	.176	.203	.219	.224
N-2.....	-.019	-.005	.018	.049	.082	.116	.146	.166	.177	.176	.166
N-3.....	-.004	.015	.042	.073	.103	.129	.147	.154	.150	.134	.112
N-4.....	.015	.040	.068	.098	.121	.137	.142	.136	.119	.095	.066
N-5.....	.039	.067	.095	.119	.134	.139	.131	.114	.088	.059	.027
N-6.....	.068	.096	.118	.134	.138	.132	.114	.089	.059	.027	.001
N-7.....	.096	.120	.135	.140	.133	.116	.090	.060	.031	.005	-.015
N-8.....	.120	.137	.140	.136	.118	.094	.064	.034	.008	-.010	-.021
N-9.....	.138	.143	.137	.120	.095	.067	.037	.011	-.007	-.017	-.019
N-10.....	.144	.138	.122	.097	.068	.039	.013	-.005	-.015	-.016	-.011
N-11.....	.138	.122	.097	.068	.039	.013	-.005	-.015	-.016	-.011	-.004

Moving-Average Weights Used in Earlier Versions of Method II

The following tables give the weight patterns for the seasonal-factor curve moving averages used in earlier versions of Method II, the weights for extending the averages at the ends of series, and the implicit weights for year-ahead seasonal factors. "N" is the last year for which an S-I ratio is available, and the weights for year "N+1" represent the implicit weights for the year-ahead seasonal factors.

Table 4. Seasonal-Factor Curve Moving Average Weights Used in Earlier Versions of Method II

A. 3-Term Moving Average
(X-10 Program)

Factor for year	Weight given S-I ratios in year		
	N-2	N-1	N
N+1.....	-.167	.333	.833
N.....	0	.333	.667
N-1.....	.333	.333	.333

B. 3x3 Moving Average

Program	Weight given S-I ratios in year				
	N-4	N-3	N-2	N-1	N
	Factor for year N+1				
Original.....	0	-.056	.056	.389	.611
X-3.....	0	-.056	.056	.389	.611
X-9.....	0	-.056	.148	.426	.481
X-10.....	0	-.050	.017	.491	.541
	Factor for year N				
Original.....	0	0	.111	.389	.500
X-3.....	0	0	.111	.389	.500
X-9.....	0	0	.185	.407	.407
X-10.....	0	0	.111	.444	.444
	Factor for year N-1				
Original.....	0	.111	.222	.389	.278
X-3.....	0	.111	.222	.389	.278
X-9.....	0	.111	.259	.370	.259
X-10.....	0	.100	.300	.350	.250
	Factor for year N-2				
All versions....	.111	.222	.333	.222	.111

C. 3x5 Moving Average

Program	Weight given S-I ratios in year													
	N-6	N-5	N-4	N-3	N-2	N-1	N	N-6	N-5	N-4	N-3	N-2	N-1	N
	Factor for year N+1							Factor for year N						
Original.....	0	0	-.034	.034	.100	.450	.450	0	0	0	.067	.133	.400	.400
X-3.....	0	0	-.034	.159	.225	.325	.325	0	0	0	.167	.233	.300	.300
X-9.....	0	0	-.034	.134	.300	.300	.300	0	0	0	.150	.283	.283	.283
X-10.....	0	0	-.034	.034	.200	.400	.400	0	0	0	.067	.200	.367	.367
	Factor for year N-1							Factor for year N-2						
Original.....	0	0	.067	.133	.200	.300	.300	0	.067	.133	.200	.200	.233	.167
X-3.....	0	0	.067	.183	.250	.250	.250	0	.067	.133	.217	.217	.217	.150
X-9.....	0	0	.067	.183	.250	.250	.250	0	.067	.133	.217	.217	.217	.150
X-10.....	0	0	.067	.133	.200	.300	.300	0	.067	.133	.200	.200	.233	.167
	Factor for year N-3													
All versions....	.067	.133	.200	.200	.200	.133	.067							

D. 3x9 Moving Average
(X-10 Program)

Factor for year	Weight given S-I ratios in year										
	N-10	N-9	N-8	N-7	N-6	N-5	N-4	N-3	N-2	N-1	N
N+1.....	0	0	0	0	-.019	.019	.111	.111	.260	.260	.260
N.....	0	0	0	0	0	.037	.111	.111	.247	.247	.247
N-1.....	0	0	0	0	.037	.074	.111	.111	.222	.222	.222
N-2.....	0	0	0	.037	.074	.111	.111	.111	.185	.185	.185
N-3.....	0	0	.037	.074	.111	.111	.111	.111	.148	.148	.148
N-4.....	0	.037	.074	.111	.111	.111	.111	.111	.123	.123	.086
N-5.....	.037	.074	.111	.111	.111	.111	.111	.111	.111	.074	.037

E. 3x15 Moving Average
(X-10 Program)

Factor for year	Weight given S-I ratios in year																
	N-16	N-15	N-14	N-13	N-12	N-11	N-10	N-9	N-8	N-7	N-6	N-5	N-4	N-3	N-2	N-1	N
N+1.....	0	0	0	0	0	0	0	-.011	-.006	.067	.067	.067	.067	.067	.227	.227	.227
N.....	0	0	0	0	0	0	0	0	.011	.067	.067	.067	.067	.067	.218	.218	.218
N-1.....	0	0	0	0	0	0	0	.022	.045	.067	.067	.067	.067	.067	.200	.200	.200
N-2.....	0	0	0	0	0	0	.022	.045	.067	.067	.067	.067	.067	.067	.178	.178	.178
N-3.....	0	0	0	0	0	.022	.045	.067	.067	.067	.067	.067	.067	.067	.156	.156	.156
N-4.....	0	0	0	0	.022	.045	.067	.067	.067	.067	.067	.067	.067	.067	.133	.133	.133
N-5.....	0	0	0	.022	.045	.067	.067	.067	.067	.067	.067	.067	.067	.067	.111	.111	.111
N-6.....	0	0	.022	.045	.067	.067	.067	.067	.067	.067	.067	.067	.067	.067	.089	.089	.089
N-7.....	0	.022	.045	.067	.067	.067	.067	.067	.067	.067	.067	.067	.067	.067	.074	.074	.052
N-8.....	.022	.045	.067	.067	.067	.067	.067	.067	.067	.067	.067	.067	.067	.067	.067	.045	.022

The following table gives the weight pattern for the 15-term Spencer moving average, which was used to obtain the trend-cycle curve in earlier versions of Method II. and the weights for extending the average at the end of series. "N" is the last month for which a value in the seasonally adjusted series is available.

Table 5. Trend-Cycle (15-Term Spencer Curve Weights Used in Earlier Versions of Method II)

C Value for Month	Weight given CI values in month														
	N-14	N-13	N-12	N-11	N-10	N-9	N-8	N-7	N-6	N-5	N-4	N-3	N-2	N-1	N
N.....	0	0	0	0	0	0	0	-.009	-.019	-.016	.009	.162	.240	.305	.327
N-1....	0	0	0	0	0	0	-.009	-.019	-.016	.009	.066	.188	.253	.275	.253
N-2....	0	0	0	0	0	-.009	-.019	-.016	.009	.066	.144	.217	.239	.217	.152
N-3....	0	0	0	0	-.009	-.019	-.016	.009	.066	.144	.209	.223	.201	.135	.057
N-4....	0	0	0	-.009	-.019	-.016	.009	.066	.144	.209	.231	.198	.133	.055	-.002
N-5....	0	0	-.009	-.019	-.016	.009	.066	.144	.209	.231	.209	.137	.059	.002	-.023
N-6....	0	-.009	-.019	-.016	.009	.066	.144	.209	.231	.209	.144	.063	.007	-.018	-.021
N-7....	-.009	-.019	-.016	.009	.066	.144	.209	.231	.209	.144	.066	.009	-.016	-.019	-.009

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