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Analysis of bank debits as a business cycle indicator

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ANALYSIS OF BANK DEBITS AS A BUSINESS CYCLE INDICATOR

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PREFACE

In the years since World War II, our economy has continued to experience alternating periods of expansion and contraction. Although there have been notable structural and institutional changes in the past twenty-five years in our economic system, the business cycle is still a very important aspect of business life. Thus, the problem of minimizing instability has come to occupy a front-row position in our business and economic thought. In order to work toward this objective, we must know at any given time where we are in the business cycle and the probable course that future developments will take. For this kind of information we rely on our business and economic indicators. Therefore, we must strive to develop indicators that are accurate, readily available, and comprehensive. A great number of statistical series that reflect economic conditions in one way or another are used as business and economic indicators.

Efforts will continue to be made to improve both the indicators themselves and the ability to interpret them. Emphasis will continue to be placed on accuracy and availability. The author has singled out bank debits for this study because they are comprehensive and readily available. Demand deposits have grown tremendously since World War II, and over ninety per cent of all monetary transactions are now handled by check.

The purpose of this study is to make a complete analysis of bank debits as a cyclical indicator in order to evaluate the usefulness of this series as a cyclical indicator of economic activity, using the past as a guide to the future.

The need for better, more effective indicators has been discussed in this paper, and the shortcomings of several of the important indicators has been explored. A definition of bank debits has been given, along with a historical summary showing the various changes that have taken place in the series since its inception. The importance and use of bank debits as an economic indicator has also been discussed in this section.

The National Income, Personal Income, Gross National Product, Retail Sales, and Industrial Production series have been compared with the bank debits series for the eleven-year period, 1951 through 1961, in order to determine best the one indicator to analyze further in comparison with bank debits. The industrial production index was found to fit best these qualifications and was selected for further comparison and analysis.

To carry out effectively this analysis cyclical relatives of bank debits and industrial production were computed by first seasonally adjusting bank debits data. The trend values for the two series was then computed by the sum of the least squares method and all data for the period 1946 through 1961 was adjusted by months for this trend. The two series were presented in the form of a chart, and an effort was made to explain why they reacted differently in certain periods and the conditions which surrounded these various changes for the period 1946 through 1961. The findings of this study are condensed in the summary.

My sincere appreciation and gratitude is extended to Doctor Thomas C. Sanders, Economist, Federal Reserve Bank of Richmond, under whose guidance this work was undertaken and whose counsel and assistance

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R. H. J.

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CHAPTER I

INTRODUCTION

Much work has been done in studying variations in business activity, particularly business cycles. The various business and economic time series used as indicators of business activity all have their advantages and disadvantages. Naturally, there is a steady desire among business analysts for better indicators and a better understanding of the existing ones. More study of these indicators would tend to promote fuller comprehension of what they can tell analysts about the magnitude, timing, geographical and industrial characteristics of business cycles. Finally, remedies for offsetting the undesirable effects of variations in business activity would in all likelihood be improved as a result of the new knowledge.

In this study, an attempt will be made to analyze bank debits in this way. Bank debits represent payments made by banks against checks drawn by depositors or against withdrawal slips presented over the counter and other charges against demand deposits. This indicator is readily available nationally, regionally, and locally. There is a strong likelihood that various adjustments and refinements of the series will become possible as more and more banks automate check handling procedures. This should give bank debits much more usefulness and importance as an indicator of economic activity. Therefore, this paper will attempt to investigate briefly the likelihood of finding ways to improve the usefulness of the series.

Bank debits are probably the most widely reproduced monetary statistics released by the Board of Governors of the Federal Reserve System.[1] The main reasons are that debits are available very promptly, are comprehensive (if not always comprehensible), are available for various localities, and cover extensive past periods for which other economic time series are extremely scarce. Especially promising, it would seem, is this fact that debits are one of the few economic indicators available for a large number of individual cities and can, therefore, be used effectively for analyzing and comparing local business developments. Debits also make an important contribution to monetary analysis in that they are used in computing the rate of turnover of deposits. It should also be noted that debits statistics are available weekly, as well as monthly and annually for a relatively long period of time. Thus, bank debits appear to have considerable potential as a tool to be used in studies of growth, cycles, and other variations in business activity.

Bank debits, as used throughout this study, exclude New York and six other leading financial centers. This was to eliminate the financial transactions and operations of the money markets in these centers. This is the type of adjustment that can be made to further purify and improve the usefulness of the series. There is the possibility that the debits statistics can be refined by this and by the elimination of other lead-

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[1]George Garvy, Debits and Clearings Statistics and Their Use (Washington, D. C.: Board of Governors of the Federal Reserve System, 1959), p. 25.

ing financial centers, such as Dallas, Cleveland, Pittsburg, and St. Louis. Even so, debit statistics outside these main centers still reflect changes in financial transactions and include a duplication of transactions, such as the payment for materials at various levels of production, as well as the payment of the final product. Also, sales of used goods, goods purchased in previous periods, have a different relationship than new sales. They are reflected in bank debits but are not included in production series. The proportion of financial transactions and operations of money markets, which is included in local debits data, as a rule, decrease with the size of the community.

The general purpose of this thesis is to examine relationships between national bank debits and a cyclically sensitive national economic indicator. The specific purpose of this investigation is to make a preliminary appraisal of bank debits in their present form as a basis for evaluating the possibility of refining them and extending them to local and regional business developments.

Preliminary comparisions were made between bank debits and five widely used indicators. One of the five was chosen as, all things considered, the best guide for testing the cyclical, and to some extent, the growth characteristics of bank debits. The industrial production index was selected because it appeared to be more sensitive to broad cyclical fluctuations and to minor variations within the business cycles. The industrial production index is also a monthly series so that timing of changes are more promptly apparent.

Bank debits data were seasonally adjusted and both series were adjusted for trend. After these adjustments, bank debits still contain erratic movements caused by the financial transactions previously mentioned and other factors. Financial transactions decrease proportionately, as a rule, with the size of the community. Other causes of irregular variations have not been investigated in this study and probably will not cause significant differences in the ultimate interpretation of cyclical behavior.

The use of debits statistics in analyzing regional and local, as well as national, business developments may be expected to grow in importance because they represent the bulk of local and regional payments for business, personal transactions, and payments by local and State governmental units. They still retain their importance as one of the best continuous monthly series available for the study of business activity in districts covered by the figures. If local debits data are not the only long-run economic series available for measuring local and regional business conditions they are usually the best. Debit statistics have the advantage of being released promptly and are compiled on a uniform basis over a relatively long period of time.

This study will attempt to show that bank debits may well become a good and useful indicator even though they are not a very good one in their present condition. Erratic changes on short notice tend to hide turning points in the business cycle. But adjustments of various kinds should remedy this in time as more elaborate and more detailed records become possible for banks generally.

The primary function of bank debits is, of course, to measure the value of transactions, not the volume of output or level of employment. There is the possibility that the debits series can and will be subdivided on national, regional, and local levels, classifying transactions according to kind, and enabling debits data to measure specific money flows. Thus, financial and other types of transactions would be reported separately.

Types of transactions that are not easily segregated, but should be, include the accounts of members of national stock exchanges, dealers in Government securities, over-the-counter dealers, investment bankers, other businesses that deal in stocks or securities, real estate brokers, and dealers in second hand goods. On a regional or local basis, debits statistics would contain fewer of these transactions and they could be segregated more easily. This could be accomplished by the use of computers and electronic high-speed check processing equipment. These financial transactions would be earmarked and sorted by these electronic machines. This would improve bank debits statistics, particularly at the local and regional level.

If debits were classified, there is the possibility that they could provide a direct measurement of wage and salary payments, income of service organizations, wholesale-retail trade, all of which are poorly represented as far as prompt availability is concerned.

Such refinements could make bank debits one of the best sources of national information, as well as providing a useful indicator of local and regional business activity for perhaps the first time.

CHAPTER II

DEFINITION AND HISTORICAL SUMMARY OF BANK DEBITS

Bank debits represent payments made by banks against checks drawn by depositors or against withdrawal slips presented over the counter (charges against demand deposits). They measure directly the total volume of money payments made by checks. Debits include checks cashed over the counter and those in which the payee deposits the check at the same bank on which the check is drawn. The primary function of bank debits is to measure the value of transactions rather than the volume of goods and services.

Debits include all payments made by check for finished products plus all transactions paid for by check between the raw material stage of production and the sale of the final goods and services. Therefore, the total volume of debits is several times larger than the total value of final goods and services produced, due to duplication.

Bank debits have been used in current business and monetary analysis for many years. The first attempt to collect debits data originated in 1908 by the Clearing House Section of the American Bankers Association (ABA) at its annual meeting. They adopted a resolution which recommended that each bank make a weekly report to the manager of the clearing house in its own city of the total of all checks on itself charged on its books, except cashiers' checks given in payment of clearing house balances. It was several years before very many of the clearing houses started collecting and reporting debit statistics to the Clearing House

Section of the American Bankers Association. Even then the number of clearing houses that collected debits was so small and the reports so inconsistent that the American Bankers Association did not make the data public. By 1916, only twenty-nine out of approximately one hundred clearing houses reported usable figures regularly enough to permit a quarterly release of totals. Debits to interbank accounts as well as debits to individual accounts were included in these data.[1] The Clearing House Section of the ABA in July 1918, tried to improve the cooperation of the local clearing house associations which then numbered 229. This last effort of the ABA was not very successful in enlisting any large number of additional centers to agree to report. Finally, the ABA decided to abandon its collection of debit statistics and to cooperate with the Federal Reserve Board, which began collecting debits for the week ended August 15, 1918. The local clearing house managers compiled totals for the individual centers and then forwarded them to the respective Federal Reserve banks, who forwarded them to the Board of Governors in Washington. The data collected under this cooperative arrangement between the Federal Reserve Board and the ABA carried separate data for debits to banks and bankers' accounts and debits to individual and business accounts.[2]

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[1] Ibid.

[2] Federal Reserve Bulletin (Washington, D. C.: Board of Governors of the Federal Reserve System, September 1918), pp. 821-828.

By year-end 1918, the Board of Governors was receiving reports from about 150 centers and this number gradually increased to 167 by year-end 1921. The Board began to publish debits to individual accounts for all the clearing house association centers of the United States beginning with the week ending February 1, 1922. This increased the number of reporting centers for which debits were published weekly to approximately 230.[3] The reporting centers continued to gradually grow until they numbered 274 by 1934.

The Federal Reserve Bulletin continued to carry weekly data for all individual reporting centers, along with district and national totals, until April 1927. After this date, the series was reduced to only monthly totals.[4]

In 1923, the Federal Reserve Board began publishing a monthly series for 141 cities in the Federal Reserve Bulletin. Also, district totals as well as a breakdown of the national total between New York City and the other 140 cities were included in the series. This monthly series of debits data was continued until it was revised in 1953.[5]

The weekly debits to total deposit accounts for an individual center may have been subject to any or all of the following factors before the 1942 revisions: (1) little cooperation of some clearing house banks,

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[3] Ibid., March 1922, p. 358.

[4] Garvy, op. cit., p. 27.

[5] Ibid., p. 27-28.

mostly during the earlier years; (2) clearing house managers reporting incorrect totals; (3) banking structure changes.[6]

The first factor was a result of delays in reporting by some banks at the time the debits series was started for as long as several years. These banks were not members of the Federal Reserve System.

Secondly, the actual reports of data from the individual banks are for the most part received by the local clearing house managers, who furnish their reports to the Board of Governors in Washington, D. C. In some instances, reports, which included cashiers' checks or other items that should have been omitted, were furnished to the Board of Governors for many years before the errors were discovered.

Also newly chartered banks, changes in membership of local clearing houses, and bank mergers were factors which could have influenced the weekly debits to total deposit accounts for an individual center.[7]

In 1942, the first major revision of the debits series was made. The series was changed from a weekly series to a monthly series, and the reporting banks supplied data comparable to the reported debits. Also, the limitation to members of local clearing house associations was abandoned. By January 1951, the coverage of the national series had been extended to 342 centers.

The Board of Governors began to publish a new weekly series of "debits to demand deposit accounts except interbank and United States Government accounts," in 1942, when the older series was shifted from a

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[6] Ibid.

[7] Ibid., p. 29.

weekly to a monthly basis. This data had been collected since 1934, but not published. The Board of Governors in 1934, had requested the weekly reporting member banks in 101 leading cities to include in the weekly condition reports certain categories of debits.

In July 1947, the series of condition reports of weekly reporting member banks was revised for the first time since its beginning 30 years earlier.[8] The number of reporting member banks was increased from 371 to 441, while at the same time the number of reporting centers was reduced from 101 to 94.[9] There were 6 cities included in the 94 centers of the new series which had not previously reported, and 13 smaller centers were dropped from the group of weekly reporting banks.

In March 1953, the weekly and monthly series were consolidated. This decision was reached after a study of the use made inside and outside of the Federal Reserve System of the debit series published at the present time.[10] The present series includes debits to demand deposit accounts except interbank and United States Government demand accounts or deposits. The elimination of these government demand accounts or deposits removed from the monthly series a factor which was not directly related to economic conditions. Although some of the United States Government demand accounts are often carried in the same ledger with accounts of private

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[8] Ibid., p. 31.

[9] Ibid., p. 32.

[10] Board of Governors of the Federal Reserve System, op. cit., April 1953, pp. 355-57.

depositors, they constitute a very small amount in relation to total debits. These accounts are of a miscellaneous nature and are a burden to segregate for reporting purposes by some of the banks.

Elimination of debits to time deposit accounts affected the volume of debits very little, because time deposits are relatively stable.

The number of reporting centers were increased to 345 centers by the March 1953 revision. Also, there was a new three-way breakdown of reporting centers. Instead of publishing the totals for New York, 140 other leading centers, and 201 other reporting centers, as was done previously, they are now published for New York, 6 other financial centers (Boston, Philadelphia, Chicago, Detroit, Los Angeles, and San Francisco), and 338 other reporting centers.

The Board of Governors of the Federal Reserve System in a special release, Bank Debits to Demand Deposit Accounts, publishes the monthly debits for each of the 344 reporting centers, and this release is available 12 or 13 days after the month to which it refers.

Our complex society of today necessitates considerable money flows. Virtually all sales of goods and services are transacted by a transfer of money. If business activity increases, the volume of payments is expected to increase, and as economic activity contracts, the volume of payments does likewise. Thus, increases and decreases in volume of payments should mirror basic economic changes. Today, more than 90 per cent of all monetary transactions are made by check, the total dollar amount of checks drawn against deposit accounts (bank debits) tends to reflect changes in

over-all business activity.[11]

The bank debit series is one of the most widely used indicators of trade changes, particularly by analysts studying business fluctuation in individual localities. The extensive use of debit statistics is due to their superiority over many other indicators in various respects. The principal advantages are quick availability and long-term continuity. Bank debit statistics, as previously mentioned, are available for analysis usually within two weeks following the close of the month. Also, debit statistics is available over a relatively long period of time. The Board of Governors of the Federal Reserve System began collecting monthly data for 141 centers in 1919, and over the years there have been additions until, at the present time, debit data for 344 centers throughout the country is collected and published.

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[11] Monthly Business Review (Federal Reserve Bank of Cleveland, Cleveland, Ohio, November 1957), p. 6.

CHAPTER III

BANK DEBITS COMPARED WITH OTHER SERIES

The bank debit series, as used in this study to compare with other series, excludes New York and six other leading financial centers (Boston, Philadelphia, Chicago, Detroit, San Francisco, and Los Angeles). The series covers debits to demand deposit accounts, except interbank and United States Government accounts. The debits data is reported from 337 centers and published monthly and annually by the Board of Governors of the Federal Reserve System.[1]

The national income series is the aggregate of earnings by labor and property from the current production of goods and services by the Nation's economy. It is the sum of five major items: (1) compensation of employees; (2) proprietors' income; (3) rental income of persons; (4) net interest; and (5) corporate profits and inventory valuation adjustment.[2]

This series is a useful measure of aggregate economic activity as well as of the rate of flow of earnings from current output. In comparing bank debits with the national income series in Chart 1, page 14, the latter is not as sensitive to fluctuations and cyclical variations in the economy as is needed in order to analyze further and compare with the debits series. The national income series is only available quarterly, and the

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[1]Before April 1955, 338 centers.

[2]1960 Supplement to Economic Indicators (Washington, D. C.: United States Government Printing Office, 1960), p. 95.

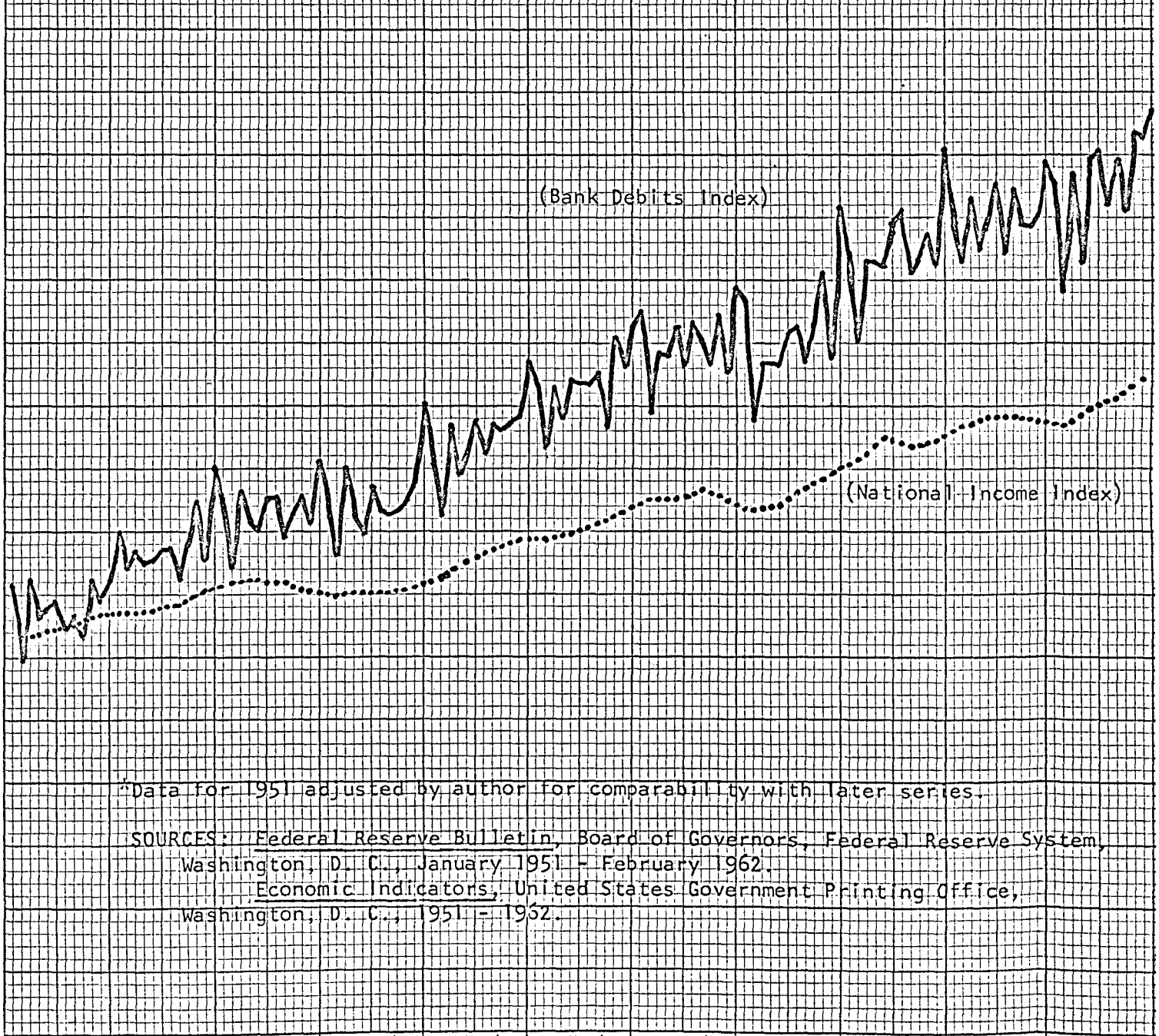
CHART 1

BANK DEBITS INDEX* AND NATIONAL INCOME INDEX

NOT SEASONALLY ADJUSTED

1951 - 1961

(1947 - 1949 = 100)



*Data for 1951 adjusted by author for comparability with later series.

SOURCES: Federal Reserve Bulletin, Board of Governors, Federal Reserve System, Washington, D. C., January 1951 - February 1962.

Economic Indicators, United States Government Printing Office, Washington, D. C., 1951 - 1962.

statistics are released about forty-five days after the close of the quarter. Chart I on page 14, indicates that national income reached a peak in the third quarter of 1957, and at the same time, bank debits did not seem to react. In the second quarter of 1959, national income again reached a peak, but as before bank debits did not appear to react. The national income series, as compiled by the Department of Commerce, are estimates and are valuable statistics for other studies, but the series is not suitable for further comparison and analysis with bank debits.

In contrast to national income, personal income is composed of income received currently by individuals, unincorporated businesses, and nonprofit institutions (including pension, trust, and welfare funds). The majority of total personal income is received by employees in the form of wages and salaries and other labor income. Approximately 30 per cent of the total is derived from rents, interest, dividends, transfer payments, and income from farming, professional work, and other unincorporated businesses. Estimates of personal income are released monthly with less than a one-month lag.

Personal income statistics are useful as current indicators of general business activity. The estimates for personal income and components measure trends in spending power of individuals. By including such nonmonetary items as imputed rent, interest, food, and fuel in the series it makes the income estimates more stable, but has little effect on the ability of the estimates to indicate when a change is occurring

and the direction of the change.[3] Personal income data are thus useful for analyzing short-term business changes and long-term economic trends, but not as a measure of total spendable income or purchasing power of all economic entities.

The personal income series is estimated on a monthly and annual basis by the Department of Commerce. It is compared to bank debits in Chart 2, page 17. Personal income is not as sensitive as might be desired to various economic fluctuations. A series is desired that is sensitive to most all variations in the economy. Chart 2 on page 17 indicates that personal income reached a slight peak in November 1958 of 180.3, whereas bank debits actually dropped to 215.7 in the same month. Also, personal income reached another peak in June 1959, but bank debits does not seem to react at the same time. Also, personal income is an estimate and like national income it does not warrant further comparison and analysis with bank debits.

Gross National Product (usually shortened to GNP) is the most comprehensive measure of aggregate economic activity. It is the total amount of final goods and services produced during the year, valued at current market prices. It measures this total output or amount in terms of the expenditures by which these goods and services are acquired. These expenditures are made up of the four following items: (1) personal consumption expenditures; (2) net exports of goods and services; (3) gross

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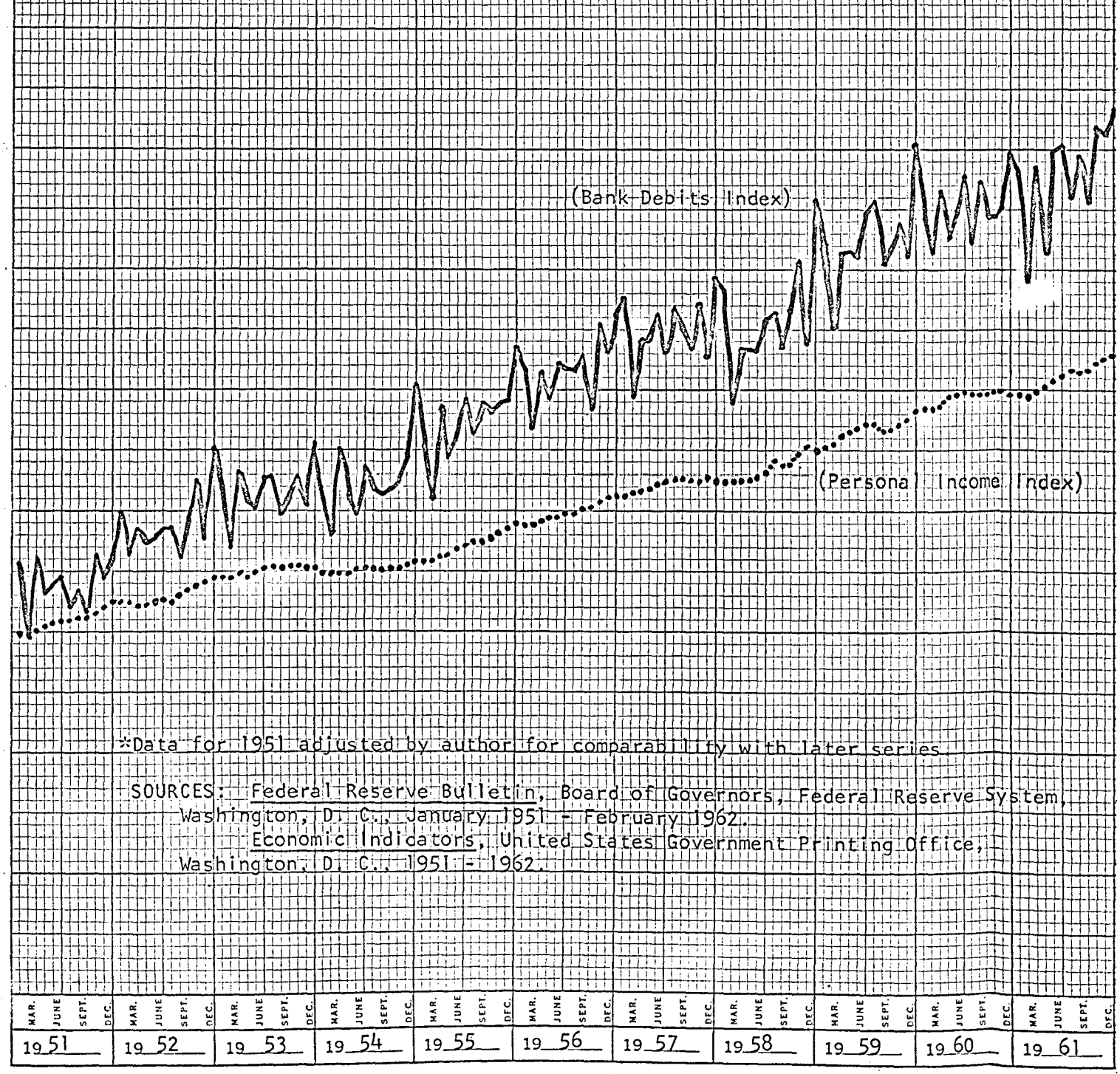
[3] Ibid., p. 11.

CHART 2
BANK DEBITS INDEX* AND PERSONAL INCOME INDEX
NOT SEASONALLY ADJUSTED
1951 - 1961
(1947 - 1949 = 100)



*Data for 1951 adjusted by author for comparability with later series.

SOURCES: Federal Reserve Bulletin, Board of Governors, Federal Reserve System, Washington, D. C., January 1951 - February 1962.
Economic Indicators, United States Government Printing Office, Washington, D. C., 1951 - 1962.

private investment; and (4) government purchases of goods and services.[4]

When using GNP to compare with bank debits, it must be brought out that GNP preliminary estimates are not published by the Department of Commerce until six or seven weeks after the close of the quarter to which they relate, whereas final debits figures for a certain month are released about twelve or thirteen days after the end of the month. While estimating the GNP on a quarterly basis, some detail must be sacrificed to provide full coverage. The GNP estimates appear several months late and hence are not sufficiently current for many forecasting problems.

There are general similarities between changes in GNP and bank debits figures as shown by Chart 3 on page 19. The GNP dropped to 173.3 in the first quarter of 1958 as shown by Chart 3, and bank debits also dropped from 233.2 in January 1958 to 195.9 in February of the same year. In the second quarter of 1959, GNP reached a peak, but bank debits does not seem to react. The GNP is so broad in its coverage that it does not show all of the minor fluctuations or the precise turning points in the cycle as predominately and as clearly as is needed for an accurate comparison with bank debits.

Retail sales are monthly sales statistics collected by the Department of Commerce from a large number of diversified retail stores, including independent, chain, and mail-order establishments. In order to qualify as a reporting store, at least half of its sales must be made at retail to ultimate consumers rather than for resale. From these figures

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[4] Ibid., p. 4.

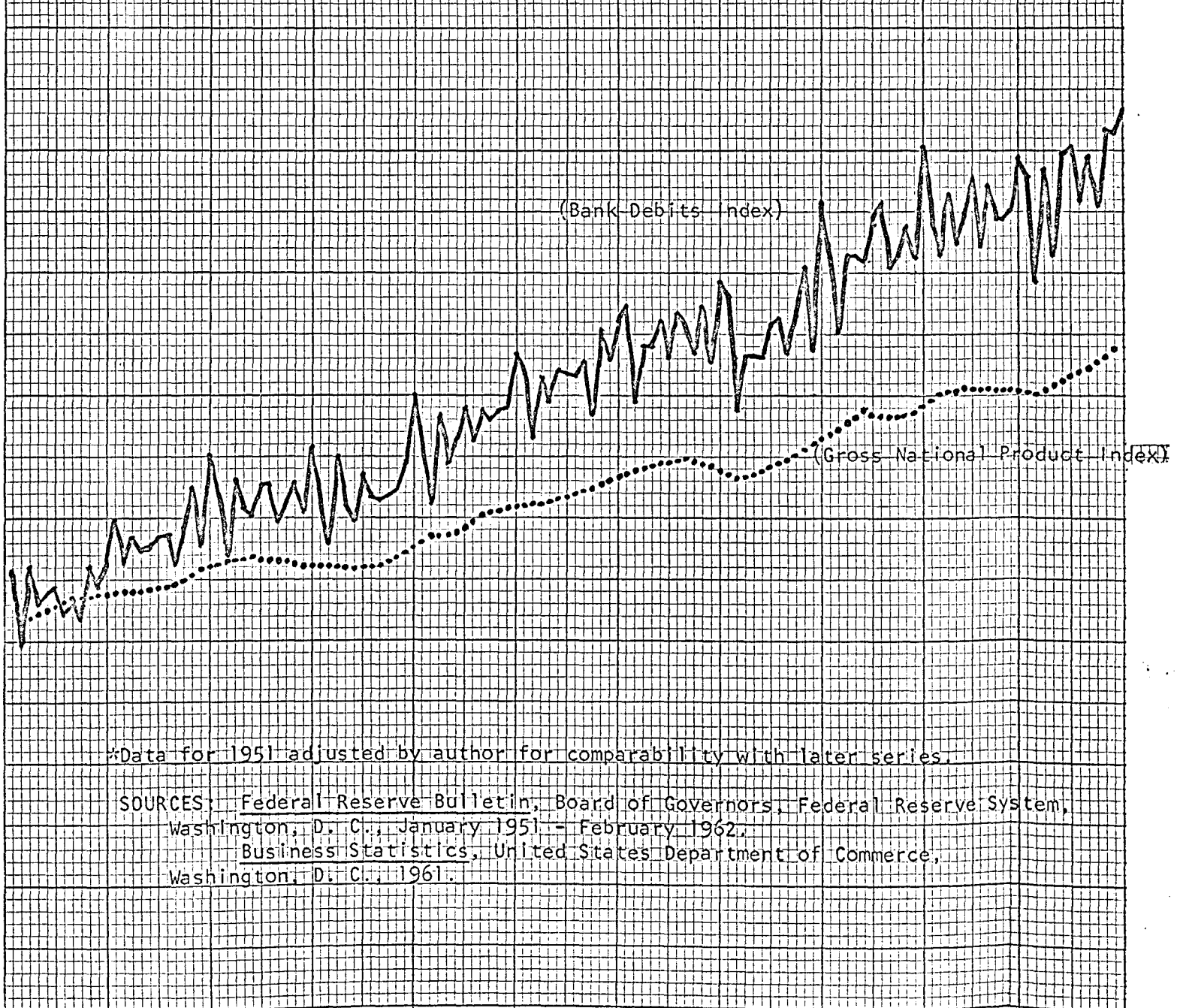
CHART 3

BANK DEBITS INDEX* AND GROSS NATIONAL PRODUCT INDEX

NOT SEASONALLY ADJUSTED

1951 - 1961

(1947 - 1949 = 100)



*Data for 1951 adjusted by author for comparability with later series.

SOURCES: Federal Reserve Bulletin, Board of Governors, Federal Reserve System, Washington, D. C., January 1951 - February 1962.

Business Statistics, United States Department of Commerce, Washington, D. C., 1961.

and others, the U. S. Department of Commerce estimates each month the aggregate dollar volume of sales at retail stores. Since a large proportion of consumer expenditures are made at retail stores, this series is a significant barometer of consumer demand.

In making a comparison of bank debits and retail sales, as shown in Chart 4 on page 21, the retail sales series did not react to many of the various fluctuations with any degree of sharpness or predominance. Chart 4 indicates that retail sales reached a slight peak in August 1958, of 159.4, but bank debits actually dropped from 225.2 in July of 1958 to 213.6 in August of the same year. In April 1960, retail sales again reached a peak of 178.3, and bank debits dropped from 266.0 in March 1960, to 250.4 in April 1960. Bank debits failed to react in the same manner as retail sales in both examples. The monthly retail sales estimates are based on a probability sample and are, therefore, subject to sampling variability, as well as other biases as non-response or reporting errors.[5]

The index of industrial production is compiled monthly by the Board of Governors of the Federal Reserve System and measures the physical volume of output in manufacturing and mining, and electric and gas utilities. Prior to December 1959, the index measured only manufacturing and mining activity. At present, the index is a weighted average of 207 economic time series obtained from government and private sources.

The index is not a measure of total economic activity, but it does

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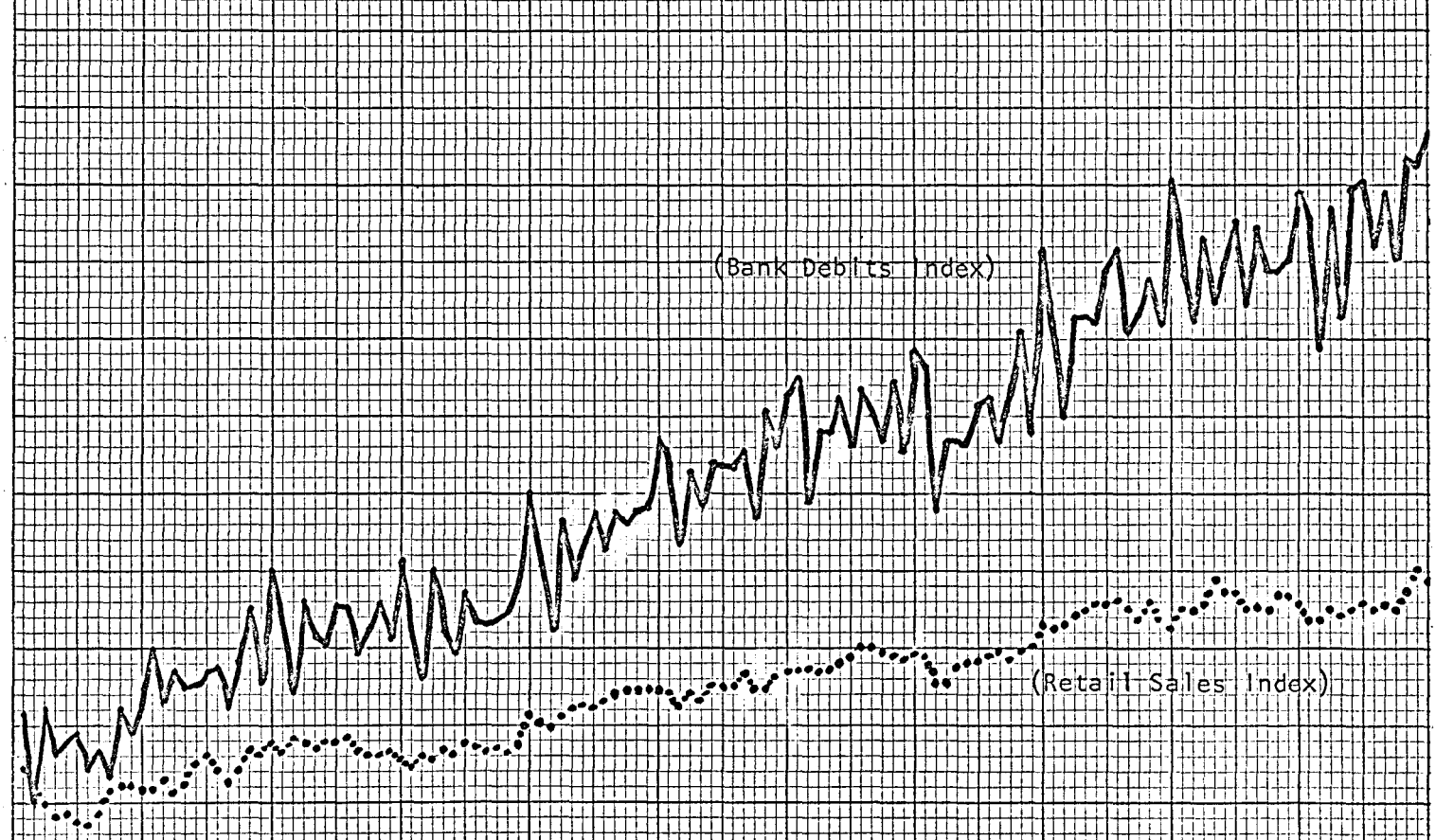
[5] Ibid., p. 68.

CHART 4

BANK DEBITS INDEX* AND RETAIL SALES INDEX
NOT SEASONALLY ADJUSTED
1951 - 1961
(1947 - 1949 = 100)



*Data for 1951 adjusted by author for comparability with later series.

SOURCES: Federal Reserve Bulletin, Board of Governors, Federal Reserve System, Washington, D. C., January 1951 - February 1962.
Economic Indicators, United States Government Printing Office, Washington, D. C., 1951 - 1962.

include areas of the economy that are most sensitive to changes in over-all demand. It is a very useful barometer of changes in over-all business activity, and it has come to be one of the most widely quoted business indexes now being published. There are two reasons that largely account for the wide use of the Federal Reserve index. It is the best index we have of activity in a very important sector of the economy. It is carefully constructed, comprehensive, and available approximately fifteen days following the month for which they cover. Also, manufacturing, mining, and gas and electric power account for about one-third of total national income and about the same part of all nonagricultural employment.

This index, which is available back to 1919 is published monthly and annually by the Board of Governors of the Federal Reserve System. It has been steadily and effectively improved and now provides greater accuracy, detail, and convenience, and is flexible enough to allow the computation of different groupings for special analytical purposes. The chart on page 23 indicates the sensitivity of the index to each of the recessions that we have experienced since World War II, the various steel strikes, and other factors that affect production, along with the growth of the economy during this period.

Of all the series used, the industrial production index showed cycle patterns best, so it was chosen for detailed comparison with bank debits.

In comparing bank debits and the industrial production index, it

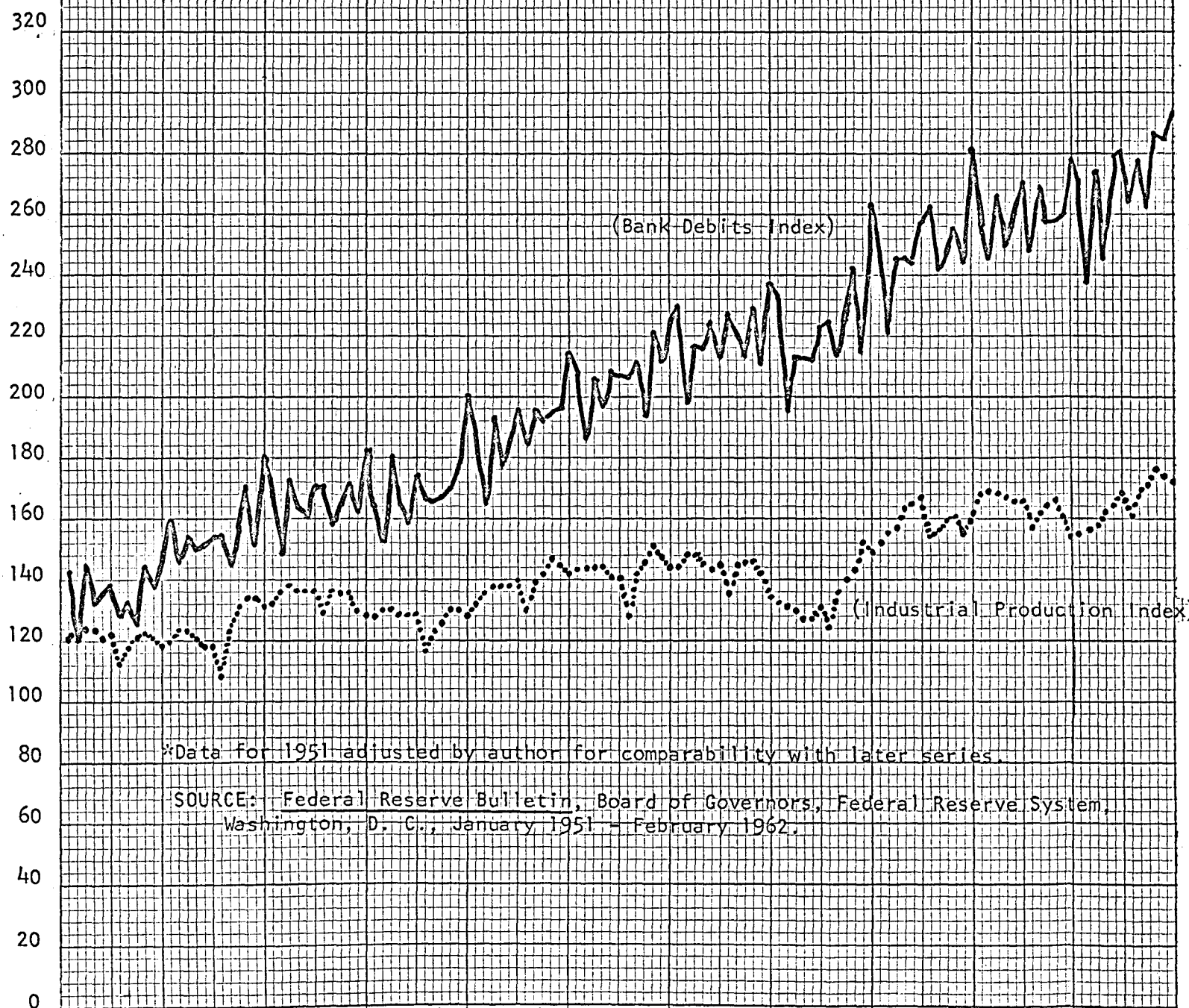
CHART 5

BANK DEBITS INDEX* AND INDUSTRIAL PRODUCTION INDEX

NOT SEASONALLY ADJUSTED

1951 - 1961

(1947 - 1949 = 100)



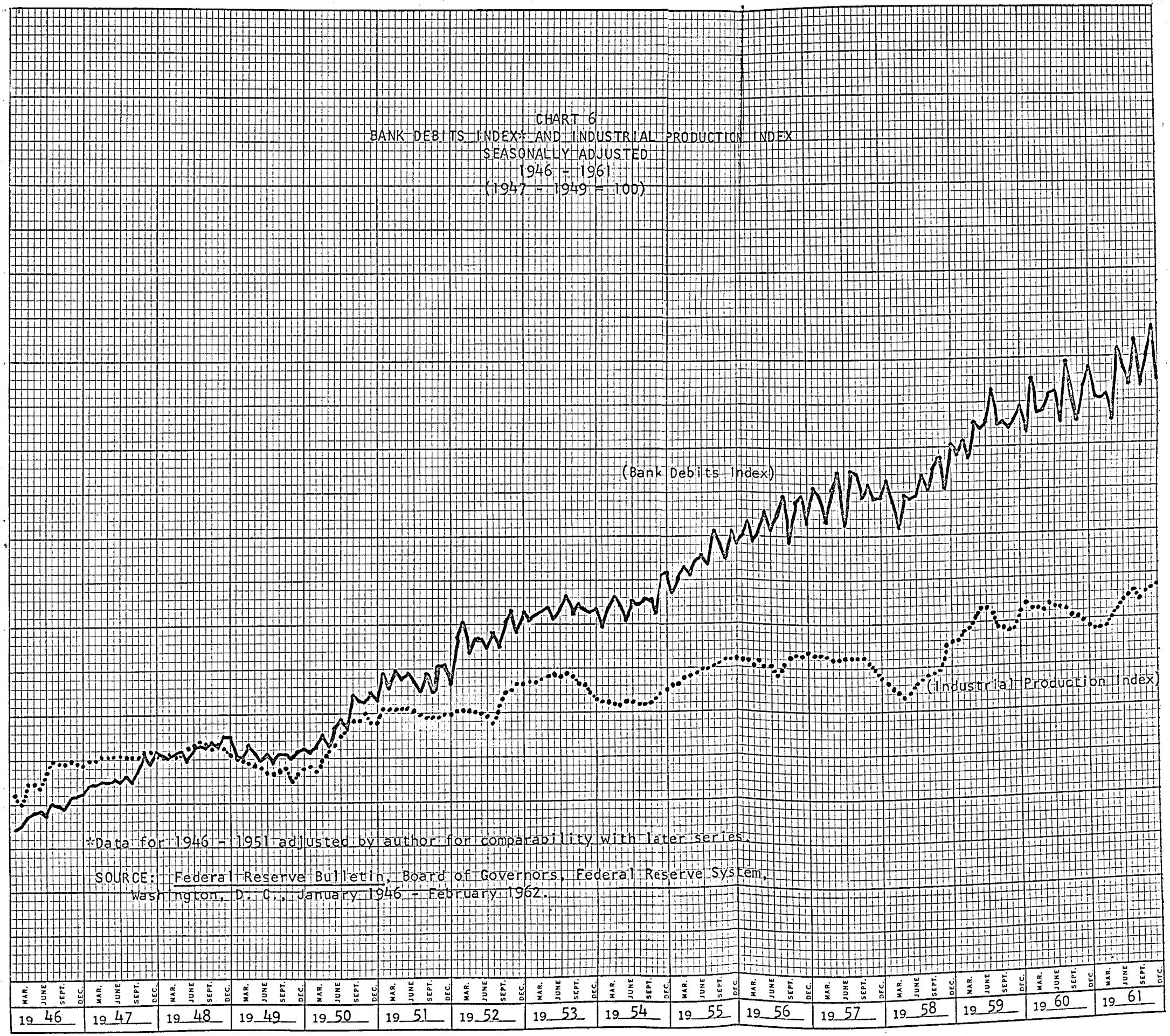
*Data for 1951 adjusted by author for comparability with later series.

SOURCE: Federal Reserve Bulletin, Board of Governors, Federal Reserve System, Washington, D. C., January 1951 - February 1962.

must be noted that bank debits have experienced a rapid growth. This is due to the increased use of checking accounts by consumers and others in transacting their business and also to more intermediate payments to suppliers, more government transfer payments, more pensions, retirements, and income, broader ownership of securities, and more dealings in securities. Part of this growth is also related to the movement of families to the suburbs and, therefore, using checks to settle their accounts. Today, over 90 per cent of all monetary transactions are handled by check. The rapid growth of bank debits is evident by the chart on page 23. The industrial production index has also shown some growth, but not as great as bank debits.

In order to compare effectively these two series, it is considered necessary to compute cyclical relatives for both series. These are measures of the cyclical component of the series and are derived by removal of the trend and seasonal movements. Since the bank debits series was not available seasonally adjusted except for the last few years, it was also considered necessary to adjust the data for the seasonal variation as shown in Appendix B. The graph on page 25 presents the two series after the seasonal factors have been removed. The logarithmic trend was computed for bank debits and industrial production, as indicated in Appendices C and D, and both series were adjusted for this trend. Chart 7 on page 26 shows the trend in both series. The cyclical relatives for bank debits and industrial production are presented in Tables 19 and 20 in Appendix E.

CHART 6
BANK DEBITS INDEX* AND INDUSTRIAL PRODUCTION INDEX
SEASONALLY ADJUSTED
1946 - 1961
(1947 - 1949 = 100)



*Data for 1946 - 1951 adjusted by author for comparability with later series.

SOURCE: Federal Reserve Bulletin, Board of Governors, Federal Reserve System, Washington, D. C., January 1946 - February 1962.

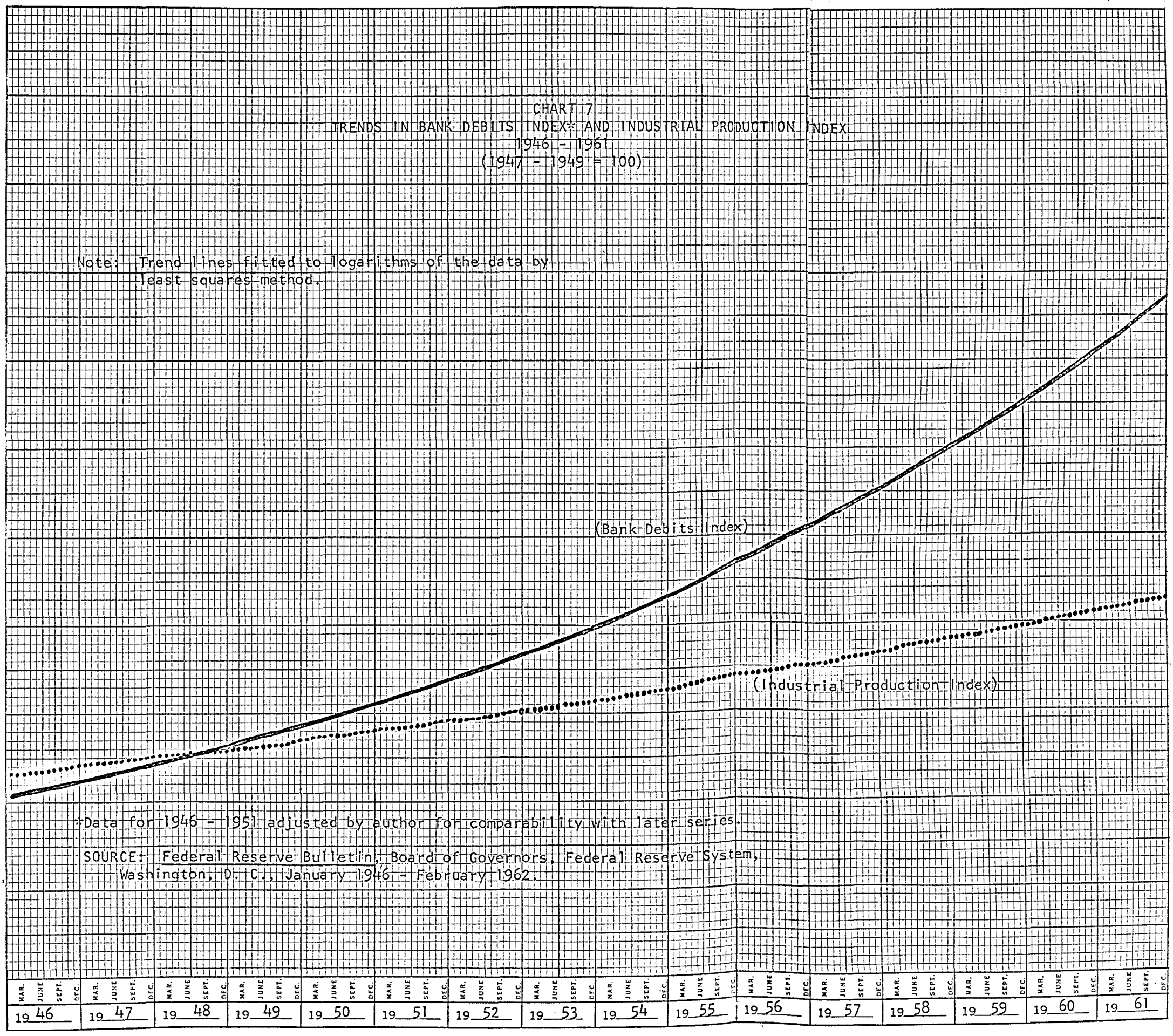
CHART 7

TRENDS IN BANK DEBITS INDEX* AND INDUSTRIAL PRODUCTION INDEX

1946 - 1961

(1947 - 1949 = 100)

Note: Trend lines fitted to logarithms of the data by least squares method.



*Data for 1946 - 1951 adjusted by author for comparability with later series.

SOURCE: Federal Reserve Bulletin, Board of Governors, Federal Reserve System, Washington, D. C., January 1946 - February 1962.

In the following chapter, the two series are compared with each other, as well as the conditions that existed in the economy from 1946 through 1961. An effort is made to explain why the two series change and why they act differently in certain circumstances.

CHAPTER IV

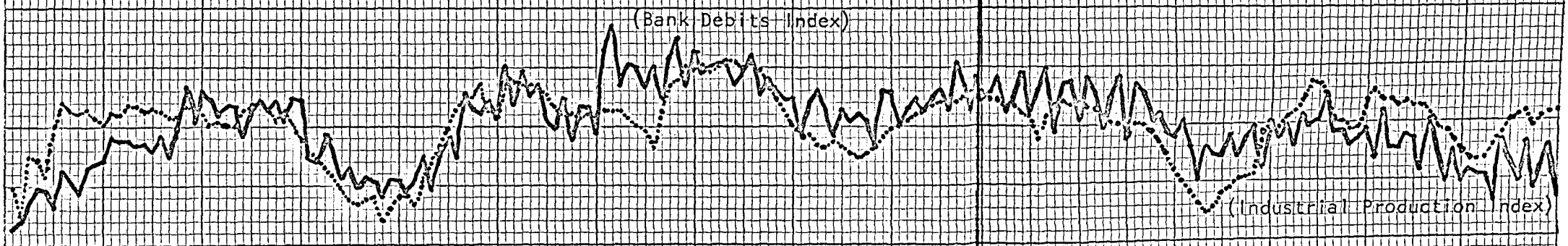
COMPARATIVE ANALYSIS OF CYCLICAL RELATIVES: BANK DEBITS AND INDUSTRIAL PRODUCTION

During the sixteen years (1946 - 1961) covered by this comparison between bank debits and industrial production, the national economy experienced growth, inflation, and a series of recessions and recoveries. In order to isolate the business cycles and remove influences that would tend to conceal or distort them, bank debits and industrial production index have been adjusted for trend and seasonal variation. The results are shown on the accompanying chart and in Tables 19 and 20 in Appendix E. The generalization is frequently made that post-World War II cycles have become shorter and milder with the passage of time. The graph in question tends to confirm this. It also shows quite clearly the basic cyclical sensitivity of both series. Distortions in the bank debits have, as discussed elsewhere, been caused by the erratic behavior of certain kinds of payments. Distortions in industrial production are largely caused by strikes. The graph strongly suggests that bank debits might well become an accurate and, therefore, very useful harbinger of cyclical changes if ways can be found to eliminate or smooth out its erratic components and retain in it a composite of desirable kinds of payments.

The low point of a mild business slowdown linked with industrial reconversion to peacetime production was reached in the last quarter of 1945. Following this, a vigorous inflationary boom took place. As indicated in Chart 8 on page 29 and Table 20 in Appendix E, the industrial

CHART 8

BANK DEBITS INDEX* AND INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR TREND AND SEASONAL
1946 - 1961
(1947 - 1949 = 100)



*Data for 1946 - 1951 adjusted by author for comparability with later series.

SOURCE: Federal Reserve Bulletin, Board of Governors, Federal Reserve System, Washington, D. C., January 1946 - February 1962.

production index increased from 89.9 per cent of normal trend-seasonal leads in January of 1946 to a peak of 104 by July of the same year. This boom was characterized by a swollen foreign demand for American goods, a seemingly insatiable domestic demand for consumer goods, and a large volume of private investment of all types.[1] Inflation received a big boost from the removal of price controls in June of 1946.

After the July peak in industrial production, the series remained relatively stable until mid 1948. This tendency to show little increase was due partly to limitations in capacity, but also the fact that consuming units had satisfied their most immediate needs carried forward from the war.

Bank debits also showed growth during the early part of 1946, but not as great as the industrial production index. As the chart on page 29 and Table 19 in Appendix E indicate, bank debits rose from 82.9, 17.1% below the level that trend and seasonal factors might normally be expected to establish in January of 1946 to 92.6 in July of the same year. This gradual growth of bank debits continued until a peak of 107.1 was reached in October 1947.

During the period from the latter part of 1947 to October 1948, the two series remained relatively stable. Chart 8 on page 29 indicates, at this point, that the industrial production index began a downward

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[1]Robert Aaron Gordon, Business Fluctuations (New York, New York: Harper & Brothers, Second Edition, 1962), pp. 468-469.

movement and bank debits followed in December 1948. The two series reached a low point in October 1949. This recession was fairly severe while it lasted, but was brief and resulted from many factors. During 1948, increasing supplies of goods, both in the United States and abroad, began to check the upward movement of prices. Thus, the rapid rise in prices was effectively checked for the first time. Also, the pent-up demand for consumer goods began to level off. This was caused by the fact that the postwar demand for most durable goods (except automobiles) was either satisfied or close to being satisfied. The rise in prices had caused the real value of the public's stock of liquid assets to be reduced. Also, private investment stopped expanding at its former rate and showed a tendency to decline.[2]

In the industrial production grouping consumer goods output displayed notable stability. Equipment and materials output bore the brunt of decline, reflecting curtailed private-investment spending and the liquidation of inventories.

The economy had scored a rapid recovery from the recession of 1949 by June 1950, and bank debits and industrial production both continued to increase, as indicated by Chart 8 on page 29, until the early part of 1951. These increases were the result of a wave of buying by both consumers and businessmen, which was the result of the communist invasion of South Korea. The big rise in actual government expenditures came in 1951, along with general price and wage controls being reimposed on the economy.

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[2] Ibid., pp. 476-477.

There was a sharp rise in bank debits the first few months of 1952, and it can best be explained by a spurt in private spending, both by consumers and business in the last part of 1951 and early 1952. There was also an increase in net exports of goods and services about this time, plus a continuation of increased employment and government expenditures. Bank debits, as shown by the chart on page 29, remained fairly stable the rest of the year, but the industrial production index decreased to a low point in July 1952. This was caused primarily by the steel strike in that month. Industrial production recovered rapidly, as evidenced by the graph on page 29, which was the result of a number of factors. Inventories had to be replenished after the steel strike, government controls had been relaxed as the rise in military expenditures began to level off, capacity continued to increase, and a larger supply of scarce materials could be released for civilian use. Also, after a year and a half of fairly restrained buying, consumers were in a mood and had the cash or credit to step up their purchases, mainly of durable goods. As a result, the volume of durable goods purchased by consumers increased by over one-fifth between the third quarter of 1952 and the first quarter of 1953.[3]

The industrial production and bank debits series remained relatively stable from October 1952 until July 1953. Retail sales leveled off rapidly in the first half of 1953. Total consumer expenditures continued to rise about the same as the rise in disposable income, but most of the

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[3]Edward J. Chambers, Economic Fluctuations and Forecasting (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1961), p. 179.

increase went into services rather than durable or nondurable goods. Inventories were building up and the government had already begun to reduce its new orders to manufacturers in defense industries. Up until June 1953, the Federal Reserve had maintained a tendency of monetary tightness. At this time, they became concerned about the degree of credit tightness that was developing and its effects on the economy. The Federal Reserve authorities executed a quick reversal, and credit conditions eased rapidly from June on. It is felt that these monetary developments played only a minor role in the downturn.

The contraction lasted about thirteen months. The chart on page 29 shows the industrial production index reached a low point in August 1954, and bank debits also declined to a low point by October 1954. This was another inventory recession, which might have been almost too mild to be noticed had it not been for the decline in federal defense expenditures.

In the latter part of 1954, rapid recovery got under way which was sparked particularly by a new boom in residential building and a steady expansion in expenditures by consumers.

The industrial production index rose to a peak in December 1955, as indicated by the chart on page 29. It remained relatively high, interrupted by some weakness in the early months of 1956, until it again reached a low point in August of 1956. This was the result of the mid-year steel strike. The weakness mentioned in early 1956 was most apparent in durable manufacturing, and this component also displayed a relatively

weak revival following the steel strike. A factor sustaining production in early 1956 was a fairly high rate of inventory accumulation. Bank debits from the middle of 1955 to the end of the first quarter of 1957 showed virtually no increase.

After the latter part of 1956, industrial production failed to rise any further. In fact, it began to decline in the first part of 1957 and continued downward until a low point was reached in April 1958. Bank debits did not decrease as rapidly but reached a low point in March of 1958.

In the first half of 1957, manufacturers' new orders for durable goods were declining and investment programs were being curtailed. Some excess capacity was beginning to emerge as sales leveled off or began to decline. Tight money and declining profit margins may have played a contributing role. Around the middle of the year both federal government expenditures and exports began to decline, and a cumulative contraction began.

The recession that followed in 1958 was more severe than the two preceding postwar contractions, but it was shorter in duration. Chart 8 on page 29 indicates the recession lasted only about eight months with a trough in April of 1958. Long-term investments declined rapidly, particularly in producers' durables, and as output declined, so did employment and incomes. Inventory investment declined sharply, and the decline in plant and equipment expenditures accelerated.

Industrial production made a rapid recovery and by May 1959, it had reached a peak as indicated by Chart 8 on page 29. Bank debits also

recovered and continued on a fairly stable basis, but indicated very little growth.

In the latter part of 1959, there was a decline in both series, which was due to the prolonged steel strike.

The industrial production index had recovered by January 1960, but declined to a low point by February 1961, as shown by the graph on page 29. After mid-year 1960, final purchases rose more slowly, business had reduced its spending for plant and equipment, and residential construction activity continued its downward movement. Output of both durable and nondurable finished goods, as well as materials, declined after July 1960.

Bank debits, as indicated by the chart on page 29, also declined during the last four months of 1960 and reached a low point by December.

By August 1961, industrial production had recovered and it remained relatively stable for the remainder of the year. Bank debits reached a high for the year in May and experienced fairly wide fluctuations, as shown by the previously mentioned chart throughout the latter part of the year 1961.

Elimination of the trend and seasonal components of both industrial production and bank debits leaves little doubt as to the similarity of their cyclical movements. A similar adjustment of other series, such as GNP or personal income, would also accentuate the cyclical similarities. However, the greater amplitude of cyclical swings in industrial production, as well as its more frequent availability, prompted a comparison of this series with bank debits as a test of both the current and potential usefulness of the latter series.

CHAPTER V

SUMMARY

This study represents an attempt to examine the current usefulness of the bank debits series as a business indicator, and to judge from this and in the light of automated banking processes the possibility that these statistics can be made much more useful than they are right now. Particularly, it was felt that more detailed tabulations made possible by new equipment will at one and the same time make the debits series much more useful nationally and one of the best yardsticks of business conditions at the regional and local level.

The foregoing analysis based mainly on the comparison of bank debits with the Industrial Production Index (selected as a sensitive cyclical indicator) shows that bank debits now are not one of the best indicators of over-all business activity. Even though debits statistics do reflect underlying changes in general business conditions, as evidenced by Chart 8, they still contain a high proportion of random and miscellaneous transactions which tend to obscure the basic cyclical course of the data. Financial transactions are, perhaps, the principal category of such influences. Others include payments made for the purchase of goods on credit. Payments on an automobile, for example, would be reflected in bank debits over a period of time determined by the term of the loan. The full amount of the item would not be included at the time of its purchase. These credit transactions would have the effect of smoothing

out the movements of bank debits over periods of time, tending to reduce the sensitivity of the data to turning points in the business cycle. Payments made to transfer existing property such as real estate, used cars, furniture, and other items also tend to obscure more the pattern of more basic payments.

A comparison of bank debits with other available indicators of regional and local business conditions suggests that they may well become of paramount importance in these areas. They include the bulk of local payments for business and personal transactions and payments by local and State governments. Debits statistics are one of the best, and in many cases, the only, continuous monthly data available for analyzing business developments in small cities, counties, and other local areas. The smaller the community, the smaller the proportion of financial transactions included in the debits data. This strengthens the series for local and regional analysis, in that it more nearly reflects business activity.

The bank debits statistics would certainly be more useful if they could be classified along the lines discussed in Chapter I. This would enable the bulk of the financial and other special transactions to be reported separately and, therefore, analyzed separately or excluded from the main body of debits statistics.

Increasing the number of reporting centers would probably improve the debits series. This would mean a broader coverage by the series and provide a broader, therefore, a more accurate measure of the value of transactions. It might also improve the sensitivity of the series to over-all cycles as well as contributing to their geographical

study. Several Federal Reserve banks collect and sometimes publish bank debits for additional centers not included in the national series.

Because of specialization in the economy, bank debits statistics do include a considerable amount of duplication. Thus, in a manufacturing process, the value of raw materials would be part of every payment made from the origin of those materials through all intermediate stages of processing involving transfer of ownership and all levels of distribution. Special identification and processing might isolate payments for real productive services and payments for the sale to the final consumer, which would reflect cycles with less distortion.

The statistical analysis used in this paper to evaluate the present and potential significance of bank debits began with preliminary comparisons between the debits series and five widely used indicators of business activity. The bank debits and national income, available quarterly with considerable lag, were compared in Chart 1. The more sharply upward movement of bank debits tended to exaggerate the rate of economic growth. The main reason for this was the duplication of payments, which inflated the debits series considerably. The more highly organized and specialized the productive process becomes, the more goods change hands at intermediate stages. The chart shows that bank debits followed the national income series closely, but was much more sensitive to fluctuations and changes in the economy, than national income.

Chart 2 presented a comparison of bank debits and personal income. Unlike national income, personal income estimates are released monthly with less than a one-month lag. There was the same type of relationship

between bank debits and personal income as between bank debits and national income. Again the debits series appeared to be more sensitive to minor fluctuations and overstated the element of growth, due primarily, as previously mentioned, to duplication of payments.

Gross National Product, like national income, is reported quarterly. Chart 3 shows the general similarities between changes in GNP and bank debits figures. Because GNP is so broad in coverage and is available only four times a year, it does not show cyclical turning points with much precision, nor does it reflect the minor fluctuations that would be of interest in detailed time series studies. The chart also indicated that bank debits were several times larger than the GNP, and this relationship with certain refinements might conceivably be developed into an index of economic specialization.

The correlation between bank debits and retail sales, as shown in Chart 4, indicated that the retail sales series did not react sharply to many of the varied influences that were dominant in the other series. Since a large proportion of consumer expenditures are made at retail stores, this monthly retail sales series is a significant barometer of consumer demand. The bank debits series displayed greater growth and more sensitivity to changes in general business conditions. Retail sales displayed greater stability.

The industrial production index is one of the most widely used business indexes now being published. It is an exceptionally useful indicator of changes in over-all business activity and, being unusually sensitive, it clearly shows each of the recessions that we have

experienced since World War II, the various steel strikes, and other factors affecting production. The comparison of bank debits and industrial production was shown in Chart 5. Similarities between the two series are immediately apparent. The industrial production series showed cycle patterns more clearly than the four indicators previously discussed, so it was selected for further comparison with the bank debits series.

In order to compare the components of the two series effectively, it was necessary to compute cyclical relatives for both series. These were derived by the removal of trend and seasonal movements. The bank debits data were not available seasonally adjusted except for the last few years. Seasonal adjustment was accomplished by using a centered 12-month moving average (or weighted 13-month moving average) method, as developed in Tables 8 and 9 of Appendix B. The bank debits series seasonally adjusted was presented in Table II and both series seasonally adjusted were shown in Chart 6. The semilogarithmic straight line trend was computed for each series by the method of "least squares," as shown in Appendix C and D. The trends in bank debits and industrial production were presented in Chart 7. The bank debits index and industrial production index adjusted for trend and season were shown in Chart 8. This graphical presentation of the two series indicated that they are very similar in cycle behavior, but vary at several different points. An attempt was made in Chapter IV to explain these particular points and what was happening in the economy during these periods. The chart in question clearly indicated the erratic movements in the

debits series which were caused by the financial and other transactions previously discussed.

The close relationship between present bank debits data and generally accepted, more precise indicators of economic change strongly suggests that refinements which may be possible in the future could substantially improve the usefulness of the bank debits data.

The bank debits series is now useful mainly because of the regional and local aspect. The series will be more useful in the future if debits are classified by destination and possibly, origin of payment and by further study and refinement of seasonal adjustment and computation of trend of the data so that cycles can be measured more accurately and studied more effectively. Greater geographical coverage will also make the series more useful in the future along with further analysis of the effects on the measurement and interpretation of growth and business cycles arising from the duplication of payments.

Perhaps in the near future as we continue to explore and study business cycles and economic activity, such improvements in the debits series will be made. When these refinements are put into effect, bank debits may become one of the most versatile indicators of business activity, applicable to both regional and industrial areas and available with a minimum of delay.

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APPENDICES

COMPUTATION TABLES

APPENDIX A

INDEX TABLES OF BANK DEBITS, NATIONAL INCOME, PERSONAL INCOME, GROSS NATIONAL PRODUCT, RETAIL SALES, AND INDUSTRIAL PRODUCTION INDEX TABLES

TABLE 1

BANK DEBITS *
NOT SEASONALLY ADJUSTED
1951 - 1961
(1947 - 1949 = 100)

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
Jan.	143.1	159.5	167.6	164.8	181.1	207.3	230.2	233.2	245.0	256.7	271.8
Feb.	119.0	145.5	148.9	152.1	164.5	187.4	198.3	195.9	220.3	245.9	237.1
March	144.9	153.7	172.7	180.0	193.4	205.9	216.4	213.1	245.6	266.0	273.7
April	132.5	149.8	163.8	164.7	178.2	197.4	216.0	213.5	246.1	250.4	246.0
May	135.9	151.4	160.1	159.3	185.7	208.4	224.5	213.2	244.2	259.7	279.1
June	137.6	153.7	170.8	174.4	195.9	207.1	212.5	223.0	257.5	271.1	281.0
July	128.9	154.5	171.0	167.4	185.1	206.8	227.2	225.2	263.0	248.5	264.0
Aug.	133.2	145.1	158.7	166.1	195.4	211.0	220.7	213.6	241.5	269.1	278.0
Sept.	126.6	157.1	165.4	167.6	192.1	193.6	213.5	225.7	246.5	257.9	262.1
Oct.	144.6	170.4	171.5	169.2	195.1	221.4	228.9	241.6	255.0	257.8	287.4
Nov.	138.2	151.9	161.8	177.3	196.4	212.3	211.7	215.7	245.3	260.1	285.3
Dec.	145.1	180.1	182.3	200.1	213.6	224.9	237.3	262.9	281.2	277.9	293.1

*Data for 1951 adjusted for comparability with later series.

SOURCE: Federal Reserve Bulletin, Board of Governors, Federal Reserve System, Washington, D. C., December 1951 - January 1962.

TABLE 2
NATIONAL INCOME*
1951 - 1961
(1947 - 1949 = 100)

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
Jan. Feb. March	126.5	134.6	143.5	139.7	146.1	157.6	169.6	166.9	183.4	194.0	193.2
April May June	128.9	135.1	144.6	140.3	151.0	159.8	170.8	168.4	190.2	196.7	199.1
July Aug. Sept.	131.5	136.3	143.7	140.2	154.0	161.6	173.0	173.4	187.4	196.6	202.4
Oct. Nov. Dec.	134.0	141.4	140.7	142.3	156.9	165.8	169.6	178.5	189.0	195.4	208.3

*Not seasonally adjusted.

SOURCE: Economic Indicators, United States Government Printing Office, Washington, D. C., 1951 - 1962.

TABLE 3

PERSONAL INCOME *
1951 - 1961
(1947 - 1949 = 100)

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
Jan.	119.5	129.2	137.6	139.8	143.3	155.4	164.8	170.8	181.0	194.1	198.0
Feb.	119.4	129.3	137.9	139.8	143.8	155.6	165.8	169.9	182.0	194.1	197.8
March	120.4	128.5	139.1	139.8	145.1	156.3	166.6	170.3	184.2	194.8	199.8
April	122.2	128.8	138.7	139.5	146.6	157.8	167.1	170.8	185.9	197.2	201.0
May	122.5	129.8	139.7	140.4	147.9	158.4	168.2	171.7	187.1	198.5	202.7
June	123.1	130.8	140.5	140.5	148.0	159.4	169.2	172.7	188.3	199.2	204.7
July	123.8	129.5	141.0	140.2	149.8	159.1	169.8	176.0	188.1	198.5	206.6
Aug.	124.5	132.3	140.8	140.0	149.8	161.0	170.1	174.7	186.4	198.8	205.7
Sept.	124.4	134.3	141.1	141.2	151.0	161.6	170.0	175.5	186.9	198.9	206.6
Oct.	126.3	135.5	141.2	141.5	152.9	163.1	169.7	178.7	188.5	199.4	208.6
Nov.	128.0	136.0	140.9	142.7	154.3	164.3	171.8	180.3	190.7	199.2	210.6
Dec.	129.4	137.7	140.8	143.9	155.8	164.2	170.9	180.0	193.2	198.2	211.6

*Not seasonally adjusted.

SOURCE: Economic Indicators, United States Government Printing Office, Washington, D. C., 1951 - 1962.

TABLE 4

GROSS NATIONAL PRODUCT OR EXPENDITURE*
1951 - 1961
(1947 - 1949 = 100)

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
Jan. Feb. March	127.2	136.5	145.9	144.1	153.8	164.3	175.5	173.3	189.0	200.7	200.4
April May June	130.6	136.6	147.6	143.6	157.3	166.1	176.9	175.0	195.5	202.7	205.3
July Aug. Sept.	133.6	138.9	146.9	144.9	161.4	168.5	179.4	178.9	193.0	202.1	209.0
Oct. Nov. Dec.	135.3	143.5	144.4	148.4	163.6	172.1	177.0	184.3	195.4	201.9	215.6

*Not seasonally adjusted.

SOURCE: Business Statistics, U. S. Department of Commerce, Washington, D. C., 1961.

TABLE 5

RETAIL SALES*
1951 - 1961
(1947 - 1949 = 100)

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
Jan.	128.3	123.6	133.0	128.3	140.6	148.1	153.8	157.5	165.1	170.8	167.9
Feb.	125.5	126.4	136.8	132.1	139.6	144.3	154.7	151.9	166.0	170.8	167.9
March	119.8	122.6	135.8	131.1	142.5	148.1	153.8	151.9	168.9	171.7	170.8
April	116.0	125.5	134.0	134.0	144.3	146.2	154.7	155.7	169.8	178.3	168.9
May	117.0	130.2	135.8	132.1	145.3	150.0	156.6	156.6	171.7	174.5	169.8
June	115.1	132.1	135.8	135.8	144.3	150.9	158.4	156.6	171.7	174.5	171.7
July	114.2	128.3	136.8	134.9	146.2	150.9	160.3	157.5	172.6	170.8	169.8
Aug.	117.0	125.5	133.0	133.0	148.1	153.8	160.3	159.4	170.8	171.7	171.7
Sept.	122.6	128.3	132.1	134.0	149.1	150.0	159.4	156.6	167.9	170.8	170.8
Oct.	124.5	134.0	132.1	133.0	149.1	150.0	157.5	159.4	172.6	174.5	175.4
Nov.	124.5	132.1	133.0	135.8	149.1	152.8	156.6	160.3	167.9	173.6	180.2
Dec.	123.6	135.8	131.1	142.5	149.1	153.8	158.4	166.0	165.1	171.7	177.4

*Not seasonally adjusted.

SOURCE: Economic Indicators, United States Government Printing Office, Washington, D. C., 1951 - 1962.

TABLE 6

INDUSTRIAL PRODUCTION INDEX
NOT SEASONALLY ADJUSTED
1951 - 1961
(1947 - 1949 = 100)

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
Jan.	121	119	132	124	132	143	144	132	152	168	155
Feb.	123	123	136	126	135	144	148	131	155	169	156
March	124	123	138	126	138	144	148	129	157	168	158
April	123	120	136	124	138	144	145	127	163	167	162
May	121	118	136	124	138	141	143	127	165	166	164
June	122	118	136	124	139	141	145	131	167	166	168
July	112	108	129	116	130	128	135	125	154	157	160
Aug.	118	123	136	123	139	142	145	136	156	162	169
Sept.	121	131	135	126	142	146	146	140	159	164	171
Oct.	122	134	136	130	147	151	146	143	160	166	176
Nov.	120	134	130	130	145	147	142	152	157	160	174
Dec.	118	131	124	128	142	144	134	149	162	154	172

SOURCE: Federal Reserve Bulletin, Board of Governors, Federal Reserve System, Washington, D. C., December 1953 - January 1962.

APPENDIX B

SEASONAL ADJUSTMENT OF BANK DEBITS DATA

TABLE 7

BANK DEBITS*
(In millions of dollars)

	1946	1947	1948	1949	1950	1951	1952	1953
Jan.	26,490	34,015	39,387	38,956	39,613	53,135	59,215	62,212
Feb.	23,685	29,902	33,902	33,949	35,517	44,163	54,029	55,287
March	28,420	34,579	39,767	41,046	42,792	53,789	57,055	64,119
April	27,552	32,467	37,520	37,362	38,391	49,171	55,604	60,788
May	27,755	32,855	36,208	36,396	41,328	50,429	56,197	59,443
June	28,270	34,101	39,605	38,770	44,484	51,076	57,050	63,416
July	29,446	34,041	39,119	36,320	41,970	47,833	57,358	63,476
Aug.	28,573	32,338	37,823	36,726	45,982	49,458	53,847	58,913
Sept.	28,228	34,584	39,124	37,146	45,794	47,002	58,306	61,390
Oct.	31,182	39,147	40,126	38,098	47,859	53,688	63,255	63,679
Nov.	30,157	35,304	39,708	37,345	46,634	51,301	56,374	60,046
Dec.	34,206	41,736	44,530	42,352	51,166	53,866	66,845	67,663
	1954	1955	1956	1957	1958	1959	1960	1961
Jan.	61,170	67,220	76,970	85,457	86,561	90,941	95,285	100.9
Feb.	56,470	61,058	69,551	73,615	72,738	81,783	91,299	88.0
March	66,776	71,774	76,447	80,332	79,098	91,172	98,724	101.6
April	61,128	66,168	73,282	80,192	79,262	91,358	92,969	91.3
May	59,118	68,933	77,367	83,349	79,156	90,631	96,396	103.6
June	64,757	72,714	76,870	78,895	82,765	95,574	100,626	104.3
July	62,138	68,721	76,757	84,339	83,609	97,615	92,250	98.0
Aug.	61,661	72,522	78,333	81,936	79,287	89,633	99,890	103.2
Sept.	62,233	71,291	71,874	79,249	83,798	91,516	95,727	97.3
Oct.	62,823	72,409	82,198	84,976	89,680	94,642	95,682	106.7
Nov.	65,826	72,908	78,810	78,567	80,064	91,055	96,562	105.9
Dec.	74,282	79,303	83,469	88,100	97,573	104,382	103,158	108.8

SOURCE: Federal Reserve Bulletin, Board of Governors, Federal Reserve System, Washington, D. C., February 1946 - March 1962

*Without Seasonal Adjustment and excludes interbank and United States Government accounts. Prior to April 1955, 338 centers. Data for the years 1946-1951 has been adjusted from 140 centers to 338 centers.

TABLE 8

SEASONAL ADJUSTMENT - BANK DEBITS
COMPUTATION OF WEIGHTED 13-MONTH (12 MONTH CENTERED)
MOVING AVERAGE AND RATIOS TO MOVING AVERAGE
1946 - 1961

Month and Year	Bank Debits (Billions of Dollars)	13 month moving total centered at 7th month	13 month moving average	Ratios to 13-month average
1946 January	26.49			
February	23.69			
March	28.42			
April	27.55			
May	27.76			
June	28.27			
July	29.45	696.46	29.02	101.48
August	28.57	709.23	29.55	96.68
September	28.23	721.60	30.07	93.88
October	31.18	732.68	30.53	102.12
November	30.16	742.70	30.95	97.44
December	34.21	753.63	31.40	108.94
1947 January	34.02	764.05	31.84	106.84
February	29.90	772.41	32.18	92.91
March	34.58	782.53	32.61	106.04
April	32.47	796.85	33.20	97.80
May	32.86	809.96	33.75	97.36
June	34.10	822.63	34.28	99.47
July	34.04	835.53	34.81	97.78
August	32.34	844.90	35.20	91.87
September	34.58	854.09	35.59	97.16
October	39.15	864.33	36.01	108.71
November	35.30	872.73	36.36	97.08
December	41.74	881.59	36.73	113.64
1948 January	39.39	892.18	37.17	105.97
February	33.90	902.74	37.61	90.13
March	39.77	912.76	38.03	104.57
April	37.52	918.28	38.26	98.06
May	36.21	923.67	38.49	94.07
June	39.61	930.87	38.79	102.11
July	39.12	933.23	38.88	100.61
August	37.82	932.85	38.87	97.29
September	39.12	934.18	38.92	100.51
October	40.13	935.30	38.97	102.97
November	39.71	935.33	38.97	101.89
December	44.53	934.68	38.95	114.32

Month and Year	Bank Debits (Billions of Dollars)	13 month moving total centered at 7th month	13 month moving average	Ratios to 13-month average
1949 January	38.96	931.04	38.79	100.43
February	33.95	927.15	38.63	87.88
March	41.05	924.09	38.50	106.62
April	37.36	920.09	38.34	97.44
May	36.40	915.70	38.15	95.41
June	38.77	911.16	37.97	102.10
July	36.32	909.63	37.90	95.83
August	36.73	911.85	37.99	96.68
September	37.15	915.16	38.13	97.42
October	38.10	917.93	38.25	99.60
November	37.35	923.89	38.50	97.01
December	42.35	934.53	38.94	108.75
1950 January	39.61	945.89	39.41	100.50
February	35.52	960.79	40.03	88.73
March	42.79	978.68	40.78	104.92
April	38.39	997.08	41.55	92.39
May	41.33	1,016.12	42.34	97.61
June	44.48	1,034.22	43.09	103.22
July	41.97	1,056.57	44.02	95.34
August	45.98	1,078.74	44.95	102.29
September	45.79	1,098.38	45.77	100.04
October	47.86	1,120.16	46.67	102.54
November	46.63	1,140.04	47.50	98.16
December	51.17	1,155.74	48.16	106.25
1951 January	53.14	1,168.20	48.68	109.16
February	44.16	1,177.54	49.06	90.01
March	53.79	1,182.23	49.26	109.19
April	49.17	1,189.27	49.55	99.23
May	50.43	1,199.77	49.99	100.88
June	51.08	1,207.14	50.30	101.55
July	47.83	1,215.92	50.66	94.41
August	49.46	1,231.87	51.33	96.35
September	47.00	1,245.01	51.88	90.59
October	53.69	1,254.71	52.28	102.69
November	51.30	1,266.91	52.79	97.17
December	53.87	1,278.65	53.28	101.10

Month and Year	Bank Debits (Billions of Dollars)	13 month moving total centered at 7th month	13 month moving average	Ratios to 13-month average
1952 January	59.22	1,294.15	53.92	109.82
February	54.03	1,308.07	54.50	99.13
March	57.06	1,323.77	55.16	103.44
April	55.50	1,344.65	56.03	99.23
May	56.20	1,359.29	56.64	99.22
June	57.05	1,377.34	57.39	99.40
July	57.36	1,393.31	58.05	98.81
August	53.85	1,397.56	58.23	92.47
September	58.31	1,405.88	58.58	99.53
October	63.26	1,418.13	59.09	107.05
November	56.37	1,426.56	59.44	94.83
December	66.85	1,436.17	59.84	111.71
1953 January	62.21	1,448.66	60.36	103.06
February	55.29	1,459.84	60.83	90.89
March	64.12	1,467.98	61.17	104.82
April	60.79	1,471.48	61.31	99.15
May	59.44	1,475.58	61.48	96.68
June	63.42	1,480.07	61.67	102.83
July	63.48	1,479.84	61.66	102.95
August	58.91	1,479.98	61.67	95.52
September	61.39	1,483.82	61.83	99.28
October	63.68	1,486.82	61.95	102.79
November	60.05	1,486.84	61.95	96.93
December	67.66	1,487.86	61.99	109.14
1954 January	61.17	1,487.86	61.99	98.67
February	56.47	1,489.27	62.05	91.00
March	66.78	1,492.86	62.20	107.36
April	61.13	1,492.84	62.20	98.27
May	59.12	1,497.76	62.41	94.72
June	64.76	1,510.16	62.92	102.92
July	62.14	1,522.83	63.45	97.93
August	61.66	1,533.47	63.89	96.50
September	62.23	1,543.05	64.29	96.79
October	62.82	1,553.08	64.71	97.07
November	65.83	1,567.93	65.33	100.76
December	74.28	1,585.69	66.07	112.42

Month and Year	Bank Debits (Billions of Dollars)	13 month moving total centered at 7th month	13 month moving average	Ratios to 13-month average
1955 January	67.22	1,600.22	66.68	100.80
February	61.06	1,617.66	67.40	90.59
March	71.77	1,637.58	68.23	105.18
April	66.17	1,656.23	69.01	95.88
May	68.93	1,672.90	69.70	98.89
June	72.71	1,685.00	70.21	103.56
July	68.72	1,699.77	70.82	97.03
August	72.52	1,718.01	71.58	101.31
September	71.29	1,731.18	72.13	98.83
October	72.41	1,742.97	72.62	99.71
November	72.91	1,758.52	73.27	99.50
December	79.30	1,771.12	73.80	107.45
1956 January	76.97	1,783.32	74.31	103.57
February	69.55	1,797.17	74.89	92.86
March	76.45	1,803.56	75.15	101.72
April	73.28	1,813.93	75.58	96.95
May	77.37	1,829.62	76.23	101.49
June	76.87	1,839.69	76.65	100.28
July	76.76	1,852.35	77.18	99.45
August	78.33	1,864.91	77.70	100.81
September	71.87	1,872.86	78.04	92.09
October	82.20	1,883.65	78.49	104.72
November	78.81	1,896.54	79.02	99.73
December	83.47	1,904.55	79.36	105.17
1957 January	85.46	1,914.16	79.76	107.14
February	73.62	1,925.35	80.22	91.77
March	80.33	1,936.34	80.68	99.56
April	80.19	1,946.50	81.10	98.87
May	83.35	1,949.04	81.21	102.63
June	78.90	1,953.43	81.39	96.94
July	84.34	1,959.16	81.63	103.31
August	81.94	1,959.38	81.64	100.36
September	79.25	1,957.27	81.55	97.17
October	84.98	1,955.11	81.46	104.32
November	78.57	1,949.99	81.25	96.70
December	88.10	1,949.67	81.24	108.44

Month and Year	Bank Debits (Billions of Dollars)	13 month moving total centered at 7th month	13 month moving average	Ratios to 13-month average
1958 January	86.56	1,952.81	81.37	106.37
February	72.74	1,949.43	81.23	89.54
March	79.10	1,951.33	81.31	97.28
April	79.26	1,960.58	81.69	97.02
May	79.16	1,966.77	81.95	96.59
June	82.77	1,977.73	82.41	100.43
July	83.61	1,991.58	82.98	100.75
August	79.29	2,005.00	83.54	94.91
September	83.80	2,026.11	84.42	99.26
October	89.68	2,050.28	85.43	104.97
November	80.06	2,073.85	86.41	92.65
December	97.57	2,098.12	87.42	111.61
1959 January	90.94	2,124.93	88.54	102.71
February	81.78	2,149.28	89.55	91.32
March	91.17	2,167.34	90.31	100.95
April	91.36	2,180.02	90.83	100.58
May	90.63	2,195.98	91.50	99.04
June	95.57	2,213.79	92.24	103.61
July	97.62	2,224.95	92.71	105.29
August	89.63	2,238.82	93.28	96.08
September	91.52	2,255.89	94.00	97.36
October	94.64	2,265.05	94.38	100.27
November	91.06	2,272.43	94.68	96.17
December	104.38	2,283.26	95.14	109.71
1960 January	95.29	2,282.95	95.12	100.17
February	91.30	2,287.84	95.33	95.77
March	98.72	2,302.31	95.93	102.90
April	92.97	2,307.56	96.15	96.69
May	96.40	2,314.10	96.42	99.97
June	100.63	2,318.38	96.60	104.17
July	92.25	2,322.77	96.78	95.31
August	99.89	2,325.08	96.88	103.10
September	95.73	2,324.66	96.86	98.83
October	95.68	2,325.87	96.91	98.73
November	96.56	2,331.40	97.14	99.40
December	103.16	2,342.27	97.59	105.70

Month and Year	Bank Debits (Billions of Dollars)	13 month moving total centered at 7th month	13 month moving average	Ratios to 13-month average
1961 January	100.90	2,351.69	97.99	102.96
February	88.00	2,360.75	98.36	89.46
March	101.60	2,365.63	98.57	103.07
April	91.30	2,378.22	99.09	92.13
May	103.60	2,398.58	99.94	103.66
June	104.30	2,413.56	100.57	103.70
July	98.00			
August	103.20			
September	97.30			
October	106.70			
November	105.90			
December	108.80			

(Data for 1946 - 1951 adjusted by author for comparability of later series.)

SOURCE: Federal Reserve Bulletin, Board of Governors, Federal Reserve System, Washington, D. C., January 1946 - February 1962.

TABLE 9

SEASONAL ADJUSTMENT - BANK DEBITS
RATIOS OF DATA TO WEIGHTED THIRTEEN-MONTH MOVING AVERAGE
ARRAYED BY MONTHS
1946 - 1961

Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
98.67	87.88	97.28	92.13	94.07	96.94	94.41	91.87	90.59	97.07	92.65	101.10
100.17	88.73	99.56	92.39	94.72	99.40	95.31	92.47	92.09	98.73	94.83	105.17
100.43	89.46	100.95	95.88	95.41	99.47	95.34	94.91	93.88	99.60	96.17	105.70
100.50	89.54	101.72	96.69	96.59	100.28	95.83	95.52	96.79	99.71	96.70	106.25
100.80	90.01	102.90	96.95	96.68	100.43	97.03	96.08	97.16	100.27	96.93	107.45
102.71	90.13	103.07	97.02	97.36	101.55	97.78	96.35	97.17	102.12	97.01	108.44
102.96	90.59	103.44	97.44	97.61	102.10	97.93	96.50	97.36	102.54	97.08	108.75
103.06	90.89	104.57	97.80	98.89	102.11	98.81	96.68	97.42	102.69	97.17	108.94
103.57	91.00	104.82	98.06	99.04	102.83	99.45	96.68	98.83	102.79	97.44	109.14
105.97	91.32	104.92	98.27	99.22	102.92	100.61	97.29	98.83	102.97	98.16	109.71
106.37	91.77	105.18	98.87	99.97	103.22	100.75	100.36	99.26	104.32	99.40	111.61
106.84	92.86	106.04	99.15	100.88	103.56	101.48	100.81	99.28	104.72	99.50	111.71
107.14	92.91	106.62	99.23	101.49	103.61	102.95	101.31	99.53	104.97	99.73	112.42
109.16	95.77	107.36	99.23	102.63	103.70	103.31	102.29	100.04	107.05	100.76	113.64
109.82	99.13	109.19	100.58	103.66	104.17	105.29	103.10	100.51	108.71	101.89	114.32
Mean of 5 central items 103.65	90.79	104.16	97.72	98.42	102.30	98.92	96.70	97.92	102.62	97.37	109.00

Adjust figure by multipling each average by the fraction $\frac{1200}{\text{Total of 12 averages}}$ ($\frac{1200}{1199.57} = 1.000367$)

Mean values adjusted to total 1200	103.69	90.82	104.20	97.75	98.46	102.34	98.96	96.73	97.95	102.66	97.40	109.04

TABLE 10

BANK DEBITS *
(In millions of dollars)

Seasonally Adjusted)

	1946	1947	1948	1949	1950	1951	1952	1953
Jan.	25,547	32,804	37,985	37,570	38,203	51,244	57,108	59,998
Feb.	26,079	32,924	37,329	37,381	39,107	48,627	59,490	60,875
March	27,274	33,185	38,164	39,392	41,067	51,621	54,755	61,535
April	28,186	33,214	38,384	38,161	39,275	50,303	56,884	62,187
May	28,189	33,369	36,774	36,965	41,974	51,218	57,076	60,373
June	27,624	33,321	38,699	37,884	43,467	49,908	55,746	61,966
July	29,755	34,399	39,530	36,702	42,411	48,336	57,961	64,143
Aug.	29,539	33,431	39,102	37,968	47,536	51,130	55,667	60,905
Sept.	28,819	35,308	39,943	37,923	46,752	47,986	59,526	62,675
Oct.	30,374	38,133	39,086	37,111	46,619	52,297	61,616	62,029
Nov.	30,962	36,246	40,768	38,342	47,879	52,670	57,879	61,649
Dec.	31,370	38,276	40,838	38,841	46,924	49,419	61,303	62,053

	1954	1955	1956	1957	1958	1959	1960	1961
Jan.	58,993	64,828	74,231	82,416	83,481	87,705	91,894	97,309
Feb.	62,178	67,230	76,581	81,056	80,090	90,050	100,527	96,895
March	64,084	68,881	73,366	77,094	75,910	87,497	94,745	97,505
April	62,535	67,691	74,969	82,038	81,086	93,461	95,109	93,402
May	60,043	70,011	78,577	84,653	80,394	92,049	97,904	105,220
June	63,276	71,051	75,112	77,091	80,873	93,389	98,325	101,915
July	62,791	69,443	77,564	85,225	84,488	98,641	93,219	99,030
Aug.	63,745	74,974	80,981	84,706	81,967	92,663	103,267	106,689
Sept.	63,535	72,783	73,378	80,908	85,552	93,431	97,730	99,336
Oct.	61,195	70,533	80,068	82,774	87,356	92,190	93,203	103,935
Nov.	67,583	74,854	80,914	80,664	82,201	93,486	99,140	108,727
Dec.	68,124	72,728	76,549	80,796	89,484	95,728	94,606	99,780

*Data for 1946 - 1951 adjusted by author for comparability of later series.

TABLE 11

BANK DEBITS*
Seasonally Adjusted
(1947 - 1949 = 100)

	1946	1947	1948	1949	1950	1951	1952	1953
Jan.	68.9	88.4	102.4	101.3	103.0	138.1	153.9	161.7
Feb.	70.3	88.8	100.6	100.8	105.4	131.1	160.4	164.1
March	73.5	89.5	102.9	106.2	110.7	139.2	147.6	165.9
April	76.0	89.5	103.5	102.9	105.9	135.6	153.3	167.6
May	76.0	90.0	99.1	99.6	113.1	138.1	153.9	162.7
June	74.5	89.8	104.3	102.1	117.2	134.5	150.3	167.0
July	80.2	92.7	106.6	98.9	114.3	130.3	156.2	172.9
Aug.	79.6	90.1	105.4	102.4	128.1	137.8	150.1	164.2
Sept.	77.7	95.2	107.7	102.2	126.0	129.4	160.5	169.0
Oct.	81.9	102.8	105.4	100.0	125.7	141.0	166.1	167.2
Nov.	83.5	97.7	109.9	103.4	129.1	142.0	156.0	166.2
Dec.	84.6	103.2	110.1	104.7	126.5	133.2	165.3	167.3

	1954	1955	1956	1957	1958	1959	1960	1961
Jan.	159.0	174.8	200.1	222.2	225.0	236.4	247.7	262.3
Feb.	167.6	181.2	206.4	218.5	215.9	242.7	271.0	261.2
March	172.8	185.7	197.8	207.8	204.6	235.9	255.4	262.8
April	168.6	182.5	202.1	221.2	218.6	251.9	256.4	251.8
May	161.9	188.7	211.8	228.2	216.7	248.1	263.9	283.6
June	170.6	191.5	202.5	207.8	218.0	251.7	265.1	274.7
July	169.3	187.2	209.1	229.7	227.8	265.9	251.3	267.0
Aug.	171.8	202.1	218.3	228.3	221.0	249.8	278.4	287.6
Sept.	171.3	196.2	197.8	218.1	230.6	251.9	263.5	267.8
Oct.	165.0	190.1	215.8	223.1	235.5	248.5	251.2	280.2
Nov.	182.2	201.8	218.1	217.4	221.6	252.0	267.3	293.1
Dec.	183.6	196.1	206.4	217.8	241.2	258.1	255.0	269.0

*Data for 1946 - 1951 adjusted by author for comparability to later series

APPENDIX C

COMPUTATION OF THE LOGARITHMIC TREND FOR BANK DEBITS

TABLE 12
COMPUTATION OF SEMILOGARITHMIC STRAIGHT LINE TREND
BANK DEBITS 1946 - 1961
(1947 - 1949 = 100)

YEAR	X	X^2	Y	Log Y	X.Log Y	Log Yc	Yc
1946	-15	225	77.2	1.88762	-28.31430	1.93599	86.4
1947	-13	169	93.1	1.96895	-25.59635	1.97173	93.7
1948	-11	121	104.8	2.02036	-22.22396	2.00748	101.7
1949	- 9	81	102.0	2.00860	-18.07740	2.04323	110.5
1950	- 7	49	117.1	2.06856	-14.47992	2.07897	119.9
1951	- 5	25	135.9	2.13322	-10.66610	2.11472	130.2
1952	- 3	9	156.1	2.19340	- 6.58020	2.15047	141.4
1953	- 1	1	166.3	2.22089	- 2.22089	2.18621	153.5
1954	1	1	170.3	2.23121	2.23121	2.22196	166.7
1955	3	9	189.8	2.27830	6.83490	2.25771	181.0
1956	5	25	207.2	2.31639	11.58195	2.29345	196.5
1957	7	49	220.0	2.34242	16.39694	2.32920	213.4
1958	9	81	223.1	2.34850	21.13650	2.36495	231.7
1959	11	121	249.4	2.39690	26.36590	2.40069	251.6
1960	13	169	260.5	2.41581	31.40553	2.43644	273.2
1961	15	225	271.8	2.43425	36.51375	2.47218	296.6
Total		1,360		35.26538	24.30756		

$$a = \frac{\Sigma(\log Y)}{n} =$$

$$a = \frac{35.26538}{16} = 2.20408625$$

$$b = \frac{\Sigma(X.\log Y)}{\Sigma X^2} =$$

$$b = \frac{24.30756}{1,360} = .017873205$$

Log Yc = 2.20408625 + .017873205X
X unit = 1 year
Y unit = Bank Debits Index

TABLE 13

BANK DEBITS - LOGARITHMS OF TREND VALUES
1946 - 1961
(1947 - 49 = 100)

	1946	1947	1948	1949	1950	1951	1952	1953
Jan.	1.91950	1.95526	1.99102	2.02678	2.06254	2.09830	2.13406	2.16982
Feb.	1.92248	1.95824	1.99400	2.02976	2.06552	2.10128	2.13704	2.17280
March	1.92546	1.96122	1.99698	2.03274	2.06850	2.10426	2.14002	2.17578
April	1.92844	1.96420	1.99996	2.03572	2.07148	2.10724	2.14300	2.17876
May	1.93142	1.96718	2.00294	2.03870	2.07446	2.11022	2.14598	2.18174
June	1.93440	1.97016	2.00592	2.04168	2.07744	2.11320	2.14896	2.18472
July	1.93738	1.97314	2.00890	2.04466	2.08042	2.11618	2.15194	2.18770
Aug.	1.94036	1.97612	2.01188	2.04764	2.08340	2.11916	2.15492	2.19068
Sept.	1.94334	1.97910	2.01486	2.05062	2.08638	2.12214	2.15790	2.19366
Oct.	1.94632	1.98208	2.01784	2.05360	2.08936	2.12512	2.16088	2.19664
Nov.	1.94930	1.98506	2.02082	2.05658	2.09234	2.12810	2.16386	2.19962
Dec.	1.95228	1.98804	2.02380	2.05956	2.09532	2.13108	2.16684	2.20260

	1954	1955	1956	1957	1958	1959	1960	1961
Jan.	2.20558	2.24134	2.27710	2.31286	2.34862	2.38438	2.42014	2.45590
Feb.	2.20856	2.24432	2.28008	2.31584	2.35160	2.38736	2.42312	2.45888
March	2.21154	2.24730	2.28306	2.31882	2.35458	2.39034	2.42610	2.46186
April	2.21452	2.25028	2.28604	2.32180	2.35756	2.39332	2.42908	2.46484
May	2.21750	2.25326	2.28902	2.32478	2.36054	2.39630	2.43206	2.46782
June	2.22048	2.25624	2.29200	2.32776	2.36352	2.39928	2.43504	2.47080
July	2.22346	2.25922	2.29498	2.33074	2.36650	2.40226	2.43802	2.47378
Aug.	2.22644	2.26220	2.29796	2.33372	2.36948	2.40524	2.44100	2.47676
Sept.	2.22942	2.26518	2.30094	2.33670	2.37246	2.40822	2.44398	2.47974
Oct.	2.23240	2.26816	2.30392	2.33968	2.37544	2.41120	2.44696	2.48272
Nov.	2.23538	2.27114	2.30690	2.34266	2.37842	2.41418	2.44994	2.48570
Dec.	2.23836	2.27412	2.30988	2.34564	2.38140	2.41716	2.45292	2.48868

TABLE 14

TREND VALUES - BANK DEBITS
1946 - 1961
(1947 - 49 = 100)

	1946	1947	1948	1949	1950	1951	1952	1953
Jan.	83.1	90.2	98.0	106.4	115.5	125.4	136.2	147.9
Feb.	83.7	90.8	98.6	107.1	116.3	126.3	137.1	148.9
March	84.2	91.5	99.3	107.8	117.1	127.1	138.0	149.9
April	84.8	92.1	100.0	108.6	117.9	128.0	139.0	150.9
May	85.4	92.7	100.7	109.3	118.7	128.9	139.9	152.0
June	86.0	93.4	101.4	110.1	119.5	129.8	140.9	153.0
July	86.6	94.0	102.1	110.8	120.4	130.7	141.9	154.1
Aug.	87.2	94.7	102.8	111.6	121.2	131.6	142.9	155.1
Sept.	87.8	95.3	103.5	112.4	122.0	132.5	143.8	156.2
Oct.	88.4	96.0	104.2	113.1	122.9	133.4	144.8	157.3
Nov.	89.0	96.6	104.9	113.9	123.7	134.3	145.8	158.4
Dec.	89.6	97.3	105.6	114.7	124.5	135.2	146.8	159.4

	1954	1955	1956	1957	1958	1959	1960	1961
Jan.	160.5	174.3	189.3	205.5	223.2	242.3	263.1	285.7
Feb.	161.6	175.5	190.6	206.9	224.7	244.0	264.9	287.7
March	162.8	176.7	191.9	208.4	226.2	245.7	266.7	289.6
April	163.9	177.9	193.2	209.8	227.8	247.4	268.6	291.6
May	165.0	179.2	194.5	211.2	229.4	249.1	270.4	293.6
June	166.1	180.4	195.9	212.7	231.0	250.8	272.3	295.7
July	167.3	181.6	197.2	214.2	232.5	252.5	274.2	297.7
Aug.	168.4	182.9	198.6	215.6	234.1	254.2	276.1	299.7
Sept.	169.6	184.2	200.0	217.1	235.8	256.0	278.0	301.8
Oct.	170.8	185.4	201.3	218.6	237.4	257.8	279.9	303.9
Nov.	171.9	186.7	202.7	220.1	239.0	259.5	281.8	306.0
Dec.	173.1	188.0	204.1	221.6	240.7	261.3	283.7	308.1

APPENDIX D

COMPUTATION OF THE LOGARITHMIC TREND FOR INDUSTRIAL PRODUCTION

TABLE 15

INDUSTRIAL PRODUCTION INDEX
1946 - 1961
SEASONALLY ADJUSTED
(1947 - 1949 = 100)

	1946	1947	1948	1949	1950	1951	1952	1953
Jan.	84	99	101	100	96	122	121	134
Feb.	80	99	102	99	94	122	121	134
March	89	101	101	98	99	122	121	135
April	89	101	102	97	103	122	120	136
May	87	101	105	95	106	122	119	137
June	94	101	106	93	110	121	118	136
July	99	101	107	93	114	119	115	137
Aug.	98	101	106	94	117	118	123	136
Sept.	98	101	104	95	117	118	129	133
Oct.	99	103	106	90	120	118	130	132
Nov.	98	103	104	93	115	119	133	129
Dec.	97	102	102	95	115	119	133	126
	1954	1955	1956	1957	1958	1959	1960	1961
Jan.	125	132	143	146	133	152	168	155
Feb.	125	133	143	146	130	155	166	155
March	123	135	141	145	128	157	166	156
April	123	136	143	144	126	162	165	160
May	125	138	141	144	128	166	167	164
June	124	139	141	145	132	166	166	168
July	123	139	136	145	134	163	166	170
Aug.	123	140	142	145	136	157	165	172
Sept.	124	142	145	144	137	157	162	168
Oct.	126	143	146	142	138	155	161	171
Nov.	128	143	146	139	150	156	159	173
Dec.	130	144	147	135	151	165	156	174

SOURCES: Federal Reserve Bulletin, Board of Governors, Federal Reserve System, Washington, D. C., January 1952 - January 1962.

Business Statistics, United States Department of Commerce, Washington, D. C., 1955 and 1957.

TABLE 16

COMPUTATION OF SEMILOGARITHMIC STRAIGHT LINE TREND
INDUSTRIAL PRODUCTION INDEX: 1946 - 1961
(1947 - 1949 = 100)

YEAR	X	X^2	Y	Log Y	X.Log Y	Log Yc	Yc
1946	-15	225	92.5	1.96614	-29.49210	1.97679	94.8
1947	-13	169	101.1	2.00432	-26.05616	1.99335	98.5
1948	-11	121	103.8	2.01620	-22.17820	2.00992	102.3
1949	- 9	81	95.1	1.97818	-17.80362	2.02650	106.3
1950	- 7	49	108.9	2.03703	-14.25921	2.04307	110.5
1951	- 5	25	120.4	2.08063	-10.40315	2.05964	114.8
1952	- 3	9	123.6	2.09202	- 6.27606	2.07621	119.2
1953	- 1	1	133.8	2.12646	- 2.12646	2.09278	123.8
1954	1	1	124.9	2.09656	2.09656	2.10934	128.6
1955	3	9	138.7	2.14208	6.42624	2.12591	133.6
1956	5	25	142.8	2.15473	10.77365	2.14248	138.8
1957	7	49	143.3	2.15625	15.09375	2.15905	144.2
1958	9	81	135.2	2.13098	19.17882	2.17562	149.8
1959	11	121	159.2	2.20194	24.22134	2.19219	155.7
1960	13	169	163.9	2.21458	28.78954	2.20876	161.7
1961	15	225	165.5	2.21880	33.28200	2.22533	168.0
Total		1,360		33.61690	11.26694		

$$a = \frac{\Sigma(\log Y)}{n} = \frac{33.61690}{16} = 2.10106$$

$$b = \frac{\Sigma(X.\log Y)}{\Sigma X^2} = \frac{11.26694}{1,360} = .008285$$

Log Yc = 2.10106 + .008285X
X unit = 1 year
Y unit = Industrial Production Index

TABLE 17

INDUSTRIAL PRODUCTION INDEX - LOGARITHMS OF TREND VALUES
1946 - 1961
(1947 - 1949 = 100)

	1946	1947	1948	1949	1950	1951	1952	1953
Jan.	1.96927	1.98583	2.00239	2.01895	2.03551	2.05207	2.06863	2.08519
Feb.	1.97065	1.98721	2.00377	2.02033	2.03689	2.05345	2.07001	2.08657
March	1.97203	1.98859	2.00515	2.02171	2.03827	2.05483	2.07139	2.08795
April	1.97341	1.98997	2.00653	2.02309	2.03965	2.05621	2.07277	2.08933
May	1.97479	1.99135	2.00791	2.02447	2.04103	2.05759	2.07415	2.09071
June	1.97617	1.99273	2.00929	2.02585	2.04241	2.05897	2.07553	2.09209
July	1.97755	1.99411	2.01067	2.02723	2.04379	2.06035	2.07691	2.09347
Aug.	1.97893	1.99549	2.01205	2.02861	2.04517	2.06173	2.07829	2.09485
Sept.	1.98031	1.99687	2.01343	2.02999	2.04655	2.06311	2.07967	2.09623
Oct.	1.98169	1.99825	2.01481	2.03137	2.04793	2.06449	2.08105	2.09761
Nov.	1.98307	1.99963	2.01619	2.03275	2.04931	2.06587	2.08243	2.09899
Dec.	1.98445	2.00101	2.01757	2.03413	2.05069	2.06725	2.08381	2.10037

	1954	1955	1956	1957	1958	1959	1960	1961
Jan.	2.10175	2.11831	2.13487	2.15143	2.16799	2.18455	2.20111	2.21767
Feb.	2.10313	2.11969	2.13625	2.15281	2.16937	2.18593	2.20249	2.21905
March	2.10451	2.12107	2.13763	2.15419	2.17075	2.18731	2.20387	2.22043
April	2.10589	2.12245	2.13901	2.15557	2.17213	2.18869	2.20525	2.22181
May	2.10727	2.12383	2.14039	2.15695	2.17351	2.19007	2.20663	2.22319
June	2.10865	2.12521	2.14177	2.15833	2.17489	2.19145	2.20801	2.22457
July	2.11003	2.12659	2.14315	2.15971	2.17627	2.19283	2.20939	2.22595
Aug.	2.11141	2.12797	2.14453	2.16109	2.17765	2.19421	2.21077	2.22733
Sept.	2.11279	2.12935	2.14591	2.16247	2.17903	2.19559	2.21215	2.22871
Oct.	2.11417	2.13073	2.14729	2.16385	2.18041	2.19697	2.21353	2.23009
Nov.	2.11555	2.13211	2.14867	2.16523	2.18179	2.19835	2.21491	2.23147
Dec.	2.11693	2.13349	2.15005	2.16661	2.18317	2.19973	2.21629	2.23285

TABLE 18

TREND VALUES - INDUSTRIAL PRODUCTION INDEX
1946 - 1961
(1947 - 1949 = 100)

	1946	1947	1948	1949	1950	1951	1952	1953
Jan.	93.2	96.8	100.5	104.5	108.5	112.7	117.1	121.7
Feb.	93.5	97.1	100.8	104.8	108.9	113.1	117.5	122.1
March	93.8	97.4	101.2	105.1	109.2	113.5	117.9	122.4
April	94.1	97.7	101.5	105.5	109.6	113.8	118.2	122.8
May	94.4	98.0	101.8	105.8	109.9	114.2	118.6	123.2
June	94.7	98.3	102.1	106.1	110.3	114.5	119.0	123.6
July	95.0	98.7	102.5	106.5	110.6	114.9	119.4	124.0
Aug.	95.3	99.0	102.8	106.8	111.0	115.3	119.8	124.4
Sept.	95.6	99.3	103.1	107.1	111.3	115.6	120.1	124.8
Oct.	95.9	99.6	103.5	107.5	111.7	116.0	120.5	125.2
Nov.	96.2	99.9	103.8	107.8	112.0	116.4	120.9	125.6
Dec.	96.5	100.2	104.1	108.2	112.4	116.7	121.3	126.0

	1954	1955	1956	1957	1958	1959	1960	1961
Jan.	126.4	131.3	136.4	141.7	147.2	152.9	158.9	165.1
Feb.	126.8	131.7	136.8	142.2	147.7	153.4	159.4	165.6
March	127.2	132.2	137.3	142.6	148.2	153.9	159.5	166.1
April	127.6	132.6	137.7	143.1	148.6	154.4	160.4	166.7
May	128.0	133.0	138.2	143.5	149.1	154.9	160.9	167.2
June	128.4	133.4	138.6	144.0	149.6	155.4	161.4	167.7
July	128.8	133.8	139.0	144.5	150.1	155.9	162.0	168.2
Aug.	129.2	134.3	139.5	144.9	150.5	156.4	162.5	168.8
Sept.	129.6	134.7	139.9	145.4	151.0	156.9	163.0	169.3
Oct.	130.1	135.1	140.4	145.8	151.5	157.4	163.5	169.8
Nov.	130.5	135.6	140.8	146.3	152.0	157.9	164.0	170.4
Dec.	130.9	136.0	141.3	146.8	152.5	158.4	164.5	170.9

APPENDIX E

TABLES SHOWING ADJUSTMENT FOR TREND APPLIED TO BANK DEBITS AND INDUSTRIAL PRODUCTION

TABLE 19

BANK DEBITS INDEX *
Adjusted for Trend
1946 - 1961

	1946	1947	1948	1949	1950	1951	1952	1953
Jan.	82.9	98.0	104.5	95.2	89.2	110.1	113.0	109.3
Feb.	84.0	97.8	102.0	94.1	90.6	103.8	117.0	110.2
March	87.3	97.8	103.6	98.5	94.5	109.5	107.0	110.7
April	89.6	97.2	103.5	94.8	89.8	105.5	110.3	111.1
May	89.0	97.1	98.4	91.1	95.3	107.1	110.0	107.0
June	86.6	96.1	102.9	92.7	98.1	103.6	106.7	109.2
July	92.6	98.6	104.4	89.3	94.9	99.7	110.1	112.2
Aug.	91.3	95.1	102.5	91.8	105.7	104.7	105.0	105.9
Sept.	88.5	99.9	104.1	90.9	103.3	97.7	111.6	108.2
Oct.	92.6	107.1	101.2	88.4	102.3	105.7	114.7	106.3
Nov.	93.8	101.1	104.8	90.8	104.4	105.7	107.0	104.9
Dec.	94.4	106.1	104.3	91.3	101.6	98.5	112.6	105.0
	1954	1955	1956	1957	1958	1959	1960	1961
Jan.	99.1	100.3	105.7	108.1	100.8	97.6	94.1	91.8
Feb.	103.7	103.2	108.3	105.6	96.1	99.5	102.3	90.8
March	106.1	105.1	103.1	99.7	90.5	96.0	95.8	90.7
April	102.9	102.6	104.6	105.4	96.0	101.8	95.5	86.4
May	98.1	105.3	108.9	108.0	94.5	99.6	97.6	96.6
June	102.7	106.2	103.4	97.7	94.4	100.4	97.4	92.9
July	101.2	103.1	106.0	107.2	98.0	105.3	91.6	89.7
Aug.	102.0	110.5	109.9	105.9	94.4	98.3	100.8	96.0
Sept.	101.0	106.5	98.9	100.5	97.8	98.4	94.8	88.7
Oct.	96.6	102.5	107.2	102.1	99.2	96.4	89.7	92.2
Nov.	106.0	108.1	107.6	98.8	92.7	97.1	94.9	95.8
Dec.	106.1	104.3	101.1	98.3	100.2	98.8	89.9	87.3

*Seasonally adjusted. Data for 1946 - 1951 adjusted for comparability of later series.

TABLE 20

INDUSTRIAL PRODUCTION INDEX*
ADJUSTED FOR TREND
1946 - 1961

	1946	1947	1948	1949	1950	1951	1952	1953
Jan.	89.9	102.2	100.5	95.7	88.3	108.2	103.3	110.1
Feb.	85.3	102.1	100.9	94.6	86.7	107.8	102.9	109.7
March	95.1	103.6	100.2	93.0	90.9	107.5	102.6	110.3
April	94.9	103.6	100.3	91.8	93.9	107.2	101.5	110.7
May	91.6	102.8	102.7	89.5	96.5	106.8	100.3	111.2
June	98.8	103.1	103.5	87.7	99.8	105.7	99.2	110.0
July	104.0	102.4	104.3	86.9	102.9	103.6	96.3	110.5
Aug.	102.6	101.6	102.6	87.9	105.5	102.3	102.7	109.3
Sept.	102.3	101.8	101.2	88.3	105.5	102.1	107.4	106.6
Oct.	102.7	103.8	102.6	84.1	107.3	101.7	107.9	105.4
Nov.	101.9	102.9	100.6	86.0	102.9	102.2	110.0	102.7
Dec.	100.5	102.1	98.3	88.2	102.4	101.9	109.6	100.0

	1954	1955	1956	1957	1958	1959	1960	1961
Jan.	98.9	100.5	104.8	103.0	90.4	99.4	105.7	93.9
Feb.	98.6	101.0	104.5	102.7	88.0	101.0	104.1	93.6
March	96.7	102.1	102.7	101.7	86.4	102.0	104.1	93.9
April	96.4	102.6	103.8	100.6	84.8	104.9	102.9	96.0
May	97.7	103.8	102.0	100.3	85.9	107.2	103.8	98.1
June	96.6	104.2	101.7	100.7	88.2	106.8	102.9	100.2
July	95.5	103.9	97.8	100.3	89.3	104.6	102.5	101.1
Aug.	95.2	104.2	101.8	100.1	90.4	100.4	101.5	101.9
Sept.	95.7	105.4	103.6	99.0	90.7	100.1	99.4	99.2
Oct.	96.8	105.8	104.0	97.4	91.1	98.5	98.5	100.7
Nov.	98.1	105.5	103.7	95.0	98.7	98.8	97.0	101.5
Dec.	99.3	105.9	104.0	92.0	99.0	104.2	94.8	101.8

*Seasonally adjusted.