economic review

NOVEMBER 1964

IN THIS ISSUE

FEDERAL RESERVE BANK OF CLEVELAND

PERSPECTIVE ON PRICES

A central theme in recent discussions of the business situation has been the remarkable degree of industrial price stability associated with the current business expansion. It has in fact been the virtual stability of prices that has enabled this expansion to be both moderate and balanced. In short, the absence of "inflation" has helped the economy to move forward in reasonably satisfactory fashion without the imbalances or distortions experienced during previous economic expansions.

Nevertheless, analysts need to remain alert to emerging patterns in order to evaluate implications for the economy and for policy-making—both private and public. This is as true in the price area as anywhere else—particularly because of the pervasive impact that significant changes in prices have on spending, saving and borrowing decisions.

In view of the increasing attention to near-term price developments, it seems appropriate to take a look at prices and price behavior. This is especially important in light of the fact that certain price series in the past have served as early warning signals, that is, they have tended to foreshadow near-term price movements. This article examines the past and current record of such price series.

GENERAL PRICE INDEXES

Before considering specific series, it may be helpful to present some idea of the meaning of the general price level and to point out why certain price series are selected for emphasis in preference to others. Generally speaking, any conception of the general price level should cover the entire spectrum of economic activity. In practice, however, there is no complete or foolproof measure of the general price level.

Price changes do not affect various sectors of the economy in the same way or to the same degree. Different price indexes are appropriate for analyzing the international and domestic sectors of economic activity, as well as the production, consumption, or agricultural aspects of domestic activity. Moreover, the problem of determining which price index, or combination of indexes, best serves for a particular purpose is often compounded by technical limitations of the various indexes, for example, problems of definition, coverage, and weighting.

There are three series that are commonly used to approximate the general price level. These are: (1) the implicit price index for the Gross National Product, (2) the Consumer Price Index, and (3) the Wholesale Price Index.

In principle, the GNP price index is the only available measure of the price level for currently produced goods and services. The GNP price index is derived by dividing the sum of the components of GNP at current market prices by the sum of the corresponding components in dollars of a selected base period. About one hundred product groups are adjusted separately for price changes by the appropriate price indexes. The ratio of GNP in current dollars to GNP in base period dollars yields an "implicit" price index often called the GNP deflator. This index cannot be used indiscriminately, however, for purposes of either current or historical analysis. First, there are built-in upward biases in the individual indexes for the construction and government sectors because they are based in part on prices of labor and materials without making allowance for productivity improvements. Second, the implicit price indexes on a national income accounts basis are effectively weighted by current expenditure patterns in contrast to the conventional price indexes, which have weights based on constant expenditure patterns. Thus, in many instances it is difficult to determine whether the GNP price indexes measure actual price changes or changes in spending patterns. Still another shortcoming is that price indexes on a national income accounts basis are available only by quarters with a two-month lag, which makes for particular difficulty in current analysis.

A "true" *cost of living index* would serve as a comprehensive measure of the general price level. Unfortunately, however, there is no such index, despite the fact that the "Consumer Price Index for Urban Wage and Salary Earners" frequently is used. Because the consumer is free to make substitutions in his market basket of goods and services, the fixed-weight base of the CPI may understate decreases and overstate increases in the cost of equivalent levels of satisfaction. Many price analysts believe that there is an upward bias in the CPI resulting from inadequate allowances for quality improvements in goods and services. Despite this, however, the CPI is the best measure available of price changes at the retail level and is thus useful as a supplement to other price series.

A third general price index — the *Wholesale Price Index* — is generally recognized to be the most useful for certain analytical purposes. The WPI does not have the upward bias of the GNP price index; also it is subject to fewer limitations with respect to sampling, weighting, and treatment of quality changes than is the Consumer Price Index. On the whole, periods of stability in wholesale prices have tended to be accompanied by periods of stability or by only moderate increases in the other general price indexes, while sharply rising wholesale prices either have usually preceded or accompanied sharp increases in both other price indexes. Thus, most analysts of the general business situation use the WPI and its various components rather than the GNP price index or the CPI.

Changes in the three general price indexes, as well as in the more important components, during the three most recent business recoveries are shown in Table I. As noted earlier, the price index for GNP has tended to overstate price increases that have been experienced during the past decade.

(Note in particular the large increases in the implicit price indexes for the public sector.) The main reason for divergence between the CPI and the WPI is that the latter excludes services, whose prices have increased considerably more than those of goods.

Although any of the three major price indexes could be used as a proxy measure for the general price level, attention in the pages that follow is focused on the WPI, including its various components and special groupings.

WHOLESALE PRICES IN GENERAL

A problem in evaluating wholesale prices, like most other economic series, mainly results from measurement difficulty. Small month-to-month changes in prices or even moderately long drifts often have uncertain or misleading meaning. When small changes or drifts in prices give way to widespread and cumulative movements, however, disruptions or imbalances in economic activity may result.

During the postwar period sizable increases in wholesale prices have been concentrated in 1946-48, 1950, and 1955-56. Emphasis on the rise of wholesale prices to succeedingly higher levels during each of these inflationary episodes, however, has tended to obscure the fact that wholesale prices have on balance either declined or remained relatively stable during 13 of the 19 postwar years (1946-1964). Thus, the behavior of the WPI since early 1958, as shown in the top panel of the accompanying chart, represents a continuation of the noninflationary period from early 1951 to mid-1955.

(See chart on pages 10 and 11.)

TABLE I

Changes in Price Indexes

	Percentage Change			
National Income Accounts	1954-57 Expansion (a)	1958-60 Expansion (b)	Current Expansion (c)	Net Change 1954-63
Implicit Price Indexes				
Gross National Product	9.1%	3.1%	4.3%	18.5%
Personal Consumption Expenditures	5.7	2.5	3.5	13.4
New Construction	14.2	3.9	4.2	22.9
Producers' Durable Equipment	16.1	2.6	0.5	20.9
Federal Government Expenditures	15.8	6.4	4.9	30.2
State and Local Government Expenditures	14.5	5.2	10.4	36.4
Consumer Price Index	5.1	2.2	4.3	14.0
Wholesale Price Index	7.0	0.3	−0.3	8.0
Total Manufactures	8.5	1.0	−0.1	10.1
Durable Manufactures	14.4	2.8	1.1	17.8
All Items ex Farm and Food Products	10.0	2.1	−0.1	11.4
Machinery and Motive Products	17.2	2.7	0.4	22.8
Metals and Metal Products	18.5	3.8	2.6	18.7

(a) GNP price indexes, 3rd Q, 1954-3rd Q, 1957; CPI and WPI, Aug. 1954-July 1957
(b) GNP price indexes, 2nd Q, 1958-2nd Q, 1960; CPI and WPI, Apr. 1958-May 1960
(c) GNP price indexes, 1st Q, 1961-2nd Q, 1964; CPI and WPI, Feb. 1961-Sept. 1964

Sources: U.S. Department of Commerce; U.S. Department of Labor

The weight of the farm and food component (not shown on the chart) accounts for almost one-fourth of the total WPI.[1] Because farm and food prices are more heavily influenced by government support policies, by weather conditions, and by livestock cycles that are largely independent of the business cycle, it is more meaningful to isolate this component, and to consider the WPI excluding farm and food products, that is, the industrial component.

INDUSTRIAL PRICES

Removal of the erratic farm and food component clearly reduces the extent of irregular movement in wholesale prices and reveals a smoother index of industrial prices. Farm and food prices declined on balance during the expansions of 1954-57 and 1958-60 (the unshaded periods on the chart), while industrial prices rose more than the total WPI during those periods. At its most recent level, the industrial commodities component was just a shade higher than annual averages during 1961-63 and was virtually the same as at the trough of the recession in early 1961. The remarkable stability of industrial prices during the present expansion (a decline of 0.1 percent) stands in contrast to the sharp rise of 10.0 percent during the 1954-57 expansion and the more moderate increase of 2.1 percent during the 1958-60 expansion (see Table I).[2]

The special price indexes, price groupings, and other series shown in the accompanying chart portray the broad sweep of industrial behavior, and are often useful in identifying the economic sectors and industries that may be experiencing price pressures. These series taken together often help to anticipate cumulative price movements such as have occurred in the past.

SEGMENTS OF INDUSTRIAL PRICES

The smooth contour of the durable manufactures price index suggests a high degree of short-run price stability; however, the index has registered a larger net increase over the long-run than either the industrial component or the total WPI (see table for percentage changes). During the 1954-57 economic expansion, which was concentrated in durable manufactures, prices of durable manufactures began to firm in mid-1954, one year prior to the rapid upswing in industrial prices. Shortly after the 1957-58 recession,

[1] See appendix for the composition and relative importance of the price indexes shown on the chart.

[2] Industrial price stability should not be confused with price rigidity because individual prices are frequently changing. While widespread publicity has been given to price markups of many industrial products, there have been sufficient price reductions in other lines to offset the increases.

There is evidence that more variation exists in price patterns than is revealed by the WPI and the individual subgroups. A number of studies have indicated that effective transactions of prices are often at variance with published price indexes. Although official attempts are made to collect transactions prices, many sellers allegedly report prices (not necessarily list prices) that are unchanged over considerable periods of time. With discounts, rebates, and other concessions from list prices frequently not reported, a number of undetected price movements, both on the up and down side, may not be included in the index of industrial prices. See, for example, the paper by John Flueck, "A Study in Validity: B.L.S. Wholesale Price Quotations," in George Stigler, et al., *The Price Statistics of the Federal Government*, National Bureau of Economic Research, New York, 1961.

prices of durable manufactures strengthened once again, but weakened during the 1960 recession. Recent behavior shows a moderate firming since the spring of 1963, primarily because of price increases in the two major components of the durable manufactures group—machinery and motive products and metals and metal products.[3]

The price index for the machinery and motive products group began to firm in the spring of 1963, while the metals and metal products group edged up at a slightly faster rate since January 1963. Currently, the level of metals and metal product prices is at an all-time high. This means for one thing that price declines in metals and metal products during 1960 and 1962 have now been more than recouped.

The major significance of the metals and metal products group perhaps lies in the fact that price changes in this area tend to be diffused throughout important parts of the economy, particularly affecting prices on producers' equipment and some consumers' durable goods. During the 1955-56 expansion, price increases in metals and metal products accounted for one-third of the total increase in industrial prices from June 1955 to December 1956 (the period of most rapid advance in industrial prices). The metals and machinery groups combined were responsible for more than three-fourths of the rise in total industrial prices during that 18-month period.

Two important components of the strategic metals and metal products group are shown separately; the iron and steel index and the nonferrous metals index represent 37 percent and 22 percent, respectively, of the metals and metal products group. Iron and steel prices followed a strong upward course beginning in mid-1955, reaching an all-time high in November 1959. During the next three years, most of the price weakness in the iron and steel index reflected a sharp downswing in iron and steel scrap prices. Vigorous competition—both foreign and domestic—has contributed to price stability for steel mill products in recent years. Prices of some steel mill products were raised in April 1963 and once again in October 1963. The special price grouping of steel mill products (not shown in the chart) was at a new high until it declined in October 1964.

Prices of nonferrous metals are extremely sensitive to supply-demand relationships, both foreign and domestic. As shown on the chart, nonferrous metal prices firmed early in 1954, when the United States bought a large amount of Chilean copper and began to stockpile lead and zinc. The price rise accelerated with the copper strike in mid-1955, culminating in a record high for nonferrous metal prices early in 1956. There was a sharp setback in prices during the next two years followed by a partial recovery during the 1958-60 economic expansion. Subsequently, prices of nonferrous metals weakened during the 1960 recession, strengthened in 1961, and weakened once again in 1962. Early in 1963 an upward price movement emerged in nonferrous metals, which has been sustained to the present, as a result of mounting worldwide consumption and tightened supplies of those metals. A further sustained up-

[3] Table III in appendix shows the overlapping of price series in the chart.

ward thrust of nonferrous metal prices would intensify cost increases in the industries where nonferrous metals constitute a significant share of the total cost of manufactured products.

The special price index of sensitive industrial materials, which is calculated by the Federal Reserve Board within the framework of the Wholesale Price Index, includes nonferrous metals and other materials that are particularly responsive to cyclical changes in supply and demand factors. Historically, this index has been a fairly reliable barometer of general shifts in industrial demands and in productive activity. Generally, the sensitive materials index has declined prior to a downturn in industrial production and has increased coincidentally with an upswing in industrial production. When prices of sensitive industrial materials are firming, there is likely to be an accompanying increase in the rate of manufacturing capacity utilization. On the other hand, price weakness in sensitive industrial materials is likely to be accompanied by an easing in the rate of capacity utilization.

It is significant that industrial price inflation in mid-1955 was foreshadowed by a sharp rise in prices of sensitive industrial materials. When the price index of sensitive industrial materials began a sustained downward movement early in 1957, the rapid acceleration in industrial commodity prices eased to a virtual creep. During the 1960 recession, the decline in sensitive materials prices caused an imperceptible softening of the total industrial price index—probably more so in actual market conditions than was indicated by the WPI of industrial commodities. Since 1960, prices of sensitive industrial materials have firmed, then weakened, and have moderately strengthened again in 1964—a pattern that may be more characteristic of actual industrial price transactions than the record shown by the official price indexes.

An acceleration in the current upward pace of sensitive industrial materials prices is likely to be accompanied by increased pressures against manufacturing capacity, rising costs, and possible termination of relatively stable industrial prices.

PRICE DIFFUSION INDEXES

In many manufacturing industries cyclical movements in productive activity generate cyclical changes in prices. However, the price index of total manufactures, as shown on the chart, changes little from month to month. That apparent stability reflects, in part, the aforementioned cross-currents in prices and, in part, previously noted problems of measuring effective transactions prices.

To assist in evaluating the price situation, the Bureau of the Census has developed a diffusion index of price changes for 23 manufacturing industries.[4] Because each industry has an equal weight in the diffusion index the direction of price change, but not the magnitude, is shown. The diffusion index ranges between 100 percent (all components rising) and zero (all components falling); a 50 percent figure indicates that half the components are rising and half falling.

[4] The "industries" actually are selected subgroups of the WPI—see appendix, Table IV.

As presented on the chart, the diffusion index for 23 manufacturing industries—based on a six-month span—is superimposed on the corresponding price index of total manufactures. Although the diffusion index generally tends to foreshadow movements in the corresponding aggregate price index, the record indicates that the diffusion index occasionally has given "false" signals. Thus, caution must be exercised in evaluating the significance of short-run changes in the diffusion index. The broad sweeps in the diffusion index, however, do portray a meaningful picture of the cyclical movements in transactions prices.

The diffusion index of manufacturing prices foreshadowed the inflationary periods that began in mid-1950 (not shown on the chart) and in mid-1955 (shown on chart). When the diffusion index rises to and then remains at a high level—as in 1955 and 1956—an increase in the aggregate index may be expected. In mid-1957 the diffusion index was declining although its level was above 50 percent; accordingly, the price index of total manufactures continued to rise but at a slower rate. A diffusion index below 50 percent suggests weakness in the aggregate price index, which typified the price situations in 1960 and 1962. The sharp rise in the diffusion index that began in December 1962 preceded a moderate firming tendency in manufactures' prices in 1963. During 1964 the diffusion index has remained above 50 percent, indicating continued price strength.

The last price series on the chart shows monthly averages of the spot market index of 13 raw industrials and the corresponding diffusion index on a nine-month span. The diffusion index of 13 raw industrials' prices has a favorable record of anticipating swings in the aggregate price index. Since the fall of 1963, the price index of 13 raw industrials has demonstrated almost persistent strength primarily because of a sharp upswing in the metals component.

The 13 raw industrials also are included in the sample universe of the monthly WPI. The significance of the spot price index of 13 raw industrials, however, appears to be greater than suggested by the combined relative importance of those items in the total WPI (less than 1 percent). Price movements of the 13 raw industrials receive much publicity because the index is available daily, is particularly sensitive to international developments as well as domestic economic conditions, and because the index reflects price developments in many other industrial materials. A case in point, for example, is the close correspondence over the business cycle, but not in amplitude of fluctuation, between the price index of 13 raw industrials and the price index of sensitive industrial materials that represents over 10 percent of the total WPI.

The record of the decade shows that the price index of 13 raw industrials reached a peak late in 1955 and declined to a trough early in 1958, precisely when the rate of capacity utilization in manufacturing was at its respective high and low. This and subsequent patterns suggest the significance of watching current movements in the index of raw industrials (see chart).

SUMMARY

Evaluation of prices and price behavior could conceivably involve consideration of even more series than those discussed in this article. On the basis of past performance those discussed here are the price indexes that have usually foreshadowed or anticipated increases in the broader measures of price behavior. Thus far, movements in these series have generally been on the up side but have not been reflected in either the total Wholesale Price Index or in the industrial component. Thus, the economy's record of overall price stability has not been disturbed. Although there have been price increases, it is a matter of simple arithmetic to decide that there have been corresponding declines elsewhere.

Some observers have suggested that recent price advances in selected industries are merely recoveries of previous declines and are associated with the pace of business activity. In this sense, the recovery of lost ground may be considered as a sign of economic health as price erosion would be a sign of economic weakness. This type of reasoning implies that some cyclical fluctuation in prices (and in profit margins) is tolerable and that recent price increases represent a sort of normal readjustment. If these readjustments or recoveries were compounded by other economic developments that tend to raise prices or costs, for example, wage increases in excess of productivity gains or excessive inventory building, price increases could easily become widespread and cumulative movements. This in turn would influence the broader price measures, namely the Wholesale Price Index and the Consumer Price Index. If this were to occur, it would not only confirm the value of studying the various price indexes discussed in this article, but more important, would suggest possible difficulty in maintaining the record of moderate and balanced economic expansion.

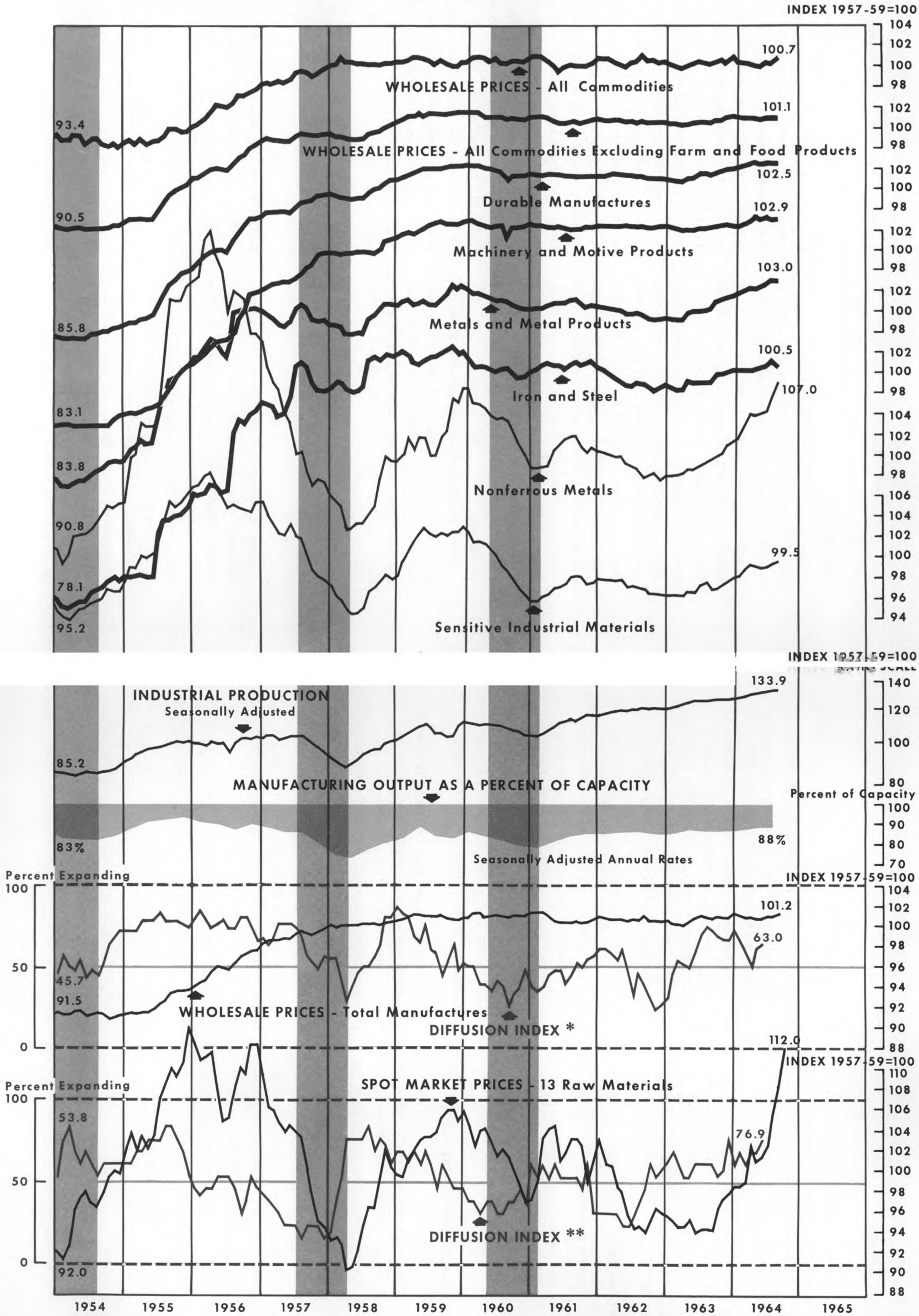
APPENDIX

The Wholesale Price Index measures average changes in prices of approximately 2,200 commodities sold in the U. S. at other than the retail level. In all, more than 6,300 separate price quotations are taken each month. The sample universe is designed to reflect price changes of many unpriced commodities that are known or assumed to have price movements similar to those items included in the index.

WEIGHTS IN THE WHOLESALE PRICE INDEX

The current weight universe is the 1958 value of commercial shipments or sales in the U. S. of all commodities produced by manufacturing, mining, agricultural, forestry, and fishing industries, plus commercial imports. These value weights, adjusted for relative price changes from 1958 to December 1960, were used to calculate the WPI beginning January 1961. Table II shows the relative

SELECTED PRICE DEVELOPMENTS and PRODUCTIVE ACTIVITY



* 23 manufacturing industries, 6-month span

** 13 raw industrials, 9-month span

Sources of data: U.S. Department of Labor; U.S. Department of Commerce; Board of Governors of the Federal Reserve System

importance of wholesale price groupings, which represent the effective weights in the WPI from December 1961 to the present.

TABLE II

Wholesale Price Indexes	Relative Importance As Percent Of Total WPI	Relative Importance As Percent Of Industrial Commodities
All Commodities	100.0%	—
Total Manufactures	82.6	—
Industrial Commodities	75.5	100.0%
Durable Manufactures	40.2	53.2
Machinery and Motive Products	17.6	23.3
Metals and Metal Products	12.9	17.1
Sensitive Industrial Materials	10.2	13.5
Iron and Steel	4.8	6.3
Nonferrous Metals	2.8	3.7
13 Raw Industrials (spot market)	0.9	1.2

Source: U.S. Department of Labor

COMPOSITION OF WHOLESALE PRICE INDEXES

The "Total Manufactures" index includes all commodities except farm products and other raw or slightly processed goods. The "All Commodities Other Than Farm Products and Foods" group has been abbreviated in Table II to "Industrial Commodities". Table III shows the composition of the other price indexes discussed in the article.

DIFFUSION INDEXES

Although the diffusion index of prices for 23 manufacturing industries (listed in Table IV) does not correspond precisely to the aggregate price index of Total Manufactures, the relationship is sufficiently close for comparison. The components of the price diffusion index for 13 raw industrials are listed in Table III.

Each of the price series for 23 manufacturing industries and the 13 raw industrials is seasonally adjusted by the Bureau of the Census prior to calculating the direction of change. To maintain symmetry in the diffusion indexes, instances of no change are counted as one-half increases and one-half decreases.

Each diffusion index is centered in the middle of the span over which the change is being measured. The most recent diffusion index for 23 manufacturing industries shows the percentage of series rising from March 1964 to September 1964. The most recent diffusion index for 13 raw industrials shows the percentage of series rising from January 1964 to mid-October 1964.

TABLE III

Composition of Wholesale Price Index Groups

Durable Manufactures

Lumber and wood products
Metals and metal products (ex iron ore and scrap metals)
Machinery and motive products
Furniture and other household durables (ex floor coverings)
Nonmetallic mineral products (ex sand, gravel, and crushed stone)
Miscellaneous products (ex manufactured animal feeds)

Machinery and Motive Products

Agricultural machinery and equipment
Construction machinery and equipment
Metalworking machinery and equipment
General purpose machinery and equipment
Miscellaneous machinery and equipment
Special industry machinery and equipment
Electrical machinery and equipment
Motor vehicles
Transportation equipment, R.R. rolling stock

Metals and Metal Products

Iron and steel
Nonferrous metals
Metal containers
Hardware
Plumbing, fixtures and brass fittings
Heating equipment
Fabricated structural metal products
Fabricated nonstructural metal products

Iron and Steel

Iron ore
Iron and steel scrap
Finished and semifinished steel products
Foundry and forge shop products
Pig Iron and ferroalloys

Nonferrous Metals

Aluminum	Platinum
Cobalt	Zinc
Copper	Antimony
Lead	Cadmium
Nickel	Mercury
Gold	Magnesium
Silver	Titanium
Tin	Nonferrous scrap

Sensitive Industrial Materials

Iron and steel scrap
Nonferrous metals
Lumber, plywood, wastepaper
Rubber, hides, leather
Textile fibers and intermediate products
Residual fuel oil

13 Raw Industrials (Spot Market Index)

Copper scrap	Print cloth
Lead scrap	Wool tops
Steel scrap	Hides
Tin	Rosin
Zinc	Rubber
Burlap	Tallow
Cotton	

Source: U.S. Department of Labor

TABLE IV

Components of Price Diffusion Index for 23 Manufacturing Industries

Lumber and wood products
Furniture and other household durables
Nonmetallic mineral products
Iron and steel
Nonferrous metals
Fabricated structural metal products
Fabricated nonstructural metal products
General purpose machinery and equipment
Miscellaneous machinery
Electrical machinery and equipment
Motor vehicles
Miscellaneous products
Processed foods
Tobacco products and bottled beverages
Cotton products
Wool products
Manmade fiber textile products
Apparel
Pulp, paper and allied products
Chemicals and allied products
Petroleum products, refined
Rubber and rubber products
Hides, skins, leather, and leather products

Sources: U.S. Department of Commerce

MANUFACTURING INVESTMENT IN OHIO — 1954-1962

There are few communities of significant size that cannot boast of a public or private agency to enlist new industry and encourage the expansion of established enterprise. In addition, state governments have created similar agencies to foster statewide industrial development.

The success of industrial development efforts is frequently measured by the amount of business investment that occurs within a particular region. It is assumed that such investment creates employment opportunities and increases personal income, which in turn should stimulate consumer spending and provide increased tax revenues to support public services. The resulting expansion in business activity may also encourage a second wave of capital spending by businesses that benefit either directly or indirectly from the initial investment. Thus, an increase in business investment may ignite a chain of capital spending programs and bring about significant improvements in the economic climate of a region.

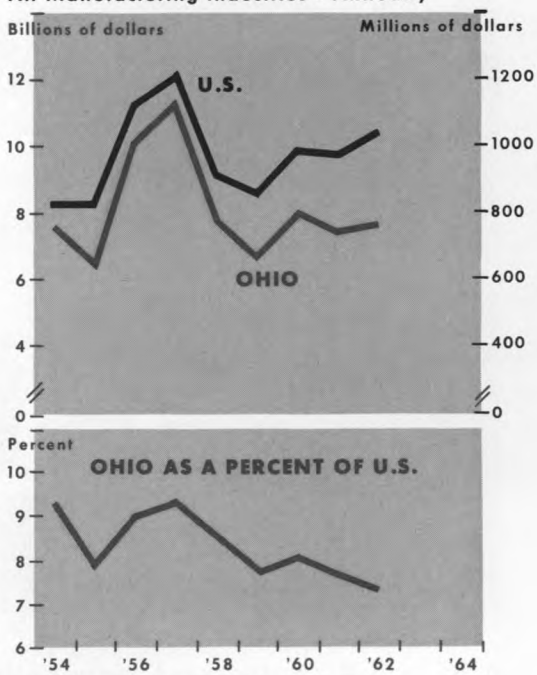
As competition for new investment has intensified, many of the less industrialized states have been notably successful in attracting new industry. There are a number of factors that help attract industry to these regions—including market proximity, improved transportation and lower labor costs. Many officials of industrial states fear that the rapid rate of expansion in the less industrialized regions of the country may be occurring at the expense of the established industrial areas. For example, public officials and business leaders in Ohio have frequently expressed concern that the recent rate of business investment in Ohio is inadequate if the state is to retain its position as a major industrial region.

In order to help evaluate recent business investment in Ohio, the amount and character of capital spending by manufacturing firms between 1954 and 1962 is examined in this article. The data used are derived from the Annual Survey of Manufactures and the 1954 and 1958 Census of Manufactures conducted and compiled by the Bureau of the Census of the U. S. Department of Commerce.

Expressions of concern about Ohio's industrial development are probably received with a mixture of amusement and chagrin by officials of the less industrialized states for Ohio ranks among the nation's top five industrial states by nearly every measure of industrial performance. For example, in terms of value added by manufacturers, in 1962 Ohio placed third behind New York and California. In the same year Ohio also ranked third in total manufacturing payroll and fourth in number of employees in manufacturing enterprise. Most significant, however, is the fact that Ohio ranked second in expenditures for new plant and equipment by manufacturing firms in 1962.

Moreover, during the period 1954-62 Ohio ranked first among the states in total investment by manufacturing firms. As Chart 1 shows, however, the proportion of total manufacturing investment that occurred in Ohio was not constant throughout the nine year period. There are two important and diverse trends observable. During the period 1954 through 1957, with the exception of 1955, Ohio accounted for 9 percent or more of total annual manufacturing investment. During this period the annual investment both in the nation and in Ohio rose sharply, reaching a peak in 1957. In contrast, after 1957, with the exception of 1960, the proportion of total annual manufacturing investment that occurred in Ohio declined steadily. In 1962 total manufacturing investment in Ohio was at approximately the same level as 1958; however, total manufacturing investment in the nation was 15 percent higher than 1958. This development partly explains the concern

1.
TOTAL CAPITAL EXPENDITURES
All Manufacturing Industries - Annually



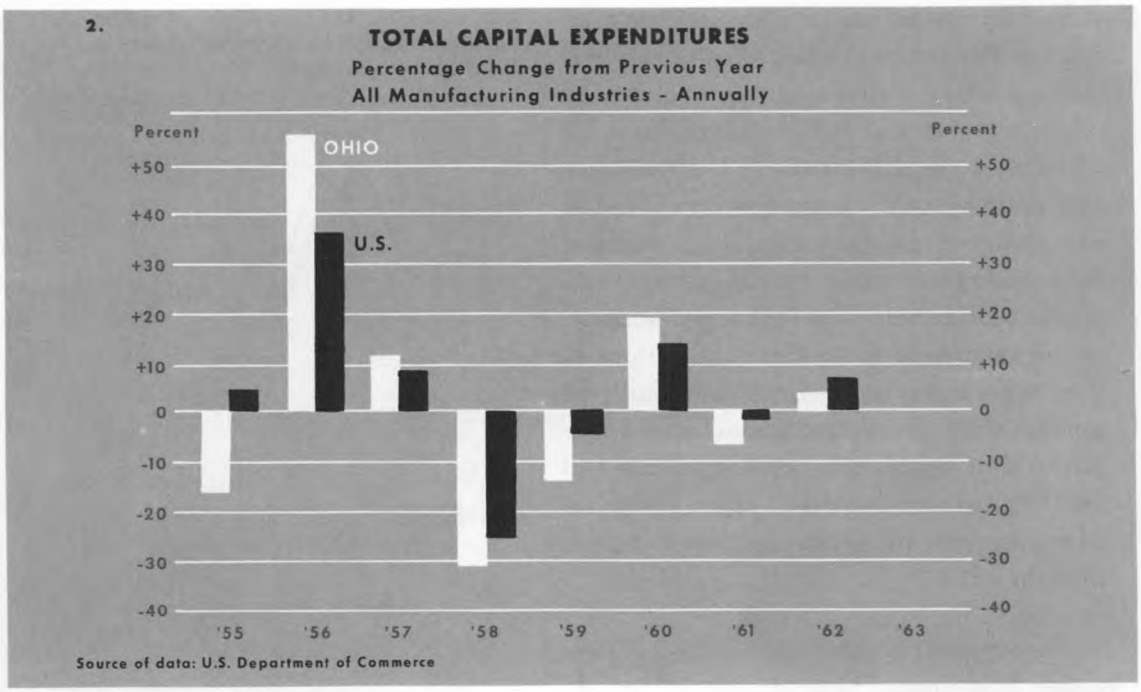
Source of data: U.S. Department of Commerce

by public officials about Ohio's industrial future.

Unfortunately, the absence of data on capital spending in Ohio prior to 1954 makes it impossible to determine whether the high level of manufacturing investment that occurred in 1954-57 was merely a continuation of the pace of investment before 1954, or whether the decline in the 1958-62 period represented a return to a "normal" rate of capital investment following an investment boom.

CYCLICAL BEHAVIOR OF INVESTMENT

Business conditions also had a marked effect on manufacturing investment in Ohio, as revealed in Chart 2. With the exception of 1955 the direction of year-to-year change



in the level of investment in Ohio was identical to that of the entire nation. However, Chart 2 demonstrates that the magnitude of change in Ohio exceeded the change in the nation with the exception of 1962. For example in 1956, 1957 and 1960 manufacturing investments in Ohio increased 56 percent, 12 percent and 19 percent respectively, as compared with increases of 36 percent, 8 percent and 14 percent in the nation. Furthermore, in 1958, 1959 and 1961 manufacturing investments in Ohio declined 31 percent, 14 percent and 7 percent respectively, as compared with 25 percent, 5 percent and 1 percent in the nation.

Thus, the pattern of investments between 1954 and 1962 suggests that capital spending among Ohio manufacturing firms is relatively more sensitive to business cycle developments than is the expenditures pattern for all manufacturing firms.

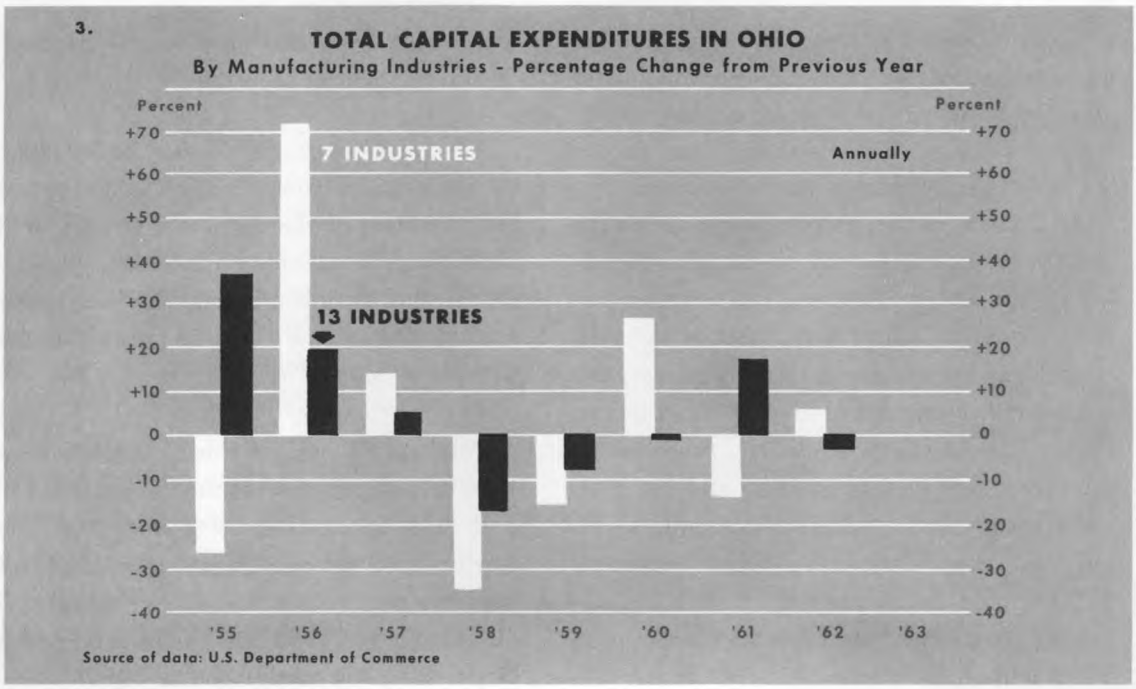
MANUFACTURING CATEGORIES

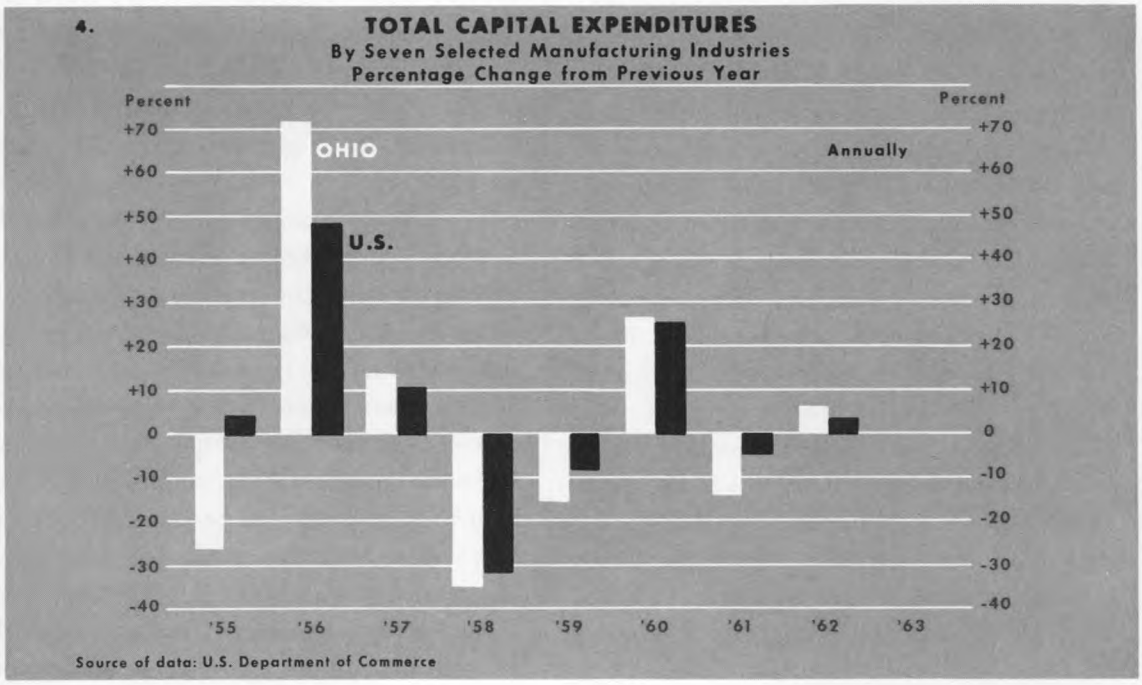
The pronounced cyclical behavior of investment in Ohio is largely a result of the nature of the state's manufacturing activity. Even a cursory analysis reveals the importance of producer and consumer durable goods production. For example, during 1962 nearly three-quarters of the value added by manufacture in Ohio was contributed by seven of 20 manufacturing categories; namely, transportation equipment, machinery (both electrical and nonelectrical), primary metals, fabricated metal products, chemical and allied products, and rubber and plastic products. These seven categories, usually referred to as "heavy industries", require

substantial and frequent investments for purposes of replacement as well as net new additions to fixed assets. Therefore, it is not surprising that the seven manufacturing groups accounted for as much as 82 percent and no less than 70 percent of total annual manufacturing investment in Ohio between 1954 and 1962. In contrast, the proportion of total annual manufacturing investment in the nation accounted for by the seven manufacturing categories ranged from 51 percent to 57 percent during the same period.

The seven manufacturing categories in Ohio have also accounted for a larger share of the national total in the respective groups than have the remaining 13 manufacturing classifications in Ohio. Between 1954 and 1962, the Ohio share of total capital invested by the seven heavy industries in the U. S. ranged from 10 percent in 1962 to 15 percent in 1954. In contrast, the amount of total manufacturing investment accounted for by all manufacturing firms in Ohio ranged from 7 percent to 9 percent during the same period.

In addition, a significant part of the volatility of manufacturing investment in Ohio can be explained by the investment behavior of the seven principal manufacturing groups. As Chart 3 shows, the volatility of investment among the seven heavy manufacturing groups was greater than the other 13 manufacturing categories that comprise total manufacturing in Ohio. The predominance of the seven manufacturing groups in Ohio is demonstrated by the fact that in 1960 total manufacturing investment in Ohio increased 14 percent despite the fact that the total invest-





ments of 13 of the 20 manufacturing classifications declined 1 percent. The small decline in investments by the 13 manufacturing classifications in 1960 was entirely overshadowed by a 26 percent increase among the seven heavy manufacturing groups.

As Chart 4 shows, the direction of change in investment among the seven manufacturing categories in Ohio was the same as that experienced by the seven industries nationally with the exception of 1955; however, the magnitude of change tended to be larger in Ohio. The volatility is clearly revealed in the investment pattern in 1957 and 1958. In 1957 aggregate investment among the seven industry classifications in Ohio increased $108 million or 14 percent, and in the following year aggregate investments declined $309 million or 35 percent. Nationally, investment in these industries increased 11 percent in 1957 and declined 31 percent in 1958.

The predominance of the seven heavy manufacturing categories in Ohio also tends to mask one of the principal causes of the slowdown in manufacturing investment in Ohio—the sluggish behavior of investment among the remaining 13 manufacturing categories since 1958.

Total annual investments by the light manufacturing categories reached a peak in 1957 and then declined steadily until 1961. Following a 16 percent increase in 1961, total investments by light manufacturing firms declined again in 1962; the total was 15 percent below the peak established in 1957.

METROPOLITAN AREA INVESTMENT PATTERNS

In addition to variations among manufacturing categories, there are also significant differences in the rate and nature of manufacturing investment among the major metropolitan areas in Ohio, as shown on Chart 5. The seven metropolitan areas used in this study are Akron-Canton, Cincinnati, Cleveland, Columbus, Dayton, Toledo and Youngstown-Warren.[1]

Among Ohio's major metropolitan areas, Cleveland accounted for the largest single share of total manufacturing investment between 1954 and 1962, roughly one-quarter of the total. However, with the exception of Cleveland, the largest metropolitan center in Ohio, the distribution of manufacturing investment is not closely related to the population size of the centers. For example, between 1954 and 1962 manufacturing investment in the Akron-Canton metropolitan areas was second only to Cleveland, and while Cincinnati accounted for the third largest share, Youngstown-Warren was fourth largest in manufacturing investment. Interestingly, Columbus, which has the fifth largest population among the seven centers and is considered a rapidly expanding center, was last among the seven centers in terms of manufacturing investment.[2]

As might be expected, the seven principal industries in Ohio also played a significant part in the business investment patterns experienced by the major metropolitan areas. Among the metropolitan areas receiving the largest shares of total manufacturing investment, the seven heavy manufacturing industries were dominant. For example, with the exception of 1955 the seven manufacturing categories accounted for no less than four-fifths of total investment in Cleveland and three-quarters of the investment in the Akron-Canton area. In Youngstown four manufacturing groupings (primary metals, metal fabricators, machinery producers, and transportation equipment manufacturers) accounted for nine-tenths of total manufacturing investment in each year with the exception of 1954, and primary metals producers alone accounted for roughly three-quarters of the total.

Despite the differing influence of Ohio's largest manufacturing industries on the principal metropolitan areas, there is no indication of important differences in the cyclical pattern of business investment among the seven major urban areas.

SUMMARY

It is unlikely that Ohio will fall from the ranks of the principal industrial states in the near future; however, this is not an adequate reason for disregarding the concern expressed by officials of Ohio with respect to the declining share of annual manufacturing

[1] Akron and Canton are separate metropolitan areas; however, for purposes of this article the two areas have been combined.

[2] The following are population approximations of the seven principal metropolitan areas of Ohio as of the end of 1962:

Cleveland	1,886,525	Columbus	737,062
Cincinnati	1,123,160	Youngstown-Warren	532,493
Akron-Canton	896,173	Toledo	472,464
Dayton	743,703		

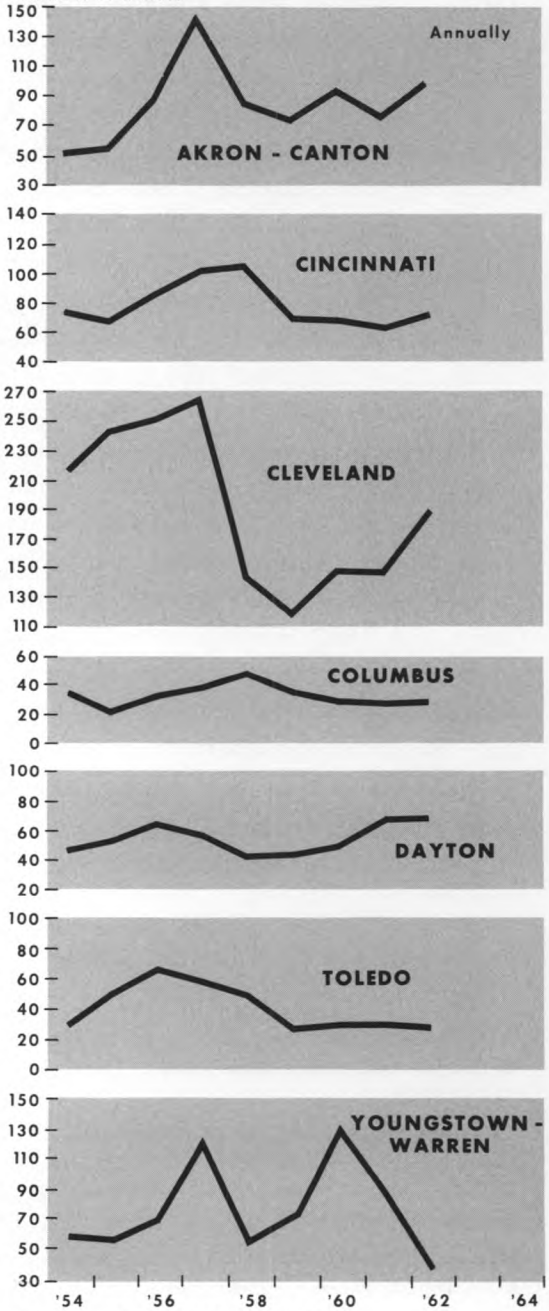
Data supplied by the Division of Planning and Research, Ohio Department of Economic and Industrial Development, Columbus, Ohio

investment occurring in Ohio since 1958. On the other hand, because of the absence of data before 1954, it is difficult to determine whether the high level of investment in Ohio between 1954 and 1957 was a temporary phenomenon or was a continuation of the level of spending that existed before that time.

Furthermore, there is little reason to expect the influence of the business cycle on manufacturing investment in Ohio to become less important so long as the seven heavy manufacturing industries continue to account for such a large proportion of total investment. In this connection, programs designed to moderate the cyclical behavior of investment in Ohio as well as to increase the level of investment might enjoy more success if attempts were made to establish a better balance between light and heavy manufacturing.

5.
CAPITAL EXPENDITURES BY ALL MANUFACTURING INDUSTRIES

Seven Metropolitan Areas in Ohio
Millions of dollars



Source of data: U.S. Department of Commerce