

economic review

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IN THIS ISSUE

Dimensions of
Business Spending . . . 3

A Note on
Corporate Profits . . . 14

Recent Trends in the
Paper Industry . . . 21

Capital Spending Plans
in Pittsburgh 32

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DIMENSIONS OF BUSINESS SPENDING

Increases in business spending are recognized to be an important part of the vigorous expansion that has characterized the nation's economy for the past three or more calendar quarters.¹ Demands stemming from Federal Government requirements have shared in the limelight, but seemingly not to the same extent as business spending. On the other hand, it is widely accepted that consumer demand has been playing a supporting rather than initiating role in the general upswing.

A closer appraisal of the relative roles of recent business spending and Federal Government spending can be made by use of a number of quantitative measures. Comparisons of corresponding magnitudes of change during other postwar periods of business expansion are useful in this connection, provided that important differences in surrounding circumstances are taken into account. When viewed in this way, the relative role of recent business spending is seen in more accurate perspective; in some ways, and according to some measures, it takes second place to Federal Government spending as a propelling force in the current upswing. In any event, a more careful set of comparisons than often appears in public discussions is

¹ For purposes of this article, business spending is defined as private outlays for nonresidential fixed investment, that is, producers' durable goods and structures, and the net change in nonfarm business inventories.

required in order to obtain a factually based perspective.

The contribution of business spending and Federal Government spending to changes in Gross National Product during three expansion periods is shown in the accompanying table. The contribution of changes in business spending to the changes in GNP in the first two quarters of 1966 (second quarter estimated) was less than that of Federal spending. Moreover, the net contribution of business spending to the change in GNP thus far this year on average was less, in percentage terms, than during many of the calendar quarters shown in the table. It may be surprising that the figures turn out this way. However, given the fact that the current expansion is the longest peacetime expansion on record, that business spending was already on a high level and further gains are hard to come by, and that Federal spending, particularly for defense, has spurted since last summer, it is understandable that the relative contribution of business spending to the advance in economic activity is of comparatively limited, although significant, magnitude.

A number of surrounding circumstances should be taken into account in comparing figures on recent business spending with those for previous comparable periods. Most important, probably, is the fact that the recent

ECONOMIC REVIEW

advance in business spending has been occurring at a time when the economy is pressing hard on available resources—both physical and financial. Thus, business spending has continued to expand sharply at a time when resources are near full utilization; this is strikingly dissimilar to most previous periods of sharp expansion in business spending when margins of unused resources were noticeably larger. There are other differences with previous experience, as well as similarities; these are revealed in the following review of business spending, which deals with both the total figures and the component parts—capital spending and inventory investment.

THE BUSINESS SECTOR

Both the magnitude and the rate of advance in business spending during the present expansion have surpassed the experience of two previous major business spending expansions of the postwar period (1949-53 and 1954-57).² This is shown in the top panel of Chart 1, which traces (in constant dollars) the behavior of business spending as well as Federal Government spending and GNP since the end of World War II.

² Periods of business expansion and contraction used in this article are those designated by the National Bureau of Economic Research and appear in the Appendix of monthly issues of *Business Cycle Developments*, U. S. Department of Commerce. The NBER designates five business expansion periods since the end of World War II. Of these, the 1945-48 expansion is excluded from consideration in this article because of the influence of the backlog of demands from the Great Depression and World War II, and the 1958-60 expansion is excluded because of smaller magnitudes and different implications.

The central feature of business spending during the 1949-53 expansion—when such spending increased faster than GNP—was the role played by inventories (not shown in the chart). In the fourth quarter of 1950, outlays for nonfarm inventories accounted for 4.4 percent of GNP, a record that still stands. During the 1949-53 expansion, fluctuations in total business spending were largely associated with changes in inventory investment. Capital spending essentially remained on a high plateau during most of the period.

In contrast, the 1954-57 expansion period—when total business spending again increased at a faster rate than GNP—was characterized especially by a capital spending boom (as distinct from inventory investment).

In the current expansion (1961 to present), business spending advanced moderately until late 1964, with capital spending somewhat more important than inventory investment. While business spending has risen faster than GNP throughout the expansion, it is the surge of the past two years that is more reminiscent of the earlier expansion periods (see Chart 1).

The bottom panel of Chart 1 shows the proportion of GNP accounted for by both total business spending and Federal Government spending. In recent quarters, business spending as a percent of GNP has returned to the level of 1955-56, but not to that of 1950-51. As the chart shows, business spending accounted for 11 percent or more of GNP for a considerably longer time in the 1954-57 expansion than it has thus far during the present expansion. In neither of these periods, however, did business spending as a percent of GNP reach the levels attained for a short

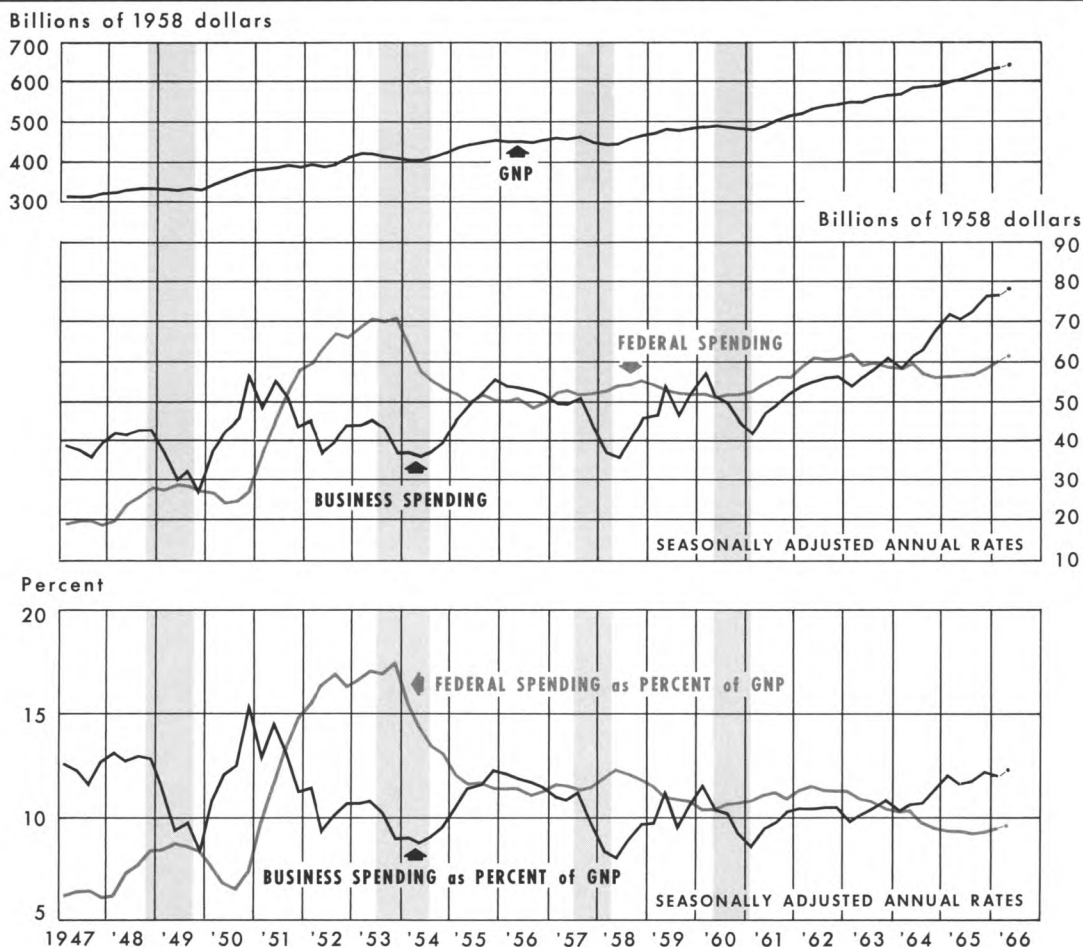
period during the 1949-53 expansion, which was importantly influenced by speculative psychology affecting both inventory and fixed investment, and which was associated with the Korean War developments.

Thus, while there is a mixed bag of similarities and dissimilarities between this expansion and the two previous expansions under

review, a major disquieting development distinguishes the present expansion. This time, a rapid rise in Federal outlays in recent quarters has been superimposed on expanding business outlays in an advanced stage of the general expansion. Increasing outlays by the business and Federal sectors have combined to press hard on available resources at a time

1.

BUSINESS SPENDING, FEDERAL SPENDING, and GROSS NATIONAL PRODUCT



Sources of data: U.S. Department of Commerce and estimates by Federal Reserve Bank of Cleveland

ECONOMIC REVIEW

when little slack remains in the economy. As a result, it has become a matter of public policy to take whatever steps are necessary to sustain moderate and balanced real growth in the economy.

The relative magnitude of the conjuncture of business and Federal spending is shown in the table. For example, in the first quarter of 1966 combined Federal and business spending accounted for 21.5 percent of GNP, and in the second quarter for an estimated 22.1 percent. But, importantly, both sectors were in advancing phases.

During the 1954-57 expansion when business spending was the major spark, combined Federal and business spending accounted for as much as 23.5 percent of GNP in the fourth quarter of 1955. However, as shown in Chart 1, during early 1954 through late 1955, Federal spending was receding (in dollars and as a percent of GNP), while business spending was increasing (in dollars and as a percent of GNP). Thus, the two sectors were moving in opposite directions, unlike the situation since the third quarter of 1965.

There were two separate periods in the 1949-53 business expansion. In the first phase, as shown in Chart 1, business spending rose rapidly and dominated the expansion. Meanwhile, Federal spending was declining and accounted for a relatively small share of GNP (it averaged 7.4 percent during the first four quarters of the expansion). The second phase of the expansion, from late 1950 to the end of 1953, was marked by rising Federal spending (in terms of dollars and as a percent of GNP), with the business sector playing a lesser role, especially after the third quarter of 1951 (see chart). Combined business and

Federal spending accounted for 27.2 percent of GNP during the peak third quarter of 1953.

The central point in this aspect of the comparisons is that during previous expansion periods Federal spending and business spending did not rise concurrently, as they have been doing in the recent situation.

CAPITAL SPENDING IN THREE EXPANSIONS

The growth of business fixed investment in the three periods of business expansion under review is shown in Chart 2. Not only is the present expansion in capital spending the longest in duration, but it also embodies the largest increase in both dollar amount and percentage growth. Businessmen invested over \$210 billion (in 1958 dollars) from the trough quarter (second) in 1961 through the first quarter of 1966, a 55 percent increase overall and an average quarterly increase of 2.3 percent.³ The average quarterly increase thus far in this expansion is considerably above that for either of the two preceding periods. In the 1955-57 period, which has been regarded, at least up to now, as the greatest capital spending boom in the postwar period, capital outlays rose 19 percent from trough to peak, or at an average quarterly rate of 1.8 percent. In the 1949-53 expansion, outlays rose by nearly 26 percent from the trough through the third quarter of 1953, or at an average quarterly rate of 1.5 percent, the slowest rate of any of the three expansion periods under review.

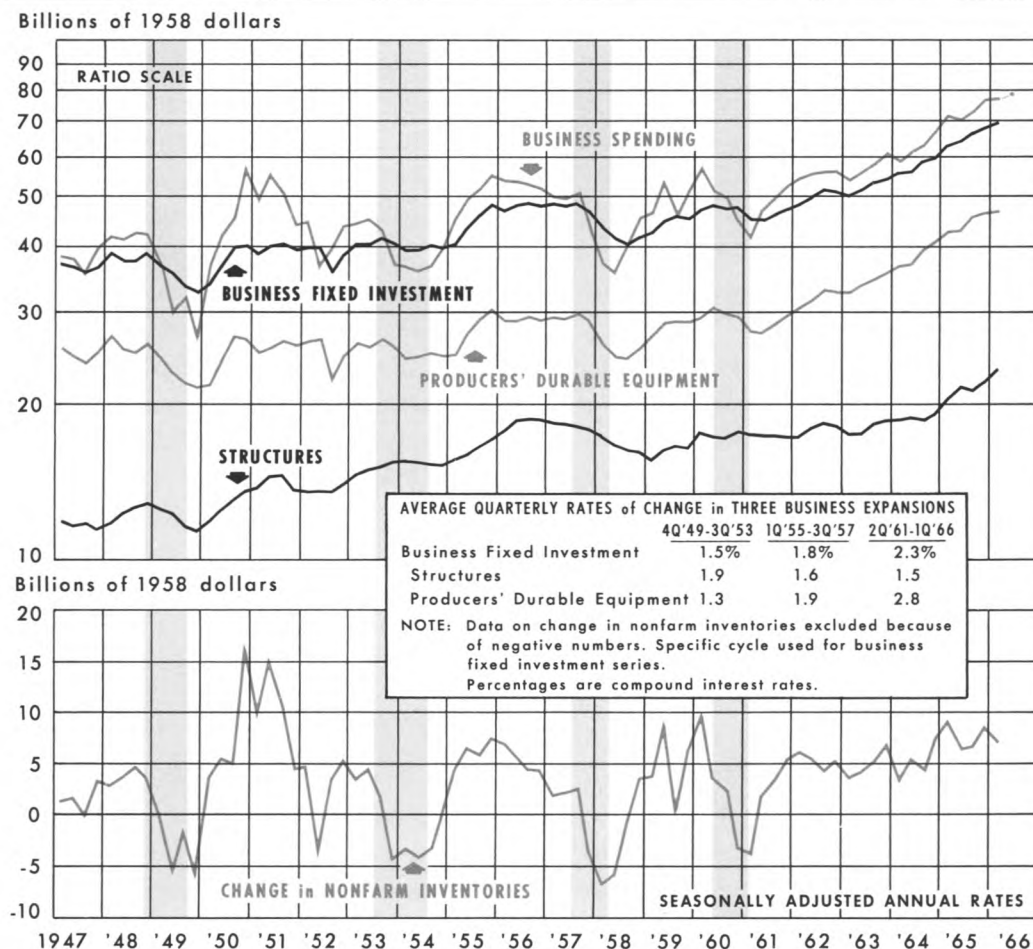
³ For purposes of this discussion, the NBER's specific trough and peak dates for the business expenditures series are used, rather than business cycle reference dates.

The growth rate for producers' durables in the present expansion is considerably higher than during previous expansions, averaging 2.8 percent per quarter compared with 1.9 percent in the 1955-57 expansion and 1.3 percent in the 1949-53 expansion. Overall, the average quarterly growth rate for producers' durables has exceeded that for structures—2.8 percent versus 1.5 percent—dur-

ing the present expansion. In the most recent stage of this expansion, however, outlays for structures have been stepped up relative to producers' goods, in response to more intense utilization of plant capacity by manufacturers. Interestingly, it was not until mid-1964 that spending on structures had returned to the postwar highs of the third and fourth quarters of 1956.

2.

BUSINESS SPENDING for FIXED INVESTMENT and INVENTORIES



Sources of data: U.S. Department of Commerce and estimates by Federal Reserve Bank of Cleveland

ECONOMIC REVIEW

As a result of recent acceleration, capital spending as a percent of GNP has virtually regained the previous peak (11 percent) achieved in the third quarter of 1950, a level that was not maintained for long. More importantly, a high ratio of capital spending to GNP has now been held for a period of time approaching the period of high ratio during the 1955-57 capital spending expansion. Thus, from the third quarter of 1955 through the third quarter of 1957, capital spending accounted for between 10.3 and 10.8 percent of GNP; during the five quarters from the first quarter of 1965 through the first quarter of 1966, capital spending accounted for 10.5 to 10.9 percent of GNP, but tended to be in a rising trend during the period. Total dimensions of the expansion in capital spending during the 1949-53 period were smaller than in either of the later periods, and the expansion occurred earlier.

Thus, capital spending in the present expansion has attained new records in terms of dollar magnitudes and growth rates. Moreover, its share of GNP in the past several quarters has been as large as during the record period in the 1955-57 capital goods boom.

INVENTORY INVESTMENT IN THREE EXPANSIONS

Inventory investment, which is the most volatile GNP component, is shown in the bottom panel of Chart 2. As suggested in the chart, the impact of inventory investment on GNP in the present expansion has been less than during the two previous expansions. Quarterly changes in outlays for nonfarm inventories from the trough quarter in 1961 through

the first quarter of 1966, when combined, amounted to 7.0 percent of the total change in GNP. This compares with 8.5 percent of the change in GNP in the 1954-57 period, and 11.1 percent in the 1949-53 expansion. Changes in overall outlays for nonfarm inventories during the present expansion have been moderate despite the stepped-up rate of real growth in the economy, and despite specific fluctuations attributable to subcycles in steel and auto output.⁴

Aside from the moderate pace of inventory buildup, a feature of this expansion has been the timing of inventory investment. Businessmen have accelerated inventory investment in the more recent stages, adding, for example, \$7 billion (at annual rates in 1958 dollars) to nonfarm inventories during the first quarter of 1966. In contrast, large additions to inventories were made in the earlier stages of the two previous expansions. In the 1954-57 expansion, inventory accumulation began to slacken as early as the first quarter of 1956; by the third quarter of 1957, businessmen were adding stocks at an annual rate of only \$2.4 billion. Much the same was true during 1949-53. An inventory surge took place early, and by the third quarter of 1953, additions to inventories were at less than a \$2 billion annual rate.

BUSINESS SPENDING AND RESOURCE PRESSURES

Recent acceleration in business spending has been a factor in pushing utilization of resources to new highs for this expansion.

⁴ See "Dimensions of Subcyclical Fluctuations in Steel and Auto Output," *Economic Review*, Federal Reserve Bank of Cleveland, Cleveland, Ohio, March 1966.

While according to some of the measures just reviewed, the magnitudes of change in business spending in recent quarters have not been large, the increase in business spending, coupled with increased Federal spending, has happened to occur at a time when there is little slack left in the economy. The combined impact has placed a strain on the economy's resources reminiscent of the early and mid-1950's. At those times, the business expansions were characterized—at a much earlier stage—by pressure on resources, that is, by rising order backlogs, stretched out deliveries, spot shortages of labor and materials, and rising prices. It is the relatively recent emergence of similar characteristics in the present expansion that has provided a troublesome change in the economic environment.

Some indications of that change are revealed by selected series on new investment commitments, buying policies of businessmen, and utilization of human and physical resources. Such series are shown in Chart 3. In practically each case, the series shown has now either matched or approached the highs of both the 1949-53 and 1954-57 business expansions.

NEW ORDERS, SHIPMENTS, AND BACKLOGS

Indications of the balance (or lack of it) in supply-demand relationships for goods are provided by the series on manufacturers' new orders, shipments, and order backlogs (see Chart 3). Since early 1961, manufacturers' new orders have increased by 54 percent, or at an average annual rate of more than 9 percent. The capital goods industries, especially machinery (electrical and non-

electrical) and transportation equipment, were important contributors to the increase. In the 1954-57 expansion, new orders rose 22 percent from trough to peak, or at an average annual rate of 7 percent. (The high was in the fourth quarter of 1956, after which new orders began to recede due largely to conditions in the steel industry.) In that expansion, primary metals, electrical and non-electrical machinery, and transportation equipment industries were important contributors to the rise in orders. The 1949-53 expansion was marked by a sharp rise in orders in the early phase, reflecting speculative buying by consumers and businessmen; a second upswing occurred later as defense buying was stepped up as a result of the Korean War. Over the full course of that business expansion, new orders rose at an average annual rate of 11 percent.

Manufacturers' order backlogs have increased steadily in the present expansion, recently reaching a 13-year high despite a steady uptrend in shipments. While record backlogs of 1953 still stand, the composition of present backlogs is considerably different from either of the two previous major expansions. For one thing, in 1953 backlogs for transportation equipment represented a larger component of the total, both in dollar and percentage terms, than is the case currently. In addition, electrical machinery and nonelectrical machinery currently account for about one-third of total order backlogs, compared with the previous record of 26 percent set in late 1953. Finally, backlogs in steel products have declined to 5 percent of the total, in contrast to highs of 10 percent and 12 percent during 1953 and 1956, respectively.

ECONOMIC REVIEW

Rising backlogs imply one kind of resource pressure, namely, tightened supply conditions. This is verified by the behavior of two series on purchasing policies—commitments, as reported in surveys by the National Association of Purchasing Agents, and vendor performance, as reported by the Chicago Purchasing Agents Association—which are also shown in Chart 3. It is apparent from these series that purchasing agents have been encountering supply conditions reminiscent of the early and mid-1950's. In contrast to behavior in the present expansion, both of these series moved up sharply in the early phases of the 1949-53 and 1954-57 expansions; supply pressures in the present expansion have built up in the more recent stages. The situation appears to be particularly acute in the case of vendor performance, where extended deliveries have moved beyond the peak level during the 1954-57 expansion, and are close to the situation experienced in late 1950, when the greatest percentage of purchasing agents reported commitments over 60 days.

UTILIZATION OF PLANT CAPACITY

Additional pressures on resources show up in utilization of manufacturers' plant capacity. For most of this expansion—from early 1961 through 1964—the utilization rate was relatively stable, ranging from an estimated 85 to 88 percent of capacity. Thereafter, operating rates moved up gradually despite large additions to plant capacity, so that recently manufacturers have been producing at an estimated 92 percent of capacity, the highest rate in more than a decade.

The behavior of operating rates during the two previous expansions differed from the

present expansion. In the 1954-57 expansion, operating rates moved quickly and sharply in the early stages into the 90-92 percent range (from the second quarter of 1955 through the first quarter of 1956). Operating rates then began to recede equally quickly, five quarters before the expansion peak in July 1957.

Similar to the 1954-57 expansion, operating rates rose quickly and sharply in the early stages of the 1949-53 expansion, reaching a high of an estimated 93 percent by the fourth quarter of 1950. As the pressures of speculative buying waned, operating rates receded, but then again increased, hitting 96 percent during the first half of 1953, a record that still stands.

CONCLUDING COMMENTS

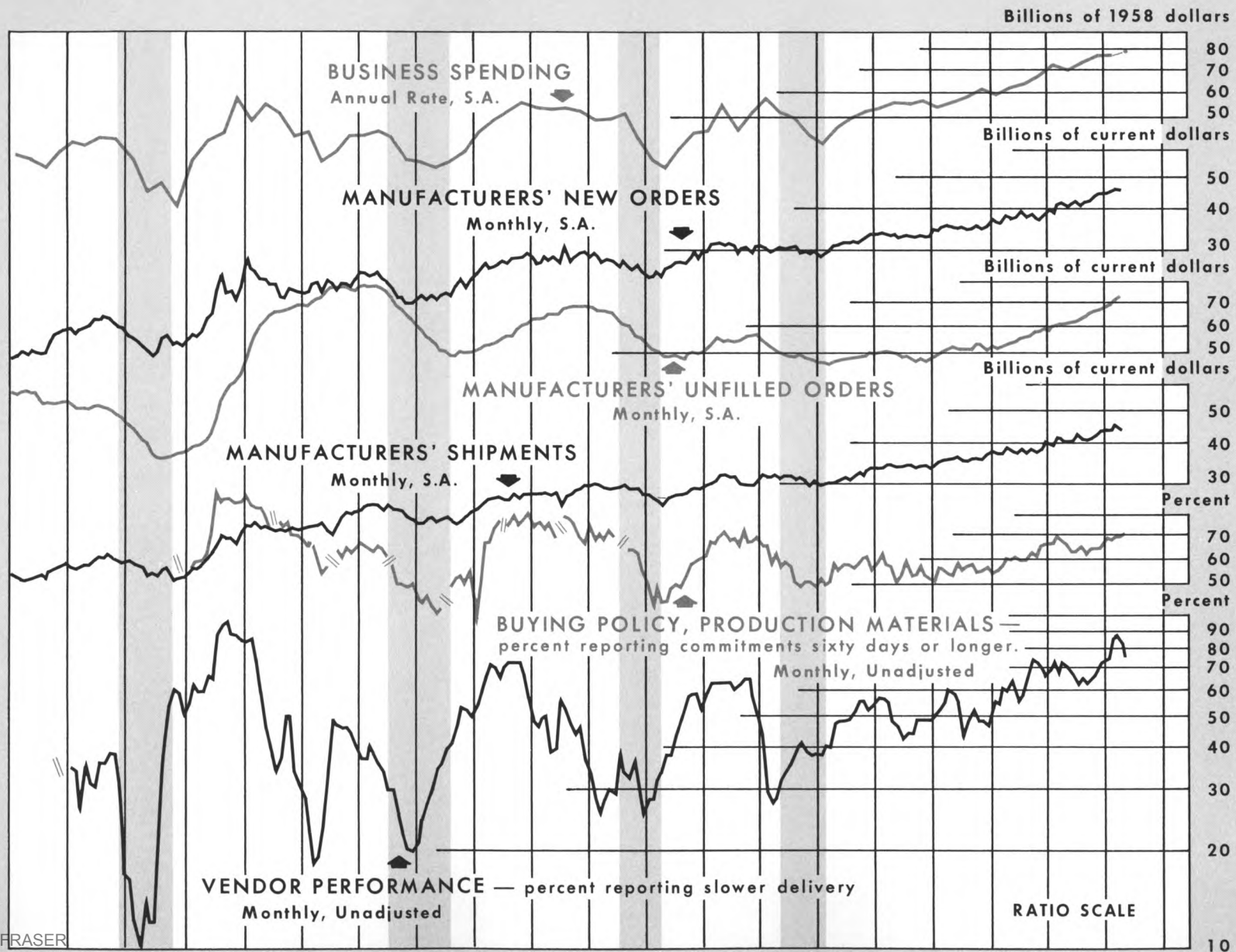
The discussion in the preceding section provides some indication of how the rise in business spending, coupled with other demand factors, has been reflected in pressures on resources.⁵

Although the pace of the economy has shown some tendency to moderate, business spending continues to rise. The contribution of business spending to changes in GNP thus far in 1966—in dollar terms and percentages—has been less than during many quarters in major expansions, as well as less than that of Federal spending.

Nevertheless, business spending is playing

⁵ On the strategically important matter of pressure on human resources, the tightening labor market (with its own repercussions on the economy) is worthy of separate treatment, and will be discussed in the August issue of the *Economic Review*. The price situation, which also warrants separate treatment, was discussed in detail in an earlier article. See "Prices: Patterns and Expectations," *Economic Review*, Federal Reserve Bank of Cleveland, Cleveland, Ohio, April 1966.

SELECTED BUSINESS SERIES and PRESSURES on the ECONOMY



BUSINESS SPENDING AND OTHER GROSS NATIONAL PRODUCT COMPONENTS DURING THREE EXPANSIONS
(billions of 1958 dollars)

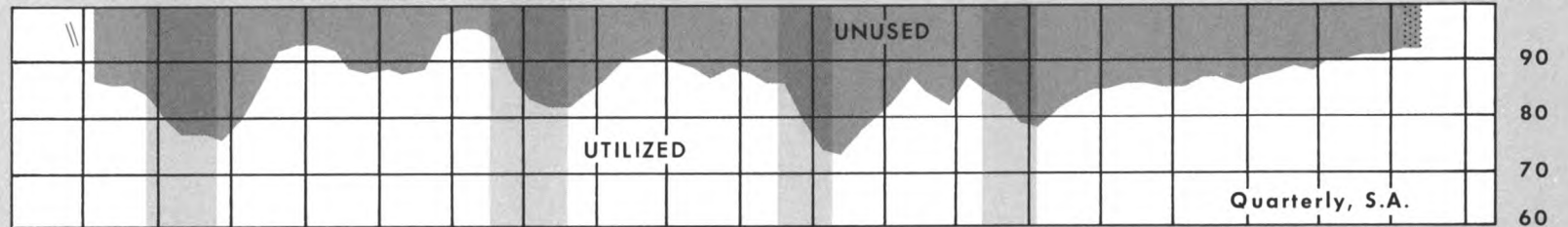
	1949-53				1954-57				1961-66							
	1949				1954				1961							
	4 Q	1 Q	2 Q	3 Q	3 Q	4 Q	1 Q	2 Q	3 Q	4 Q	1 Q	2 Q	3 Q	4 Q		
Total Gross National Product	\$323.3	\$339.6	\$348.5	\$362.8	\$370.1	\$374.8	\$381.5	\$388.7	\$388.7	\$391.4	\$389.6	\$393.9	\$405.3	\$412.1	\$416.4	\$413.7
Nonresidential Fixed Investment	32.7	33.6	36.5	39.9	40.0	38.8	39.8	40.3	39.4	39.5	39.6	35.7	38.4	40.4	40.4	41.1
Structures	11.3	11.9	12.3	13.0	13.6	13.8	14.4	14.4	13.7	13.6	13.6	13.6	14.0	14.5	14.9	15.0
Producers' Durable Equipment	21.4	21.7	24.2	26.9	26.4	25.0	25.4	26.0	25.7	26.0	26.1	22.1	24.3	25.9	25.5	26.1
Change in Nonfarm Inventories	-6.0	3.2	5.4	5.0	16.4	9.7	15.1	10.6	4.3	4.8	-3.2	3.5	5.1	3.5	4.4	1.7
Total Business Spending	26.7	36.8	41.9	44.9	56.4	48.5	54.9	50.9	43.7	44.3	36.4	39.2	43.5	43.9	44.8	42.8
Federal Government Spending	27.1	26.2	23.8	24.0	27.0	36.6	43.9	51.8	57.5	59.8	63.1	66.6	65.6	68.4	70.7	70.0
As Percent of Gross National Product																
Nonresidential Fixed Investment	10.1%	9.9%	10.5%	11.0%	10.8%	10.4%	10.4%	10.4%	10.1%	10.1%	10.2%	9.1%	9.5%	9.8%	9.7%	9.9%
Structures	3.5	3.5	3.5	3.6	3.7	3.7	3.8	3.7	3.5	3.5	3.5	3.5	3.5	3.5	3.6	3.6
Producers' Durable Equipment	6.6	6.4	6.9	7.4	7.1	6.7	6.7	6.7	6.6	6.6	6.7	5.6	6.0	6.3	6.1	6.3
Change in Nonfarm Inventories	-1.9	0.9	1.5	1.4	4.4	2.6	4.0	2.7	1.1	1.2	-0.8	0.9	1.3	0.8	1.1	0.4
Total Business Spending	8.3	10.8	12.0	12.4	15.2	12.9	14.4	13.1	11.2	11.3	9.3	10.0	10.7	10.7	10.8	10.3
Federal Government Spending	8.4	7.7	6.8	6.6	7.3	9.8	11.5	13.3	14.8	15.3	16.2	16.9	16.2	16.6	17.0	16.9
Quarterly Change in GNP	\$-2.8	\$ 16.3	\$ 8.9	\$ 14.3	\$ 7.3	\$ 4.7	\$ 6.7	\$ 7.2	\$ 0	\$ 2.7	\$-1.8	\$ 4.3	\$11.4	\$ 6.8	\$ 4.3	\$-2.7
Nonresidential Fixed Investment	-0.7	0.9	2.9	3.4	0.1	-1.2	1.0	0.5	-0.9	0.1	0.1	-3.9	2.7	2.0	0	0.7
Structures	-0.3	0.6	0.4	0.7	0.6	0.2	0.6	0	-0.7	-0.1	0	0	0.4	0.5	0.4	0.1
Producers' Durable Equipment	-0.4	0.3	2.5	2.7	-0.5	-1.4	0.4	0.6	-0.3	0.3	0.1	-4.0	2.2	1.6	-0.4	0.6
Change in Nonfarm Inventories*	-4.5	9.2	2.2	-0.4	11.4	-6.7	5.4	-4.5	-6.3	0.5	-8.0	6.7	1.6	-1.6	0.9	-2.7
Total Business Spending	-5.2	10.1	5.1	3.0	11.5	-7.9	6.4	-4.0	-7.2	0.6	-7.9	2.8	4.3	0.4	0.9	-2.0
Federal Government Spending	-1.0	-0.9	-2.4	0.2	3.0	9.6	7.3	7.9	5.7	2.3	3.3	3.5	-1.0	2.8	2.3	-0.7
As Percent of Change in GNP																
Nonresidential Fixed Investment	25.0%	5.5%	32.6%	23.8%	1.4%	-25.5%	14.9%	6.9%	0	3.7%	-5.6%	-90.7%	23.7%	29.4%	0%	-25.9%
Structures	10.7	3.7	4.5	4.9	8.2	4.3	9.0	0	0	-3.7	0	0	3.5	7.4	9.3	-3.7
Producers' Durable Equipment	14.3	1.8	28.1	18.9	-6.8	-29.8	6.0	8.3	0	11.1	-5.6	-93.0	19.3	23.5	-9.3	-22.2
Change in Nonfarm Inventories*	160.7	56.4	24.7	-2.8	156.2	-142.6	80.6	-62.5	0	18.5	444.4	155.8	14.0	-23.5	20.9	100.0
Total Business Spending	185.7	62.0	57.3	21.0	157.5	-168.1	95.5	-55.6	0	22.2	438.9	65.1	37.7	5.9	20.9	74.1
Federal Government Spending	35.7	-5.5	-27.0	1.4	41.1	204.3	109.0	109.7	0	85.2	-183.3	81.4	-8.8	41.2	53.5	25.9

* Second difference.
† Estimated.
NOTE: Figures not necessarily additive due to rounding.
Sources: U. S. Department of Commerce and Federal Reserve Bank of Cleveland

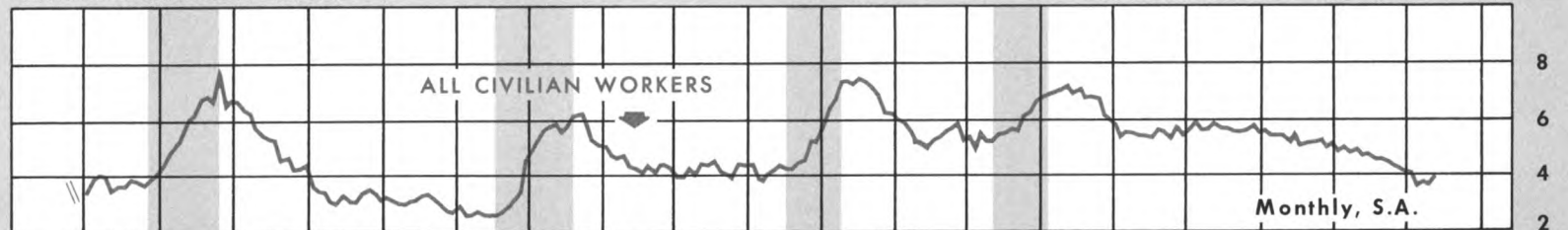
RATIO of MANUFACTURERS' SHIPMENTS to UNFULFILLED ORDERS



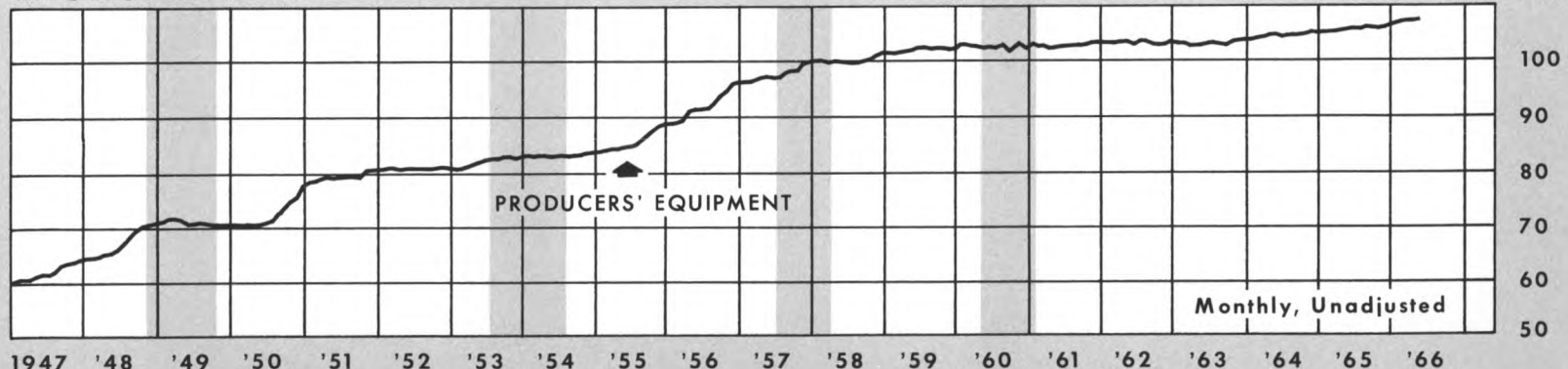
UTILIZATION of MANUFACTURING CAPACITY



UNEMPLOYMENT RATE



WHOLESALE PRICES



∥ Data not available

Sources of data: U.S. Department of Commerce; National Association of Purchasing Agents; Chicago Purchasing Agents Association; Board of Governors of the Federal Reserve System; U.S. Department of Labor, estimates by Federal Reserve Bank of Cleveland

a very large role in the continued advance of the economy. The dollar magnitudes and growth rates (constant dollars) of business spending over the entire expansion have surpassed those of previous expansion periods; its share of GNP has reached the level achieved during the record 1955-57 business spending boom, and has been maintained for a

longer period than during the 1949-53 expansion. Perhaps more important, business spending is rising concurrently with increases in Federal Government spending, at a time when the margin of unused resources has narrowed. Thus, the central problem of maintaining sustained and balanced economic growth, in real terms, remains.



A NOTE ON CORPORATE PROFITS

Against the background of the longest peacetime expansion in the nation's history, the advance in corporate profits has attracted considerable attention. This was underscored in May when it was announced that corporate profits before taxes rose to another record in the first quarter of 1966—\$78.3 billion at a seasonally adjusted annual rate—and after-tax profits (\$48.4 billion) were up 11 percent from a year earlier, also to a record level.

Corporate profits could not have advanced in recent years without continued economic expansion—and vice versa. Nonetheless, without arguing the "whys" and the "hows", the durability and magnitude of corporate profits are particularly impressive when compared with previous postwar experience, which is done in Chart 1.¹ As the chart shows, in previous periods of economic expansion, corporate profits usually increased rapidly for five or six quarters and then levelled or turned down. In the current expansion, there

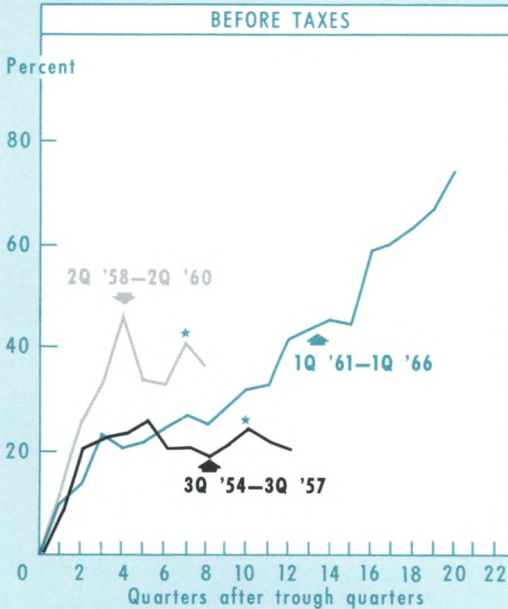
have been at least three distinct phases of profit behavior. In the first phase, corporate profits moved up at a rapid rate for about a year; and in the second phase, they advanced moderately for another year; and in the third phase, beginning in early 1963, profits increased in a stair-step pattern, but at a faster pace than in the second phase (see chart). The renewed vigor of corporate profits during the advanced stages of the current expansion is indeed the major characteristic that distinguishes the behavior of corporate profits from the experience of earlier expansions.

With corporate profits occupying a place of prominence in the economic scene, it may be interesting at this juncture to examine some of the patterns associated with the profits statistics in recent years—again, without belaboring the whys and hows. Specifically, this article is concerned with the behavior of total profits during 1954-65 and the profits patterns of the five broad industry groups which, when combined, make up the total. The groups are: (1) durable goods, (2) non-durable goods, (3) transportation, communications, and public utilities, (4) financial institutions, and (5) all other industries. (The fifth group is a miscellaneous category that covers trade, mining, services, construction, and agriculture.)

¹ The three periods of economic expansion used for comparison are: August 1954-July 1957 (35 months); April 1958-May 1960 (25 months); and February 1961 to the present. The first two expansions of the postwar period, one beginning in 1945 and the other in 1949, have been excluded because of the influences of World War II and the Korean involvement. Data for the present expansion are taken through the first quarter of 1966, although the expansion is already (July) in its 65th month.

1. **CORPORATE PROFITS
in THREE EXPANSIONS**

Percent Increase from Trough Quarter



* Secondary peaks reflect in part aftermath of steel strikes in 1956 and 1959.

Source of data: U.S. Department of Commerce

**CORPORATE PROFITS BY
INDUSTRY GROUPS (ANNUAL)**

The breakdown in Table I shows the relative importance of before-tax corporate profits² in each year from 1954 through 1965 for each of the five industry groups. As the table shows, there was little difference in the shares accounted for by each group at the beginning and end of the period, although a number of year-to-year shifts did take place. As a general matter, year-to-year changes in the shares of each group were comparatively

² The profits figures used in this article are "before-tax but after adjustment for inventory valuation."

moderate with the exception of durable goods. Durables also provided the largest spread (7.9 percentage points) between the highest and lowest shares of the total (1955 and 1958). The next widest spread was that of 5 percentage points (1955 and 1960) for financial institutions. The high-low spread of other groups during 1954-65 ranged between 2 and 4 percentage points, with the most stable share that of the "all other industries" group.

In all but three years the durable goods group accounted for the largest share of total corporate profits. However, following a sharp drop in relative importance in 1958, the durables group did not regain its pre-1958 share until 1965. Since capacity utilization rates have an important bearing on profits performance, substantial excess capacity in the durable goods sector in the late 1950's and early 1960's was doubtless a major factor in that turn of events. That is to say, following modernization and vigorous expansion of productive facilities, especially during 1954-57, demand failed to keep pace with increased capacity, so that a considerable gap developed between production and capacity in the durable goods sector beginning in 1958.³ As a result, demand for new plant and equipment, which accounts for a large segment of durable goods output, was correspondingly moderate. With operations at considerably less than capacity, it is not surprising that the share of total profits accounted for by the durable goods sector was depressed until well into the current expansion period.

³ See Peter Gajewski, "Manufacturing Capacity Measures and Current Economic Analysis," *American Statistical Association, 1964 Proceedings*, p. 475.

ECONOMIC REVIEW

TABLE I

Percentage Distribution of Before-Tax Corporate Profits by Industry Groups

Year	Total Profits (in billions)	Financial Institutions	Durable Goods	Nondurable Goods	Transportation, Communications, and Utilities	All Other
1954	\$38.0	12.6%	27.6%	24.7%	12.4%	22.6%
1955	46.9	10.4	30.5	25.2	11.9	21.7
1956	46.1	11.3	27.8	25.8	12.8	22.5
1957	45.6	12.1	29.2	23.5	12.7	22.6
1958	41.1	14.3	22.6	24.3	14.4	24.3
1959	51.7	13.7	26.3	24.6	13.5	21.9
1960	49.9	15.4	24.0	24.8	15.0	20.5
1961	50.3	15.3	22.7	23.7	15.7	22.7
1962	55.7	14.5	24.5	22.4	15.3	22.3
1963	58.1	12.9	26.5	22.7	15.8	21.9
1964	64.5	12.4	26.7	23.1	15.5	22.2
1965	73.1	12.2	28.3	23.0	14.8	21.7

Source: U. S. Department of Commerce

Year-to-year changes in the gap between production and capacity in the nondurable goods group were more moderate than in durables. (The lowest rate of capacity utilization for this group since 1954 was 84 percent in 1958.) Consequently, nondurable profits as a share of total profits fluctuated within more narrow limits during 1954-65 than did those of the durable goods sector.

CORPORATE PROFITS BY INDUSTRY GROUPS (Quarterly Changes)

Quarterly changes⁴ for each industry group and for total profits during 1954-65 are shown in Chart 2. (The direction and degree of change in total profits are the net of changes in the profits of all industry groups, implicitly weighted for the influence of each group.) As the chart shows, changes in profits of the five industry groups and changes in total

profits varied widely from quarter to quarter, with profits of all of the five industry groups infrequently moving together in the same direction. During 1954-65, there were only seven quarters out of 48 in which profits of all groups changed in the same direction; all groups increased in six quarters, and all decreased in one quarter.

As the following figures show, durable goods profits and total profits moved together most often, which is not surprising in view of the relative dominance of the durable goods sector in the total. Durable and nondurable

Industry Group	Percent of Quarters during 1954-65 that Total and Industry Group Profits Moved Together
Durable goods	88%
Nondurable goods	73
Transportation, communications, and utilities	69
All other	58
Financial institutions	48

profits moved in the same direction in 34 quarters, and durables moved synchronously with the transportation, communications, and

⁴ Quarterly data are more limited in coverage than annual data, and should be interpreted with caution.

utilities group in 31 quarters. All three moved together in 23 quarters. Thus, about half the time, the profits of groups accounting for between one-half and two-thirds of total profits (see percentages in Table I) changed in the same direction.

In only one instance were durable goods profits solely responsible for the direction of change in total profits, namely, in the fourth quarter of 1956 when profits of the durable goods sector increased 14.8 percent and total profits increased 1.8 percent. As the chart shows, profits of all other groups decreased in that quarter. In part, that particular rise in profits of durables reflected the "catching-up" after the steel strike in the summer of 1956.

The only other instance of one group determining the direction of change in total profits was in the third quarter of 1954. In that quarter, profits of the "all other industries" group moved up 26.7 percent, those of the other four groups decreased or remained unchanged, and total profits experienced a 4.4 percent gain.

CORPORATE PROFITS BY INDUSTRY GROUPS (Swings and Growth)

The major influence of durable goods profits on total profits is indicated in Chart 3. Accordingly, swings in total profits—including changes in magnitude—tend to be more closely associated with swings in the profits of the durable goods sector than of any other sector. For example, during the period under review, swings in durable goods profits included increases as large as 106 percent from the first quarter of 1958 to the second quarter of 1959 and 144 percent from the

first quarter of 1961 through the fourth quarter of 1965. Corresponding swings in total profits during the same time periods amounted to increases of 52 percent and 67 percent, respectively. (The advance in durables profits has obviously been a major factor in the durability and magnitude of total profits during the current expansion.) Declines in profits of the durable goods group of 46 percent from the fourth quarter of 1955 to the first quarter of 1958 and of 47 percent from the second quarter of 1959 to the first quarter of 1961 were accompanied by declines in corporate profits of 24 percent and 19 percent, respectively.

Swings in nondurable goods profits during 1954-65 were more moderate than those of durables, ranging from rises of 44 percent and 52 percent to declines of 29 percent and 12 percent. Of the nonmanufacturing groups, the "all other industries" group experienced the greatest relative declines (20 percent to 25 percent), with increases usually less than for those for the transportation, communications, and utilities group and approximately the same as for the financial institutions group. Profits of the latter two groups experienced the smallest downward movement and showed the most stable patterns of growth, which help explain the increases in their shares of total profits during periods of recession.

The average annual percentage increases in profits of the various groups during 1954-65, as shown below, reveal that the highest figure belongs to one of the more stable groups—transportation, communications, and utilities—while the second highest belongs to the most volatile group—durable goods.

Average Annual Percentage Increases in Corporate Profits
1954-65

Total profits	7.7%
Durable goods	8.1
Nondurable goods	6.6
Transportation, communications, and utilities	10.8
Financial institutions	7.1
All other	7.1

These rates of growth indicate that the growth path of profits is not as important as the degree to which profit declines in recessions are more than compensated for by increases during expansions.

Estimates of the contribution of each of the

five industry groups to the growth of total profits can be computed by weighting the average annual percentage increase of each industry group by its average share of total profits during 1954-65 (from Table I), as shown in Table II.

As the figures show, the product sum of the contributions of the industry groups equals the 7.7 percent average annual increase of total profits. The largest contribution came from the durable goods group, which accounted for the largest average share (Column

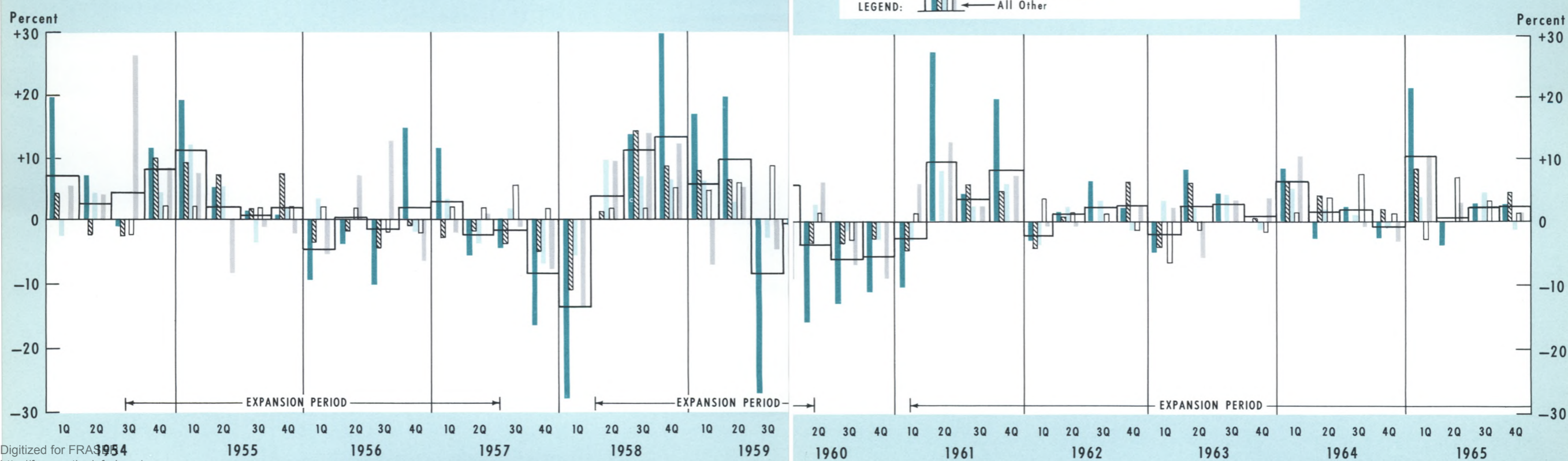
1) but only the second largest average annual percentage increase (Column 2). Another combination of share and growth shows that the nondurables group, which ranked second in average share but fifth in average annual percentage increase, made the second largest contribution to total profit growth. "All other industries," which ranked third in size of average share and third (the same as financial institutions) in average annual percentage increase, followed closely behind. Due mainly to a high rate of average annual percentage increase, the contribution to the

total of the transportation, communications, and utilities group was close to that of the nondurable goods and "all other industries" groups.

Finally, the share of annual profit growth accounted for by each industry group was considerably different from the average share of total profits during 1954-65 in the case of only two groups: the transportation, communications, and utilities group, which was higher; and nondurables, which was lower. (See figures in Columns 1 and 4 of Table II.)

2. CORPORATE PROFITS BEFORE TAXES by INDUSTRY GROUPS

Quarter-to-quarter Percent Changes

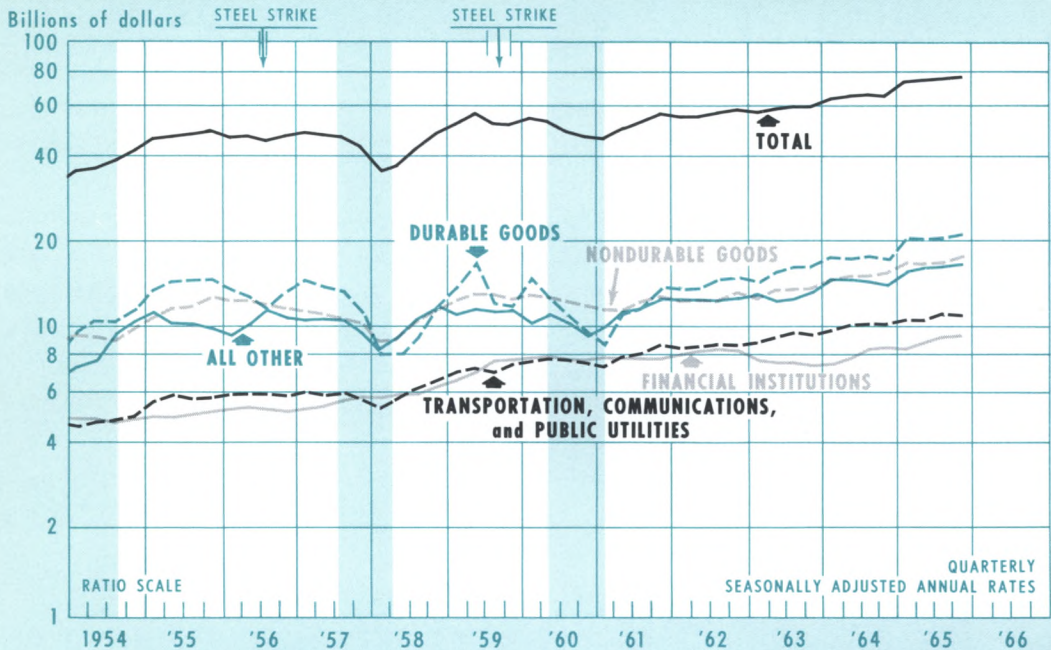


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Source of data: U.S. Department of Commerce
Federal Reserve Bank of St. Louis

ECONOMIC REVIEW

3.

CORPORATE PROFITS BEFORE TAXES by INDUSTRY GROUPS



NOTE: White area denotes expansion periods.

Source of data: U.S. Department of Commerce

TABLE II

Contribution of Industry Groups to Total Profits, 1954-65

Industry Group	Average Share of Total Profits 1954-65		Average Annual Percentage Increase 1954-65		Weighted Contribution to Annual Average Profit Growth 1954-65	Share of Annual Average Profit Growth 1954-65
Durable goods	27%	X	8.1%	=	2.18%	28.1%
Nondurable goods	24	X	6.6	=	1.58	20.4
Transportation, communications, and utilities	14	X	10.8	=	1.51	19.5
Financial institutions	13	X	7.1	=	0.92	11.9
All other	22	X	7.1	=	1.56	20.1
Total Profits					7.75%	100.0%

Source: U. S. Department of Commerce



RECENT TRENDS IN THE PAPER INDUSTRY

The paper and allied products industry of the United States is larger than that of any other nation in the world. Measured in terms of paper and board production, the U. S. output of 43.3 million tons in 1965 was well in excess of the combined annual production of Canada, Japan, the United Kingdom, and the U.S.S.R., the next four nations in order of production.¹

As one of the nation's ten major nondurable industries, the paper and board industry during 1964 ranked sixth in terms of employment, fifth in value added by manufacture, and third in capital expenditures for new plant and equipment (see Table I). It took nearly 600,000 persons working in some 3,000 plants at an annual payroll cost of about \$4 billion to produce the 43.3 million tons of domestic paper and board output in 1965. Aside from being the world's largest producer of paper and board, the U. S. consumes 50 percent more paper per capita than Sweden, the second largest consuming nation in per capita terms.

The paper and board group is the largest of the wood-using industries.² Annual shipments

of the industry, in dollar terms, are nearly twice as large as the "lumber and products" industry and three times as large as the "furniture and fixtures" industry.

The paper and board industry is also of large and growing significance in the Fourth Federal Reserve District, as will be discussed in a future article.

PRODUCTION OF PAPER AND BOARD

Output of the "paper and products" industry, as measured in the Index of Industrial Production, expanded rapidly in the past decade, increasing 53 percent from 1955 to 1965. More than half, or 32 percentage points, of that increase occurred during the most recent five years. The only other nondurable industry groups experiencing a greater rate of growth from 1960 to 1965 were the "rubber and plastics products" and the "chemicals and products" industries.

The course of production in the "paper and products" industry has generally paralleled that of total industrial production during the past decade, with the two output measures in particularly close step since 1962 (see Chart 1). Interestingly, around recession periods, changes in the production path of the paper and products group have tended to precede those for total industrial production. Thus, as shown in the chart, paper production turned down considerably before industrial production in the recessions of 1957-58 and 1960-61. (A similar relationship prevailed in the 1953-54 recession, which is not shown on the chart.)

¹ In addition to being the largest producer of paper and allied products in the world, the U. S. produced 33 million tons of wood pulp in 1965, or more than the combined yearly output of the pulp mills in Canada, Sweden, Finland, and Japan, the four countries that rank next in order of output.

² For a discussion of the lumber and products industries, see "Recent Trends in the Wood-Using Industries," *Economic Review*, Federal Reserve Bank of Cleveland, Cleveland, Ohio, May 1965.

ECONOMIC REVIEW

TABLE I
Paper and Allied Products Compared With
Other Nondurable Goods Industries—1964
(In Millions)

Industry Rank	Employment		Value Added by Manufacture	Capital Expenditures
1	Food and kindred products	1.6	Food	Chemicals \$1,876
2	Apparel and related products	1.3	Chemicals	Food 1,419
3	Printing and publishing	0.9	Printing	Paper 886
4	Textile mill products	0.9	Apparel	Textiles 492
5	Chemicals and allied products	0.7	Paper 7,805	Printing 463
6	Paper and allied products	0.6	Textiles 6,736	Petroleum 412
7	Rubber and plastics products	0.4	Rubber 4,984	Rubber 400
8	Leather and leather products	0.3	Petroleum 3,774	Apparel 124
9	Petroleum and coal products	0.1	Leather 2,270	Tobacco 59
10	Tobacco manufactures	0.08	Tobacco 1,772	Leather 38

Source: 1964 Annual Survey of Manufacturing, U. S. Department of Commerce

Although the various products within the broad paper group have shared rather generally in the production growth of recent years, advances in particular lines have been far from uniform. Thus, the production of wood pulp expanded by nearly 60 percent from 1955 through 1965 (due, in considerable part, to an increase in exports after 1958), while at the other extreme, output of "building paper and board" rose by only about 20 percent over the same interval. The extent of such variations is shown in Table II (see column 3). In addition to showing differences in growth rates among the various paper and paper product lines, Table II also indicates the relative importance of the various lines, as measured by the composition of the "paper and products" component of the Index of Industrial Production. (See column 1 of Table II, where the "weights" of the various paper lines appear in the form of the 1957-59 proportion of the total index.) Thus, for example, "fine paper" accounts for only 0.17 percent of the total Index of Industrial Production,

while "boxes, etc." (as a subdivision of "converted paper products") accounts for 0.72 percent of the Index.

Some of the factors influencing the varying rates of output growth are mentioned below in connection with the discussion of consumption of paper and board, by types.

CONSUMPTION OF PAPER AND BOARD BY TYPES

Paper and paperboard are used for a multitude of purposes in the everyday life of the American consumer. In general, paper and paperboard may be considered as serving four broad functions—as a carrier of written communications, as protection and packaging for many forms of goods, as a construction material, and as an indispensable element in modern hygiene and sanitation.

The growth of paper and board consumption has outpaced that of the total U. S. population, with per capita consumption increasing nearly 19 percent during the period 1955 to 1965. Changes in per capita consumption,

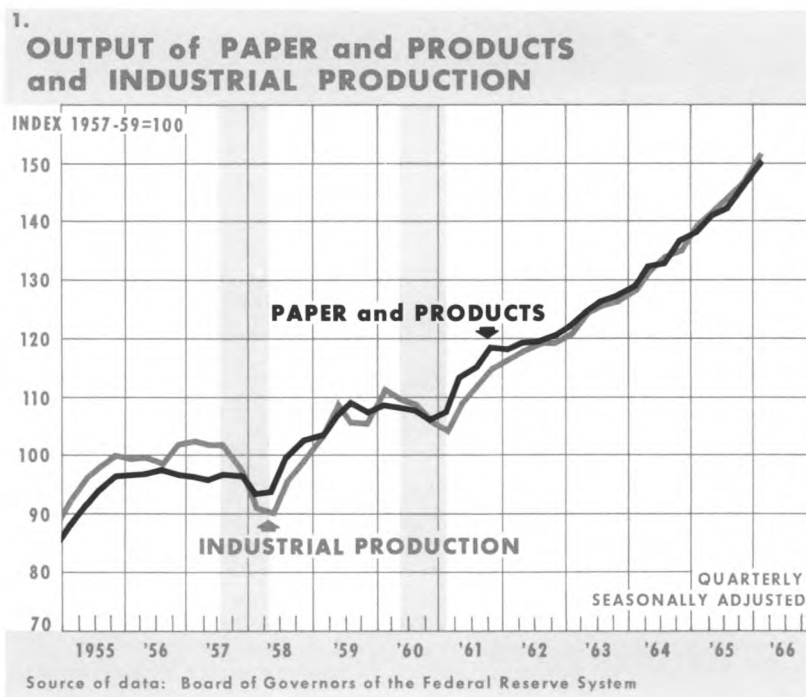


TABLE II
"Paper and Products" as Components
of Industrial Production

	1957-59 Proportion of Total	1965 Index (1957-59 = 100)	Percent Change 1955 to 1965
Paper and products	3.43%	141.8	+53.3%
Pulp and paper	1.71	138.8	+48.6
Wood pulp	0.18	147.9	+59.4
Paper and board	1.53	137.7	+47.4
Paper	0.88	137.4	+49.7
Printing paper	(0.26)	143.2	+55.0
Fine paper	(0.17)	151.1	+67.3
Coarse paper	(0.20)	122.4	+23.1
Miscellaneous paper	(0.25)	134.6	+56.3
Paperboard	0.52	141.3	+50.6
Building paper and board	0.13	125.0	+20.9
Converted paper products	1.72	145.8	+59.1
Shipping containers	0.42	147.0	+55.5
Boxes, etc.	0.72	*	*
Sanitary paper products	0.13	148.6	+79.2
Food containers, etc.	0.45	*	*
Total Index of Industrial Production	100.00%	143.3	+48.3%

* Included in combined indexes but not published separately.

Source: Index of Industrial Production, Board of Governors of the Federal Reserve System

ECONOMIC REVIEW

as well as in domestic production of the different types of paper, reflect the growth in the various functions served by paper and paperboard (see Table III).

Paper for Communication. A major use of paper is for communication. The three types of paper most extensively used for this purpose are newsprint, printing paper, and fine paper. Per capita consumption of these three types of paper totaled 167 pounds in 1965, or 17 percent more than in 1955, and equal to about one-third of total per capita consumption of all paper and board (see Table III). Newsprint registered the slowest rate of growth during 1955-65, but continued

to represent the largest single use of paper. Domestic production of that type of paper, however, did not make up a corresponding proportion of the total domestic output of paper because newsprint imports accounted for 75 percent of estimated consumption in 1965.

Printing papers, which ranked next in order of the papers used for communications, registered a gain in consumption during 1955-65 about equal to that of all paper and board, although consumption of coated printing papers more than doubled. The marked expansion in coated printing papers, used commonly in magazines, was partially offset by slower expansion in uncoated groundwood and bookprinting papers.

Fine paper, which is widely used in business, educational institutions, and government agencies, registered the sharpest increase in consumption of the papers commonly used in communications. Marked increases occurred in the use of writing paper made from chemical pulps (as distinct from rag-pulp writing paper) cover paper, text paper, colored school paper, and thin paper. Thin paper was the only one of the fine papers to register as much as a doubling in consumption during the ten-year interval, reflecting in part the practice of using multiple copies for many types of forms and communications.

Paper for Protection and Packaging. One of the major uses of paper, is for protection and packaging of all forms of goods. "Coarse and industrial papers" include most wrapping paper, shipping sack paper, bag paper, and grease and waterproof papers. The comparatively modest increase in consumption of coarse and industrial papers during the ten-

TABLE III
Consumption of Major Types of
Paper and Board

	1965	1965	
	Consumption	Per Capita Consumption	
	Million tons	Pounds	Percent change from 1955
Total paper and board	48.4	499.7	+18.6%
Total paper	24.8	255.9	+19.1
Sanitary and tissue	3.0	30.8	+44.6
Fine paper	2.1	22.3	+31.2
Printing paper	5.5	56.4	+18.5
Coarse and industrial	5.6	58.0	+13.1
Newsprint	8.6	88.5	+12.6
Total paperboard	19.7	203.2	+21.5
Special food board	1.9	19.3	+37.9
Container board	11.0	113.6	+27.5
Folding boxboard	3.7	38.2	+17.2
Nonbinding and other	3.1	32.2	+ 4.5
Total building paper and board	3.9	40.5	+ 3.1
Building board	2.4	24.9	+23.8
Building paper	1.5	15.6	-21.4

Source: *Pulp, Paper and Board Supply, Demand Report of Committee on Interstate and Foreign Commerce, 88th Congress, House Report #693, August 1963; U. S. Industrial Outlook 1966, U. S. Department of Commerce, December 1965*

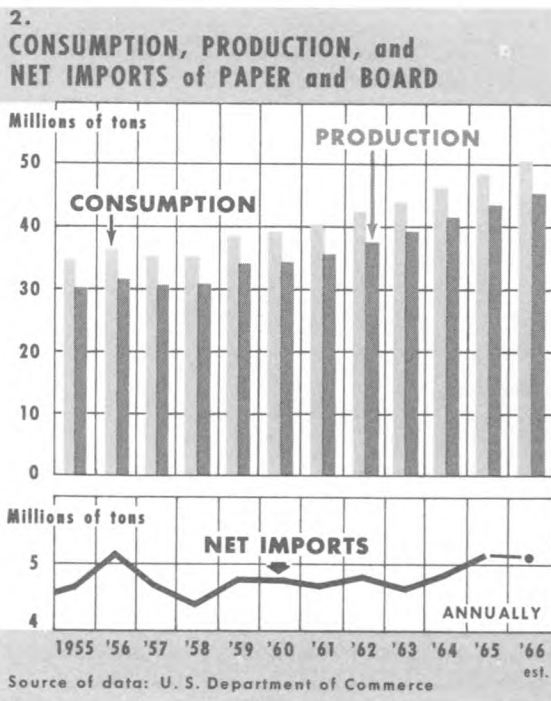
year interval (13.1 percent) probably reflects the influence of competitive materials such as plastics. Also, there is some evidence that bulk handling of such items as sugar, flour, feed, and fertilizer, especially at the wholesale or processing levels, has increased as materials handling processes have become more highly mechanized.

Container board represents the largest classification of paperboard. This type of paperboard did not experience as sharp a rate of growth in consumption during 1955-65 as did special food board (27.5 percent versus 37.9 percent). The combined growth of per capita consumption of these two paperboards over the ten-year period was the principal factor pushing the rate of expansion of consumption of all paperboard moderately above that for all paper and board.

The combined per capita consumption of the paper and paperboard used in all forms of protection and packaging amounted to 261 pounds per capita in 1965, or 20 percent more than ten years earlier, and equal to more than one-half of all paper and board consumed per capita.

Paper for Construction. The two principal forms of paper used in construction are building board and building paper. Together they accounted in 1965 for 40.5 pounds per capita, 3 percent more than in 1955 and less than 10 percent of total per capita consumption of paper and board.

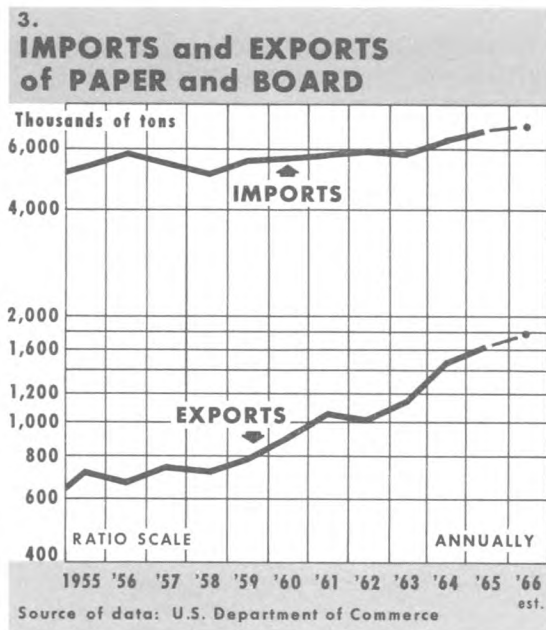
Consumption per capita of building board increased by about one-fourth over the ten-year period. In contrast, consumption of building paper on a per capita basis declined by about one-fifth. The decline in use of building paper, the only major type of paper ex-



periencing a decline in per capita use from 1955 to 1965, reflects the fact that paperboard and other similar insulating materials, which can be applied with less labor, have replaced building paper to an increasing degree in recent years.

Paper for Sanitation. The uses of paper for sanitary purposes have multiplied in recent years with the result that per capita consumption of sanitary and tissue paper of 30.8 pounds in 1965 was 45 percent more than in 1955 (see Table III). A doubling of consumption of paper toweling and a comparatively sharp expansion in the use of facial tissue were included in this showing. Even with such increases, per capita consumption of paper for sanitation represented only about 6 percent of total per capita consumption of paper and board in 1965.

ECONOMIC REVIEW



IMPORT-EXPORT RELATIONSHIPS

As shown in Chart 2, domestic consumption of paper and board has exceeded domestic production in each year—and by a fairly steady amount. The difference between consumption and production has been satisfied by net imports ranging between 4½ and 5 million tons per year (see Chart 2). The stability of the net import balance, in terms of tonnage, conceals the fact that exports of paper and board have more than doubled in the past ten years. Reflecting a smaller starting base, exports have actually expanded more rapidly than imports (see Chart 3, where the use of a ratio scale permits a comparison of relative increases). Container board and kraft paper make up a large part of the export total; such products are widely used in converting plants in other countries. Although still relatively small in relation to U. S. output of paper and board, exports as a

percent of production rose from 2.4 percent in 1955 to 3.75 percent in 1965. If recent trends prevail, exports may equal 4 percent of total production during 1966.

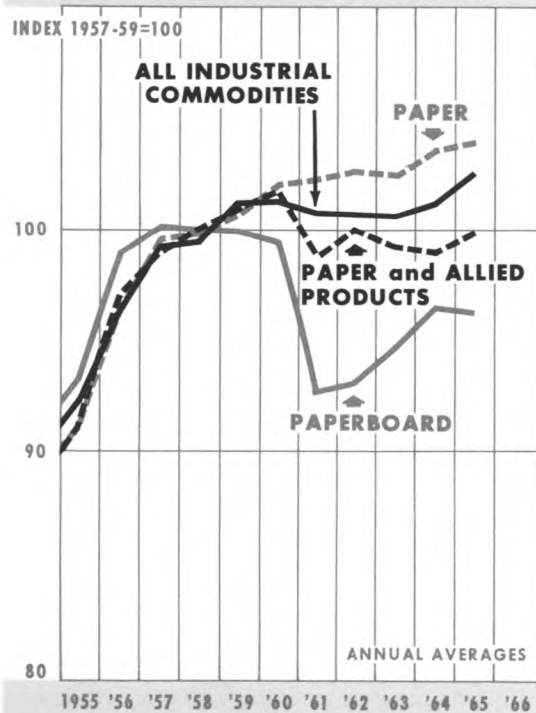
Exports of wood pulp have also more than doubled since 1955, rising from 631,000 tons to about 1.4 million tons in 1965. Exports of pulp, paper, and paperboard now go to some 120 countries, and the long-range possibilities for export expansion are considered to be virtually unlimited if per capita consumption of paper in those nations expands as world living standards rise. Present world paper consumption of about 70 pounds per capita is less than a third of the per capita consumption of such countries as United Kingdom and Denmark. The long-term outlook for pulp and paper exports is, therefore, considered favorable even though the international market is highly competitive. Rapidly rising raw material and labor costs in other exporting countries are expected to help U. S. producers of pulp, paper, and board remain competitive.

Paper and board imports into the U. S. over the past decade have been confined largely to newsprint from Canada, which has accounted for over 90 percent of total imports. Much of the newsprint from Canada is produced by wholly or partially-owned subsidiaries of United States firms. Nevertheless, these shipments constitute imports and contribute to an unfavorable balance of trade so far as paper and products are concerned. With the recent and expected further expansion in exports of wood pulp, container board, coarse papers, etc., some observers are suggesting that exports may completely offset imports by 1975.

**PRICES, PROFITS,
AND CAPITAL SPENDING**

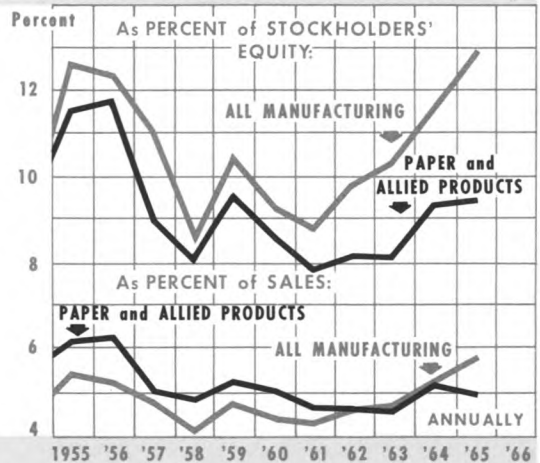
Average prices of "pulp, paper and allied products," as a component of the Wholesale Price Index, dropped below the level of all industrial commodities (all commodities less farm and food products) in 1961 and have not completely recouped since that time (see Chart 4). Most of the price weakness has been centered in paperboard, as wholesale prices of paper have remained broadly in line with price trends in industrial commodities. The relative weakness of paperboard prices has been, in part, a reflection of over-

4. WHOLESALE PRICES OF PAPER and ALL INDUSTRIAL COMMODITIES



Source of data: Bureau of Labor Statistics, U.S. Department of Labor

5. NET PROFITS AFTER TAXES, PAPER and ALLIED PRODUCTS INDUSTRY



Source of data: Federal Trade Commission - Securities and Exchange Commission

capacity in that segment of the industry, with the ratio of production to capacity for paperboard consistently lower than that for paper throughout the period since 1961.

Relative weakness in paperboard prices has probably been a factor in causing paper industry profits to perform somewhat unfavorably in recent years compared with profits for all manufacturing industries. Thus, net profits after taxes as a percent of stockholders' equity for the paper and allied products industry were lower than for all manufacturing industries throughout the ten-year period shown in Chart 5. The spread has tended to be somewhat wider since 1962.

Looking at the profit situation another way, profits as a percent of sales in the paper industry exceeded the performance of all manufacturing from 1955 to 1961, as shown in the chart. The margin vanished in 1962, however, and since that time profits on sales in the

ECONOMIC REVIEW

paper and allied products industry, despite some improvement in 1964 and 1965, have remained below the average for all manufacturing industries.

Twice during the past ten years, plant and equipment expenditures in the paper and allied products industry have risen sharply, in 1956-57 and in 1964-65 (see Chart 6). On each occasion the spurt occurred when the ratio of production to capacity in the industry exceeded 90 percent. Thus, capital expansion in 1956-57 followed a period of high production relative to capacity that began in 1955 and extended into 1956, and that in 1964-65 followed a similar period beginning in 1964. Capital spending in the paper and allied products industry was estimated at an all-time high of \$1.3 billion annual rate in the first quarter of 1966, which also

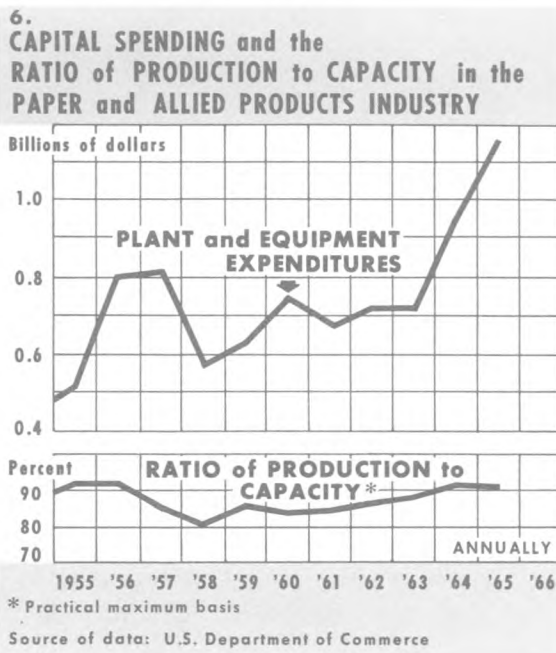
coincides with a period when the production to capacity ratio was particularly high.

FACTORS IN THE OUTLOOK

The current expansion in capacity is causing some concern in the paper and allied products industry as to whether aspects of overcapacity may develop, with unfavorable repercussions on profits, similar to the developments which followed the accelerated expansion of the 1950's. Two significant developments within the industry in recent years, however, may serve to accelerate demand and to sustain industry profits or improve them.

The first among these developments is the marked expansion in industry expenditures for research and development. Expenditures of the paper and allied products industry for research and development rose from \$42 million in 1958 to \$77 million in 1965. One of the tangible results is a major breakthrough in machine design and technology, recently announced, of a new paper forming system for production of tissue and toweling. The industry has also sought to improve productivity by conducting research on pulpwood cutting procedures, on site chipping, shorter cycle pulping, and increased machine speeds. (See discussion in Appendix.) Considerable research effort has also been expended on the basic chemistry of wood to further broaden the market for pulpwood products.

The other development that has had a significant impact on demand for pulp, paper, and allied products is the growth that has occurred in exports. Exports of wood pulp and paperboard have more than doubled since 1958, and the long-range prospects are for



continued growth in foreign markets, as previously mentioned.

One area where the demand for pulp is expected to rise is in Latin America. A recent study³ cited by the Department of Commerce has projected a Latin American demand for 200,000 tons of dissolving pulp by 1970. Only three of the nine consuming countries in that area are producers. These three—Mexico, Brazil, and Argentina—may increase capacity to 120,000 tons by 1970, but this

³ *Pulp, Paper, and Board*, U. S. Department of Commerce, January 1966, p. 6, *The Dissolving Pulp Industry in Latin America—Present Situation and Future Prospects*, UNESCO, Pulp and Paper Advisory Group for Latin America.

will still leave a gap of about 80,000 tons, indicating an expanding export market for the U. S. producers of pulp.

Japan is another country where a rapidly expanding paper industry is expected to require large quantities of pulp from foreign sources. According to forecasts of the Japanese Government, that country expects to import about 110,000 tons more dissolving pulp in 1968 than was imported in 1964, while Japanese imports of paper-grade pulp may be three times the 1964 volume. Other geographic areas to which U. S. exports of wood pulp have increased significantly since 1958 are the United Kingdom, Europe, Africa, and Oceania.

APPENDIX

CHANGE IN SOURCE AND TYPE OF PULPWOOD

Changes in sources and types of pulpwood constitute an important factor in the paper industry generally. Significant aspects of such changes within the Fourth Federal Reserve District will be discussed in a later article.

Softwoods account for a major part of domestic pulpwood production, but hardwoods and chipped residues have furnished an increasing proportion of the total in recent years. Softwoods had accounted for 75 percent of the total in 1955, but dropped to 57 percent by 1965. Meanwhile, hardwoods increased from 17 to 21 percent of the total during the same period, largely reflecting the development of equipment that permits

low-grade hardwoods to be used for the production of wood pulp.

Perhaps an even more significant development in the recent period has been an increase in use of wood chips produced from slabs, edgings, and other wood residues from lumber, veneer, plywood, and other forest product operations. The quantity of wood chips used increased more than fourfold from 1955 to 1965, with the result that chipped residues comprised more than one-fifth of the raw material used in the domestic production of pulpwood in 1965. The phenomenal growth in the use of chipped residues represents substantial savings in wood costs and conserves forest acreage by more complete utilization of the timber harvested. Chips

ECONOMIC REVIEW

have been used increasingly as a source of fiber, with the development of efficient log and slab debarkers, portable and semiportable chippers, and chip loading and transportation equipment.

Growth in use of chipped residues allowed the western part of the U. S. to register the sharpest regional expansion in output of pulpwood during the past ten years, as shown in the following figures:

Region	Pulpwood Production by Regions, 1965 (Million Cords)	Percent Increase from 1955
West	10.6	+77%
South	29.9	+63
North	8.2	+26

Source: U. S. Department of Agriculture, Miscellaneous Publication No. 1009, November 1965

Nevertheless, the South has continued to be the major source of pulpwood, accounting for 61 percent of the total in 1965 (as compared with 60 percent in 1955). The softwood species of trees common to the South and predominant in the West grow more rapidly than hardwoods, and the time lapse from seedling to merchantable trees is much shorter. In some of the southern states, merchantable pulpwood has been harvested 15 to 20 years after planting. While the slower growing hardwoods that predominate in the North do not provide the pulpwood resources that the softwoods of the South and West do, forest authorities expect the percentage of hardwoods used to increase to a third or more of the total in contrast to about one-fifth of the total in 1965. Reasons cited for the increasing use of hardwoods are: improved pulping processes, availability of hardwoods at relatively low cost per ton of fiber, and the im-

provement to many grades of paper when hardwood pulps are added.

PULP PRODUCTION PROCESSES

Five major types of processes are used in processing pulpwood into wood pulp. All require chipping of the wood into small particles, and most involve use of a vertical digester in which the chips are cooked in a chemical solution in order to separate the cellulose from the non-cellulose fibers.

About 60 percent of the pulpwood is processed by the sulfate process, which uses an alkaline solution and is particularly effective on pines and hardwoods. This process has gained in importance since the mid-1950's, as shown below.

Process	Pulpwood Production, by Type of Process, Percent of Total	
	1955	1965*
Sulfate	54.4%	61.2%
Groundwood	13.3	11.8
Sulfite	12.3	8.4
Special alpha	4.7	4.5
Soda	2.1	0.7
Other	13.2	13.0
TOTAL	100.0%	100.0%

* Based on first nine months' operations.

Source: *Pulp, Paper, and Board*, U. S. Department of Commerce, March 1965 and January 1966

The groundwood process presses the pulpwood stick lengthwise against a high-speed sandstone that separates and pulverizes the fibers to a certain degree of fineness. This process has declined in importance although it is considered best suited for the pulping of balsam, hemlock, and spruce as well as for some species of pine and poplar.

The sulfite process uses an acid solution that is considered well suited for pulping of

spruce, balsam, fir, and hemlock. The disposal of wastes from the sulfite process is a problem that has tended to hinder expansion of sulfite mill capacity.

The special alpha and dissolving process applies to both bleached sulfite and sulfate pulps used primarily for nonpaper products such as rayon, cellophane, plastics, and explosives. The proportion of pulpwood subjected to this process in 1965 was virtually the same as ten years earlier.

The oldest of the pulping processes is the soda process which uses sodium hydroxide as the active chemical in the pulping solution.

Although this process is reported to be well suited for pines and hardwoods, it has never been widely used and is even less significant now than it was ten years ago.

Present-day technology in the manufacture of paper permits a wider range of substitution between types of pulp than formerly. Moreover, the sulfate and semichemical processes are adaptable to pulping a wide range of species of both hardwoods and resinous softwoods, which currently are in greater supply than such preferred species of the past as spruce, fir, and hemlock.



CAPITAL SPENDING PLANS IN PITTSBURGH

Spending for new plant and equipment by business firms in the four-county Pittsburgh metropolitan area in 1966 is expected to exceed by 21 percent the amount spent in 1965.¹ This increase not only represents a sizable gain for 1966 over 1965, but it is also a higher figure than was estimated in the fall of last year.

Within the total group, manufacturing firms plan capital outlays 37 percent greater than in 1965, while nonmanufacturing firms anticipate an 11 percent increase.² (See Table I.) The margins of increased capital spending, for the entire group and for the manufacturing industries, are substantially higher than those indicated in the survey conducted among Pittsburgh business firms last fall. At that time, both the entire group and the manufacturing subgroup expected to raise capital outlays in 1966 by about 14 percent above

¹ The spring survey is the first of regular semiannual surveys to be conducted by the Bureau of Business Research of the University of Pittsburgh, and which will be financed by the Federal Reserve Bank of Cleveland. Annual surveys had been undertaken each fall by the University of Pittsburgh for a number of years through 1965.

² Manufacturing firms in the survey represent one-fourth of total manufacturing employment in the Pittsburgh metropolitan area. Total spending reported by all participating firms will exceed \$200 million in 1966.

the level of 1965.³ The upward revision in spending plans since last fall appears to reflect not only the general trend toward high capital investment but also the special effect of the nationwide spending boom upon manufacturing firms in the Pittsburgh area that supply capital goods producers with special steels.

Early tentative plans for 1967, which were submitted by a somewhat smaller group of firms, indicate that an overwhelming majority of Pittsburgh firms expect to reduce their capital spending next year—at least they do at this juncture. Even so, next year's capital spending by manufacturing firms, taken as a group, is likely to surpass that for this year if present plans for increased spending by a few very large firms materialize; such spending would more than offset the effects of curtailments by other manufacturing firms. Nonetheless, reductions in the nonmanufacturing sector would result in lower capital outlays in 1967 for the entire group of reporting business firms in the Pittsburgh area.

As in previous years, a large portion of total capital outlays in 1966 will be made by

³ See Robert J. A. Pratt, "Capital Spending to Rise in '66 in Pittsburgh," *Pennsylvania Business Survey*, October 1965, p. 2.

TABLE I
Capital Spending by Pittsburgh Area Firms
(Spring 1966 Survey)
Year-to-Year Percent Changes

	1965 (actual) to 1966 (planned)	1966 (planned) to 1967 (planned)
MANUFACTURING	+ 37%	+ 5%
Durable goods	+ 32	+ 6
Stone-clay-glass	+ 33	- 35
Primary metals	+ 53	+ 28
Fabricated metals	- 4	- 43
Machinery	+ 36	+ 11
Electrical equipment	- 16	- 20
Other durables*	+ 53	†
Nondurable goods	+ 81	- 4
Food	- 65	+370
Textiles; rubber	+1212	- 73
Printing	+ 713	- 18
Chemicals; petroleum prod.	+ 19	- 8
NONMANUFACTURING	+ 11	- 24
Transportation	+ 142	- 50
Public utilities	+ 29	- 27
Retail trade	- 61	- 3
TOTAL	+ 21%	- 10%

* Includes transportation equipment, instruments, and miscellaneous manufacturing industries.

† Insufficient data.

Sources: University of Pittsburgh and
 Federal Reserve Bank of Cleveland

the public utilities and other nonmanufacturing business concerns in the area. In the manufacturing sector, the durable goods industries will account by far for the largest share of spending in that sector, with the primary metals industry well ahead of any other single industry in both the amount of money to be spent for new plant and equipment and the margin of increase over last year's spending.

Nearly one out of every four dollars spent by manufacturing firms this year will be for new structures, with a somewhat larger proportion by business firms in nonmanufactur-

ing industries. In both cases, the figure for structures is down considerably from 1965, indicating a shift toward a larger proportion of total spending for new equipment (see Table II).

As indicated by survey returns, over 60 percent of manufacturing firms consider their present plant and equipment facilities adequate, and an additional 10 percent have more facilities than needed. Only 30 percent reported insufficient capacity.

TABLE II
Capital Spending by Pittsburgh Area Firms
(Spring 1966 Survey)
Percent Distribution of Total Spending by Type*
(Between Structures and Equipment and Between Expansion and Replacement)

	Structures†		Expansion‡	
	1965	1966	1965	1966
MANUFACTURING	28%	22%	35%	28%
Durable goods	29	23	37	27
Stone-clay-glass	3	2	3	0
Primary metals	33	28	18	18
Fabricated metal prod.	34	20	76	52
Machinery	25	15	48	61
Electrical equipment	2	0	63	6
Other durables§	0	0	0	0
Nondurable goods	11	13	10	35
Food	13	16	0	0
Textiles; rubber	0	0	18	19
Printing	12	19	1	63
Chemicals; petroleum prod.	11	13	17	22
NONMANUFACTURING	42	28	47	25
Transportation	6	11	1	1
Public utilities	33	36	26	25
Retail trade	68	30	95	78
TOTAL	36%	25%	42%	26%

* Based upon returns in which these breakdowns were supplied.

† Spending for equipment equals 100% less the percentage shown for structures.

‡ Spending for replacement or modernization equals 100% less the percentage shown for expansion.

§ Includes transportation equipment, instruments, and miscellaneous manufacturing industries.

Sources: University of Pittsburgh and
 Federal Reserve Bank of Cleveland

ECONOMIC REVIEW

The relative amounts of spending earmarked for expansion as against replacement and modernization of facilities seem to support the conclusion that many manufacturers in the Pittsburgh area—except in some of the metalworking industries—are not faced with serious shortages of capacity. Only 28 percent of total outlays in 1966—down from 35

percent last year—will be used to pay for additional manufacturing facilities.

Financing of this year's capital outlays does not appear to be a serious problem. Manufacturing firms expect to cover 85 percent of the cost of new plant and equipment in 1966, and close to 80 percent in 1967, out of internal funds.



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