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COMPARISONS AND INTERPRETATIONS

Preceding chapters contain findings about seven related variables in a variety of industries: man-hours per unit of product, hourly earnings, labor cost, total cost, prices received, profit margins, and aggregate profits. In some divisions of manufacturing and in the railroad industry, it was possible to explore the relations between each of the seven variables and fluctuations in the quantity of goods or services sold. In other industries, it was possible only to explore the relation between margins and profits on the one hand and fluctuations in sales (revenue) on the other. In still others, quantity and revenue tended to rise without serious interruption over long periods; the only cyclical relations that could be investigated were those between the last two variables and cycles in business at large. The charts and tables in this chapter summarize many of the findings. For the reasons just indicated, the kinds of information assembled differ from industry to industry.

Net Changes During Expansions and Contractions of Quantity: Manufacturing and Railroads

A conformity score, it will be remembered, is a means of comparing the direction of change in two variables. A high positive score means that the two variables tend to rise and fall together. A high negative (inverse) score means that they tend to move in opposite directions. A low score means there is little relation between their directions of movement. Man-hours per unit of output produced by manufacturing industries tended to vary inversely with quantity (Table 87). Hourly earnings, on the other hand, had little relation to quantity; they rose both in expansions and in contractions of the latter. Because hourly earnings rose in expansions

and contractions alike, labor cost per unit of product rose more often than hours per unit in both. Labor cost, nevertheless, was also inversely related to quantity. Total cost per unit (including not only labor but materials, interest on borrowed capital, etc.) also fluctuated inversely with quantity, although the score was much lower, since cost often rose in expansions of quantity. The net, full-phase changes in the prices manufacturers received bore little relation to upswings and downswings in the quantity of goods they sold in the mild postwar cycles to which our information pertains; they tended to rise in contractions as well as expansions. (The BLS index of prices of finished products, which begins in 1913, fell in all contractions of business or of manufacturing production between that year and World War II. So did the index of prices of semimanufactures.)

In many postwar expansions, prices rose faster than cost, while in contractions they rose less rapidly than cost. Profit margins therefore had a strong positive relation to cycles in quantity. Profits themselves sometimes rose in an expansion even when the profit margin was declining, and sometimes fell in a contraction

TABLE 87
Manufacturing and Railroads: Profit Variables and Output

| | Relation to Manufacturing Quantity Sold, 15 Industries ^a | | Relation to Railroad Traffic | |
|--------------------------------|---|----------------------|---------------------------------|----------------------|
| | Conformity Score | Relation Inferred | Conformity Score | Relation Inferred |
| Hours per unit | -71 ^b | Inverse | -62 | Inverse |
| Hourly earnings | -8 ^b | None | 0 | None |
| Labor cost per unit | -56 ^b | Inverse | -88 | Inverse |
| Total cost per unit | -39 | Inverse | -83 | Inverse |
| Prices received | -2 | None | -42 | Inverse |
| Operating margin ^c | -- | -- | +67 | Positive |
| Operating profits ^d | -- | -- | +75 | Positive |
| Margin before tax | +76 | Positive | +100 | Positive |
| Profits before tax | +91 | Positive | +100 | Positive |

^a Each expansion or contraction in each industry is treated separately in computing score.

^b Production workers only.

^c Ratio to sales of net revenue from railway operations.

^d Net revenue from railway operations.

even when the margin was rising. Profits were therefore even more closely related than margins to swings in quantity.

Fluctuations in labor cost on railroads are similar to those in factories. Hours per unit of service rendered to the shipping and traveling public varied inversely with traffic. Hourly earnings tended to rise in both upswings and downswings, with no relation to traffic; but the rise in expansions was not large enough to keep labor cost, as well as hours per unit, from varying inversely. Total cost per unit had a much stronger inverse relation to volume in the railroad industry than in manufacturing. Prices received for railroad services, however, tended to vary inversely with volume, while there was no relation in manufacturing. The inverse fluctuations in cost were larger, percentagewise, than those in railway rates and fares; profit margins, and likewise profits, therefore tended to rise and fall with volume on railroads also.

In spite of partial differences with respect to cost and prices, margins in both manufacturing and the railroad industry usually widened when volume rose, and narrowed when it declined. In manufacturing expansions, the rise in margins was caused mainly by rising prices; in traffic expansions, it was caused mainly by falling cost. In manufacturing contractions since 1947, and in traffic contractions, the fall in margins was caused mainly by rising cost.

Railway rates, fares, and charges were more stable cyclically than prices of manufactured products. The strong inverse relation between unit operating cost and traffic, and the large aggregate size of railway fixed charges, make stable rates compatible with profitability in expansion, and impose obstacles to reduction of rates in contraction. It has been suggested that railway charges should be raised in periods of business expansion, and, more urgently, that they should be reduced in business contraction as a means of controlling the business cycle, just as interest rates supposedly are or can be used for the same purpose. But if this were done, railway profit margins would have to be much higher during peak prosperity than they have been in the past, or else the railroads would be in even more imminent danger of bankruptcy in depressions than they have been. Furthermore, railway charges are an important component in the costs of manufacturers and

other businessmen. If they fluctuated in the manner suggested, manufacturing costs would rise more sharply in expansion than they do. Even though prices of manufactured products are only loosely related to cost, it is not clear that rising railway charges would be counter-inflationary.

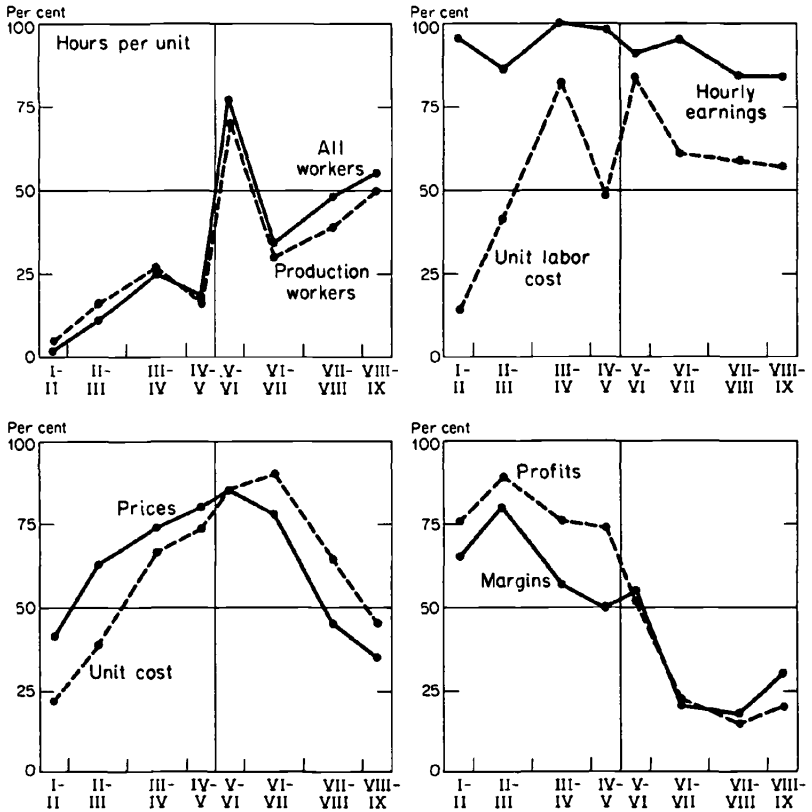
PATTERNS OF CHANGE DURING EXPANSIONS AND CONTRACTIONS

The foregoing discussion pertains to net changes in profit variables during upswings and downswings in quantity of goods or services sold. Where Table 87 suggests a positive, or inverse, relation, the relation is often more pronounced during some portions of cycles in quantity than during others. For some variables the characteristic direction of change in the earlier portion of expansions or contractions is different from the characteristic direction in the later portion.

When a manufacturing industry begins to expand output, the hours of labor it requires to turn out a unit of product usually decline (Chart 23). Hourly earnings of production workers commonly rise even at this early stage, but the rise is not large enough to offset the fall in hours per unit, and labor cost per unit usually declines. Total cost including labor and other expense also usually falls. In these early stages, the prices the industry receives for its products decline in most cases, although the majority of declines is not large. The net result of changes in cost, prices, and volume is that most profit margins and profits rise.

In later segments of expansion, rises in hours per unit become more and more frequent, except in the last segment, an exception which might disappear if we had more data. Falls, however, outnumber rises in all segments. Hourly earnings in most cases continue to rise. Labor cost rises more and more frequently, with the same exception; it rises in more than half of the third segments, and with more data might be found to rise in most fourth segments. Rises in total cost become steadily more frequent, and predominate in the last half of expansion. Increases in the prices factories receive for their products also become more frequent but do not always offset the increase in cost. Margins do not widen as often in the third segment as in the first two. At least in our

CHART 23
*Percentage Frequency of Rises in Profit Variables During
 Successive Segments of Quantity Cycles,
 Fifteen Manufacturing Industries, 1947-61*



sample of observations, they rise in only half of the fourth segments. Rising profits, however, predominate over falling profits in every segment.

When recession comes to an industry, the initial decline in quantity is usually accompanied by a rise in man-hours and labor cost per unit of product. Increases in total cost are even more numerous than in late expansion. But so are increases in prices received. Margins rose in a small majority of our observations, and profits in a slightly smaller majority.

Rises in hours per unit are less common after the first segment of contraction, although the succession of frequencies is irregular. Hourly earnings and labor cost continued to rise, but the labor cost frequency declined continuously. Even at the end, however, there were more rises than falls; and the percentages would probably be higher if they included nonproduction labor. Increases in total cost likewise become less frequent after the second segment. After the first, rises in prices received become less frequent, and falls predominate in the last half of contraction. Margins and profits fall in most cases after the first segment.

Cycles in sales revenue (rather than in quantity) can be observed in all twenty-two subdivisions of manufacturing. Rising margins and profits were more common in the first than in the second half of upswings in sales (Chart 24). Rises predominate in all segments of expansion, however, (except for margins in the fourth segments) and declines predominate in all segments of contraction. Changes in the margins and profits of twenty-two companies before 1942 were similar, except that margins and profits held up better throughout expansions.

Corresponding curves for the railroad industry look more eccentric, perhaps because of fewer observations. Hours per unit always fall in the first half of traffic expansions (Chart 25). Some rises occur thereafter, but declines predominate throughout. Hourly earnings usually rise in all except fourth segments; they rose in exactly half of those. Rises in labor cost become more frequent, but even in the last segment occur in less than half of the observations. Rises in total cost also become more frequent except in fourth segments. Rises in rates and fares have an irregular curve; but, on the whole, falls predominate. Declines in the operating margin and in net revenue are more numerous in the last half of expansion than in the first. Even in the last half, however, net revenue rises more often than it falls.

When traffic begins to decline, hours per unit, hourly earnings, labor cost, and total cost rise in most cases. Prices received are also likely to rise, but not enough to prevent the operating margin and profit from falling. Rises in the four cost variables are less frequent in later stages. Rises in the operating margin and net revenue become somewhat more frequent; but declines still predominate.

CHART 24
Percentage Frequency of Rises in Margins and Profits During Successive Segments of Sales Cycles

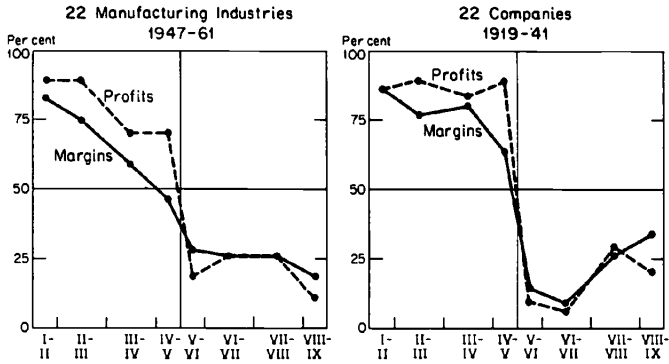
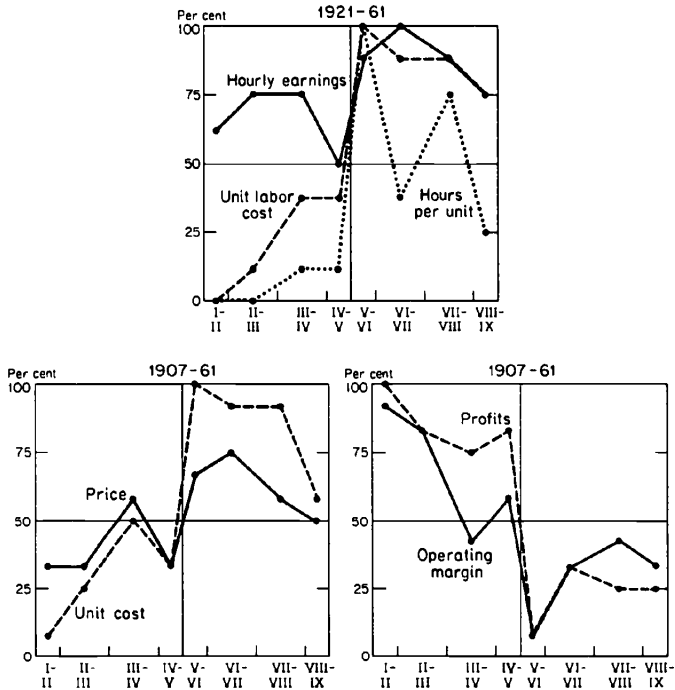


CHART 25
Railroads: Percentage Frequency of Rises in Profit Variables During Successive Segments of Traffic Cycles



The charts show what happened most often in the same segment of different expansions or contractions. They could, however, give an erroneous impression of the typical sequence of change in a single expansion or contraction. In Chart 23, for example, rises in cost outnumber falls in the first three segments of contractions, but falls are more numerous than rises in the last segment. The impression might result that a manufacturing industry, during a downswing, usually encounters rising cost at first, and falling cost later. In fact, the most common pattern was a continuous rise, which occurred in 38 per cent of the observations. For most profit factors, the commonest pattern occurred in a plurality, but not a majority, of the observations (Table 88).

These percentages may seem low. But if there were no systematic relations among the directions of change in successive segments, each of the sixteen permutations of change described in Chapter 1 (Table 3) should occur approximately as often as any other. A continuous rise should occur in about 1/16, or 6 per cent, of the observations; so should a continuous fall. Since we lump three permutations into "rise, fall," a rise-fall pattern should occur in about 3/16, or 19 per cent; so should a fall-rise. We may call these "neutral" frequencies. The frequencies of the most common patterns in Table 88 are all higher.

Margins in Other Industrial Divisions

We have not ventured to construct measures of quantity sold for the telephone industry, the electric utilities, or for trade or construction corporations. At first thought it might seem that we could use the number of telephone calls in the first case, and kilowatt-hours sold in the second. But telephone subscribers pay for a minimum number of calls whether they use them or not. Is the number of calls, the number of phones, or some weighted average the best measure? The convenience of the telephone has greatly increased with the increase in the number of parties that can be called from any one instrument; subscribers get more and more potential connections for their money. The average distance called on toll calls may fluctuate with business conditions. Kilowatt-hours sold include those sold for low-cost, low-price uses (like

TABLE 88
*Profit Factors and Profits: Most Common Pattern of Change During Cycles in
 Manufacturing Quantity Sold or Produced and Railroad Traffic*

| | During Expansions | | During Contractions | |
|---|---------------------|----------------------------|------------------------|----------------------------|
| | Most Common Pattern | Percentage of Observations | Most Common Pattern | Percentage of Observations |
| 15 MANUFACTURING INDUSTRIES, 1947-61 ^a | | | | |
| Hours per unit | | | | |
| Production workers | Continuous fall | 46 | Rise, fall | 28 |
| All workers | Continuous fall | 52 | Rise, fall, rise | 31 |
| Hourly earnings | Continuous rise | 83 | Continuous rise | 69 |
| Labor cost per unit | Fall, rise | 38 | Continuous rise | 28 |
| | | | Rise, fall | 28 |
| Total cost per unit | Fall, rise | 54 | Continuous rise | 38 |
| Prices received | Fall, rise | 44 | Rise, fall | 47 |
| Margin | Rise, fall | 31 | Continuous fall | 28 |
| Profits | Continuous rise | 44 | Continuous fall | 32 |
| RAILROADS, 1907-61 | | | | |
| Hours per unit ^b | Continuous fall | 75 | Rise, fall | 38 |
| Hourly earnings ^b | Rise, fall | 25 | Rise, fall, rise, fall | 38 |
| | Fall, rise | 25 | Continuous rise | 62 |
| Labor cost per unit ^b | Continuous fall | 38 | Continuous rise | 50 |
| | Fall, rise | 38 | Continuous rise | |
| Total cost per unit | Fall, rise | 33 | Continuous rise | 42 |
| | Fall, rise, fall | 33 | Rise, fall | 42 |
| Prices received | Fall, rise, fall | 42 | Continuous rise | 25 |
| | | | Rise, fall | 25 |
| Operating margin | Rise, fall, rise | 42 | Fall, rise, fall | 42 |
| Operating profits | Continuous rise | 58 | Continuous fall | 33 |
| | | | Fall, rise, fall | 33 |

^aEach expansion or contraction in each industry is counted separately in determining frequency of patterns.
^b1921-61.

those in industrial processes) and those sold for high-cost, high-price uses (as in private homes); industrial use fluctuates more than household consumption. It would be possible to take care of this difficulty, but another would remain: sales to any one class of user include sales in the high-price initial brackets, and sales in the lower-price later brackets. When the total sales diminish, the percentage of kilowatt-hours in the higher brackets increases.

With no production indexes, we cannot construct indexes of price or cost per unit in these four industries. We do, however, know something about their profit margins. Margins of construction corporations, and somewhat more imperfectly those of trade corporations, appear to rise and fall with sales; probably they also rise and fall with quantity sold. If so, these industries are like manufacturing and railroads.

Although we have no good measure of percentage change in the production of electric utilities, the peaks and troughs in a price-weighted output index would probably not differ greatly from those in kilowatt-hours. Profit margins of electric utilities vary inversely with kilowatt-hours sold; at least, operating profits before fixed charges do so.

The telephone industry has had only one contraction in the number of calls; even if we accept the number of calls as indicating the dates of turning points in the quantity of service, there are virtually no cycles. Nevertheless, the telephone industry increases its service when most other industries are increasing their production, i.e., during the greater part of business expansions. It differs from other industries in that its volume of business rises, although more gradually, when the income of the others is falling. Telephone operating margins, however, show no consistent relation to business cycles (Table 89). If one considers recent cycles only, they show an inverse relation. When both the telephone industry and other industries are expanding, the telephone industry, unlike construction, manufacturing, railroads, or trade has had a falling margin in recent times.

Probably the decline in the electric operating margin, and in the telephone operating margin during recent cycles, has been caused by delays in the adjustment of publicly regulated rates, together with rises in wages and prices of materials during business expan-

TABLE 89
Margins and Profits: Relation to General Business

| | Period Covered | Margins | | Profits | |
|---|----------------|------------------|-------------------|------------------|-------------------|
| | | Conformity Score | Relation Inferred | Conformity Score | Relation Inferred |
| Manufacturing | 1919-61 | +90 | Positive | +90 | Positive |
| Railroads | | | | | |
| Operating profits | 1907-61 | +77 | Positive | +92 | Positive |
| Net income before taxes | 1933-61 | +100 | Positive | +100 | Positive |
| Telephone Industry | | | | | |
| Operating profits | 1933-61 | +33 | Positive | +33 | Positive |
| Net operating income | 1933-61 | -17 | None | +17 | None |
| | 1918-61 | +14 | None | +14 | None |
| | 1918-38 | +64 | Positive | +27 | Positive |
| | 1938-61 | -40 | Inverse | 0 | None |
| Electric and Gas Utilities | | | | | |
| Electric operating profits | 1926-61 | -47 | Inverse | +20 | None |
| Electric net operating revenue | 1926-61 | -33 | Inverse | +7 | None |
| Electric utility net income before taxes ^a | | | | | |
| Gas operating profits ^b | 1937-61 | +9 | None | -9 | None |
| Gas net income before taxes ^b | 1937-61 | -9 | None | +27 | Positive |
| Construction | 1932-61 | +45 | Positive | +9 | None |
| Trade | 1932-61 | +17 | None | +33 | Positive |
| | 1919-61 | +10 | None | +60 | Positive |

^aIncludes income from nonelectric operations.

^bGas companies and gas departments of electric utilities.

sions. Short-run economies associated with larger volume, if they exist, are apparently not sufficient to offset the increases in prices paid.

The telephone and power industries are regulated with a view toward giving the investor a fair return over a period of years, but not necessarily the same rate of return every year, still less every month or quarter. Cyclical fluctuations in operating margin are not incompatible with the regulatory objective. Heavy fixed charges tend to counteract any rise in operating cost during expansion, although investment in plant and equipment has at times increased fast enough to negate the tendency. Except in the inflationary period after the war, the declines in margin during business expansion have not been severe; a margin ample to protect against bankruptcy remains at the business peak. The more rapid growth of telephone or electric service during business expansion tends to offset the mild decline in margin, sometimes producing higher aggregate profits and perhaps even a higher rate of return on investment.

Some Quasi-Margins for All Domestic Business

Profit data for many sections of the economy are inadequate. From estimates that enter into the Department of Commerce national income figures, however, it is possible to construct what may be called a consolidated income account for all domestic business. The details are illustrated in Table 90. The consolidated statement differs from ordinary income statements because sales by one domestic business to another domestic business, charged to cost of sales by the purchaser, are not included in either sales or cost. Sales to domestic business, charged to capital account by the purchaser, are included.

The omissions make it impossible to calculate cost ratios and profit margins analogous to those we have so far considered. The omitted items reduce aggregate sales and aggregate costs by the same amount. We can calculate the ratio of what may be called external costs (cost-type payments to nonbusiness) to external sales (sales to nonbusiness, including sales of business capital equipment, which one may think of as sales to the individuals who own business enterprises). The difference between this external

cost ratio and 100 (Chart 26) may be considered a profit margin of a sort.

These are very rough figures. For example, the sales include the gross rental value of homes occupied by their owners, and the costs include expenses associated with home ownership. One does not usually think of one's home as an enterprise conducted for a profit.

Nevertheless, the "margin" looks similar to many other margins we have examined. It narrows in five contractions of sales. It widens at the beginning of all four expansions, and usually narrows later. In two of the four expansions it has a net rise, although it has a net fall in the other two.

TABLE 90
Estimated Income Account of Domestic Business, 1956
(million dollars)

| SALES | | |
|---------------------|---|-------------|
| | To "public" | |
| a. | Consumers | 250,515 |
| b. | Federal government | 24,487 |
| c. | State and local governments | 15,758 |
| d. | Foreigners | 20,466 |
| e. | Total, a + b + c + d | 311,226 |
| | To domestic business, charged by purchaser to | |
| f. | Capital expense | 69,042 |
| g. | Cost of sales | x |
| h. | Total, f + g | 69,042 + x |
| i. | Total sales, e + h | 380,268 + x |
| COST OF SALES | | |
| j. | Compensation of employees | 195,476 |
| k. | Indirect tax and non-tax liability | 35,000 |
| l. | Transfer payments | 1,303 |
| m. | Purchases from foreigners | 14,658 |
| n. | Interest | 7,322 |
| o. | Rent | 10,322 |
| p. | Capital consumption allowances | 34,266 |
| q. | Purchases from domestic business | x |
| r. | Total cost | 298,347 + x |
| PROFIT ^a | | |
| s. | Before tax, i - r | 81,921 |
| t. | Corporate profits tax liability | 21,959 |
| u. | After tax | 59,962 |
| COST RATIO | | |
| v. | $100 \cdot r$ (excluding x) + i (excluding x) | 78.5 |

Note: x indicates an unknown amount.

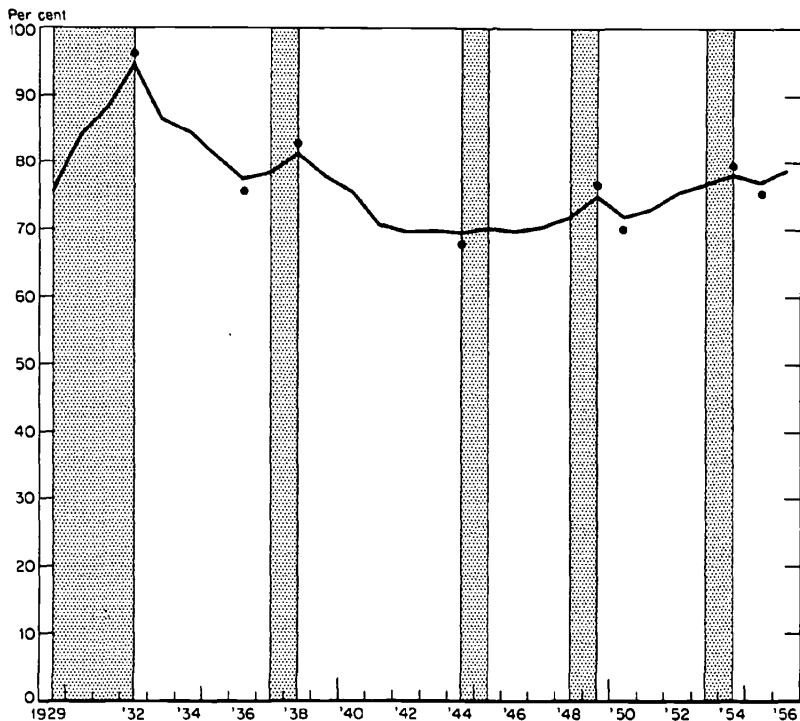
^a"Profit" is total of corporate profit plus income of unincorporated enterprises. The latter includes reward for owners' labor and management as well as for use of their capital.

Concurrent Margin and Profit Changes in Different Industries

In a way, the rough, general, annual figures in the preceding section round out the picture. More interesting inferences can be drawn, however, from the varied and detailed data for manufacturing industries, to which we revert. In particular, they show that the profit experiences of different industries are more diverse at some times during the general economic cycle than at others.

During the later portion of a contraction in business at large, a growing number of industries expand the quantity of goods they

CHART 26
*Ratio of "External" Cost to "External" Sales, All Domestic Business,
1929-56*



SOURCE: Appendix Table B-32.

NOTE: Shaded areas are contractions in "external" sales. Dots are at peaks and troughs in ratio.

sell. Most of these expanding industries enjoy rising margins and profits. At the same time, a small but increasing percentage of the industries that continue to contract also have rising margins, although not necessarily rising profits.

During the earlier portion of a business expansion, an increasing majority of industries expand. They have rising margins and profits which presently spread over most of the business economy. During the later portion of a business expansion, however, an increasing number of industries contract. Eventually their margins and profits fall. A majority of the still expanding industries continue to have rising margins, but the majority is smaller than before. Falling margins and profits become more prevalent.

In the earlier portion of a business contraction, an increasing majority of industries have a falling physical volume of sales, accompanied sooner or later by falling margins and, even more widely, by falling profits. But as the business contraction wears on, the number of expanding industries eventually begins to rise, and the cyclical sequence just described begins to repeat itself. In one of the three postwar business expansions for which we have data, however, the Korean episode greatly complicated the sequence.

Causes of Rising Cost in Expansion and in Contraction

The difference between the percentage of contractions in quantity with labor cost rising and that with total cost rising is not as wide as the corresponding difference in expansions. The rises in total cost during contractions, where they are much more frequent than during expansions, are due largely to the rise in labor input per unit of product that is so often associated with diminishing volume. In other words, rising prices of materials and rising wage rates are the main causes of rising cost during expansion; greater input of labor is an important cause during contraction.

When discussing cost in Chapter 2, we noted that the predominance of rises over declines was concentrated in certain time groups of expansions. In the early Korean, 1949-53, and 1954-57 groups, when costs of most industries with expansions approximately covering those periods rose (Table 15), prices of

materials rose substantially (Table 32). In the late Korean and 1958-60 groups, on the other hand, when cost fell in most industries, prices of materials either fell or rose very little. The difference among time groups strengthens the conclusion that rising cost during expansions is caused mostly by rising prices.

Why Cost Often Falls in Late Contraction

Although rising cost predominates in contractions in quantity sold, the predominance is not nearly as strong in the last as in the first half of such contractions. Hours per unit and labor cost rise most often during the first segment.

A substantial amount of new equipment, perhaps ordered before the contraction set in, is put into service as a contraction proceeds; new equipment is usually more efficient than old. Whether or not they have recently received equipment, many enterprises have some that is more efficient and some that is less efficient. When the quantity of goods turned out recedes, production can be concentrated on the better facilities.

With a smaller volume of business on hand, management may have more time to devote to more efficient operation of whatever facilities are at hand; i.e., such matters as discipline, scheduling, waste of materials, etc.

As cost falls in some industries, managers of those industries are encouraged to reduce prices. Most reductions in cost during late contraction are translated into price reductions. Insofar as their customers are other industries, their price reductions tend to reduce the costs of those customers. Even industries with rising cost reduce their prices more frequently in late than in early contraction.

Rising Demand Often Makes Higher Cost Compatible with Higher Volume and Profits

There was a net rise in price during thirty-five of the forty-eight expansions in quantity sold (Table 10). Price and quantity both rose. We must conclude that in most expansions demand was higher at the end than at the beginning. Prices also rose in 63 per

cent of the second, 74 per cent of the third, and 80 per cent of the fourth segments. We must further conclude that demand rose in a majority of these instances. Prices rose in nineteen, or 41 per cent of the first segments; these may be regarded as cases of rising demand. But what of the first segments of the twenty-seven expansions in which prices fell?

A rise in quantity sold, accompanied by a fall in price, might be interpreted as a response of customers to lower prices, i.e., as a movement along a fixed demand curve. Or it might be interpreted as evidence also of an upward shift in the curve. But if the rise in quantity is very large in comparison with the fall in price, it is difficult to believe that demand has not shifted. If a 2 per cent fall in price is accompanied by a 20 per cent rise in quantity, one questions whether so large an increase in quantity can be attributed entirely or even mainly to so small a reduction in price. In technical language, such an interpretation implies a "price elasticity" of $20 \div (-2)$ or -10 . A figure computed in this way from observed changes in price and quantity may be called a purported elasticity. Many economists are skeptical of alleged elasticities materially larger, numerically, than -1 . Confronted with a materially larger figure, they would surmise that something else, as well as the reduction in price, stimulated customers to increase their purchases. The demand curve must have risen. Customers would have increased their purchases to some extent even if the price had not been cut.

We have computed purported elasticities for each of the twenty-seven observations. When the change in price is very small, such computations often yield fantastically high purported elasticities, e.g., -100 . In such cases the error in the figures may be large relative to the change in price, and the extreme ratios should be disregarded. However, we can arrange the purported elasticities in the order of size and pick out the median. In this case the median of the twenty-seven elasticities turns out to be -2.7 , which implies a response to price reduction so large it is hard to believe. One may conclude that in many of the twenty-seven observations, rising demand as well as falling price helped to stimulate sales. Considering these as well as the observations in which prices went up, demand appears to have risen in most first as well as most later segments.

In earlier and more severe recessions than those with which we deal here, prices as well as quantities declined; and no doubt demand fell. In forty-two of the sixty postwar contractions of quantity sold for which we have data—mostly mild contractions—there was a net rise in price. Consequently, it is possible on first thought to explain most of the contractions mainly in terms of rising prices. But computation of the elasticities implied by such an explanation again renders this interpretation doubtful. The median is -4.3 ; demand must have fallen in many of these forty-two contractions.

Prices fell in 55 per cent of the third segments and 65 per cent of the fourth segments of contractions in quantity; in these, therefore, falling demand predominated. Prices rose, however, in thirty-four, or 85 per cent, of the first segments and thirty-one, or 78 per cent, of the second segments. The median purported elasticity for the thirty-four observations is -1.6 . In the second segments, nine of the thirty-one rises in prices were accompanied by small increases in quantity, which temporarily interrupted the contractions in the latter. For the remaining twenty-two, the median purported elasticity is -2.0 . These figures suggest that demand fell in many instances.

That demand for the products of an industry should be higher at the peak than at the trough of the industry's activity may not seem remarkable, since its own peak will usually occur in the neighborhood of a peak in general business activity. When income is high, consumer spending is large, and industry in general may badly need additional capacity and therefore have a high demand for productive equipment. At such a time almost any industry can sell more goods than it could have sold at the same price when the general level of activity was lower. But this kind of explanation is applicable only to one industry or a narrow group of industries, *given* a rise in demand in most other industries. It does not explain a general rise in demand which appears in most of the diverse branches of manufacturing.

There are influences other than a rise in income, sales, or realized profits that tend to raise demand. They include the development of new commodities and inventions to a point of more widespread practicability, the wearing out of consumer durables and industrial equipment, fear of wars, changes in taxes

and governmental spending, changes in the ability and willingness of bankers to expand credit, and other factors. A preponderance of such influences will raise demand, increase quantities sold, and thereby generate additional income. The spending of the additional income will, however, tend to spread rising demand over a wider area.

That factors other than the general business situation influence demand is shown by the fact that an increasing number of industries have upturns before the general upturn. Before the business trough in 4Q 1949, for example, one of our fifteen manufacturing industries had a trough in quantity sold in 3Q 1948, three had a trough in 1Q 1949, and four in 2Q 1949. In all, thirty-three of our quantity expansions began before the corresponding business expansion. In ten of these, there was a net rise in price between the industry and business trough, so rising demand was presumably a factor. For the other twenty-three, we have computed the percentage change in output and price for the interval between the two peaks, and the purported elasticity coefficients. The median is -3.9 , suggesting rises in demand.

Conversely, consumers can become well stocked in the latest styles of consumer durables, businessmen can become well supplied with the most modern equipment, fear of war may subside, and other influences may tend to reduce demand. A preponderance of such influences may cause a general decline in demand schedules.

Rising demand explains why it was so often possible for a manufacturing group to widen its profit margin during expansions in spite of rising cost. Falling demand, at least in the last half of contractions, explains why even groups that were able to reduce their costs had their margins squeezed.

No Glut Before the Peak

It has sometimes been supposed that, as new plants and equipment are completed and begin to operate during an expansion, a flood of products from the new equipment gluts the markets, causing a fall in price which reveals that much of the increased stock of equipment is unprofitable to operate, at least for the time

being. Further investment in new facilities is discouraged, and these developments help to usher in a recession. If this is how expansions meet their end, however, one would expect the statistics to show that prices commonly fall in the last segment of an upswing in quantity sold. Such a conjunction of changes in quantity and price seems to have been rare in the postwar period. Rising prices were more frequent in the last segment than in any other segment of expansions in quantity sold. They occurred in 80 per cent of the observed last segments. Margins rose in 48 per cent, and profits in 74 per cent.

These figures do not make it necessary to reject "excess" capacity as a cause of postwar recessions. While capacity increases, the percentage of capacity actually operated may fall. What the figures do show is that excess capacity, if any, did not often display itself in the form of a price-breaking glut of products actually made and hunting a market.

Rising Margins Imply Barriers to Expansion

A rise in the demand curves for the products of an industry would not, under some circumstances, raise its average margin. If, as the curves rose, the quantity supplied to its customers rose fast enough, prices would remain at their initial level; and if the average cost did not change, the margin would also remain at its initial level. (In Chart 1, if the quantity sold increased from OA to OA' , the price would not change.) Since prices did rise in many cases, the quantity sold did not increase fast enough to hold prices at their initial level. What prevented the quantity sold from expanding to that extent?

One explanation might be accentuated differences in cost. Manufacturers of any product may at any time have some minimum price in mind for any volume of that product. It would not be worth their while to sell that quantity at less than that minimum price, which may be called their out-of-pocket cost. If this cost is higher for larger than for smaller quantities, quantity sold will not be expanded to the point at which it would sell at the initial price. Instead, quantity and price will rise to some intermediate position, such as OA'' and $A''B''$ on the chart.

Different parts of the potential supply may have different out-of-pocket costs. At low levels of demand, only the low-cost sources will actually supply the market. As demand rises, higher-cost sources may come in as rising demand makes it possible for them to charge higher prices. But in a competitive market, the low-cost sources will also get comparable prices, and they will earn higher margins. If the inequality of costs among different sources of supply rises the average margin should rise.

But actually, cost fell during the first half of most expansions. Price also fell in some, but not all, of these instances. Even when prices fell, margins often increased. Changes in cost fail to explain much of the early rise in prices and margins.

Physical limitations on the expansibility of supply may be an alternative explanation. If demand rises rapidly, it may be physically impossible, within a short period, to expand the quantity sold to the amount that buyers would take, if they could get it, at the initial prices. Stocks of the commodity in the hands of vendors may be small, and even a slight rise in sales would exhaust them. Vendors may wish to sell more, but it takes time for them to place orders with their sources of supply, for the latter to carry out the manufacturing or other processes necessary to fill the orders, and for transport agencies to deliver them. Time may also be consumed in making arrangements to finance an enlarged volume of business. If the rise in the demand schedule stops, vendors might soon be able to catch up with it; but if it continues, the physical limitations may also continue to operate indefinitely.

Most vendors will probably sense a situation of this kind when the orders or inquiries they receive begin to increase. Each will realize that he can raise his price without fear of diverting trade to other vendors, since his competitors would also be offered more trade than they could handle if they maintained their initial prices. Or the initiative as to prices may come from buyers; the latter, finding they cannot obtain enlarged quantities at the old price, may bid it up. The price will rise, and the quantity sold per month or quarter will be an amount intermediate between the original quantity and the quantity that could be sold under the new demand conditions at the old price. (Again, in Chart 1, a quantity such as OA'' might sell for $A'' B''$.) Such a rise in price can

occur without any conscious or deliberate collusion among vendors. It could also occur as the result of collusion.

Physical limitations are more likely to operate when rises in the demand for many commodities appear simultaneously than if only one of those rises had occurred. To a large extent, vendors of different commodities make use of the same raw materials and would look for additional employees among the same groups of workers.

Physical limitations in conjunction with rising demand could raise prices in this manner even if out-of-pocket cost remained at levels equal to or below the initially prevailing prices, or if it fell. In such a situation, not only prices but margins would rise. Furthermore, the rise in demand could happen so fast, compared with the capacity of industry to expand, that even margins on the highest-cost portion of a higher-cost quantity sold would rise.

Cost, Profits, and the Generation of Cycles

In this report our principal concern has been to determine what kinds of change in cost and profit accompany fluctuations in quantity sold, sales revenue, or business at large. Profits, which depend among other things on cost, have long been regarded as a part of the economic mechanism by which supply is adjusted to demand. Reversing our approach, can we say anything about the roles cost and profit play in generating business fluctuations?

Cost falls with increasing frequency in the later half of contractions, and also falls in the earlier half of most expansions. Falling cost lowers the floor beneath which business men will not go in naming prices. Most reductions in cost during late contraction and early expansion are reflected in falling prices. Even enterprises with rising cost become increasingly willing to cut prices as contraction proceeds. Price cutting appears first in one industry and then in another, but at low stages of the general economic cycle it is widespread. Do the increasingly prevalent reductions stimulate sales and thereby help to turn the economic tide? One cannot answer this question with much confidence, because the effect of reducing a price on the sale of that product is not the only aspect that needs to be considered. General reductions in

price mean that less income is being distributed by business per unit of product sold. Such reductions therefore tend to lower the demand for any specified commodity. In terms of Chart 1, they tend to move the quantity purchased to the right along demand curves, but also tend to lower the demand curves themselves. Conversely, high cost and high prices at high levels of the cycle tend to move quantity purchased to the left along demand curves, but also tend to raise the demand curves. We cannot say with confidence that price increases tend to produce a business recession.

It is evident, on the other hand, that businessmen do respond to shifts in demand, which are linked with changes in margins. Demand usually falls during the later part of contractions and rises during expansions of quantity sold. This is another way of saying that quantity sold is adjusted upward and downward in response to changes in demand. Margins also fall in late contraction and rise in expansion. What part do the margin changes play in the adjustment?

Businessmen are often in a position to increase the quantities they sell without adding to their plant or durable equipment, particularly near the bottom of a depression. The only additional expenditure needed is an increase in outlays for material and labor. Some time must elapse between the additional outlay and the sale of the resulting product; the additional outlay is temporarily an investment. A rise in margin, unless it is accompanied by a substantial lengthening of the production period, means a rise in the rate of return on such investments. If the average interval between outlay and the associated revenue is two months, a rise in the margin amounting to 1 per cent of sales is roughly equivalent to 6 per cent per year on the investment. Experience shows that once margins have begun to rise they often continue to rise for many months. An initial rise can be interpreted as evidence of better things to come. When this kind of investment ceases to yield satisfactory returns it can quickly be halted. The changes in margin that accompany shifting demand do appear to be part of the mechanism of adjustment.

Margins, however, are usually higher when quantity sold begins to contract than when it begins to expand. Furthermore, in most

cases they rise for a short while when quantity begins to decline. The foregoing line of analysis does not explain these paradoxes.

Experienced rises in margins probably have less effect on business purchases of plant and durable equipment than on requisitions of materials and labor for use in current production. Such purchases usually require years to pay off. If they are to be made wisely, they must often promise to improve profits over a period considerably longer than most of the upswings studied in this investigation. A cyclical upturn in margins does not provide a basis for projection sufficient to justify such expenditures. If the latter would improve profits by reducing cost, a decline in margins may actually make the investments more attractive, although it may also make them harder to finance.¹

Recent margins or profits have only a limited effect on quasi-permanent expenditures. Strengthened expectations of long-run economic growth, new commodities that are expected to have wide sales appeal, and improved designs of plant and equipment raise the demand for products of the construction and equipment industries and their suppliers; they help to explain rises in margins. Conversely, gradual satisfaction of the demand for capital equipment inspired by such prospects, and failure of equally potent new prospects to appear, help to explain declines in demand and margins.

¹Some readers may wonder why rates of return on existing investment have not been discussed. Such rates, in quarterly or monthly form, are reported in, or readily computable from, many of our sources of data. The reason they have not been used is that they are often a poor indicator of the rate of return to be expected from new investment, and only the latter is meaningful for the study of business fluctuations. Much of the investment in plant and equipment existing at any moment was purchased years ago when prices were different. Part of it has been written out of the basis of computation by cumulative depreciation. New property would often be more efficient than old.