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CHAPTER VIII

Price and Cost Changes in Manufacturing Industries of the United States, 1923-1929

ALTERATIONS in quoted prices of the type cited in the last chapter are the outward manifestations of a great variety of changes in the conditions of supply and of demand, most of which are not open to definite measurement. Within one important industrial area, that which includes the manufacturing industries of the United States, it is possible to press more deeply into the complex of conditions which, on the supply side, lie back of observable market changes.

Changes in Physical Output and in Aggregate Values and Costs, Manufacturing Industries

Certain of the statistics to be utilized in the study of price and cost changes are summarized in Table 151; on the following page. The statistics there given relate to selected industries for which comparable data on physical output and on aggregate values and costs are available. The entries in column (7) define the values of the products entering into the index of physical volume of production, described in Chapter VI. The entries in column (2) give the values of the products to which the entries in columns (3) to (6) relate. The ratios in column (8) serve as a measure of the degree of comparability of the original data relating to physical output, on the one hand, and to number of establishments, number of wage-earners, aggregate value of product and aggregate costs, on the other. It appears that the quantity data employed in constructing the physical volume index relate to approximately 90 per cent, by value, of the goods represented by the data in columns (2) to (6), a relation sufficiently high to justify confidence in the measurements to be derived from a comparison of these various series. As has been explained in detail in a preceding section ¹ a correction based upon

¹ Chapter III.

TABLE 151
 STATISTICS OF SELECTED MANUFACTURING INDUSTRIES OF THE UNITED STATES, 1923-1929^a
 (All value figures in thousands of dollars)

(1) Year	(2) (3) (4) (5) (6)				(7)	(8)	
	Statistics relating to all products of industries represented in index of physical volume of production						Actual value of products entering into index of physical volume of production
	Total value of products	Cost of materials	Cost of fabrication, plus profits	Total wages paid	Overhead expenses plus profits		
1923	28,281,117	18,320,242	9,960,875	4,377,966	5,582,909	25,379,316	.897
1925	29,091,937	18,895,686	10,196,251	4,272,439	5,923,812	26,331,034	.905
1927 *	27,532,655	17,804,133	9,728,522	4,136,866	5,591,656	24,603,710	.894
1927 **	27,532,655	17,804,133	9,728,522	4,136,866	5,591,656	24,602,896	.894
1927 ***	27,189,717	17,609,634	9,580,083	4,068,522	5,511,561	24,371,727	.896
1929	29,476,380	18,329,657	11,146,723	4,197,782	6,948,941	26,536,632	.900

* The statistics for 1927 which appear on this line are comparable with the data for 1923.

** The statistics for 1927 which appear on this line are comparable with the data for 1925.

*** The statistics for 1927 which appear on this line are comparable with the data for 1929.

^a Definitions of the terms used by the Bureau of the Census are given in a footnote to Table 37, Chapter III. Essentially no changes were made prior to the 1929 Census. In the report for that year manufacturers were directed for the first time (a) to omit the cost of mill or shop supplies from the cost of materials, (b) to report either the cost of materials used or purchased, and (c) to report as the value of product the selling value of the goods actually sold.

These changes in the schedules for 1929 were designed to facilitate the making of the returns. For this reason manufacturers in certain industries (76 in all) were permitted to report value of products as at former censuses. While no information is to be had on the extent to which the comparability of the census data has been impaired by these various changes, the impairment is believed to have been slight in most industries. Some of the statistics relating to the Census of 1929 are preliminary figures.

these 'adequacy ratios' has been made, in constructing the index of physical production, to validate this comparison.

Ratios similar to those in column (8) above have been computed for the various individual industries for which census statistics are compiled. The industries for which this ratio fell below .60 have been excluded from the computations. The data in Table 151 relate to 62 major industries (60 for 1929) for which the ratio exceeded .60. Those included, enumerated in a later section, constituted somewhat more than 40 per cent of all census industries, by value of product.¹

Comparison of these various series is more readily made when the data are in relative form.

TABLE 152

RELATIVE NUMBERS DEFINING CHANGES IN IMPORTANT ELEMENTS OF MANUFACTURING PRODUCTION IN THE UNITED STATES, 1923-1929^a

(1) Year	(2) Physical volume of production (fabrication)	(3) Value of products	(4) Cost of materials	(5) Cost of fabrication, plus profits	(6) Total wages paid	(7) Overhead expenses plus profits
1923	100.0	100.0	100.0	100.0	100.0	100.0
1925	102.4	101.1	101.8	99.6	96.0	102.4
1927	104.2	95.8	95.5	96.3	93.3	98.7
1929	113.0	102.0	98.3	109.3	94.3	121.0

^a The entries in Table 152 have not been derived directly from the data given in Table 151. Weights for four industries have been reduced to the approximate proportion they would have if all census products were included in the sample. This was necessary, for pre-war years, for industries producing automobiles, forest products and petroleum products. The rubber industry has been added to this list for the post-war period. These four industries, heavily represented in the sample, would have had undue influence upon the averages if this adjustment had not been made.

¹ The importance of the industries included in the present computations, in relation to all industries covered by the Census of Manufactures, is indicated by the following summary.

Year	Total value of products reported in Census of Manufactures (thousands of dollars)	Value of products in industries represented by index numbers of physical volume (thousands of dollars)	Percentage of total value of manufactured products represented in index numbers
1923	60,555,998	28,281,117	46.7
1925	62,713,714	29,091,937	46.4
1927*	62,718,347	27,532,655	43.9
1927**	62,718,347	27,189,717	43.4
1929	70,137,459	29,476,380	42.0

* Statistics comparable with 1925 and 1923.

** Statistics comparable with 1929.

From the above measurements of changes in values and quantities (measurements relating to identical industries) we may derive index numbers measuring alterations in average selling price and in the several elements of manufacturing cost, per unit of product.¹ These are the measurements with which we are at present concerned.

CHANGES IN THE SELLING PRICES OF MANUFACTURED GOODS

The following table shows the elements which are utilized in securing estimates of the changes in the average per-unit selling price of manufactured goods in the United States between 1923 and 1929. The index numbers there given, which relate, of course, to the 62 industries for which adequate quantity statistics are available, are shown graphically in Figure 73.

Between 1923 and 1929 the aggregate value of manufactured products, for the industries here represented, remained practically constant, except for the sharp drop from 1925 to 1927 and the rise in 1929 to the earlier level. Volume of output increased without a check, however, rising most rapidly between 1927 and 1929. Average price per unit suffered a slight drop from 1923 to 1925,

¹ As explained in Chapter III, the method of weighting employed in constructing the index numbers of physical volume must be appropriate to the particular purpose. In deriving an index of selling price per unit of product, the aggregate value of product must be divided by an index of physical output in the construction of which weights based upon value of product have been employed. Similarly, in deriving an index of cost of fabrication, per unit of manufactured product, an index of physical output the elements of which are weighted according to 'value added' must be employed. We need, therefore, various index numbers of physical production, measuring changes in the apparent physical contributions of the various agents represented by the aggregate value figures compiled by the Bureau of the Census. Following are the several index numbers required:

Index Numbers Measuring Changes in the Apparent Physical Contributions of Different Agents of Manufacturing Production, 1923-1929

Year	Aggregate output (weights based on value of product)	Volume of materials (weights based on cost of materials)	Volume of fabrication (weights based on 'value added')	Apparent contribution of labor (weights based on wages paid)	Apparent contribution of ownership and management (weights based on overhead expenses plus profits)
1923	100.0	100.0	100.0	100.0	100.0
1925	102.0	101.8	102.4	101.0	103.7
1927	104.2	104.1	104.2	101.9	106.2
1929	112.3	111.8	113.0	110.0	115.5

TABLE 153

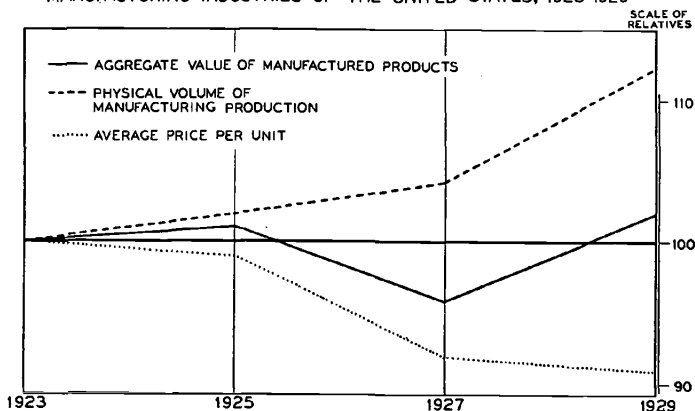
INDEX NUMBERS OF AGGREGATE VALUE, PRODUCTION AND PRICE, 1923-1929
Manufacturing Industries of the United States

Year	Aggregate value of manufactured products	Physical volume of output ^a	Average selling price per unit, products of manufacture
1923	100.0	100.0	100.0
1925	101.1	102.0	99.0
1927	95.8	104.2	91.9
1929	102.0	112.3	90.8

^a Weights based on value of product.

FIGURE 73

CHANGES IN AGGREGATE VALUE, VOLUME OF PRODUCTION
AND AVERAGE PRICE OF PRODUCTS
MANUFACTURING INDUSTRIES OF THE UNITED STATES, 1923-1929



experienced a substantial loss in 1927, and declined somewhat further during the business revival that occurred between 1927 and 1929. This confirms quite definitely the evidence furnished by other index numbers concerning the declining trend of prices of manufactured goods during these years.¹

Though we are here concerned primarily with the movements of prices and costs since 1923, the changes of this period must be

¹ There are available two other series of index numbers of prices of manufactured goods, index numbers computed directly from quoted prices. A comparison

seen against the background of earlier events, as these have been sketched in the preceding chapters. For the present purpose it is sufficient to recall that in 1923 the volume of manufacturing output was approximately 49 per cent greater than in 1914 and 44 per cent greater than in 1921,¹ while selling price per unit of product was some 67 per cent higher than in 1914 and one per cent higher than in 1921. From 1923 to 1929 production moved upward from one of the highest peaks previously attained, while prices continued at a slower pace a downward movement which dates from 1919.

§ *Selling prices, individual industries.*—Any index number is an abstraction from reality, for the diversity of movement that characterizes industrial change, seen in detail, is necessarily lost to view when attention centers on a single figure. This is particularly true in the present instance, because of the wide differences among the price movements occurring in manufacturing industries. The individual records appear in the following table.²

of these with the indexes derived independently, from data of production and aggregate value, is of interest.

Year	Index of average selling price per unit of product, manufacturing industries (derived from data of output and aggregate value)	Index numbers of prices of manufactured goods (derived from market price quotations)	
		National Bureau of Economic Research	U. S. Bureau of Labor Statistics
1923	100.0	100.0	100.0
1925	99.0	99.6	99.3
1927	91.9	93.2	93.0
1929	90.8	92.9	92.6

(The National Bureau index is an unweighted geometric mean of relative prices, based upon the quotations compiled by the U. S. Bureau of Labor Statistics. The index of the Bureau of Labor Statistics, as given above, is an average of the index numbers of prices of finished and semi-finished goods, with weights of 6 and 1, respectively. The base has been shifted from 1926 to 1923 for the purpose of the above comparison.)

There are differences in detail among the movements shown by these three index numbers, but in view of the widely different methods of derivation the agreement is convincingly close.

¹ These figures relate to the index of manufacturing production weighted by value of product. When 'value added' weights are employed the increase in manufacturing production (fabrication) is 56 per cent between 1914 and 1923, 48 per cent between 1921 and 1923.

² The validity of these and all similar measurements relating to production, price and cost changes in individual industries rests upon the accuracy and upon the inter-censal comparability of census enumerations. A correction is made for variations in the proportion of the total value of products for which quantity statistics are secured (correction for a varying *adequacy ratio*) but in all other respects the census figures as published are utilized.

TABLE 154

CHANGES IN THE SELLING PRICES OF PRODUCTS OF MANUFACTURING INDUSTRIES
OF THE UNITED STATES, 1923-1929

Index Numbers for 62 Industries, with Average Annual Rates of Change

Industry	Index numbers of selling price, per unit of product				Average annual rate of change 1923-1929 (per cent) ^a
	1923	1925	1927	1929	
Hats, fur-felt	100.0	114.4	115.3	129.5	+4.0
Slaughtering and meat packing, wholesale..	100.0	124.6	121.2	130.2	+3.7
Cars, steam and electric railroad, not built in railroad repair shops.....	100.0	103.7	118.3	120.8	+3.5
Musical instruments: organs.....	100.0	120.5	125.5	119.5	+2.8
Corn syrup, corn oil, and starch.....	100.0	110.4	92.4	120.5	+2.1
Chocolate and cocoa products.....	100.0	102.0	113.0	106.0	+1.4
Linoleum	100.0	98.4	96.8	107.3	+1.0
Knit goods	100.0	101.0	100.9	103.7	+0.5
Buttons	100.0	103.8	108.0	101.3	+0.4
Flour and other grain-mill products.....	100.0	129.9	113.4	104.4	-0.1
Butter and cheese	100.0	97.7	99.6	97.1	-0.3
Ice, manufactured	100.0	99.9	98.1	98.3	-0.3
Paints and varnishes.....	100.0	101.2	100.1	97.8	-0.4
Tanning materials, natural dyestuffs, mor- dants and assistants, and sizes.....	100.0	101.6	101.4	97.4	-0.4
Motor vehicles, including bodies and parts..	100.0	97.9	99.7	95.4	-0.6
Motorcycles, bicycles, and parts.....	100.0	99.1	98.6	95.8	-0.7
Gas, manufactured, illuminating and heating	100.0	98.9	97.3	95.7	-0.7
Soap	100.0	100.8	98.8	95.4	-0.8
Firearms	100.0	94.2	91.2	95.6	-0.8
Worsted goods	100.0	100.7	90.8	97.7	-0.9
Canning and preserving: fruits and vegeta- bles; pickles, jellies, preserves, and sauces	100.0	97.2	88.8	96.4	-1.0
Fertilizers	100.0	99.2	88.7	97.2	-1.0
Sand-lime brick	100.0	103.1	98.4	93.7	-1.2
Cordage and twine.....	100.0	113.2	101.7	95.5	-1.2
Carpets and rugs, wool, other than rag....	100.0	100.0	97.0	92.3	-1.3
Woolen goods	100.0	101.2	92.8	94.0	-1.4
Explosives	100.0	94.9	95.4	90.1	-1.5
Rice cleaning and polishing.....	100.0	140.5	108.2	98.3	-1.7
Jute and linen goods.....	100.0	108.1	96.5	91.7	-1.8
Wool shoddy	100.0	111.0	103.2	89.4	-1.9
Clay products (other than pottery) and non-clay refractories	100.0	93.7	89.5	89.1	-2.0

TABLE 154—Continued

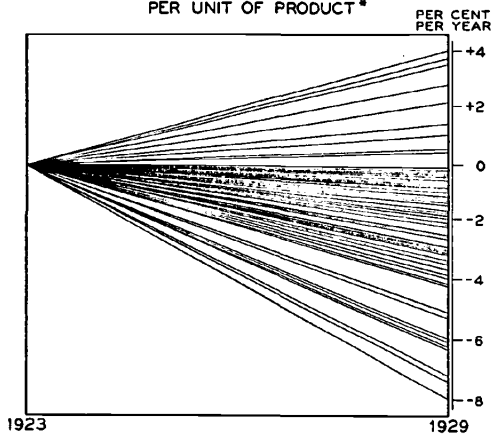
Industry	Index numbers of selling price, per unit of product				Average annual rate of change 1923-1929 (per cent) ^a
	1923	1925	1927	1929	
Carriages, wagons, sleighs, and sleds.....	100.0	104.6	99.0	87.4	-2.2
Turpentine and rosin.....	100.0	110.0	92.4	91.2	-2.2
Oil, cake, and meal, cottonseed.....	100.0	84.5	70.1	91.7	-2.2
Lace goods, cotton.....	100.0	99.3	86.2	88.2	-2.6
Iron and steel: steel works and rolling mills	100.0	92.7	87.1	85.7	-2.6
Paper and pulp.....	100.0	94.1	88.7	85.4	-2.6
Rubber products.....	100.0	110.9	101.0	84.2	-2.9
Salt.....	100.0	92.9	86.7	83.6	-3.0
Lumber and timber products.....	100.0	88.0	80.9	83.8	-3.1
Wood distillation and charcoal manufacture	100.0	78.0	80.1	81.7	-3.1
Canning and preserving: fish, crabs, shrimps, oysters, and clams.....	100.0	91.8	91.5	81.1	-3.1
Condensed and evaporated milk.....	100.0	88.4	88.4	81.2	-3.1
Oil, cake, and meal, linseed.....	100.0	103.7	86.9	84.1	-3.4
Musical instruments: pianos.....	100.0	96.3	91.9	80.1	-3.4
Cast-iron pipe.....	100.0	90.6	84.0	81.0	-3.5
Petroleum refining.....	100.0	102.2	83.2	83.1	-3.7
Hats, wool-felt.....	100.0	102.1	89.8	79.5	-3.9
Cement.....	100.0	96.0	87.6	78.2	-4.0
Lime.....	100.0	98.4	88.9	77.4	-4.2
Oilcloth.....	100.0	93.5	77.3	80.3	-4.2
Cotton goods.....	100.0	91.9	75.1	75.6	-5.1
Iron and steel: blast furnaces.....	100.0	83.2	77.5	71.9	-5.3
Coke, not including gas-house coke.....	100.0	81.1	80.0	66.8	-6.0
Asphalted-felt-base floor covering.....	100.0	98.0	72.9	72.3	-6.1
Silk manufactures.....	100.0	89.2	78.5	67.6	-6.3
Bone black, carbon black, and lampblack...	100.0	68.9	70.4	66.3	-6.3
Sugar, beet.....	100.0	77.3	73.4	62.5	-7.2
Sugar refining, cane.....	100.0	68.4	71.2	60.7	-7.4
Sugar, cane, not including products of refineries.....	100.0	63.0	70.5	57.3	-8.0
Felt goods, wool or hair.....	100.0	101.8	103.5	—	—
Wire, drawn from purchased bars or rods.	100.0	100.7	94.2	—	—
Average ^b	100.0	97.2	90.6	90.3	-1.9

^a Average rates of change for the period 1923-1929 are given in this and following tables, as a ready means of comparing the movements of different series. Such rates for the period 1923-1929 are not strictly comparable with similar figures for the period 1922-1929. Differences of conditions in terminal years may materially affect such rates over short periods of time.

^b Arithmetic average of the central items of a weighted frequency distribution, with weights based on value of product, averaged for the base year and the given year. The central one-fifth of the items, by weight, were included in computing the average.

Of the 60 industries for which complete records were available, per-unit selling prices were higher in 1929 than in 1923 for 10, lower for 50. Reducing the changes to an average annual basis, we find wide variation, ranging from an upward movement of 4.0 per cent a year in the price of the products of the industry designated 'hats, fur-felt' to a downward movement of 8.0 per cent a year in the prices of sugar cane products (excluding products of refineries). This variation in the rates of change of per-unit selling price is shown graphically in Figure 74. The degree of divergence in price movements among manufacturing

FIGURE 74
ILLUSTRATING THE DIVERGENCE OF PRICE TRENDS
AMONG 60 MANUFACTURING INDUSTRIES
OF THE UNITED STATES, 1923-1929.
AVERAGE RATES OF CHANGE IN SELLING PRICES,
PER UNIT OF PRODUCT*



* Plotted on ratio scale. The lines here plotted relate to the industries listed in Table 154, in the order of that listing. The last two entries are omitted.

industries between 1923 and 1929 was distinctly greater than the divergence between 1899 and 1914. The standard deviation (weighted) of rates of change is 3.0 for the post-war period, as compared with 1.7 for the pre-war period. In respect of price trends there was greater ferment working among manufacturing industries in recent years than in pre-war days. Diversity of fortunes was more pronounced.

In one respect the post-war record resembles that of the pre-war years. There was somewhat less diversity among price trends than among production trends, for manufacturing industries. (The standard deviation of production trends between 1923 and 1929 is 3.7, as against 3.0 for prices.)

At the foot of Table 154 are given averages of the selling price index numbers, averages derived from the central items of weighted frequency distributions for the several years. These are in some respects

more representative of the fortunes of a typical manufacturing industry than are the 'ideal' index numbers previously cited. For the years here covered the two sets of measurements differ but slightly.

CHANGES IN MATERIAL COSTS AND IN FABRICATION COSTS,
MANUFACTURING INDUSTRIES

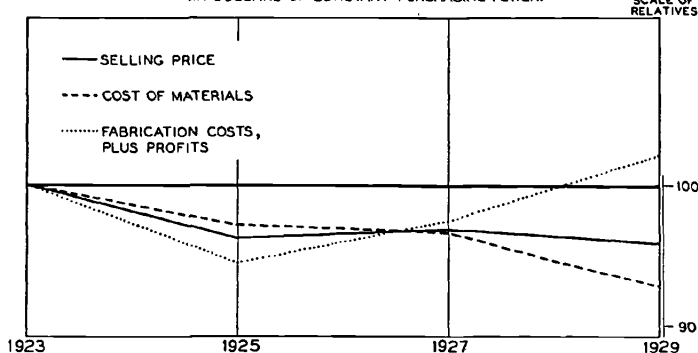
Selling price alterations are the net resultants of changes in material costs and in fabrication costs (including, in the latter, profits). Employing appropriately weighted index numbers of physical volume, we may derive from the statistics of aggregate material costs and aggregate 'value added' index numbers defining changes in these cost factors, per unit of product. These are given in the next table. To facilitate comparison with similar indexes for other periods they are expressed in terms of dollars of constant purchasing power, as well as in current dollars.¹ Index numbers of purchasing power changes are shown graphically in Figure 75.

TABLE 155
CHANGES IN SELLING PRICE, COST OF MATERIALS AND FABRICATION COSTS,
PLUS PROFITS, 1923-1929
Manufacturing Industries of the United States
(All measurements relate to changes per unit of product)

(1) Year	(2) (3) (4) In current dollars			(5) (6) (7) In dollars of constant purchasing power		
	Selling price	Cost of materials	Fabrication costs, plus profits	Selling price	Cost of materials	Fabrication costs, plus profits
1923	100.0	100.0	100.0	100.0	100.0	100.0
1925	99.0	100.0	97.3	96.3	97.2	94.6
1927	91.9	91.7	92.4	96.9	96.7	97.5
1929	90.8	87.9	96.8	95.9	92.8	102.1
Average annual rate of change (per cent)	-1.8	-2.3	-0.7	-0.6	-1.1	+0.5

¹ As in handling other indexes, reduction to constant terms has been effected through division by the U. S. Bureau of Labor Statistics index numbers of wholesale prices. It is recognized that this is not a perfect instrument for this purpose, but it provides the best available means of reducing dollar measurements for different periods to reasonably comparable terms.

FIGURE 75

CHANGES IN AVERAGE SELLING PRICE, COST OF MATERIALS
AND FABRICATION COSTS, PLUS PROFITS,
PER UNIT OF PRODUCTMANUFACTURING INDUSTRIES OF THE UNITED STATES, 1923-1929
(IN DOLLARS OF CONSTANT PURCHASING POWER)

Between 1923 and 1929 both elements of the selling price of manufactured goods declined, though somewhat unevenly. Over the six-year period the net decline in material costs (a decline of 12.1 per cent) substantially exceeded the drop in fabrication costs (3.2 per cent).¹ When these changes are measured in terms of a constant standard of value it is seen that material costs declined without a

¹ The returns relating to cost of materials in 1929 differ in one important respect from the returns for previous census periods. Mill and shop supplies were included among materials costs in all census enumerations up to and including that of 1927. In 1929 mill and shop supplies were expressly excluded from material costs. They would thus be included in that residual item which we have called overhead costs plus profits. In some degree the decline in material costs shown by the index numbers is attributable to this change in practice.

It is impossible to determine the precise degree of influence of this change. The Bureau of the Census reports that in census enumerations prior to that of 1929 some manufacturers found it impossible to segregate the cost of such supplies, and either estimated them or omitted them. To the extent that they were omitted, no change was involved in adopting the 1929 procedure.

It is reported, furthermore, that the cost of supplies is probably insignificant, or of very little importance, in comparison with the cost of materials proper except for a few industries of which the most important is that designated 'steel works and rolling mills'. For this industry the costs of relining and other repairing of furnaces and ladles, the replacement of stools, molds and rolls, and general repairs to equipment were included under cost of materials in census enumerations prior to that of 1929, but were excluded from material costs in the Census of 1929. This change would tend to lower material costs and raise 'overhead plus profits' for that industry in 1929. The record actually reveals a decline of almost 9 per cent in material costs, per unit of product, between 1927 and 1929, and an advance of 29 per cent in

break, while the drop in fabrication costs was restricted to the two-year period from 1923 to 1925. Thereafter the real cost of the services of fabricating agents advanced.

Properly to appraise these movements, and to appreciate their distinctive features, comparison should be made with the changes which occurred during earlier periods. Tables similar to that above, containing measurements covering the years 1899 to 1914 and 1914 to 1923, appear in Chapter III (p. 103) and Chapter V (p. 225). Between 1914 and 1923 there was a considerable advance in the price of manufactured goods, expressed in dollars of constant purchasing power. The recent period resembles the pre-war period in that the real price of manufactured products was declining. There is this notable difference, however. Between 1899 and 1914 the real price of manufactured goods declined because of a substantial reduction in fabrication costs, per unit of product. Material costs (in dollars of constant purchasing power) stood at the same level in 1914 as in 1899. Between 1923 and 1929 the drop in real prices of manufactured goods was due entirely to declining material costs. Fabrication costs showed a net increase over the period of 2.1 per cent.

As in every use of index numbers, the peculiarities of the base year must be remembered in interpreting these price and cost measurements. In 1923 the average selling price of manufactured goods, in dollars of constant purchasing power, stood 13.1 per cent above the 1914 level; cost of materials, per unit of product, was 9 per cent higher than in 1914, while fabrication costs (including profits) were 22.7 per cent higher than in 1914. From 1923 to 1929 manufactured goods declined somewhat from what was, relatively, a very high level of per-unit purchasing power. The cost of materials (including semi-finished goods) dropped from a level almost equally high. Fabrication costs increased fractionally from an unprecedentedly high point in 1923. From 1921 to 1929, in fact, the

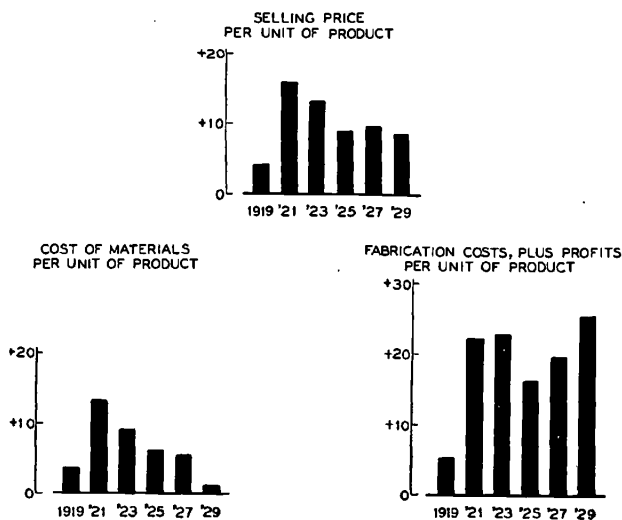
overhead costs plus profits, per unit of product, for steel works and rolling mills. These movements are probably due in considerable part to the change in reporting practice.

We should note, also, that in 1929 manufacturers had the option of reporting either the cost of materials purchased or the cost of materials consumed during the year, whereas in former enumerations the cost of materials consumed in the manufacture of products made during the year was requested. Here, again, we are at a loss to determine the influence of this change on the reported statistics, but it was probably slight.

costs to the community of the services of fabricating agents of all sorts (including those whose rewards take the form of profits) was practically constant, at a level never before attained, so far as may be judged from present records.

These various changes may be viewed in graphic form, with reference to a pre-war base, in Figure 76.

FIGURE 76
CHANGES IN AVERAGE SELLING PRICE, COST OF MATERIALS AND FABRICATION COSTS, PLUS PROFITS
MANUFACTURING INDUSTRIES OF THE UNITED STATES, 1914-1929
(PERCENTAGE DEVIATIONS FROM 1914 PARITY, IN DOLLARS OF CONSTANT PURCHASING POWER)



§ *Material costs and fabrication costs, individual industries.*—Widely divergent movements were found when we traced changes in the selling prices of manufactured products by individual industries. Comparable index numbers measuring changes in material costs and in fabrication cost, in current dollars, are given in the two following tables. The divergence of the rates of change of these index numbers is shown graphically in Figure 77.

From an advance of 53 per cent to a decline of 50 per cent within a six-year period—this is the amazing range of variation in changing costs of materials, per unit of product, among manufacturing industries. The extreme cases are, of course, exceptional, but they serve to emphasize how diverse are the forces affecting American industries. The degree of divergence of trends in material costs (if we may speak of trends over a six-year period) was materially higher between 1923 and

TABLE 156

CHANGES IN MATERIAL COSTS, MANUFACTURING INDUSTRIES OF THE UNITED STATES, 1923-1929

Index Numbers for 62 Industries, with Average Annual Rates of Change

Industry	Index numbers of cost of materials, per unit of product				Average annual rate of change 1923-1929 (per cent)
	1923	1925	1927	1929	
Hats, fur-felt	100.0	125.2	129.6	153.1	+6.7
Slaughtering and meat packing, wholesale..	100.0	127.4	125.5	133.9	+4.2
Cars, steam and electric railroad, not built in railroad repair shops.....	100.0	103.2	115.7	119.6	+3.3
Chocolate and cocoa products.....	100.0	110.4	130.7	111.2	+2.4
Musical instruments: organs.....	100.0	126.0	125.2	113.2	+1.7
Corn syrup, corn oil, and starch.....	100.0	121.0	97.8	118.5	+1.5
Linoleum	100.0	84.1	95.2	99.2	+0.5
Buttons	100.0	98.2	103.4	99.9	+0.2
Turpentine and rosin.....	100.0	121.0	110.4	102.7	-0.1
Canning and preserving: fruits and vegetables; pickles, jellies, preserves, and sauces	100.0	104.8	95.0	102.3	-0.1
Worsted goods	100.0	112.2	96.0	102.9	-0.4
Flour and other grain-mill products.....	100.0	133.3	113.6	101.7	-0.6
Butter and cheese.....	100.0	100.7	100.3	96.4	-0.6
Tanning materials, natural dyestuffs, mordants and assistants, and sizes.....	100.0	99.5	98.1	95.2	-0.8
Fertilizers	100.0	94.6	92.1	95.6	-0.8
Jute and linen goods.....	100.0	117.0	98.9	99.8	-0.9
Bone black, carbon black, and lampblack...	100.0	73.7	89.4	89.4	-0.9
Firearms	100.0	95.5	114.7	86.8	-1.0
Woolen goods	100.0	111.2	96.2	97.0	-1.2
Paints and varnishes	100.0	102.6	96.4	93.2	-1.3
Carriages, wagons, sleighs, and sleds.....	100.0	107.9	108.6	90.0	-1.4
Cordage and twine.....	100.0	124.0	105.3	95.9	-1.4
Canning and preserving: fish, crabs, shrimps, oysters, and clams.....	100.0	96.0	98.3	86.9	-1.9
Knit goods	100.0	99.2	91.9	89.9	-2.0
Wool shoddy	100.0	123.7	102.7	92.7	-2.0
Carpets and rugs, wool, other than rag....	100.0	113.6	101.8	88.9	-2.2
Soap	100.0	106.6	94.5	87.5	-2.5
Gas, manufactured, illuminating and heating	100.0	91.3	93.9	82.7	-2.6
Motor vehicles, including bodies and parts.	100.0	82.5	88.9	81.8	-2.7
Rice cleaning and polishing.....	100.0	141.0	108.8	90.6	-2.7
Asphalted-felt-base floor coverings.....	100.0	124.4	95.7	89.2	-2.9

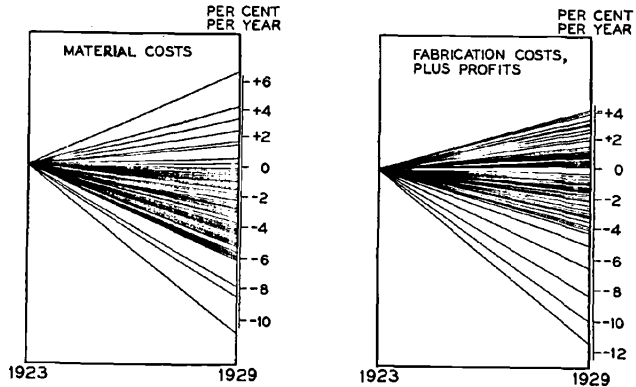
TABLE 156—Continued

Industry	Index numbers of cost of materials, per unit of product				Average annual rate of change 1923-1929 (per cent)
	1923	1925	1927	1929	
Oil, cake, and meal, cottonseed.....	100.0	80.1	64.0	88.6	-3.0
Rubber products	100.0	121.4	104.1	83.3	-3.2
Clay products (other than pottery) and non-clay refractories	100.0	90.6	90.2	80.1	-3.3
Motorcycles, bicycles, and parts.....	100.0	89.1	83.8	81.1	-3.4
Paper and pulp.....	100.0	92.7	83.8	79.6	-3.9
Condensed and evaporated milk.....	100.0	87.8	85.7	77.3	-3.9
Lime	100.0	93.2	88.6	77.2	-4.0
Petroleum refining	100.0	102.3	85.7	80.5	-4.0
Explosives	100.0	98.0	92.2	76.1	-4.2
Cement	100.0	95.4	93.9	74.4	-4.2
Oil, cake, and meal, linseed.....	100.0	99.1	83.9	79.0	-4.2
Hats, wool-felt	100.0	113.3	88.8	79.7	-4.4
Sand-lime brick	100.0	86.4	80.2	75.3	-4.6
Iron and steel: steel works and rolling mills ^a	100.0	88.0	81.7	74.7	-4.7
Lace goods, cotton	100.0	105.2	88.0	74.4	-5.0
Musical instruments: pianos.....	100.0	96.3	84.7	73.5	-5.0
Sugar, beet	100.0	84.9	92.3	68.2	-5.0
Lumber and timber products.....	100.0	93.6	85.8	72.0	-5.1
Ice, manufactured	100.0	84.4	76.5	72.9	-5.2
Oilcloth	100.0	103.5	75.4	75.5	-5.6
Wood distillation and charcoal manufacture	100.0	83.9	76.8	70.3	-5.7
Coke, not including gas-house coke.....	100.0	86.9	87.7	66.3	-5.7
Salt	100.0	84.0	82.8	67.5	-5.8
Iron and steel: blast furnaces.....	100.0	81.7	77.1	68.8	-5.8
Cast-iron pipe	100.0	83.3	80.9	66.8	-6.0
Cotton goods	100.0	95.7	69.2	73.8	-6.0
Silk manufactures	100.0	84.9	74.0	60.1	-7.9
Sugar refining, cane.....	100.0	66.0	70.0	55.9	-8.5
Sugar, cane, not including products of refineries	100.0	70.5	66.5	49.6	-10.8
Felt goods, wool or hair.....	100.0	107.8	101.2	—	—
Wire, drawn from purchased bars or rods.....	100.0	101.9	92.8	—	—
Average ^b	100.0	98.1	90.3	83.8	-3.0

^a See footnote pp. 385-6.^b Arithmetic average of the central items of a weighted frequency distribution, with weights based on cost of materials, averaged for the base year and the given year. The central one-fifth of the items, by weight, were included in computing the average.

FIGURE 77
ILLUSTRATING THE DIVERGENCE OF COST TRENDS
AMONG 60 MANUFACTURING INDUSTRIES
OF THE UNITED STATES, 1923-1929

AVERAGE RATES OF CHANGE IN MATERIAL COSTS AND IN
 FABRICATION COSTS, PLUS PROFITS, PER UNIT OF PRODUCT*



* Plotted on ratio scale. The lines here plotted relate to the industries listed in Tables 156 and 157, in the order of those listings. The last two entries are omitted.

1929 than it was between 1899 and 1914. This is indicated by a standard deviation (of the rates of change) of 3.7, as against 1.7, pre-war.

The weighted averages given at the foot of the table show the same general changes as do the 'ideal' index numbers previously derived. A somewhat greater decline in material costs in 1929 is indicated by the averages derived from the entries in Table 156.

In fabrication costs, again, there is variation from industry to industry. Such variation is to be expected in this case, for we are including in costs of fabrication the elusive element of profits. Here, again, we find a greater degree of divergence among manufacturing industries than is shown by the pre-war record. The standard deviation of the rates of change is 2.5, as against 1.9 for the earlier period.

We must make certain reservations in drawing conclusions from this comparison, but it is clearly to be inferred from the data of this and the preceding tables that post-war manufacturing conditions were less settled, less uniform from industry to industry, than was the case before the war. The difference, of course, is one of degree only, for variation within the manufacturing field has been too great, before as well as after the war, to justify one in speaking of uniformity or homogeneity of conditions.

The averages of central items given at the foot of Table 157 indicate declining fabrication costs, per unit of product, between 1923 and 1927, and a considerable advance from 1927 to 1929. This advance reflects, presumably, the higher profits of the latter year. These averages are higher than the 'ideal' index numbers previously presented.

TABLE 157

CHANGES IN FABRICATION COSTS, PLUS PROFITS, MANUFACTURING INDUSTRIES OF THE UNITED STATES, 1923-1929

Index Numbers for 62 Industries, with Average Annual Rates of Change

Industry	Index numbers of cost of fabrication, plus profits, per unit of product				Average annual rate of change 1923-1929 (per cent)
	1923	1925	1927	1929	
Sugar refining, cane.....	100.0	104.7	89.4	134.5	+4.2
Rice cleaning and polishing.....	100.0	138.0	105.0	143.3	+4.1
Cars, steam and electric railroad, not built in railroad repair shops.....	100.0	104.9	124.1	123.3	+4.0
Knit goods.....	100.0	103.4	113.0	121.9	+3.5
Corn syrup, corn oil, and starch.....	100.0	91.7	82.9	124.1	+3.2
Musical instruments: organs.....	100.0	118.3	125.7	122.0	+3.2
Oil, cake, and meal, linseed.....	100.0	148.8	115.5	134.1	+2.8
Flour and other grain-mill products.....	100.0	111.4	112.1	118.9	+2.6
Motorcycles, bicycles, and parts.....	100.0	111.6	117.4	114.3	+2.2
Soap.....	100.0	90.9	106.2	108.6	+2.0
Oil, cake, and meal, cottonseed.....	100.0	115.1	112.0	112.4	+1.6
Linoleum.....	100.0	113.9	98.6	116.0	+1.5
Motor vehicles, including bodies and parts.....	100.0	115.7	111.1	111.0	+1.3
Hats, fur-felt.....	100.0	105.2	103.2	109.6	+1.3
Explosives.....	100.0	91.4	98.9	105.7	+1.2
Ice, manufactured.....	100.0	106.1	106.7	108.3	+1.2
Paints and varnishes.....	100.0	99.0	106.1	105.1	+1.1
Butter and cheese.....	100.0	79.8	95.4	101.0	+1.0
Slaughtering and meat packing, wholesale..	100.0	109.6	98.5	110.5	+1.0
Iron and steel: steel works and rolling mills ^a	100.0	101.5	97.0	105.9	+0.7
Sand-lime brick.....	100.0	113.9	110.2	105.6	+0.6
Gas, manufactured, illuminating and heating.....	100.0	104.6	99.8	105.4	+0.6
Buttons.....	100.0	107.6	111.2	102.2	+0.5
Wood distillation and charcoal manufacture.....	100.0	69.7	84.5	97.5	+0.4
Condensed and evaporated milk.....	100.0	91.0	100.9	99.4	+0.4
Tanning materials, natural dyestuffs, mordants and assistants, and sizes.....	100.0	105.8	107.9	102.0	+0.4
Sugar, cane, not including products of refineries.....	100.0	37.9	83.8	83.5	-0.2
Carpets and rugs, wool, other than rag....	100.0	87.0	92.4	95.6	-0.4
Paper and pulp.....	100.0	96.3	96.9	95.6	-0.6
Cordage and twine.....	100.0	96.5	96.1	95.0	-0.8
Firearms.....	100.0	93.9	85.1	97.9	-0.8
Chocolate and cocoa products.....	100.0	87.3	81.9	96.9	-0.8

^a See footnote, pp. 385-6.

TABLE 157—Continued

Industry	Index numbers of cost of fabrication, plus profits, per unit of product				Average annual rate of change 1923-1929 (per cent)
	1923	1925	1927	1929	
Lace goods, cotton.....	100.0	95.2	85.0	97.7	-0.9
Salt	100.0	100.1	89.8	96.6	-1.1
Oilcloth	100.0	71.8	81.4	90.7	-1.1
Cast-iron pipe	100.0	98.7	87.4	96.8	-1.1
Fertilizers	100.0	109.9	80.9	101.0	-1.3
Clay products (other than pottery) and non-clay refractories	100.0	95.1	89.3	93.2	-1.4
Woolen goods	100.0	89.0	88.7	90.4	-1.6
Worsted goods	100.0	83.2	82.9	89.8	-1.7
Wool shoddy	100.0	88.7	104.0	83.6	-1.8
Lumber and timber products.....	100.0	84.6	77.9	91.2	-1.9
Musical instruments: pianos.....	100.0	96.4	98.8	86.4	-2.0
Canning and preserving: fruits and vegetables; pickles, jellies, preserves, and sauces	100.0	86.6	80.3	88.2	-2.3
Rubber products	100.0	99.3	97.6	85.2	-2.4
Petroleum refining	100.0	101.9	73.6	93.2	-2.6
Jute and linen goods.....	100.0	99.1	94.1	83.6	-2.8
Iron and steel: blast furnaces.....	100.0	90.0	79.1	86.0	-2.9
Carriages, wagons, sleighs, and sleds.....	100.0	101.3	89.5	84.8	-3.0
Turpentine and rosin.....	100.0	106.3	86.2	87.3	-3.0
Hats, wool-felt	100.0	90.1	90.8	79.2	-3.4
Cotton goods	100.0	86.2	84.1	78.3	-3.8
Silk manufactures	100.0	96.6	86.0	80.2	-3.8
Cement	100.0	96.3	83.7	80.5	-3.9
Lime	100.0	102.0	89.2	77.6	-4.3
Canning and preserving: fish, crabs, shrimps, oysters, and clams.....	100.0	85.2	80.8	71.8	-5.1
Coke, not including gas-house coke.....	100.0	68.6	63.4	68.0	-6.6
Asphalted-felt-base floor coverings	100.0	83.1	60.0	62.8	-8.5
Bone black, carbon black, and lampblack... ..	100.0	66.1	59.5	53.2	-10.1
Sugar, beet	100.0	65.9	45.1	53.9	-11.5
Felt goods, wool or hair.....	100.0	93.9	106.5	—	—
Wire, drawn from purchased rods or bars..	100.0	98.2	97.2	—	—
Average ^b	100.0	99.2	96.3	101.4	+0.1

^b Arithmetic average of the central items of a weighted frequency distribution, with weights based on 'value added', averaged for the base year and the given year. The central one-fifth of the items, by weight, were included in computing the average.

CHANGES IN LABOR COSTS AND IN OTHER FABRICATION COSTS,
MANUFACTURING INDUSTRIES

We now break fabrication cost into its two constituent elements—labor costs and a combination of overhead costs, salaries and profits. Movements of index numbers measuring the cost of these services, per unit of product, between 1923 and 1929, are shown graphically in Figure 78. The index numbers plotted are those which define changes in terms of dollars of constant purchasing power.

TABLE 158

CHANGES IN TOTAL FABRICATION COSTS, LABOR COSTS AND OVERHEAD COSTS
PLUS PROFITS, 1923-1929

Manufacturing Industries of the United States

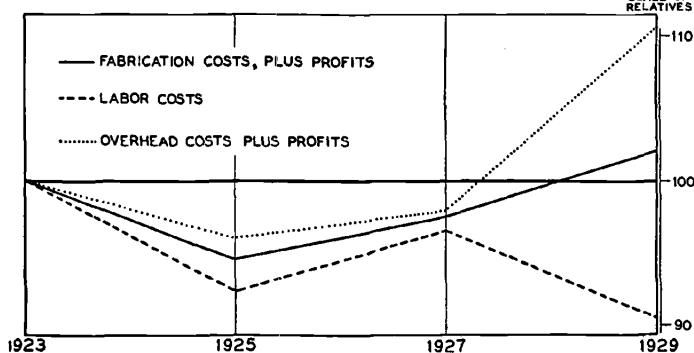
(All measurements relate to changes per unit of product)

(1) Year	(2) (3) (4) In current dollars			(5) (6) (7) In dollars of constant purchasing power		
	Fabrication costs, plus profits	Labor costs	Overhead costs plus profits	Fabrication costs, plus profits	Labor costs	Overhead costs plus profits
1923	100.0	100.0	100.0	100.0	100.0	100.0
1925	97.3	95.0	98.8	94.6	92.4	96.0
1927	92.4	91.6	92.9	97.5	96.6	97.9
1929	96.8	85.7	104.8	102.1	90.5	110.6
Average annual rate of change (per cent)	-0.7	-2.5	+0.4	+0.5	-1.3	+1.7

For the present purpose we should perhaps center attention on the index numbers defining cost changes in terms of dollars of constant purchasing power. Granting the accuracy of the deflating medium (the wholesale price index of the United States Bureau of Labor Statistics) these measures indicate the real changes in the costs of fabrication, expressed in terms of commodities.

Real fabrication costs, we have noted, fell by more than five per cent between 1923 and 1925, and advanced almost eight per cent between 1925 and 1929. The present table shows that the two component elements of these costs followed strikingly divergent

FIGURE 78
 CHANGES IN AVERAGE FABRICATION COSTS, LABOR COSTS
 AND OVERHEAD COSTS PLUS PROFITS,
 PER UNIT OF PRODUCT
 MANUFACTURING INDUSTRIES OF THE UNITED STATES, 1923-1929
 (IN DOLLARS OF CONSTANT PURCHASING POWER)



courses. Labor costs per unit of product declined by almost ten per cent over this six-year period. The cost of overhead, management and ownership, per unit of product, declined four per cent between 1923 and 1925, advanced fifteen per cent during the next four years.¹

Here, again, we must view these changes against the background of earlier tendencies. Real fabrication costs declined appreciably from 1899 to 1914, advanced sharply from 1914 to 1923. This is also the story of the changes in labor costs and in overhead costs plus profits. The pre-war decline was more pronounced

¹ Between 1923 and 1929 taxes constituted a declining proportion of the elements we have lumped under the heading 'overhead costs plus profits'. The following figures, based on data published by the Census Bureau, supplemented by estimates based on compilations of the Bureau of Internal Revenue, indicate the changes occurring in taxes and salaries, as component parts of the total.

Item of cost	Percentage of total overhead costs plus profits			
	1923	1925	1927	1929
Taxes, total	7.5	7.4	6.5	5.8
Salaries	18.9	18.2	19.3	17.7
Elements other than taxes and salaries.....	73.6	74.4	74.2	76.5
Overhead costs plus profits, total	100.0	100.0	100.0	100.0

(Data relating to rent and to payments for contract work, which appeared in similar summaries for earlier years, are not available for the period 1923-1929. Payments for contract work, for which we have figures for part of the period, made up 4.2 per cent of the total in 1923, 3.7 per cent in 1925.)

In addition to the drop in taxes, it is to be noted that the amounts paid in

for overhead costs (including profits), while the war-time advance was greater for labor costs. The record of the six years from 1923 to 1929, then, is one of labor costs declining from a conspicuously high level (the peak of labor costs came in 1921), of charges for the services of management and ownership advancing from a level already relatively high in 1923.

We have noted the highly significant reversal, after 1914, of the tendency toward constantly lower fabrication costs (i.e., real costs) which had prevailed during the decade and a half preceding the war. There is no doubt that the rising trend of prices, and the accompanying lag of various production costs, played an important part in this cheapening of manufactured goods. Insistent war-time demands, and the ability of agents of fabrication to resist price liquidation and to make prompt adaptation to the changed conditions brought by the recession of 1920-21, served to place these agents in a position of advantage, in relation to raw material producers, in the ensuing years. The movement toward lower real costs set in again, after 1921, but from the evidence presented above there emerges the rather remarkable fact that the composite of amounts going to overhead, management and ownership failed to decline from the high level reached in 1923. Minor reductions in 1925 and 1927 were offset by a renewed advance in 1929 to a level more than ten per cent higher, per unit of product, than in the preceding peak year, 1923.¹

salaries declined, as a fractional part of overhead costs plus profits, except during the minor depression of 1927.

If taxes be excluded from overhead costs plus profits, the index numbers in column (4) of Table 158 will be altered. A corrected index, expressed in current dollars, follows.

Year	Overhead costs plus profits, per unit of product, manufacturing industries (excluding all taxes)
1923	100
1925	99
1927	94
1929	107

The correction modifies the original index numbers only slightly.

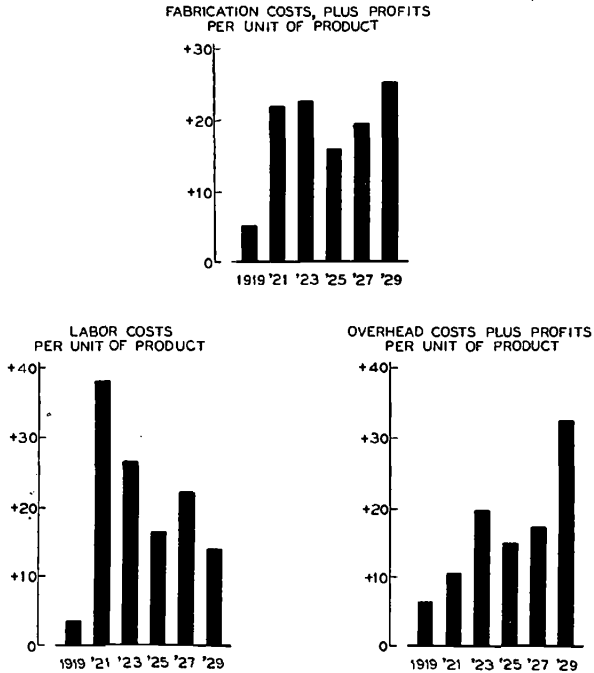
¹ The fact that the costs of 'mill and shop supplies', which were, in general, classified among material costs in census compilations prior to 1929, are included among 'overhead costs plus profits' in the returns for 1929 would account for a slight advance in this item between 1927 and 1929. (See footnote, p. 385.) But the weight of this item among all overhead costs plus profits is small, in manufacturing industries at large.

To the extent that distributive costs enter into the manufacturer's 'value of product' a somewhat uncertain element is introduced into 'overhead costs plus profits'

These changes, with reference to a 1914 base, are graphically portrayed in Figure 79.

The figures we have cited point to one of the most curious features of the post-war situation. It is the accepted view that the position of the manufacturer is most happy when prices are rising.

FIGURE 79
CHANGES IN AVERAGE FABRICATION COSTS,
LABOR COSTS AND OVERHEAD COSTS PLUS PROFITS
MANUFACTURING INDUSTRIES OF THE UNITED STATES, 1914-1929
 (PERCENTAGE DEVIATIONS FROM 1914 PARITY,
 IN DOLLARS OF CONSTANT PURCHASING POWER)



His labor costs and overhead costs, it has been assumed, rise less rapidly than his selling prices. Raw materials, traditionally sensitive to changes in the value of money, might rise more rapidly, but

for recent years. Certain tendencies have worked toward lower merchandising costs, but in the case of luxury goods such costs have remained high, and have perhaps risen. For goods of this class (as well as for certain trade-marked non-luxuries) advertising and selling costs constitute a large proportion of the final value of product, and such costs have not reflected the gain in efficiency registered in manufacturing operations.

the gains resulting from lagging labor and overhead costs might be expected to outweigh the advance in material prices. Per unit of product, this situation is assumed to swell the margin between manufacturing costs and selling prices.

So far as we may judge from the present figures this margin was expanded between 1923 and 1929, but this occurred under conditions of falling general prices rather than with advancing prices. Increasing output and rapidly increasing productivity brought substantial declines in labor costs per unit of product, even with high and rising wages. Conditions in world markets for raw materials favored the buyer, and gave the manufacturer the benefit of relatively low prices for such materials. In this situation labor costs, per unit of manufactured goods, and material costs, per unit, declined more rapidly than selling prices. The gap in our information has to do with the course of overhead costs. During this period capital investments in manufacturing plant and equipment were increasing at a fairly rapid rate. These investments, we have seen, were made at relatively high prices. It is thus not impossible that overhead costs per unit of product were advancing toward the close of this period, despite a swelling volume of manufacturing production. But if such advance occurred there is no evidence that it offset other gains sufficiently to curtail profits per unit of product. In most manufacturing industries falling general prices between 1923 and 1929 brought to the producer the gains he has been supposed to reap under conditions of advancing prices and brought, in addition, declining raw material prices. These fortunate conditions combined to maintain, and in many industries to swell, profit margins. During this period we appear to have had in the majority of manufacturing industries the curious and perhaps unprecedented condition of falling general prices and falling prices of manufactured goods, combined with an expanding margin between costs and selling prices of manufactured goods, and with manufacturing profits which increased not only in the aggregate, but per unit of product as well.

A Comparison of Sales and Profits, Manufacturing Corporations

It is regrettable that census statistics of manufacturing industries do not permit a separation of profits from overhead costs proper. Relevant supplementary information is furnished by re-

cent compilations of the Department of Commerce.¹ The following data relate to 2,046 large manufacturing corporations, the aggregate net profits of which constituted approximately 60 per cent of the total net profits of all manufacturing corporations.

TABLE 159
SALES AND PROFITS, 2,046 MANUFACTURING CORPORATIONS, 1922-1929
(In millions of dollars)

Year	Sales	Profits ^a
1922	18,103	1,784
1923	22,538	2,210
1924	22,850	2,023
1925	25,736	2,564
1926	27,309	2,759
1927	27,057	2,252
1928	28,219	2,736
1929 *	—	3,395

* The entry for 1929 is estimated from data relating to 71 manufacturing corporations. The records for the 71 corporations are sufficiently close to those for the larger sample to justify the making of estimates for the larger group for 1929.

^a Net profit is defined by R. C. Epstein as "taxable net income, plus non-taxable items where present (i.e., dividends from other corporations and tax-exempt interest), after all charges but, unless otherwise stated, before Federal taxes."

Our immediate interest is in profits in relation to physical output. Here, again, we are thrown upon methods of approximation. From the data on dollar value of sales we may derive an index of physical volume, correcting the sales record by an index of prices of manufactured goods. Data and results appear in the following table. Certain of these series are shown graphically in Figure 80.

These estimates indicate that the physical volume of sales of the manufacturing establishments here represented increased at the notable rate of 7.3 per cent a year between 1922 and 1929.² Profits kept pace with this rapidly expanding volume of production, and, in fact, advanced at a fractionally higher rate. This means that profit per unit of product, as shown in the last column, showed a slight net advance³ during this era of economic expansion. The

¹ *A Source-Book for the Study of Industrial Profits*, R. C. Epstein and F. M. Clark, U. S. Department of Commerce, 1932.

² This is a higher rate than that at which manufacturing production in general increased. The difference is probably due to the fact that the present sample of 2,046 manufacturing concerns is heavily weighted by large concerns.

³ The computed rate of change is fractionally above zero, though the figure, as rounded off in Table 160, is 0.0.

TABLE 160
 INDEX NUMBERS OF SALES, PRICES, PROFITS AND OUTPUT, 1922-1929
 2,046 Manufacturing Corporations

(1) Year	(2) Sales (dollar value)	(3) Prices ^a (whole- sale)	(4) Estimated physical volume of sales	(5) Profits	(6) Estimated profit per unit of product sold
1922	100.0	100.0	100.0	100.0	100.0
1923	124.5	105.7	117.8	123.9	105.2
1924	126.2	101.5	124.3	113.4	91.2
1925	142.2	104.7	135.8	143.7	105.8
1926	150.9	103.2	146.2	154.7	105.8
1927	149.5	97.7	153.0	126.2	82.5
1928	155.9	98.2	158.8	153.4	96.6
1929	167.7 *	96.9	173.1	190.3	109.9
Average annual rate of change (per cent)	+6.3	-0.8	+7.3	+7.4	0.0

* Estimated from gross sales, all manufacturing corporations, as reported to the Bureau of Internal Revenue.

^a Simple average of an index of prices of manufactured goods based upon value of product per unit, as derived from the Census of Manufactures, and a combination of the Bureau of Labor Statistics indexes of wholesale prices of semi-manufactured and finished products, weighted one and six, respectively. This index, which differs slightly from that cited in the preceding chapter, is the most appropriate available deflator.

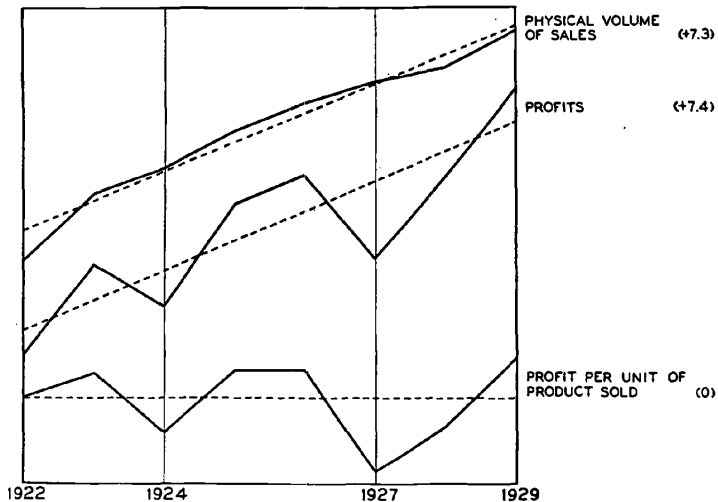
average rate of growth is small because of the declines of 1927 and 1928, but if we compare terminal years alone we note that the period ends in 1929 with profits per unit of product higher by 10 per cent than in 1922, while the physical volume of sales was greater by 73 per cent. There is here no evidence that, among the manufacturing industries represented, an increasing volume of output was accompanied by reductions in profits per unit of product and corresponding declines in selling price.¹

¹ Since the detailed compilations in *A Source-Book for the Study of Industrial Profits* extend only through 1928, it has been necessary to estimate 1929 sales and profits for the 2,046 manufacturing corporations included in the Department of Commerce sample. The corporations in this sample are large ones, and therefore Epstein has based his estimate of 1929 profits upon returns for 71 large corporations, rather than upon all corporate returns. (Previous records of the 71 corporations resembled those of the larger sample of 2,046.) It is this estimate which has been used in the tables and text, above.

A series of measurements on profits per unit of product sold may be derived from the returns to the Bureau of Internal Revenue on the profits and gross sales

FIGURE 80
CHANGES IN ESTIMATED PHYSICAL VOLUME OF SALES, IN
AGGREGATE PROFITS AND IN PROFIT PER UNIT OF PRODUCT

MANUFACTURING INDUSTRIES OF THE UNITED STATES, 1922-1929



Plotted on ratio scale. The figures in parentheses define average annual rates of change (in percentage form).

These figures may not be the most significant we may secure. The compilations of the Department of Commerce indicate that corporations in certain industrial classes suffered declining profits

of all manufacturing corporations, the dollar value of sales being deflated, as in Table 160. Data on profits and sales are, presumably, comparable, though the number of reporting corporations varies from year to year. These measurements follow.

Year	Index of estimated net profit, per unit of goods sold, manufacturing corporations
1922	100
1923	112
1924	89
1925	110
1926	106
1927	83
1928	100
1929	104

The year-to-year variations in profits per unit of goods sold are pronounced, for this group. The 1929 figure is four per cent greater than that for 1922, but, as a result of high values in 1923 and 1925, the general trend declines slightly over the eight-year period. The average annual rate of decline of the series is 0.6 per cent. It should be noted that, for this group, net profits are equivalent to taxable net income. Epstein's definition is a broader one.

during this period. These corporations, a distinct minority of the total studied, depress the aggregate somewhat. If we eliminate this group, including 815 corporations and representing 28 industries,¹ we have left a sample representing 45 industries. These industries did approximately 85 per cent of the total business of manufacturing corporations (by sales) in 1928, and contained approximately 83 per cent of the invested capital. For this group the record for the years 1922 to 1929 is a most prosperous one. Relevant data and derived measurements appear in the next table. The data are plotted in Figure 81.

TABLE 161

SALES, PRICES, PROFITS AND OUTPUT, 1922-1929
1,231 Corporations in 45 Manufacturing Industries of the United States

(1) Year	(2) Sales (dollar value)		(3)	(4) Prices (wholesale)	(5) Esti- mated physical volume of sales	(6) Profits		(7)	(8) Esti- mated profit per unit of product sold
	In mil- lions of dollars	In rela- tives	In rela- tives	In rela- tives	In mil- lions of dollars	In rela- tives	In rela- tives		
1922	14,763	100.0	100.0	100.0	1,359	100.0	100.0		
1923	18,288	123.9	105.7	117.2	1,653	121.6	103.8		
1924	18,957	128.4	101.5	126.5	1,607	118.2	93.4		
1925	21,646	146.6	104.7	140.0	2,144	157.8	112.7		
1926	23,085	156.4	103.2	151.6	2,335	171.8	113.3		
1927	23,012	155.9	97.7	159.6	1,891	139.1	87.2		
1928	24,080	163.1	98.2	166.1	2,377	174.9	105.3		
1929	—	175.5*	96.9	181.1	2,965**	218.2**	120.5		
Average annual rate of change (per cent) ..		+7.0	-0.8	+8.1		+9.8	+1.5		

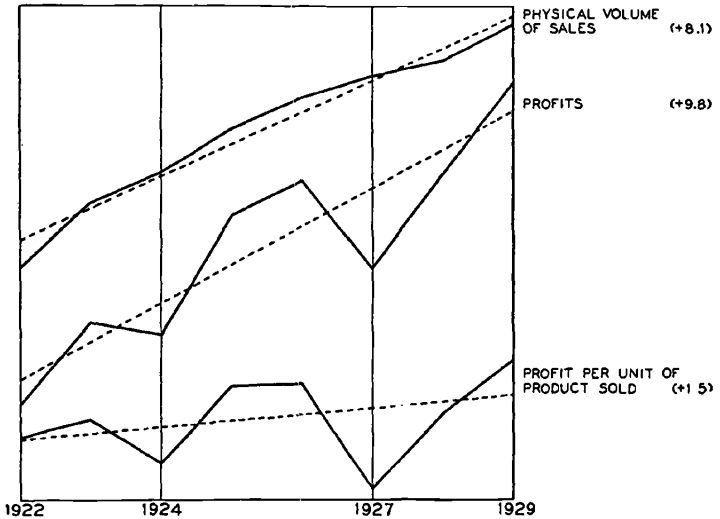
* Estimated from data relating to all manufacturing corporations.

** Estimated on the basis of returns for 71 corporations.

¹ The 28 industries in which profit rates showed definitely declining trends are the following: dairy products, canned foods, cotton converting, weaving woolens, silk weaving, carpets, knit goods, miscellaneous textiles, lumber manufacturing, planing mills, millwork, furniture (non-metal), miscellaneous lumber, blank paper, miscellaneous paper, book and music publishing, paints, toilet preparations, ceramics, glass, Portland cement, heating machinery, textile machinery, engines, railroad equipment, hardware, pianos, miscellaneous special manufacturing industries.

FIGURE 81

CHANGES IN ESTIMATED PHYSICAL VOLUME OF SALES, IN
AGGREGATE PROFITS AND IN PROFIT PER UNIT OF PRODUCT
FORTY-FIVE SELECTED MANUFACTURING INDUSTRIES, 1922-1929



Plotted on ratio scale. The figures in parentheses define average annual rates of change (in percentage form).

For this group of corporations in the more profitable industries, profits per unit of product advanced about 13 per cent between 1922 and 1926, with one check in 1924. The recession of 1927 brought a considerable decline, but during the next two years a rapid advance carried the index to the high point for the period, more than 20 per cent above the 1922 base. (The figure for 1929 is an estimate based upon records of sales for all manufacturing industries and upon profits in a sample group of 71 corporations.) The rate of advance in profits per unit of product between 1922 and 1929 averaged 1.5 per cent a year.¹

That the years between the two great post-war depressions were prosperous ones for manufacturing corporations requires no demonstration. Of immediate significance is the fact that profits,

¹ Net profits, as they enter into the above calculations, include dividends received from other corporations. In measuring changes in profits per unit of product, manufacturing profits proper are of chief concern. On the basis of data available in the *Source-Book* we may make a correction for dividends received by manufacturing corporations from other domestic corporations. Corrections for the 45 industries entering into the above calculations appear below. The last figure

per unit of product, showed no decline between 1922 and 1929 among the industries here represented. The rate of change per annum was fractionally above zero for the entire group, and +1.5 per cent for corporations from the 45 industries in which profit rates advanced, or were maintained, during this period. A check to this advance occurred in 1924, a still more serious check in 1927,¹ but the upward push over-rode these, and in 1929 profits per unit of product were apparently at a higher level than in 1922 and indeed, for many corporations, were higher than at any time during the years included in our study.

A variable volume of business played a part, of course, in these fluctuations in profits. Modern industry, with its large capital investment and heavy overhead charges, is to a great extent dependent for profits upon a full volume of production. An increase in output reduces the overhead cost borne by each unit of goods produced. But that profits per unit of goods sold should have advanced, for this group of corporations, in the face of the strong competition which is assumed to have prevailed during this period, remains a curious fact. The explanation may lie in the expansion of consumer credit at a rate which permitted sales to continue without the full price reduction which might otherwise have accompanied declining

in column (2) is estimated from Treasury statistics for all manufacturing corporations.

(1)	(2)	(3)	(4)	(5)
Year	Amounts received as dividends (millions of dollars)	Net profits less dividends received (millions of dollars)	Net profits less dividends (relative numbers)	Net profits less dividends, per unit of product (relative numbers)
1922	154	1,205	100.0	100.0
1923	154	1,499	124.4	106.1
1924	145	1,462	121.3	95.9
1925	234	1,910	158.5	113.2
1926	288	2,047	169.9	112.1
1927	248	1,643	136.3	85.4
1928	330	2,047	169.9	102.3
1929	446	2,519	209.0	115.4

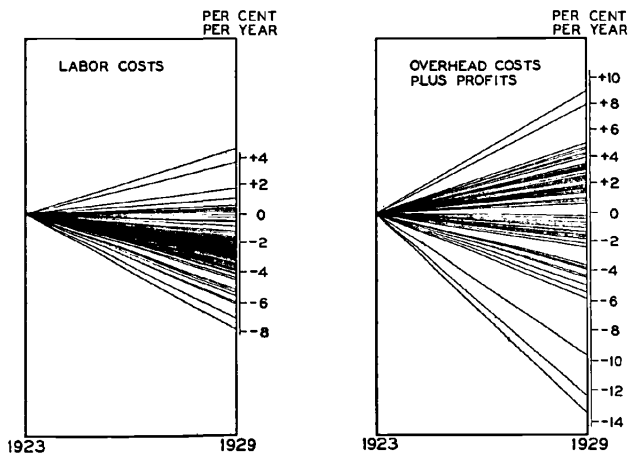
During this period surplus funds were invested in the stock of other corporations in increasing degree, and dividends constitute an increasing percentage of total net profits. The entries in the last column indicate, however, that manufacturing profits proper increased more rapidly than volume of output, over the period as a whole. Rather sharp recessions appear in 1924 and in 1927, but the rate of change averaged +0.6 per cent per year, for the period.

¹ It is a significant fact that aggregate profits and profits per unit of product declined far more sharply in 1927 than in 1924, though the business recession of 1927 was distinctly less severe than that of 1924. It is possible that by 1926-27 the basis of profits was less sound than in 1923-24, and that a slighter check to expansion had more serious effects.

material costs and falling labor costs. Again, the swelling of purchasing power through the reaping of non-recurrent, but considerable, speculative profits may have been a factor in the maintenance of prices and the growth of profits. But be the reason what it may, the fact is clear that in a large percentage of manufacturing industries profit margins expanded during the general price decline of the nineteen-twenties. An ultimate explanation of the economic collapse which was precipitated in 1929 must give full weight to this striking fact.

§ *Labor costs and other fabrication costs, individual industries.*—Supplementing the general averages given in Table 158, we have the following record of changes in labor costs, per unit of product, in each of 62 manufacturing industries. The divergent movements of these index numbers, which are expressed in terms of current dollars, are illustrated in Figure 82.

FIGURE 82
ILLUSTRATING THE DIVERGENCE OF COST TRENDS
AMONG 60 MANUFACTURING INDUSTRIES
OF THE UNITED STATES, 1923-1929
AVERAGE RATES OF CHANGE IN LABOR COSTS AND IN
OVERHEAD COSTS PLUS PROFITS, PER UNIT OF PRODUCT*



* Plotted on ratio scale. The lines here plotted relate to the industries listed in Tables 162 and 163, in the order of those listings. The last two entries are omitted.

The general sweep of the tendency toward lower labor costs in manufacturing industries is attested by the fact that in 1929 only six industries out of 60 showed higher labor costs, per unit of product, than in 1923. Increasing volume of production, more efficient equipment, enhanced skill and improvements in organization undoubtedly

TABLE 162

CHANGES IN LABOR COSTS, MANUFACTURING INDUSTRIES OF THE UNITED STATES,
1923-1929

Index Numbers for 62 Industries, with Average Annual Rates of Change

Industry	Index numbers of labor costs, per unit of product				Average annual rate of change 1923-1929 (per cent)
	1923	1925	1927	1929	
Musical instruments: organs.....	100.0	127.8	128.0	136.9	+4.6
Knit goods	100.0	106.0	117.2	122.5	+3.6
Cars, steam and electric railroad, not built in railroad repair shops.....	100.0	95.9	107.4	107.5	+1.7
Linoleum	100.0	87.7	104.7	100.6	+1.0
Motorcycles, bicycles, and parts.....	100.0	93.1	100.8	101.0	+0.5
Lace goods, cotton.....	100.0	108.6	106.1	102.2	+0.2
Rice cleaning and polishing.....	100.0	98.4	105.5	98.8	+0.2
Wood distillation and charcoal manufacture	100.0	91.2	94.3	100.0	+0.2
Oil, cake, and meal, cottonseed.....	100.0	93.4	103.6	97.1	+0.1
Musical instruments: pianos.....	100.0	96.9	105.4	96.4	-0.1
Paints and varnishes.....	100.0	103.0	104.9	98.3	-0.2
Slaughtering and meat packing, wholesale.	100.0	100.4	98.9	97.3	-0.5
Hats, fur-felt	100.0	102.1	92.9	99.9	-0.5
Firearms	100.0	80.7	86.6	93.2	-0.8
Worsted goods	100.0	94.6	92.0	92.9	-1.3
Bone black, carbon black, and lampblack...	100.0	81.4	100.9	85.6	-1.3
Buttons	100.0	101.6	102.1	90.6	-1.4
Motor vehicles, including bodies and parts.	100.0	104.8	102.9	90.2	-1.6
Corn syrup, corn oil, and starch.....	100.0	99.9	92.5	91.9	-1.6
Ice, manufactured	100.0	88.0	81.4	91.3	-1.8
Oil, cake, and meal, linseed.....	100.0	94.0	100.0	85.4	-2.0
Woolen goods	100.0	96.3	92.7	88.2	-2.0
Explosives	100.0	86.7	88.1	86.7	-2.1
Clay products (other than pottery) and non-clay refractories	100.0	96.1	92.0	87.5	-2.2
Flour and other grain-mill products.....	100.0	99.9	93.2	87.9	-2.2
Lumber and timber products.....	100.0	88.8	86.5	87.1	-2.2
Iron and steel: steel works and rolling mills	100.0	95.7	93.1	86.5	-2.3
Turpentine and rosin.....	100.0	89.8	89.3	85.8	-2.3
Wool shoddy	100.0	94.1	107.3	80.0	-2.4
Hats, wool-felt	100.0	97.7	94.2	85.7	-2.4
Carpets and rugs, wool, other than rag....	100.0	95.0	100.4	82.4	-2.5
Butter and cheese.....	100.0	82.7	90.3	82.3	-2.5
Sand-lime brick	100.0	105.9	98.7	85.3	-2.6
Asphalted-felt-base floor coverings.....	100.0	115.4	90.6	90.2	-2.7
Cast-iron pipe	100.0	91.2	85.0	85.2	-2.8

TABLE 162—Continued

Industry	Index numbers of labor costs, per unit of product				Average annual rate of change 1923-1929 (per cent)
	1923	1925	1927	1929	
Fertilizers	100.0	95.2	92.0	83.6	-2.8
Gas, manufactured, illuminating and heating	100.0	110.6	97.2	85.1	-2.9
Chocolate and cocoa products	100.0	94.5	83.5	85.5	-3.0
Cordage and twine	100.0	92.0	90.9	81.9	-3.0
Jute and linen goods	100.0	96.1	91.9	81.5	-3.2
Rubber products	100.0	88.5	86.0	81.2	-3.3
Lime	100.0	94.8	91.1	79.7	-3.5
Canning and preserving: fruits and vegetables; pickles, jellies, preserves, and sauces	100.0	95.9	87.2	80.8	-3.6
Soap	100.0	89.2	90.3	77.9	-3.6
Silk manufactures	100.0	94.5	87.9	79.7	-3.7
Sugar, cane, not including products of refineries	100.0	104.1	88.5	80.8	-3.9
Paper and pulp	100.0	92.8	83.6	79.8	-3.9
Cotton goods	100.0	90.9	87.5	77.7	-3.9
Cement	100.0	91.3	84.2	78.0	-4.1
Sugar refining, cane	100.0	77.4	76.4	77.3	-4.1
Canning and preserving: fish, crabs, shrimps, oysters, and clams	100.0	89.1	93.3	72.3	-4.4
Tanning materials, natural dyestuffs, mordants and assistants, and sizes	100.0	82.6	79.9	75.1	-4.5
Oilcloth	100.0	87.4	76.1	74.1	-5.2
Carriages, wagons, sleighs, and sleds	100.0	97.4	86.1	71.9	-5.3
Petroleum refining	100.0	77.7	76.3	71.3	-5.3
Iron and steel: blast furnaces	100.0	84.2	82.7	68.4	-5.6
Sugar, beet	100.0	82.7	79.5	67.5	-6.0
Salt	100.0	89.2	81.4	67.2	-6.1
Condensed and evaporated milk	100.0	80.0	75.1	62.9	-7.1
Coke, not including gas-house coke	100.0	84.6	76.9	58.7	-7.9
Felt goods, wool or hair	100.0	94.4	104.1	—	—
Wire, drawn from purchased bars or rods	100.0	96.7	97.6	—	—
Average ^a	100.0	95.4	92.5	86.6	-2.3

^a Arithmetic average of the central items of a weighted frequency distribution, with weights based on aggregate wages paid, averaged for the base year and the given year. The central one-fifth of the items, by weight, were included in computing the average.

contributed to this reduction of labor costs. But these factors operated, it must be recalled, under the conditions of very high labor costs which were left by the recession and depression of 1920-21. There was room for a reduction of labor costs.

More varied than the changes in labor costs were the movements of overhead costs plus profits among manufacturing industries between 1923 and 1929. The rates of change of these index numbers are plotted in Figure 82.

TABLE 163

CHANGES IN OVERHEAD COSTS PLUS PROFITS, MANUFACTURING INDUSTRIES OF THE UNITED STATES, 1923-1929

Index Numbers for 62 Industries, with Average Annual Rates of Change

Industry	Index numbers of overhead costs plus profits, per unit of product				Average annual rate of change 1923-1929 (per cent)
	1923	1925	1927	1929	
Sugar cane, refining.....	100.0	127.2	100.1	181.6	+9.0
Cars, steam and electric railroad, not built in railroad repair shops.....	100.0	123.8	159.1	156.5	+7.9
Rice cleaning and polishing.....	100.0	147.9	104.9	154.4	+4.9
Oil, cake, and meal, linseed.....	100.0	179.1	123.8	161.0	+4.6
Corn syrup, corn oil, and starch.....	100.0	89.4	80.3	133.0	+4.6
Iron and steel: steel works and rolling mills ^a	100.0	109.2	102.3	132.2	+4.1
Flour and other grain-mill products.....	100.0	115.4	118.6	129.6	+4.1
Motorcycles, bicycles, and parts.....	100.0	135.4	138.6	131.3	+3.9
Knit goods.....	100.0	101.1	109.4	121.4	+3.4
Motor vehicles, including bodies and parts.....	100.0	124.7	117.8	128.0	+3.3
Soap.....	100.0	91.3	110.3	116.4	+3.3
Sand-lime brick.....	100.0	121.3	120.7	124.1	+3.1
Hats, fur-felt.....	100.0	108.6	114.7	120.4	+3.1
Condensed and evaporated milk.....	100.0	95.8	112.3	115.4	+3.0
Buttons.....	100.0	115.7	123.5	117.8	+2.7
Explosives.....	100.0	93.0	102.6	112.2	+2.3
Ice, manufactured.....	100.0	113.7	117.4	115.5	+2.3
Musical instruments: organs.....	100.0	112.1	124.1	112.4	+2.2
Butter and cheese.....	100.0	78.8	97.2	107.9	+2.2
Tanning materials, natural dyestuffs, mordants and assistants, and sizes.....	100.0	116.7	121.0	114.6	+2.2
Oil, cake, and meal, cottonseed.....	100.0	123.3	115.2	118.1	+2.0
Slaughtering and meat packing, wholesale.....	100.0	115.9	98.2	119.6	+1.9
Linoleum.....	100.0	126.9	95.6	123.7	+1.8
Salt.....	100.0	107.3	95.4	116.2	+1.8
Paper and pulp.....	100.0	99.2	108.1	108.7	+1.7
Sugar, cane, not including products of refineries.....	100.0	12.4	82.0	84.5	+1.7
Gas, manufactured, illuminating and heating.....	100.0	102.8	100.6	111.5	+1.6
Carpets and rugs, wool, other than rag.....	100.0	79.8	85.1	107.6	+1.5

^a See footnote, pp. 385-6.

TABLE 163—Continued

Industry	Index numbers of overhead costs plus profits, per unit of product				Average annual rate of change 1923-1929 (per cent)
	1923	1925	1927	1929	
Paints and varnishes.....	100.0	98.0	106.4	106.7	+1.4
Cast-iron pipe	100.0	108.7	90.7	112.3	+0.9
Oilcloth	100.0	64.5	83.9	98.5	+0.9
Cordage and twine.....	100.0	99.9	100.1	105.2	+0.8
Wood distillation and charcoal manufacture	100.0	58.3	79.3	96.1	+0.6
Chocolate and cocoa products.....	100.0	85.2	81.4	100.2	-0.2
Clay products (other than pottery) and non-clay refractories	100.0	93.8	86.1	99.9	-0.4
Fertilizers	100.0	116.1	76.2	108.3	-0.7
Firearms	100.0	109.6	83.4	103.3	-0.8
Carriages, wagons, sleighs, and sleds.....	100.0	105.1	92.8	97.7	-1.0
Woolen goods	100.0	80.4	84.0	92.9	-1.0
Wool shoddy	100.0	85.1	101.8	86.1	-1.3
Lumber and timber products.....	100.0	80.0	68.7	95.5	-1.4
Petroleum refining	100.0	111.4	72.6	101.8	-1.7
Lace goods, cotton.....	100.0	86.9	71.9	94.9	-1.7
Iron and steel: blast furnaces.....	100.0	92.8	77.4	94.6	-1.7
Canning and preserving: fruits and vegetables; pickles, jellies, preserves, and sauces	100.0	83.3	77.8	90.9	-1.8
Rubber products	100.0	106.5	105.3	87.8	-1.9
Worsted goods	100.0	72.3	74.3	86.8	-2.2
Jute and linen goods.....	100.0	101.8	96.1	85.5	-2.5
Cotton goods	100.0	80.9	80.3	78.9	-3.7
Cement	100.0	98.4	83.5	81.6	-3.8
Silk manufactures	100.0	98.4	84.4	80.6	-3.9
Turpentine and rosin.....	100.0	130.0	81.6	89.5	-3.9
Hats, wool-felt	100.0	83.2	87.7	73.0	-4.4
Musical instruments: pianos.....	100.0	95.7	91.1	74.7	-4.4
Lime	100.0	109.0	87.4	75.6	-5.0
Canning and preserving: fish, crabs, shrimps, oysters, and clams.....	100.0	83.4	75.0	71.6	-5.5
Coke, not including gas-house coke.....	100.0	61.9	57.7	71.8	-5.9
Asphalted-felt-base floor coverings.....	100.0	78.0	55.1	58.5	-9.7
Bone black, carbon black, and lampblack...	100.0	63.3	51.8	47.1	-12.4
Sugar, beet	100.0	61.4	35.8	50.2	-13.5
Felt goods, wool or hair.....	100.0	93.6	107.9	—	—
Wire, drawn from purchased bars or rods..	100.0	99.6	96.9	—	—
Average ^b	100.0	100.9	99.6	110.1	+1.4

^b Arithmetic average of the central items of a weighted frequency distribution, with weights based on overhead costs plus profits, averaged for the base year and the given year. The central one-fifth of the items, by weight, were included in computing the average.

These measurements reveal in an illuminating fashion how diverse were the fortunes affecting manufacturing industries during the prosperity of the last decade. This diversity, while slightly less than that found for material costs per unit, exceeds the variation found among other elements of manufacturing costs. It is notable, too, that the divergence among index numbers of overhead costs plus profits was substantially greater between 1923 and 1929 than between 1899 and 1914. (The standard deviation of rates of changes in these indexes was 3.4 for the recent period, as against a figure of 2.4 for the pre-war period.) In considerable part, of course, the variations among industries are due to the influence of fluctuations in profits, an important element of this composite.¹ But whatever the changes among the separate elements of these costs, the evidence clearly indicates that the six years preceding the recession of 1929 made up a period of discordant and altogether uneven changes among manufacturing industries. The stability of economic conditions revealed by certain other data is not attested by this set of records.

ON THE RELATIVE IMPORTANCE OF DIFFERENT ELEMENTS OF COST AS FACTORS IN PRICE CHANGES, 1923-1929

The preceding account has dealt with changes in three major elements of the selling price of manufactured goods—material costs, labor costs and overhead costs (including profits). Considering now only the terminal years of the period studied, we have noted the following changes in prices and costs, per unit of manufactured product. The index numbers relate to current dollars.

Year	Selling price	Cost of materials	Labor costs	Overhead costs plus profits
1923	100.0	100.0	100.0	100.0
1929	90.8	87.9	85.7	104.8

The three cost elements are of unequal importance, as is shown in the following summary:

Year	Elements of cost as decimal fractions of value of product		
	Materials	Labor	Overhead costs plus profits
1923	.663	.148	.189

¹ The change in census practice which placed the cost of mill and shop supplies among overhead charges in 1929, instead of with material costs, as in earlier enumerations, plays some part in the movements noted. The change is believed to have had but slight effect, except in certain industries. See footnote pp. 385-6.

These two sets of data permit us to determine the relative importance of changes in the different elements of cost, as factors in changing selling prices.¹ (In expressing the results it is convenient to speak of the changes in costs, including profits, as though they determined selling price changes. This, of course, is not necessarily true. In many cases elements of cost reflect changes that have their origin in the final market for the product.)

In summary, the results take the following form:

- 72.7 per cent of the gross change in the per-unit selling price of manufactured goods between 1923 and 1929 is attributable to falling material costs.
 19.1 per cent of the gross change is attributable to falling labor costs.
 8.2 per cent of the gross change is attributable to rising overhead costs (including profits).

In the present instance changes in two of the cost factors tended toward lower selling prices, while the change in the third factor tended toward higher prices. The net influence was markedly down-

¹ The decline of 9.2 per cent in selling price is the net result of a decline of 12.11 per cent in material costs, a decline of 14.25 per cent in labor costs, and an advance of 4.76 per cent in overhead costs plus profits. The base of the percentage figures which define the degree of influence of the several cost elements upon selling price is, of necessity, the numerical sum of the changes in the several elements (each factor properly weighted), this sum being taken without regard to sign. It is the *algebraic sum* of these changes which defines the actual movement of the price of the product, or the *net change*. The numerical sum measures the aggregate price-affecting changes among the several elements of cost, without reference to possible offsetting when the changes are in opposite directions. It is this aggregate, here called the *gross change*, which is significant for the present purpose, and it is to this aggregate that the percentages and ratios relate.

The detailed computations, upon which the measurements in the text are based, are given below.

Element of cost	Computation of influence of cost factors upon price change per unit of product, 1923-1929			Percentage distribution of elements of gross change in selling price
	Degree of change in cost (per cent)	Weight	Contribution to change in selling price	
Materials	- 12.11	× .663	= - 8.03	72.7
Labor	- 14.25	× .148	= - 2.11	19.1
Overhead costs plus profits	+ 4.76	× .189	= + .90	8.2
Gross change (sum of items disregarding signs)			11.04	100.0
Net change (algebraic sum)			- 9.24	

ward, with the influence of reduced material costs and labor costs far outweighing the advance in the third factor.

It is to be noted that materials, which in the aggregate constitute about 66 per cent of the total value of manufactured goods, accounted for almost 73 per cent of the gross change in price between 1923 and 1929, while labor costs, which make up 15 per cent of the aggregate value, accounted for slightly more than 19 per cent of the gross change. Changes in these two elements exerted exceptional influence upon selling price changes during this period, while changes in overhead costs plus profits were of 'subnormal' influence. Conveniently to summarize the rôle of each cost element in selling price changes, we have employed *activity* (or *sensitivity*) *ratios*, defining the relation between the actual influence and the 'expected influence' of each factor. Expectancy is based upon the ratio of aggregate costs of each type to the aggregate value of manufactured products. These measurements, relating to gross changes, in current dollars, between 1923 and 1929, follow:

Element of manufacturing cost	Activity ratio
Materials	72.7/66.3 = 1.10
Labor	19.1/14.8 = 1.29
Overhead costs plus profits.....	8.2/18.9 = .43

For the period 1899-1914 (when the movement of selling prices was upward) corresponding ratios for materials, labor, and overhead costs plus profits, were 1.37, .45 and .06, respectively. The most conspicuous difference is found in the more active rôle played by labor in the recent period.¹

¹ In treating of price and cost changes during the pre-war period it was considered advisable to measure the influence of each cost factor upon selling price changes when these changes were expressed in terms of dollars of constant purchasing power, as well as in current dollars. Between 1899 and 1914 the changes in current dollars and in constant dollars were significantly different, for manufactured goods. The difference is much less pronounced for the recent period, and extended discussion of the measurements relating to constant dollars is unnecessary. Briefly, we may note that between 1923 and 1929 the average unit of manufactured goods declined 4.1 per cent in purchasing power. This was the net resultant of falling material costs, falling labor costs, and rising overhead costs plus profits, all expressed in dollars of constant purchasing power.

Of the gross change in per-unit purchasing power of manufactured goods, 59 per cent was due to falling material costs, 17 per cent was due to falling labor costs, while 24 per cent was due to rising overhead costs plus profits.

For this period, and with reference to changes in terms of dollars of constant purchasing power, the activity ratio for material costs was .88, for labor costs 1.16, for overhead costs plus profits 1.29.

SUMMARY: PRICE AND COST MOVEMENTS IN MANUFACTURING INDUSTRIES

Notable changes have taken place within the last decade in the market values of manufactured goods and in the costs of the services of the several agents contributing to their production. Still more pronounced have been the shifts occurring within the last two decades. In summarizing recent movements, therefore, we shall at the same time pass in review the changes that may be seen against more distant bases. To avoid the confusion which arises from a shifting standard of monetary values we employ throughout a commodity standard of value. That is, prices and costs are measured in dollars of constant purchasing power in wholesale markets. These figures are presented in the following table, and are graphically portrayed in Figure 83.

TABLE 164
CHANGES IN UNIT PRICES AND UNIT COSTS, PRODUCTS OF MANUFACTURING INDUSTRIES OF THE UNITED STATES, 1899-1929
(In dollars of constant purchasing power)

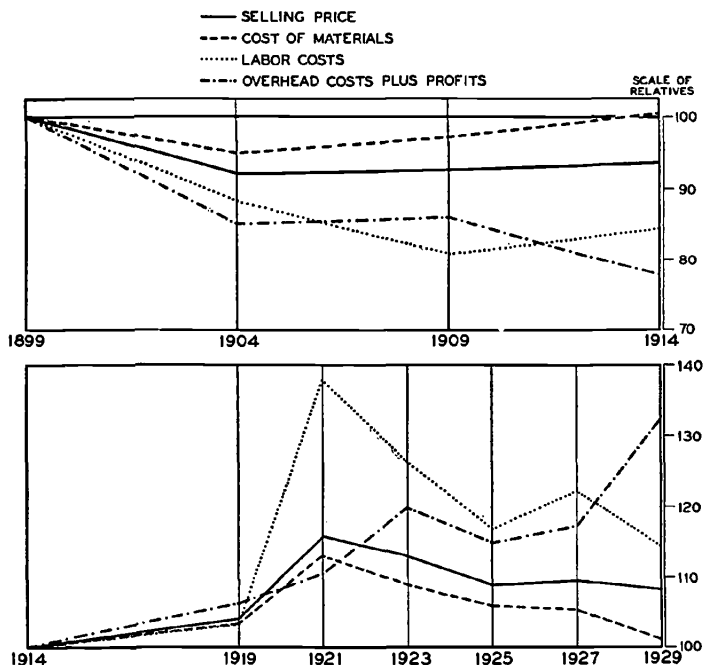
Year	Selling price	Cost of materials	Labor costs	Overhead costs plus profits
1899	100	100	100	100
1914	94	100	84	78
1914	100	100	100	100
1923	113	109	127	120
1923	100	100	100	100
1929	96	93	91	111
1914	100	100	100	100
1929	108	101	115	132

It is convenient to divide the three decades covered by these records into two fifteen-year periods, those covered by the first and last pairs of entries in the above table. During the period which preceded the war the average per-unit value of products of manufacture, in terms of commodities in general, declined 6 per cent. This was an era when processed goods were being steadily cheapened. Changes in material costs (which here include cost of fuel,

FIGURE 83

CHANGES IN AVERAGE SELLING PRICE, COST OF MATERIALS,
LABOR COSTS AND OVERHEAD COSTS PLUS PROFITS,
PER UNIT OF PRODUCT

MANUFACTURING INDUSTRIES OF THE UNITED STATES, 1899-1914 AND 1914-1929
(IN DOLLARS OF CONSTANT PURCHASING POWER)



power, containers and semi-processed materials, as well as raw materials proper) played no part in this cheapening. Steadily declining costs of the services of the agents of fabrication were the dominating factors. Labor costs, per unit of product, declined 16 per cent, while the cost of management, as represented by overhead costs plus profits, dropped no less than 22 per cent between 1899 and 1914.¹ These index numbers suggest that, in general, the consumers rather than the producers of manufactured goods benefited most from the advances of the pre-war era.

¹ The explanation of the pronounced drop in overhead costs plus profits is found, in part, in the sharp differences between business conditions in 1899 and 1914. Profits were high in the former year, low in the latter. There was a declining trend in this item, however, regardless of the state of affairs in the terminal years.

During the fifteen-year period which opens with the war and ends with the termination of post-war prosperity in 1929, the net change in the real per-unit value of manufactured goods was in the other direction. The value of each unit, in terms of goods in general, advanced 8 per cent. Again material costs played a neutral part. Labor costs and overhead costs plus profits were the active factors,¹ but in this case their influence was exerted in the direction of enhanced values. In 1929 labor costs per unit of product were 15 per cent higher than in 1914, while overhead costs plus profits stood 32 per cent higher than in 1914.²

This reversal of the relative positions of manufactured goods and of other goods has been commented upon in the preceding chapter. That it was a shift of profound significance is not to be doubted. As one result, the post-war period saw new economic classes lifted into positions of dominance, while the status of other classes was definitely lowered. Through his increased purchasing power the industrial wage-earner exerted an influence during the decade of the 'twenties which was never his before. Instead of fighting to hold his own against a constantly rising cost of living, as he did during the pre-war era, he substantially elevated his consumption standards, and his demands shaped the course of post-war investment and production. High industrial profits helped to lay a foundation for the interest in securities which generated the great speculative boom of this era. On the other hand, farmers and raw material producers generally found their worlds turned upside down when the favorable market conditions they had known before the war were replaced by adverse relations. The intangible forces which fix market values altered the scales in which processed goods and raw materials are equated for purposes of exchange, requiring less in kind from the one side, and more from the other, for the goods which are necessary for production and for living.

Though we have dealt with the fifteen years between 1914 and 1929 as a unit, we must note that within this period a significant change in tendencies occurred. The selling prices of manufactured goods (in dollars of constant purchasing power) reached a peak in 1921, and declined thereafter. Labor costs per unit of product

¹ Or the factors profiting most from selling price changes, if we think of the causal sequence as originating in the final market.

² In this comparison the base year is one with a record of depression, the terminal year one of prosperity. These conditions emphasize fluctuations in the profit element in this composite.

reached an extremely high peak in 1921, and declined thereafter. Overhead costs plus profits rose between 1914 and 1923 and fell to lower levels during the next four years. Under the influence of the most recent era of prosperity, these costs attained in 1929 a new peak, some eleven per cent above that of 1923. We may say, then, that for costs which represent the services of ownership and management the decade of the 'twenties was table land, well above the level of the valley which lay on the other side. For labor costs, and for the real per-unit values of manufactured goods, this decade was a gentle downward slope from the peak to which the economic earthquake of 1920-21 had lifted them. The effects of the volcanic explosion of 1929 on the topographic features of this economic realm remain to be determined.