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II ECONOMIC CHANGES SINCE 1939

The year 1943 marks the fourth year of war. The peace-time economy of the United States has been profoundly altered by the impact of an intensive defense program and of a more intensive war effort. In this section we survey the major shifts of this period. The more comprehensive of the measurements available to us relate to annual movements, carrying through 1942. These are supplemented by monthly records extending through the first part of 1943.

CHANGES IN THE NATIONAL PRODUCT

The measurement of changes in the over-all output of the economy is difficult even in peace time under conditions of comparative stability. The task is vastly more difficult in the transition from peace to war.⁷ We must recognize, therefore, that when we attempt to measure the degree of increase in the national product between 1939 and 1942 we are dealing with rough approximations.

The value of the gross national product, broadly defined to include all final products and services whether produced by private enterprise or by government (services of the armed forces, for example, are here included), increased approximately 71 per cent between 1939 and 1942. National income, or the value of the net national product (which is the value of consumer goods and services plus net additions to capital) increased some 69 per cent.⁸ As measures of output these aggregates suffer from the fact that they are expressed in dollar terms, and so are affected by fluctuating prices and alterations in wage and salary rates. Accurate correction for these changes is impossible, but we may modify the value measurements by taking rough account of advances in the unit prices at which goods and services are sold. Such

⁷ This problem is discussed by Simon Kuznets in a paper, *Measuring National Product in War-Time*, to appear in this series.

⁸ The dollar values of these magnitudes, as estimated by the Department of Commerce, are given herewith.

	GROSS NATIONAL PRODUCT	NATIONAL INCOME
	(billions of dollars)	
1939	89	71
1942	152	120

Gross and net national income are not crystal-clear concepts. There are important and debatable questions as to the items that should be included in these aggregates. Thus governmental operations financed by business taxes are included in gross national product, as estimated by the Department of Commerce. There is reason to question this procedure, on the ground that it involves double counting. This item amounted to some \$10 billion in 1939, well over \$20 billion in 1942.

'deflation' yields estimates of 35 per cent as the increase between 1939 and 1942 in gross national product, and 33 per cent as the increase in net national product, both in terms of volume.⁹

This estimate of the increase from 1939 to 1942 in real gross national product differs rather materially from that of the Department of Commerce.¹⁰ In the Commerce estimates use is made of an implicit deflating index that shows a price rise of only 14 per cent between 1939 and 1942. Gross national product, thus deflated, increased 50 per cent during this period. In the light of other evidence the Commerce deflator appears to understate the actual rise in the prices of goods and services entering into the national product.¹¹ Understatement in the deflator would lead to overstatement by the derived measure of increase in real gross national product. I believe that the

⁹ The correction of national income estimates by a price index gives a crude approximation to actual changes in volume of goods produced and services rendered. In the present case the 'deflator' is an average of index numbers of average hourly earnings for employees in nonagricultural industries, wholesale commodity prices, and retail food prices, with weights of 2, 2 and 1. This average shows an increase of 27 per cent from 1939 to 1942 (average hourly earnings increased 24 per cent, wholesale prices 28 per cent and retail food prices 30 per cent).

On the commodity price side the deflator almost certainly understates the actual price rise. The index of average hourly earnings, on the other hand, may overstate the average change in rates of compensation for services in the economy at large. We have some relevant information in Department of Commerce estimates of the annual average compensation per employee of workers in nonagricultural industries (*Survey of Current Business*, March 1943, p. 17). The figures relate to averages in which salaries and wages are combined. Percentage changes from 1939 to 1942 are given herewith. These

All nonagricultural industries	+29
All nonagricultural industries, excluding government	+37

advances in average compensation reflect the influence of longer hours of work as well as higher rates of pay. The figure, 24 per cent, used in the deflating index is one estimate of the increase in average rate of pay.

In an independent estimate of the influence of price factors on the values of net national product and gross national product, Simon Kuznets derives deflating index numbers almost identical with that here employed. Mr. Kuznets' index of price changes affecting national income shows a price advance of 27.9 per cent from 1939 to 1942; the index relating to gross national product shows a price advance of 26.8 per cent. These figures will be published in Mr. Kuznets' forthcoming paper, *Measuring National Product in War-Time*.

¹⁰ National Income and National Product in 1942, by Milton Gilbert and George Jaszi, *Survey of Current Business*, March 1943, p. 11.

Director's Note: I think that Department of Commerce figures for national income in 1942 are too high, in comparison with estimates for earlier years. This results from the shifting of many persons from tasks not paid for in money (e.g., the work of housewives) to employment paid for in dollars. Failure of the Department of Commerce to take account of this shift, in its estimates of national product, is in my judgment unfortunate.

OSWALD W. KNAUTH

Commerce estimate of a 50 per cent gain in the volume of national product between 1939 and 1942 does overstate the true gain. If the actual increase approximates 35 per cent, as here estimated, the accomplishment was a very substantial one indeed.

The attempt to measure physical production directly runs into difficulties of its own. The available data are limited. There is no common denominator by which the physical output of 1942 may be accurately compared with that of 1939. We may, however, estimate the physical output on the basis of employment, productivity, and actual physical count of units produced in certain basic industries, and from value series corrected for the estimated influence of price changes. The increase from 1939 to 1942 was, of course, uneven. Changes in major elements are shown in Table 2.

These measurements are for diverse and overlapping elements of the economy. The output of primary products increased more than 20 per cent. The output of basic power was up 51 per cent, reflecting the heavy demands of industry. As we pass to manufacturing we find an accelerating scale of production, reflecting the more intensive fabrication required in many of the war industries as well as the utilization of existing stocks of materials and scrap. Manufacturing output was 76 per cent greater, with durable goods (up 129 per cent) leading. The aggregate of ton-miles and passenger-miles of railroad traffic was 69 per cent greater in 1942 than in 1939. The gain for new construction of all sorts was slightly greater (87 per cent) but this average hides diverse movements. Most impressive is the gain (from a low 1939 base) in new industrial construction financed by public agencies. In 1942 this was 213 times the 1939 volume. The additions to plant capacity represented by this figure promise further advances in industrial output in 1943, as effort shifts from plant construction to manufacturing. Consumer goods and services shared in the general advance, but the gain was moderate. Here there was pressure to re-

¹¹ The following price and wage indexes may be cited:

	<i>Increase</i> 1939-42
Wholesale prices, all	+28
Wholesale prices, goods intended for use in capital equipment	+10
Cost of living	+17
Construction costs	+21
Farm prices	+71
Average hourly earnings, mfg. labor	+35
Composite wage rates (Federal Reserve Bank of N. Y.)	+24
Weighted average of hourly earnings, nonagricultural industries	+24
Prices of goods sold in department stores	+25

TABLE 2
Changes in Volume of Production and Transportation, 1939-1942

	1939	1942
Agricultural products ¹	100	120
Crops	100	117
Livestock and livestock products	100	122
Raw minerals ²	100	122
Sales of electric power to ultimate consumers (kw.-hr.) ³	100	151
Manufactured goods ²	100	176
Durable goods	100	229
Nondurable goods	100	131
New construction ⁴	100	187
Transportation ⁵	100	169
Consumer goods and services ⁶	100	113

¹ Source: American Economy in 1942, C. A. R. Wardwell and R. B. Bangs, *Survey of Current Business*, Jan. 1943.

² Board of Governors of the Federal Reserve System. See footnote 15 for a qualification concerning these indexes. The qualification applies particularly to the measurements for durable goods. The reader should note that no adjustments for seasonal movements have been made in these production figures. For most industrial series it is hazardous to assume that pre-war seasonal patterns have persisted through 1943.

³ Edison Electric Institute.

⁴ U. S. Department of Commerce estimate of construction activity (*Survey of Current Business*) deflated by American Appraisal Company index of construction costs.

⁵ U. S. Department of Commerce.

⁶ U. S. Department of Commerce, *Survey of Current Business*, March 1943, p. 14. The measure here given relates to consumer expenditures expressed in 1939 dollars.

strict output and sales. Between 1941 and 1942 there was, indeed, a slight drop in the volume of consumer goods and services sold.

The composition of the stream of industrial products turned out in 1942 was different from that of earlier years. A classification of the elements of the Federal Reserve index reveals certain of these changes. The percentages for 1942, it will be recalled, relate to a volume of industrial production approximately 68 per cent greater than in 1939.

	PERCENTAGE OF TOTAL INDUSTRIAL PRODUCTION	
	1939	1942
Durable manufactured goods	38	52
Nondurable manufactured goods	47	37
Raw minerals	15	11

Federal Reserve estimates place at 55 per cent the portion of total output devoted to the purposes of war in 1942. This was higher for durable manufactures (73 per cent) and for minerals (55 per cent) than for nondurable manufactures (29 per cent).¹²

¹² See American Economy in 1942, C. A. R. Wardwell and R. E. Bangs, *Survey of Current Business*, Jan. 1943, p. 10.

The general picture is one of extraordinary advance in the physical output of our economy. Nineteen thirty nine was by no means a depressed year in American industry. It was a year of revival after a short, severe recession. But within three years the over-all volume of goods produced and services rendered had increased more than one-third over the 1939 level. This was a more substantial accomplishment than the increase of approximately 25 per cent achieved between 1914 and 1917.¹³

In this striking advance in the physical output of our economy we drew on those resources of human power and technical potentialities that had been only partly tapped during the years immediately preceding the war. From a figure close to 9 million in 1939 the number of unemployed persons fell to about one million in March 1943. (The latter figure is taken to be close to an irreducible minimum, representing a mobile reserve of labor.) The number of employees in nonagricultural establishments increased from an estimated 29.8 million in 1939 to about 38.2 million in March 1943. We augmented our labor supply, also, by lengthening the work week. A manufacturing work week that averaged 38.1 hours in August 1939 was increased to an average of 44.7 in March 1943. Total man-hours worked in manufacturing plants increased from approximately 15 billion in 1939 to 26 billion in 1942, or 73.3 per cent.¹⁴

¹³ The production index for 1914-17 is from *Economic Tendencies in the United States* (National Bureau of Economic Research, 1932, p. 188). It relates to the production of both raw and processed goods.

I should point out that the difference between the productive records of the two war periods is due, in good part, to differences in the non-industrial sector of the economy. There was a gain of 20 per cent in the output of agricultural products between 1939 and 1942, as compared with a gain of only 2 per cent from 1914 to 1917. The superiority of the recent gain has been much less pronounced in industrial production. A detailed comparison of production in the two periods will appear in a forthcoming paper in this series, *Industrial Production in World Wars I and II*, by Geoffrey Moore. Mr. Moore's studies indicate that the production of industrial materials increased 35 per cent from 1939 to 1942, 32 per cent from 1914 to 1917. These figures are based, of course, upon that portion of industrial production that is open to measurement. They do not include elaborate finished instruments of war or highly fabricated goods of peace. It is probable that in the recent period the shift to products of elaborate design has been more pronounced than in the earlier war. If this is true, the record of the later period would be more favorable than these percentages indicate.

¹⁴ This estimate is derived as follows:

The *Census of Manufactures* gives 7,886,567 as the average number of employees in manufacturing establishments in the United States in 1939. Between 1939 and 1942 the number of employees in the sample of manufacturing plants reporting to the Bureau of Labor Statistics increased 52.3 per cent. Applying this percentage to the Census compilation for 1939 we have 12,011,242 as the estimated number of manufacturing em-

The technical improvements of this period, which added to the substantial productivity gains of the preceding decade, cannot be listed at this time, nor can we measure, except in the roughest way, their effects on the over-all productivity of labor. In manufacturing establishments there were conflicting movements, with declining output per man-hour in some industries, considerable advances in others. The net change seems to have been slightly upward between 1939 and 1942, but because of changes in the character of production and the absence of detailed output figures for certain finished goods no accurate measures of productivity changes can be derived. If we have held to the 1939 level of man-hour output in the face of a 73 per cent increase in total man-hours worked, the accomplishment has been a noteworthy one indeed. The record of over-all output shows that the powers of industrial production that were, in large part, only potential in 1939 were utilized in 1942 in a drive for production that far exceeded anything attempted before in our history. That drive was successful.¹⁵

ployees in 1942. The average length of the work-week increased from 37.7 hours in 1939 to 42.9 hours in 1942. Multiplying the average number of employees in each of the two years 1939 and 1942 by the average length of the working week, and multiplying this product by 50 (the estimated number of weeks worked per year by manufacturing workers, on the average) we have the man-hour totals given in the text. These may understate the over-all gain, for employed factory workers almost certainly worked more weeks on the average in 1942 than in 1939.

¹⁵ We must recognize that production indexes covering a period marked by wide shifts in the character of goods produced are less accurate than indexes covering more stable times. The difficulties are far more serious, of course, for manufactured products than for primary products. The measurements of manufacturing output cited above, issued by the Board of Governors of the Federal Reserve System, rest in part on estimates of productivity changes, for a direct count of physical output under the war program is not available. The attempt to build up a continuing series on man-hour output, covering the activities of peace and of war, faces serious conceptual and practical difficulties. It involves equating the products of peace with those of war. But what common system of physical measurement is applicable to automobiles, refrigerators, vacuum cleaners, and to tanks, planes, explosive shells and the varied equipment of war? When a factory passes from the making of juke boxes to the production of fuses, or from the making of passenger cars to the production of airplane parts, how can we judge whether productivity per man-hour has increased or decreased? If we resort to the gauge of money values as a bridge from the output of peace to the output of war we are on very uncertain ground indeed, particularly in a period of rapidly changing values and of government bidding that, in its early stages, must subordinate price to more pressing considerations.

The production figures for primary products and for manufactured goods involve an apparent inconsistency, since the increase in output of finished manufactures so greatly exceeds the gain in raw material production. This is not an impossible relationship, however. If the degree of fabrication undergone by raw materials in 1942, in the making of planes, tanks, ships, fire control equipment, and all the other instruments of

MONTHLY RECORDS OF PRODUCTION CHANGES

When production is increasing rapidly, annual figures measure the movement with a considerable lag. The record of economic expansion during the war is brought closer to date by monthly index numbers (Table 3). These are less comprehensive, of course, than the over-all statistics on gross national product.

For durable manufactured goods, the category of primary importance in the present effort, the output in March 1943¹⁶ was threefold the average of the twelve months preceding September 1939. The other entries in the table show smaller gains, as they did in the comparisons in Table 2. The only notable difference between relative standings in the two tables is provided by new construction contracts which fell off sharply after July 1942. The peak of our needs for new

modern warfare, was substantially greater than the degree of fabrication of basic materials in the making of automobiles, bedsprings, refrigerators and other peace-time goods, production indexes would stand in just such a relationship. It is perhaps true that manufacture for war involves, on the average, more refined operations than does manufacture for peace, but the margin of difference between the production indexes for primary products and manufactured goods may not be entirely accounted for on this ground. Other factors contributing to this margin are the using up of stock piles of materials, the decline in exports of materials, and the acquisition of important supplies of new scrap metal not recorded with primary production. Furthermore, the indexes of primary production exclude some materials used by manufacturing plants, notably certain chemicals.

These various factors would contribute to an increase in manufacturing output exceeding that recorded by current indexes of primary production. They would perhaps not account for the observed difference (see Table 2). It is not unlikely that the index of manufacturing output overstates the actual gain of the period 1939-42. In the transition from peace to war, from established production techniques to the trials and errors of a new production job, man-hour productivity could decline, initially. In its handling of certain production series the Federal Reserve Board makes the assumption of a steadily advancing man-hour productivity, in which we start war work from a productivity level achieved over years in perfecting techniques of peace-time production. The assumption is open to question. (The matter is discussed by Moore in the forthcoming paper, *Industrial Production in World Wars I and II*.)

One offsetting consideration must be stressed, however. Once the transition has been effected, and the initial experimental stage completed, opportunities for great productivity gains are opened. We know something of what has been accomplished as assembly line methods and other mass production techniques have been applied in turning out tanks, ships and airplanes. Although man-hour productivity may drop in the first stages of transition to war, it may increase substantially as factories swing into full war production. Later, as labor supply difficulties develop and problems of maintenance become acute under a speeded-up program, efficiency and productivity may fall off.

¹⁶ Throughout this paper attention is centered on the situation in March 1943, the month set as standard in the President's 'hold-the-line' order of April 8. Later monthly figures are given in many of the tables, but the discussion in the text deals in the main with March relations.

equipment was then passed, and efforts could be concentrated on the production of final products.

TABLE 3
Monthly Changes in Production and Transportation, 1939-1943

	<i>Sept. 1938- Aug. 1939</i>	<i>March 1943</i>	<i>June 1943</i>
Raw minerals ¹	100	124	121
Sales of electric power to ultimate consumers (kw.-hr.) ²	100	176	181
Manufactured goods ¹	100	212	217
Durable goods	100	308	316
Nondurable goods	100	138	141
Construction, contracts awarded ³	100	91	60
Revenue freight, in ton-miles ⁴	100	237	240 ⁵

¹ Index numbers of the Board of Governors of the Federal Reserve System.

² Edison Electric Institute.

³ Value of construction contracts awarded, Federal Reserve index, deflated by index of construction costs, American Appraisal Company.

⁴ Interstate Commerce Commission. ⁵ Latest available figure is May 1943.

The preceding statements relate to physical output. Aggregate values were increasing more rapidly than volume of output during these years, for unit prices were rising for all types of economic goods. These advances in values reflected a general upward movement of unit prices. The rise was not of a runaway character, but in its scope and amplitude it was clearly inflationary. We turn now to a survey of this price rise.

CHANGES IN PRICES, 1939-1943¹⁷

Five periods, which are set off in the two sections of Table 4, may be distinguished in following the record of price changes since 1939. They include an initial period of 18 months, 13 months from February 1941 to March 1942 (the month of the first general fixing of prices under the General Maximum Price Regulation), six months to September 1942 (the month set as standard in the President's Stabilization Decree of October 1942), six months between September 1942, and March 1943 (the month set as standard in the President's 'hold-the-line' order of April 8, 1943), and a final period of three months to June 1943. The index numbers in section A of Table 4 show the cumulative changes over these several periods. More illuminating for the present purpose are the entries in section B (Chart 2), in which

¹⁷ Remarks in footnote 15 concerning the difficulties faced in measuring production movements in the transition from peace to war apply with equal force to price indexes. Such measurements lose in accuracy when the character of production is being rapidly changed. Special difficulties are faced in treating the area of government purchases. Price measurements for primary products retain their accuracy, but all other indexes for 1939-43 are to be looked upon as approximations.

TABLE 4
Price Movements in Various Markets, 1939-1943

A PRICE AND WAGE INDEX NUMBERS

	Sept. 1938-						
	Aug. 1939	Aug. 1939	Feb. 1941	Mar. 1942	Sept. 1942	Mar. 1943	June 1943
Wholesale prices ¹	100	97.9	105.2	127.4	130.0	135.0	135.5
Cost of living, industrial workers ¹	100	99.4	101.3	114.9	118.4	123.4	125.4
Retail prices of goods sold in department stores ²	100	100.4	106.1	126.3	126.9	127.0	126.8
Construction costs ³	100	100.4	106.4	118.9	123.4	124.9	125.4
Per capita earnings, mfg. labor ⁴	100 ⁴	101.5	119.3	152.1	167.3	185.4	192.2
Hourly earnings, mfg. labor ⁴	100 ⁴	99.0	108.7	128.7	141.6	148.3	152.2
Farm prices ⁵	100	95.9	112.2	159.0	177.6	198.3	207.0

B MONTHLY RATES OF CHANGE⁶

	PERIOD					TOTAL CHANGE Sept. 1938- Aug. 1939 to June 1943
	1 Aug. 1939- Feb. 1941 (18 mo.)	2 Feb. 1941- Mar. 1942 (13 mo.)	3 Mar. 1942- Sep. 1942 (6 mo.)	4 Sep. 1942- Mar. 1943 (6 mo.)	5 Mar. 1943- June 1943 (3 mo.)	
Wholesale prices ¹	+0.4	+1.6	+0.3	+0.6	+0.1	+36
Cost of living, industrial workers ¹	+0.1	+1.0	+0.5	+0.7	+0.5	+25
Retail prices of goods sold in department stores ²	+0.3	+1.6	+0.1	+0.02	-0.1	+27
Construction costs ³	+0.3	+0.9	+0.6	+0.2	+0.1	+25
Per capita earnings, mfg. labor ⁴	+1.0	+2.1	+1.7	+1.8	+1.2	+92
Hourly earnings, mfg. labor ⁴	+0.5	+1.4	+1.7	+0.8	+0.9	+52
Farm prices ⁵	+0.9	+3.2	+1.9	+2.0	+1.5	+107

¹ The index of wholesale prices and the cost of living index are computed by the U. S. Bureau of Labor Statistics.

² This series, compiled by Fairchild Publications, consists of 105 non-style items (excluding foods) of 49 retail trade organizations.

³ Compiled by the American Appraisal Company.

⁴ Per capita earnings derived from employment and payroll data of manufacturing industries as published by the U. S. Bureau of Labor Statistics. Hourly earnings of manufacturing industries compiled by the U. S. Bureau of Labor Statistics. The base for both series is Jan.-Aug. 1939.

⁵ Prices received by farmers computed by the U. S. Bureau of Agricultural Economics.

⁶ A monthly rate is here derived by dividing the percentage change between two dates by the number of months in the period.

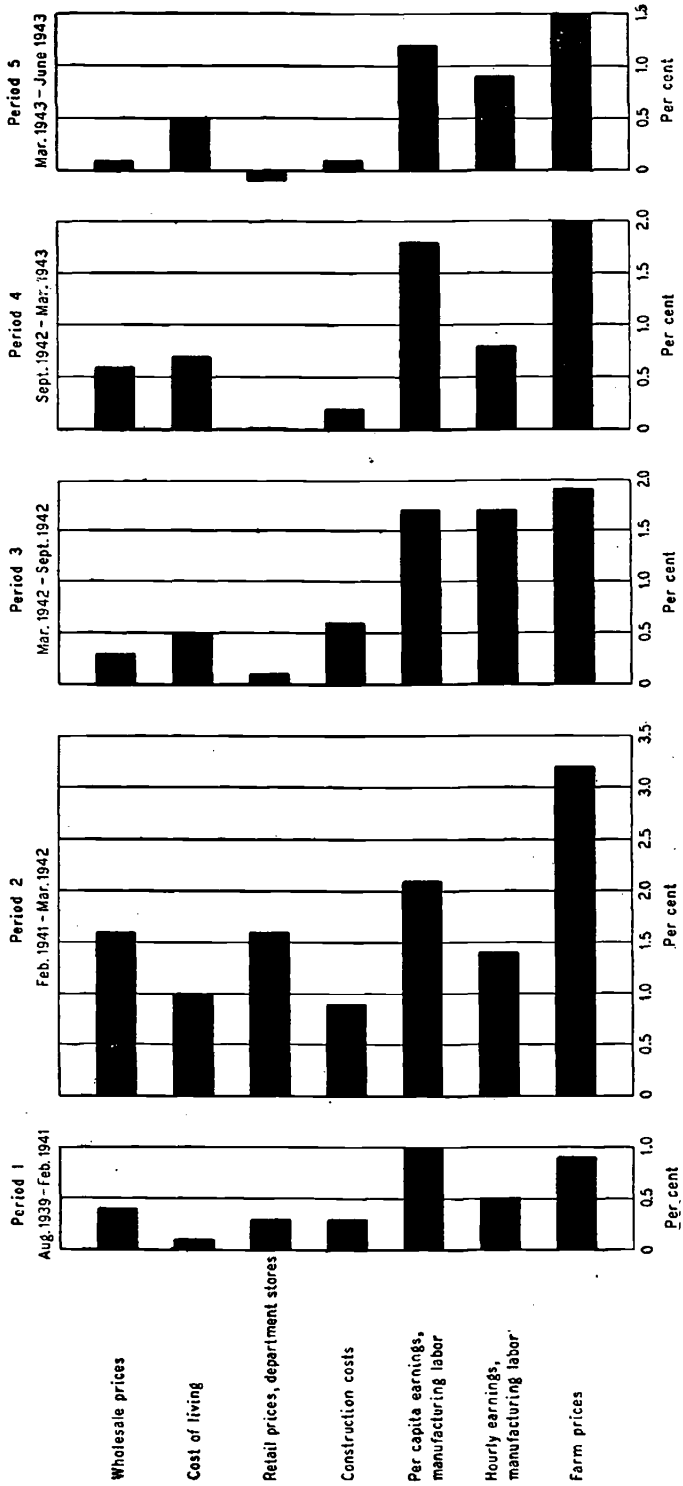
the movements during the different periods are put in comparable terms—average monthly rates of change.

The first period, to February 1941, was marked by mixed movements. On a unit basis, farm prices rose most rapidly, with hourly earnings next, and wholesale prices third. Per capita earnings of manufacturing labor actually increased more rapidly than any other series, but this increase reflects longer hours as well as higher wage rates. These relatively moderate movements gave way to a great upward surge during the thirteen months from February 1941 to March 1942. All elements of the price system were affected, even the tardiest (construction costs) rising at a rate of almost 1 per cent a

CHART 2

The Changing Tempo of Inflation
1939 - 1943

Percentage Change per Month



month. Retail prices in department stores rose as rapidly as wholesale prices. Farm prices leaped upward at a rate exceeding 3 per cent a month; wholesale prices, retail prices, and hourly earnings of manufacturing labor rose at rates close to 1.5 per cent a month. The advance of wholesale prices was checked somewhat during this period by control of the prices of certain materials strategically placed in the war effort. But the underlying push of rising costs and newly released purchasing power was far too great to be stemmed by the limited efforts possible under a system of selective control.

In April 1942 the Office of Price Administration was empowered, under the General Maximum Price Regulation, to hold retail and wholesale prices at the levels of March 1942. The powers of the Price Administrator were limited. Farm prices were almost completely free from control; wages and salaries were exempt; rent controls were of restricted scope. Between March and September 1942, the flood of rising values was not stopped, but in important areas the rates of advance were substantially retarded. Farm prices continued to rise, at a rate averaging almost 2 per cent a month; hourly earnings of manufacturing labor advanced 1.7 per cent a month, a rate exceeding that of the preceding period. The advance in living costs was cut to 0.5 per cent a month, and the advance in wholesale prices to 0.3 per cent. This last was a substantial accomplishment, in the face of the serious limitations on the power of the Administrator.¹⁸

The effects of the President's general stabilization decree of October 1942 are to be read in the entries for the period September 1942-March 1943. This decree did not stop the rise, nor is it clear that the general advance was retarded in any substantial degree. Wholesale prices rose at a rate of 0.6 per cent a month, as against a rate of 0.3 per cent during the preceding six months. Living costs advanced 0.7 per cent a month, a rate higher than that of the preceding period. Farm prices advanced 2.0 per cent a month, fractionally above the 1.9 per cent of the six months preceding. In the field of wages greater success was achieved. The rate of advance in average hourly earnings in manufacturing industries was reduced from 1.7 to 0.8 per cent a month. (Because of a lengthening of the work week, per capita earnings continued to advance at the earlier rate.) It is clear that the general stabilization order of October 1942 reduced the upward pressure

¹⁸ Undercover advances did occur, however; the actual rate of increase undoubtedly exceeded the figure derived from the quoted prices. For examples of price advances that eluded direct measurement see Melville J. Ulmer, *Hidden Price Increases*, *Monthly Labor Review*, Nov. 1942, pp. 903-12.

of wages and cut the rate of advance in construction costs but failed to retard increases in farm prices, wholesale prices, and living costs.

RATES OF CHANGE AMONG WHOLESALE PRICES, 1939-1943

The movements of various elements of the system of wholesale prices during the last three and one-half years are traced in Table 5. Mixed movements in the first period, with net increases for nearly all groups, were followed by sharp advances along the whole front between February 1941 and March 1942. The movements of the next twelve months, following the General Maximum Price Regulation, are of greatest interest. Between March 1942 and September 1942 farm products and foods were the only groups to advance materially (raw materials as a group rose in price because of the influence of farm products). The front was held for all other classes of goods, at wholesale. During the six months to March 1943 the record was much the same. Farm products rose by 2.3 per cent a month; foods trailed, but continued to advance at a good pace. With two exceptions (chemicals and drugs and the miscellaneous group) prices of other classes of goods were fairly well held in check.

TABLE 5
Monthly Rates of Change in Commodity Prices, 1939-1943
Classes of Commodities, at Wholesale

	P E R I O D					TOTAL CHANGE Sept. 1938- Aug. 1939 to June 1943
	1 Aug. 1939- Feb. 1941 (18 mo.)	2 Feb. 1941- Mar. 1942 (13 mo.)	3 Mar. 1942- Sep. 1942 (6 mo.)	4 Sep. 1942- Mar. 1943 (6 mo.)	5 Mar. 1943- June 1943 (3 mo.)	
Wholesale prices (BLS)	+0.4	+1.6	+0.3	+0.6	+0.1	+36
Raw materials	+0.6	+2.5	+0.7	+1.6	+0.7	+64
Semimfd. goods	+0.5	+1.0	+0.1	+0.02	-0.1	+24
Mfd. goods	+0.3	+1.3	+0.2	+0.2	-0.1	+25
Farm products	+0.8	+3.6	+0.8	+2.3	+0.9	+92
All other than farm products	+0.3	+1.3	+0.3	+0.2	-0.1	+25
& foods	+0.3	+1.0	+0.05	+0.2	+0.1	+20
Farm products	+0.8	+3.6	+0.8	+2.3	+0.9	+92
Foods	+0.5	+2.4	+1.1	+0.8	+0.7	+54
Hides & leather products	+0.5	+1.1	+0.2	-0.05	0	+28
Textiles	+0.7	+2.0	+0.1	+0.03	+0.03	+46
Fuel & light	-0.04	+0.6	+0.3	+0.3	+0.3	+10
Metals	+0.3	+0.5	0	0	0	+10
Building materials	+0.6	+0.9	-0.02	0	+0.1	+24
Chemicals & drugs	+0.3	+1.8	-0.2	+0.7	0	+32
House furnishings	+0.2	+1.2	-0.02	+0.02	+0.1	+20
Miscellaneous	+0.3	+1.3	-0.2	+0.5	+0.1	+25

The system of wholesale prices moved upward as a whole, though with some important differences in rates, between August 1939 and March 1942. During the twelve months to March 1943 inflation in this area was a highly selective process. Farm products and foods con-

tinued to advance in price; all other commodities inched upward, but with individual exceptions stabilization was approximated as of March 1942. It is to be noted, however, that the inching process was being accelerated in the half year from September 1942 to March 1943. Advancing farm prices and wage rates were exerting an influence beyond their immediate groups. These movements called forth the more drastic order issued by the President in April 1943.

RATES OF PRICE CHANGE AT DIFFERENT STAGES OF PRODUCTION AND DISTRIBUTION, 1939-1943

For certain classes of goods we have price quotations relating to different stages in the movement from primary production to final consumption. Comparability is not perfect, but the tracing of relative movements at these stages is illuminating. This is done for foods in Table 6.¹⁹

TABLE 6
Monthly Rates of Change in Prices of Selected Consumer Goods,
1939-1943

	P E R I O D					TOTAL CHANGE
	1 Aug. 1939- Feb. 1941 (18 mo.)	2 Feb. 1941- Mar. 1942 (13 mo.)	3 Mar. 1942- Sep. 1942 (6 mo.)	4 Sep. 1942- Mar. 1943 (6 mo.)	5 Mar. 1943- June 1943 (3 mo.)	Sept. 1938- Aug. 1939 to June 1943
A Food products, general						
At the farm	+1.3	+2.7	+1.7	+2.8	+0.9	+103
At wholesale (raw)	+0.8	+3.1	+1.1	+2.2	+0.9	+ 88
At wholesale (proc.)	+0.5	+1.9	+0.5	+0.6	-0.2	+ 38
At retail (raw and proc.)	+0.3	+1.6	+1.1	+1.4	+1.1	+ 49
B Fruits and vegetables						
At the farm	+1.8	+1.0	+4.2	+7.3	+6.7	+202
At wholesale	+0.1	+3.7	+1.9	+3.1	+8.1	+135
At retail	+0.2	+2.2	+0.8	+4.5	+4.6	+101
C Meat animals and meats						
Meat animals at the farm	+1.6	+3.1	+1.4	+2.0	-1.1	+ 90
Livestock at wholesale	+1.4	+2.9	+1.2	+1.8	-1.7	+ 72
Meats at wholesale	+0.7	+2.4	+1.0	-0.1	-1.1	+ 39
Meats at retail	+0.4	+1.4	+1.4	+0.8	+0.2	+ 42
D Cotton and cotton goods						
Raw cotton at the farm	-0.2	+6.6	+0.5	+1.2	+0.1	+129
Raw cotton at wholesale	+0.6	+7.2	-1.2	+2.3	-0.1	+132
Print cloth at wholesale	+1.1	+4.1	+0.4	0	0	+104
Cotton goods at wholesale	+1.0	+3.5	+0.02	-0.02	0	+ 75

In the first period the price rise in foods was sharper at the farm than in other markets. The rate of price rise at the farm exceeded the rates

¹⁹ The reader should note that no seasonal corrections have been made in the measurements in this table.

of advance in other markets in all periods, with one exception. Raw foods at wholesale moved upward most rapidly in the second period, which was marked by a general upsurge in all markets. In the third period, that following the General Maximum Price Regulation, rates of advance in food prices in all markets were retarded, sharply retarded for processed food products at wholesale. The period of six months following the October stabilization edict witnessed higher rates of increase for food products at the farm and at wholesale, unchanging rates at retail.

Such a table does not show where the pressures toward higher prices originate. The intensity of movement, however, shows a decline as products pass from the farm through wholesale markets to retail markets. This is customary in periods of price advance, but the present spread between the rise at the farm and at retail is unusually great.

The section of the table dealing with fruits and vegetables shows the same general relations. Here there is some retardation of price advances in wholesale and retail markets in the third period, under the General Maximum Price Regulation; in the fourth period advances were accelerated in all markets. A few fruits and vegetables were brought under control in this period but in the main prices in this area were left free to rise.

The records for meat animals and meats reflect the same failure to check prices at the livestock stage, and show an accelerated rise in livestock prices as we pass from the third period to stabilization under the Presidential edict. The prices of meats at wholesale were definitely restricted in the fourth period, but retail meats continued to advance, though at a slightly lower rate. The effect of control at the meat stage, without corresponding restrictions at the livestock stage was, of course, to narrow the processing and marketing margin, with consequent disturbance of the flow of meats to market.

A final example of a related sequence of changes is provided by cotton and cotton goods. During the first period prices of cotton and cotton goods in wholesale markets advanced, but farm prices sagged. The general acceleration that came early in 1941 carried all cotton prices up, at very rapid rates, the rise being sharpest for raw cotton at wholesale, least rapid for cotton fabrics in wholesale markets. The General Maximum Price Regulation brought abrupt checks or price declines at all stages here represented. In period 4 the freeze continued to be effective for cotton fabrics, but raw cotton prices in whole-

sale markets and at the farm advanced. The result was a narrowing of unit fabricational margins.

The significance of price changes is imperfectly realized if we look at prices alone. Prices are intimately related to the volume of goods entering into exchange. For individual commodities this is obviously true in the interplay of unit prices and quantities offered and purchased. It is equally true when we are concerned with more general aspects of production and trade—with aggregate production, with the stream of goods in transit, with total amount of employment. For it is as aggregate values, in dollars, that these physical totals enter into many of our commercial accounts, our banking records, our national gross product and national income accountings. When unit prices are altered the value record of exchange transactions and the underlying facts of physical volume do not tally. The essence of inflation is divergence of corresponding value and volume aggregates: records of the values of goods and services entering into exchange exaggerate increases (or understate declines) in the physical volume of goods and services exchanged; the essence of deflation is divergence of the opposite type: value records exaggerate declines in physical volume (or understate advances). We turn now to a survey of the changes of the last four years with special reference to inflationary divergences between value and volume aggregates.

THE INCIDENCE OF PRICE INFLATION, 1939-1943²⁰

The impact of changing prices on certain elements of the economic system is graphically portrayed in Chart 3. Corresponding measurements are given in Table 7. The first five entries relate to the pro-

²⁰ Inflation and deflation are economy-wide conditions. Rising prices and values for one class of goods are not inflationary if these advances are offset by declines among other classes of goods. Thus the volume and value aggregates that diverge (i.e., change at unequal rates) under inflationary or deflationary pressure are aggregates comprehending all goods and services entering into exchange. Transactions involving existing wealth in the form of land or capital, as well as those involving newly produced goods, are included in these aggregates. Measurements relating to portions of this total will, of course, reflect the influence of special conditions as well as the play of inflationary or deflationary forces of wider incidence. The observations cited in the text in tracing the incidence of inflation relate, of necessity, to special areas of the economy.

In defining inflation as a divergence between volume and value aggregates in a given economy, with value rising more rapidly than volume, we recognize as inflationary a divergence resulting from declining productivity. Such a decline could mean higher costs per unit, higher prices per unit, and a decline in volume not paralleled by a decline in aggregate value or in aggregate disbursements to income recipients.

Pigou defines inflation as the condition that exists "when money income is expand-

TABLE 7
Quantity, Price, and Value Changes in Major Elements
of the Economy, 1939-1943

	PERCENTAGE CHANGE 1939 TO MARCH 1943		
	Quantity	Average unit price	Aggregate value
Agricultural production ¹	+20	+71	+105 ²
Mineral production	+17	+14	+33 ²
Manufacturing production	+96	+25	+145 ²
Construction, contracts awarded ⁵	-6 ³	+24	+17
Revenue freight, in ton-miles	+120	-2 ⁴	+116
Retail sales	+13 ³	+28	+45
Consumer expenditures	+15 ³	+24	+42
Mfg. production and payrolls	+96	+55 ⁴	+204
Mfg. employment and payrolls	+99	+53 ⁴	+204
Mfg. production and profits of mfg. corporations ⁶	+94	-7 ⁴	+81
Shares traded on N. Y. Stock Exchange ⁷	+57	+1	+59 ⁸ +4 ⁹

¹ For this series the changes are measured from the annual average for 1939 to the annual average for 1942.

² Aggregate value is average unit price multiplied by the quantity measurement.

³ In deriving the quantity index, aggregate value is divided by the price factor.

⁴ Average unit price is derived by dividing aggregate value by the quantity factor.

⁵ Awards of construction contracts had by March 1943 declined substantially from their peak, which came in July 1942.

⁶ These figures relate to 1939 and the first quarter of 1943. Profits of the first quarter are expressed at an annual rate. See Table 18 and accompanying text for a fuller statement on corporate profits.

⁷ The quantity index relates to all shares sold on the N. Y. Stock Exchange. The price index is the N. Y. Stock Exchange average for all shares sold. The derived value index is the product of the price and quantity measures. The actual value figure is that reported by the N. Y. Stock Exchange. For an explanation of the difference between the two see footnote 23 and Table 14, footnote 7.

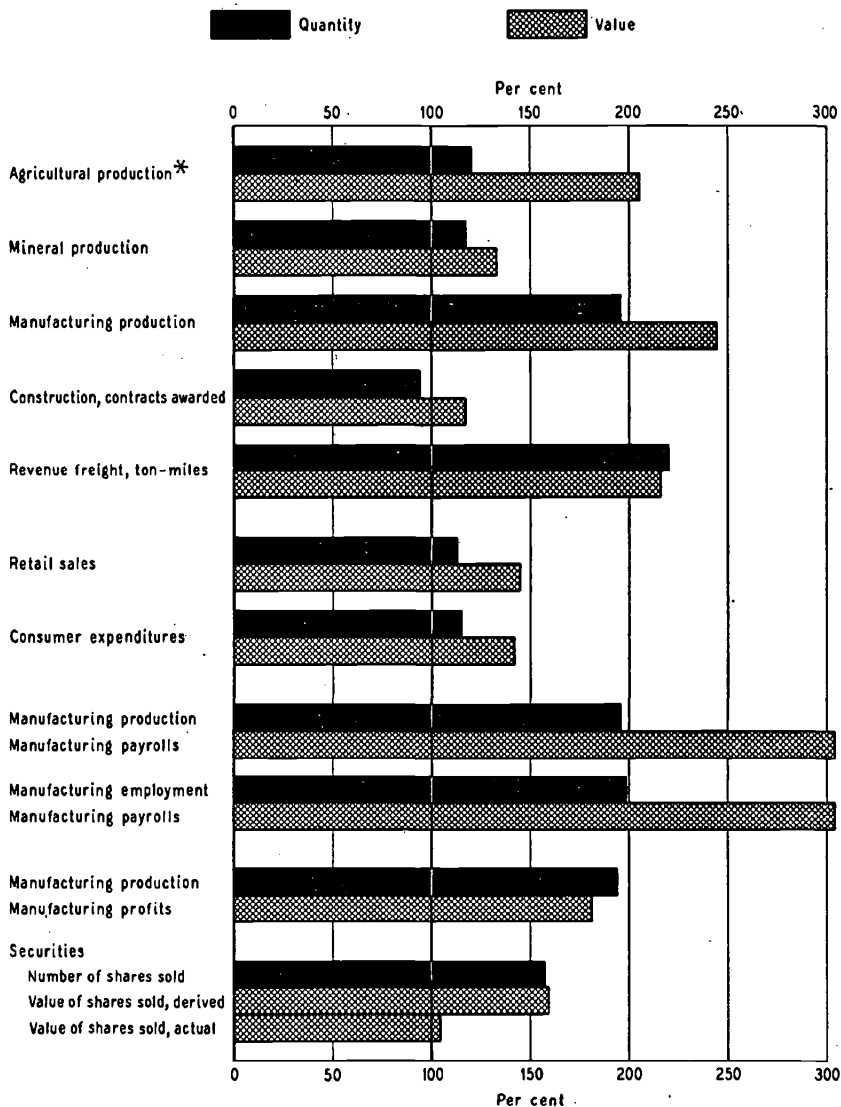
⁸ Derived.

⁹ Actual.

ing more than in proportion to income earning activity" (*Economic Journal*, Dec. 1941, p. 439). He calls attention to the bearing of productivity changes on this relationship, but prefers to treat as non-inflationary (or non-deflationary) non-proportionate changes in income and in output that are due to changes in productivity.

I believe it well to treat as inflationary a decline in physical volume not paralleled by a corresponding decline in aggregate disbursements to income recipients, whether this condition results from a drop in productivity or from other causes, and as deflationary a rise in physical volume not paralleled by a corresponding increase in aggregate disbursements to income recipients, whether this condition results from an advance in productivity or from other causes. Such a deflationary movement might be socially desirable; the term is here used without normative implications. It is to be recognized, of course, that productivity changes would not necessarily lead to divergence between value and volume aggregates. Such divergence would occur only when selling prices (and corresponding disbursements to agents of production) were not altered commen-

CHART 3
Changes in Certain Elements of the Economy
1939 - March 1943
 (1939 = 100)



*Index numbers represent 1942.

surately with an advance or a decline in productive technique.

The evil effects of inflation are attributable in good part to the dispersion that accompanies rapid change in average prices. But such dispersion of prices is a concomitant of inflation, not the essence of it.

duction, transportation, and valuation of physical goods. In all cases, except in ton-miles of freight, value increases materially exceeded the increases in physical output. The difference was most pronounced for agricultural products, least for ton-miles of revenue freight. These differential value gains do not correspond to physical accomplishments; they are due to advancing unit prices. Viewed collectively, they reflect the play of inflationary forces.

The movement of goods and the rendering of services in the final stages of distribution to consumers may be measured, physically, only by indirection. The entries in Table 7 for retail sales and consumer expenditures must be regarded as estimates. Retail sales in March 1943 were, in volume, some 13 per cent greater than the monthly average for 1939; in value they were 45 per cent greater. Volumes were inflated by an average rise of some 28 per cent in unit price. Aggregate consumer expenditures, as estimated by the Department of Commerce, were 42 per cent greater in March 1943 than the monthly average for 1939. The physical equivalent of this advance in expenditures was an advance of some 15 per cent in 'quantity' of goods and services received. The 'inflationary differential' at the stage of final purchase by consumers thus amounted to some 24 per cent—the increase from 1939 to March 1943 in the average price of goods and services bought by consumers.²¹

The next set of entries in the table and chart relate to changes in physical volume of production and corresponding disbursements of wages. With the rise of 96 per cent in manufacturing production went an advance of 204 per cent in manufacturing payrolls. Wage disbursements per unit of goods produced increased some 55 per cent between 1939 and March 1943. Since such a measure may be

²¹ The rise is that shown by the index of living costs for urban workers. This index, like the index of wholesale prices, is subject to a wider margin of possible error in war-time than it is in peace-time. Up-grading, undercover price advances, and quality changes that are not reflected in quoted prices combine to complicate the task of the maker of index numbers. In their net effect such changes may introduce a downward bias, causing the index to understate the inflationary differential and the derived index of physical consumption to exaggerate the true increase. But such biases are difficult to define with precision.

Director's Note: I think the average degree of deterioration of consumer goods since 1939 may be pretty accurately estimated at between 15 and 20 per cent. Scarcely any article today does not show some small degree of deterioration, while in some lines it is clearly around 30 per cent. This estimate is not made as a statistical measurement, but as a personal observation based on numerous judgments and inquiries. In my opinion it is better to use a rough estimate of deterioration than to ignore this important change.

OSWALD W. KNAUTH

distorted by short-term variations this rise may be followed more accurately on an annual basis. From 1939 to 1942 total manufacturing output increased 76 per cent; total manufacturing payrolls 142 per cent. These indexes differ somewhat in coverage, but on the assumption that each is generally representative of manufacturing industries, an advance of 38 per cent in wage payments per unit of goods produced is indicated.²² As a measure of changing labor costs this should be taken as a rough index only. The character of our industrial production changed so greatly from 1939 to 1942 that all measures of production, productivity, and labor cost lose some of their precision. But as indicators of the general direction and character of economic movements they have value.

A somewhat different aspect of changing values, with reference to disbursement, is revealed when we compare total manufacturing employment, measured in man-hours, with total payrolls. Against a rise of 99 per cent in aggregate man-hours worked in manufacturing industries we have an advance of 204 per cent in the total value of this labor, i.e., in total wage disbursements. Disbursement per man-hour of labor time (average hourly earnings in manufacturing) increased 53 per cent. Here is another area in which aggregate values rose much more rapidly than the corresponding physical entities.

Production and profits (after taxes) increased substantially for manufacturing corporations between 1939 and the first quarter of 1943, but the advance in profits fell somewhat behind the increase in output. Unit value (profits per unit of product), as shown in Table 7, declined an estimated 7 per cent.

To complete the picture we trace changes in the sales and unit values of equities. The final estimates in the table relate to such changes. Between 1939 and March 1943 the total number of shares traded on the New York Stock Exchange advanced 57 per cent. The average price of all shares listed on that Exchange increased 1 per cent.²³ Prices advanced in the first half of 1943, but to date inflation-

²² Advances in labor costs per unit appeared to be greater in the heavy industries than in the light, but changes in the character of goods produced render the measurements less accurate for the heavy industries. The U. S. Bureau of Labor Statistics has published measures of change in unit labor costs for selected manufacturing industries, mainly light industries. The median advance from 1939 to 1942 in labor costs per unit among 19 major groups is 18 per cent. (See Productivity of Unit Labor Cost in Selected Manufacturing Industries 1939-42, *Monthly Labor Review*, May 1943, p. 885.)

²³ A measure of percentage change in the aggregate value of shares traded that is consistent with the quantity and unit price measurements is not consistent with the value

ary forces have not been strong in the markets for common and preferred stocks.

Chart 3, giving a general perspective of changes in quantities and aggregate values in different economic areas, portrays graphically the incidence of inflation. The uneven character of the physical advances and the still more uneven impact of inflationary forces on the elements of the economy are clear.

TABLE 8
Farm Products
Changes in Quantities Produced, Average Unit Prices,
and in Aggregate Values, 1939-1942

		1939	1942
Farm products	quantity	100	120
	price	100	171
	value	100	205
Grains (food)	quantity	100	137
	price	100	165
	value	100	226
Cotton and cotton seed	quantity	100	112
	price	100	212
	value	100	237
Truck crops	quantity	100	120
	price	100	190
	value	100	228
Fruits	quantity	100	103
	price	100	162
	value	100	167
Meat animals	quantity	100	128
	price	100	172
	value	100	220
Poultry and products (chickens and eggs)	quantity	100	119
	price	100	161
	value	100	192
Dairy products	quantity	100	114
	price	100	146
	value	100	166

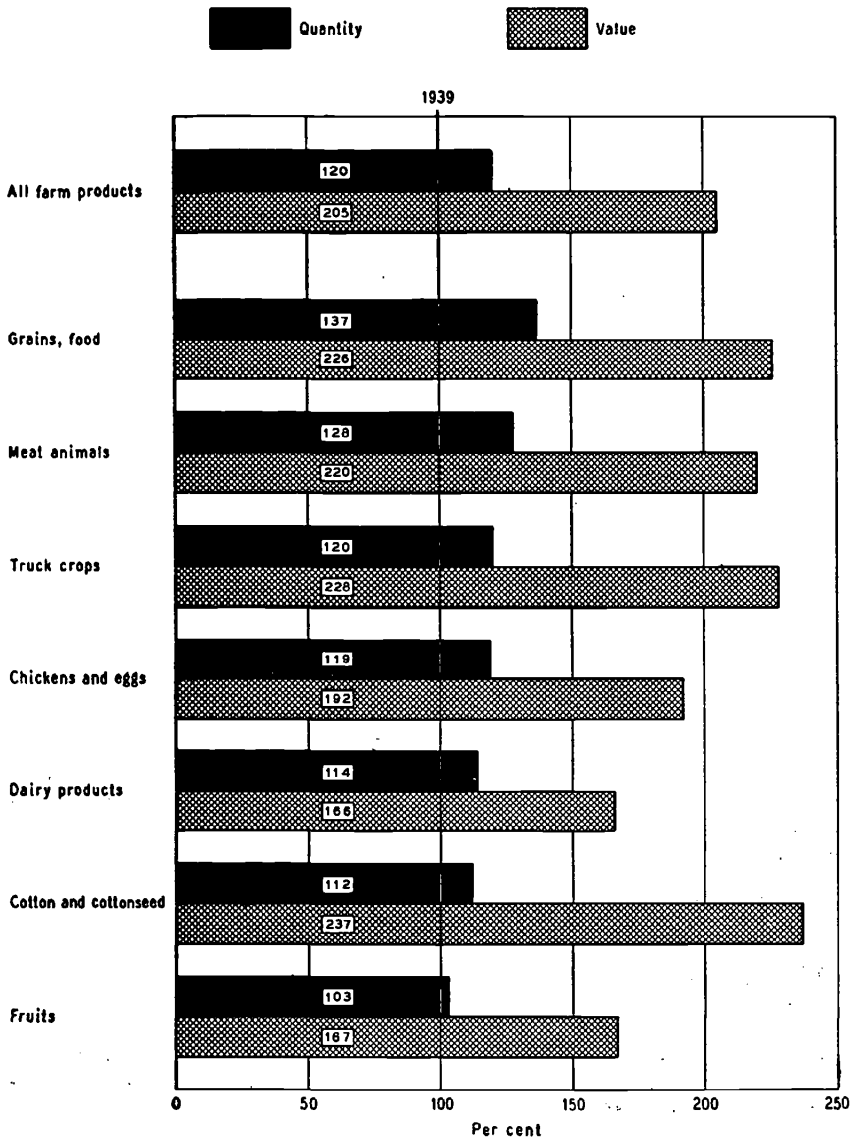
Production measurements relate to physical quantities produced for sale and farm consumption. Price index numbers are computed from prices at the farm. Both series rest on computations of the U. S. Bureau of Agricultural Economics. Indexes of aggregate value are derived from quantities and unit prices.

Further details of the volume and value changes between 1939 and 1942 are set forth in the accompanying tables and charts. Among farm products (Table 8 and Chart 4) the gains in physical output were greatest for grains and meat animals; the volume-value differ-

figure reported by the Stock Exchange. The latter shows a gain of 4 per cent between 1939 and March 1943. Changes in the composition of the total (i.e., an increasing proportion of low-priced stocks) account for the difference.

entials due to price changes were greatest among cotton and cotton seed, truck crops, and meat animals. But the differentials were large

CHART 4
Farm Products
Movements of Volume and of Aggregate Values
1939 - 1942
(1939 = 100)



for all classes of farm products. Raw minerals (Table 9, Chart 5) experienced relatively small price advances; the value aggregates exceeded the physical volume totals by only narrow margins. For iron ore, indeed, average unit prices declined, and the value changes were smaller than the volume changes.

TABLE 9
Mining
Changes in Quantities Produced, Average Unit Prices,
and in Aggregate Values, 1939-1943

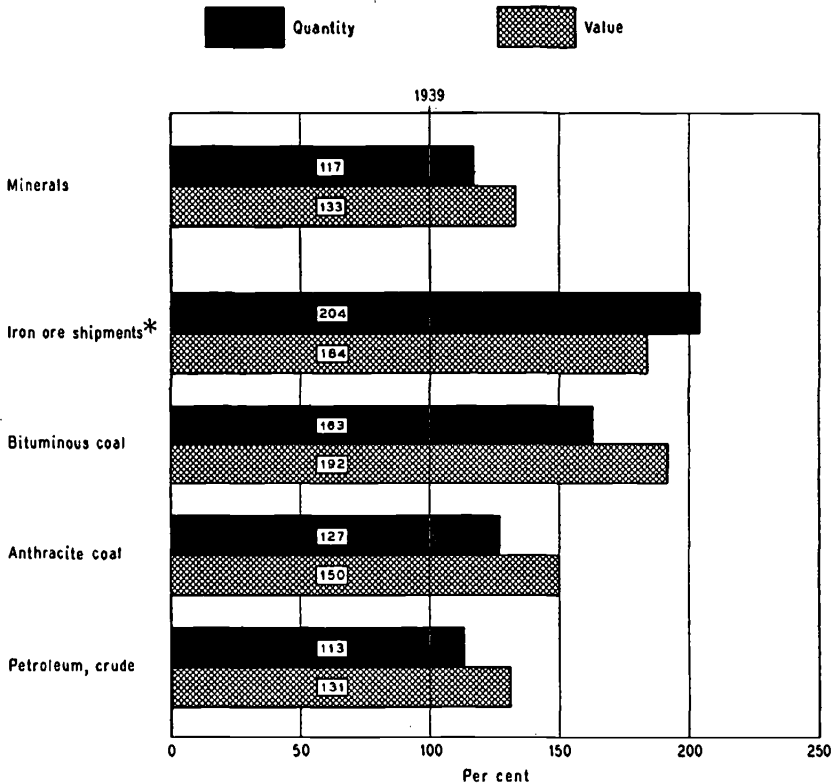
		1939	1942	March 1943	June 1943
Raw minerals	quantity	100	122	117	114
	price	100	111	114	115
	value	100	135	133	131
Bituminous coal	quantity	100	146	163	104
	price	100	113	118	119
	value	100	165	192	124
Anthracite coal	quantity	100	116	127	72
	price	100	113	118	118
	value	100	131	150	85
Petroleum, crude	quantity	100	109	113	114
	price	100	116	116	118
	value	100	126	131	135
Iron ore shipments	quantity	100	204		321
	price	100	90		90
	value	100	184		289

Quantity measurements are derived from production indexes computed by the Board of Governors, Federal Reserve System. No seasonal adjustments have been made. Price indexes (computed by the National Bureau of Economic Research) relate to wholesale markets. Indexes of aggregate value are derived from quantities and unit prices.

Among manufacturing industries (Table 10 and Chart 6) there is a wide range of variation in both physical output and the volume-value differentials. Durable goods advanced most rapidly in volume of output. (This class includes certain industries not represented among the detailed entries for individual industries.) The prices of the materials going into such goods were held down, however, and the inflationary differentials were in general smaller than among non-durable goods. Among individual industries the price gains were greatest for manufactured farm products, wood pulp and lumber.

At the distributional stage physical volume advances were substantial, while price increases were large enough to inflate these to still higher value levels. March 1943 marked the end of a period during which there was much discussion of abstention from consumption, but in which actual reductions were modest. With reference to 1939, indeed, gains were registered widely among consumption goods (see Table 11). The figures in Table 11 relate solely to retail distribution.

CHART 5
Mineral Products
Movements of Volume and of Aggregate Values
1939 - March 1943
(1939 = 100)



* Index numbers represent 1942.

In 1942 total retail sales were in volume some 12 per cent greater than in 1939, in value 34 per cent greater. Price advances were the chief factor in the greater value change. Food and apparel sales and prices reveal notable shifts in the status of consumers. For each of these classes dollar expenditures were roughly 50 per cent again as high in 1942 as in 1939. But these higher dollar expenditures bought only 25 per cent more clothing, only 15 per cent more food.

The entries for March 1943 mark a further stage in the advance of prices. The value of all food sales was substantially greater than the monthly average for 1942, but the quantities were identical. The same is true for total retail sales. Consumers were spending more

CHART 6

Manufacturing Industries
 Movements of Volume of Production and of Aggregate Values
 1939 - March 1943
 (1939 = 100)

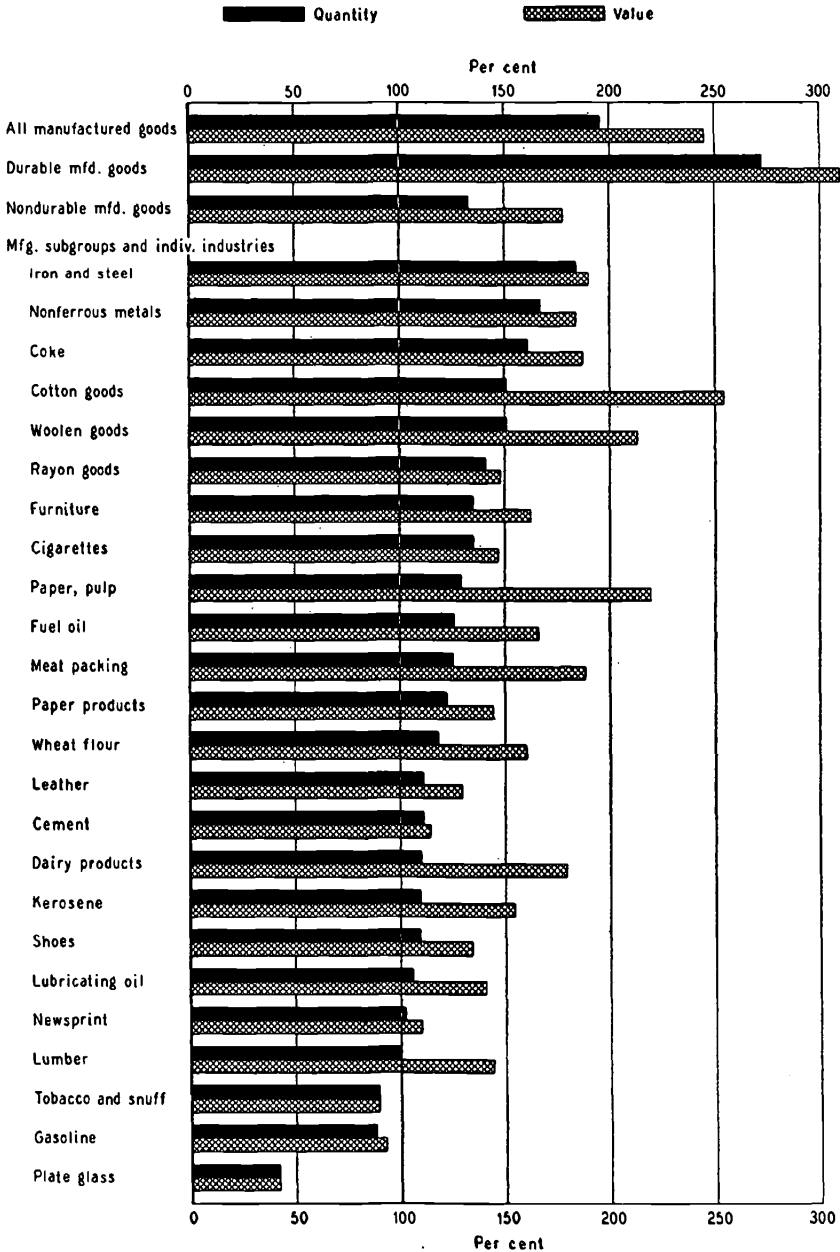


TABLE 10
 Manufacturing
 Changes in Quantities Produced, Average Unit Prices,
 and in Aggregate Values, 1939-1943

		1939	1942	March 1943	June 1943
All manufactured goods	quantity	100	176	196	201
	price	100	124	125	125
	value	100	218	245	251
Durable mfd. goods	quantity	100	229	272	278
	price	100	114	114	114
	value	100	261	310	317
Nondurable mfd. goods	quantity	100	131	133	136
	price	100	130	133	132
	value	100	170	177	180
Iron and steel	quantity	100	175	184	176
	price	100	103	103	103
	value	100	180	190	181
Nonferrous metals	quantity	100	163	167	169
	price	100	110	110	110
	value	100	179	184	186
Lumber	quantity	100	119	100	116
	price	100	142	144	146
	value	100	169	144	169
Furniture	quantity	100	132	135	134
	price	100	120	120	121
	value	100	158	162	162
Cement	quantity	100	150	111	119
	price	100	103	103	103
	value	100	154	114	123
Plate glass	quantity	100	45	42	50
	price	100	100	100	100
	value	100	45	42	50
Cotton goods	quantity	100	155	151	145
	price	100	167	168	168
	value	100	259	254	244
Rayon goods	quantity	100	135	141	143
	price	100	105	105	105
	value	100	142	148	150
Woolen goods	quantity	100	144	151	148
	price	100	138	141	141
	value	100	199	213	209
Leather	quantity	100	120	111	102
	price	100	116	116	116
	value	100	139	129	118
Shoes	quantity	100	113	110	108
	price	100	123	123	123
	value	100	139	135	133
Wheat flour	quantity	100	103	118	107
	price	100	124	136	135
	value	100	128	160	144
Dairy products	quantity	100	132	110	194
	price	100	144	163	158
	value	100	190	179	307

		1939	1942	March 1943	June 1943
Meat packing	quantity	100	132	125	138
	price	100	145	150	145
	value	100	191	188	200
Cigarettes	quantity	100	136	135	142
	price	100	105	109	109
	value	100	143	147	155
Tobacco and snuff	quantity	100	94	89	80
	price	100	100	100	100
	value	100	94	89	80
Paper, pulp	quantity	100	148	129	134*
	price	100	170	170	170
	value	100	252	219	228
Paper products	quantity	100	122	122	121*
	price	100	116	118	120
	value	100	142	144	145
Newsprint	quantity	100	104	102	102
	price	100	100	108	108
	value	100	104	110	110
Petroleum refining, total	quantity	100	104	99	105
	price	100	118	121	124
	value	100	123	120	130
Gasoline	quantity	100	98	88	95
	price	100	103	106	108
	value	100	101	93	103
Fuel oil	quantity	100	118	126	127
	price	100	124	132	135
	value	100	146	166	171
Lubricating oil	quantity	100	110	106	109
	price	100	153	133	135
	value	100	168	141	147
Kerosene	quantity	100	99	109	108
	price	100	130	141	146
	value	100	129	154	158
Coke	quantity	100	156	161	150
	price	100	116	116	116
	value	100	181	187	174

Measurements of changes in aggregate value in this table are derived from indexes of changes in physical quantities produced or consumed and in average unit prices. The quantity indexes are those of the Board of Governors, Federal Reserve System (with a few additional series in handling specific commodities). No seasonal adjustments have been made. Price indexes are those of the U. S. Bureau of Labor Statistics or of the National Bureau of Economic Research.

For full accuracy in the value measurements, quantity and price components of each value index should include precisely the same commodities. This condition is met in most of the smaller groups covered in this table. For the larger groups, especially the durable and nondurable categories, the quantity and price indexes differ rather widely in coverage. They are here combined on the assumption that each quantity and price index is broadly representative of commodities in the group in question. The derived value measurement indicates the direction and magnitude of changes in a value aggregate, but is no more than a rough index of actual movements.

*Latest available figure is May 1943.

TABLE 11
Distribution
Changes in Quantities Sold, Average Unit Prices, and in
Aggregate Sales, 1939-1943

		1939	1942	March 1943	June 1943
Total retail sales	quantity	100	112	113	114
	price	100	120	128	131
	value	100	134	145	149
Apparel stores	quantity	100	125	136	155
	price	100	124	127	127
	value	100	155	173	197
Food stores	quantity	100	115	115	107
	price	100	130	144	149
	value	100	149	166	160
Household furnishing stores	quantity	100	112	108	111
	price	100	121	123	124
	value	100	135	133	138
Department store sales	quantity	100	110	106	110
	price	100	125	126	126
	value	100	138	134	138

The estimates of changes in physical volume of department store sales and of other retail sales were derived from index numbers of the aggregate value of such sales and corresponding indexes of unit prices. In some cases price and value measurements are not as fully comparable as might be wished, but the derived figures may be taken as reasonable approximations to the actual quantity changes.

For department store sales, value indexes are those of the Board of Governors of the Federal Reserve System, and price indexes are those of the Fairchild Publications. The value index numbers for retail sales are compiled by the U. S. Bureau of Foreign and Domestic Commerce; price indexes are the cost of living indexes of the Bureau of Labor Statistics (excluding rents) and appropriate sub-group measures.

money for the same quantities of goods. The advances from 1939 to March 1943 show very wide differentials between quantities and values. For foods a rise of 44 per cent in average unit price converts a 15 per cent advance in physical quantities into a 66 per cent rise in aggregate value. A volume increase of 13 per cent in total retail sales becomes a 45 per cent rise in value. Movements of this sort are, of course, the essence of inflation.

The several preceding tables have dealt with changes in the physical volume of output and with corresponding price and value changes. In certain fields of production activity we may trace the incidence of inflation in other terms. We may measure the physical volume of input, in terms of man-hours of work done, and compare changes in this factor with corresponding price and value changes. The 'price', in such cases, is a measure of average hourly earnings, and the 'value' series relates to aggregate wage disbursements.

In manufacturing industries the differentials between volume of employment measured in man-hours and corresponding total wage

disbursements are wide (Table 12 and Chart 7). For all manufacturing industries employment increased 99 per cent between 1939 and March 1943. The corresponding increase in value, measured by aggregate payrolls, was 204 per cent. The rise in average unit 'price' (i.e., in average hourly earnings) was 53 per cent.

Employment and payroll changes vary widely among industries. These variations correspond in general to the physical production differences previously noted. Variation in the measures of increase in hourly earnings is smaller, but not inconsiderable. These measures extend from 13 per cent for printing and publishing to 56 per cent for industries manufacturing transportation equipment other than automobiles. For all durable goods industries the increase amounted

TABLE 12
Manufacturing Industries
Changes in Employment, Hourly Earnings and Wages
1939 to March 1943

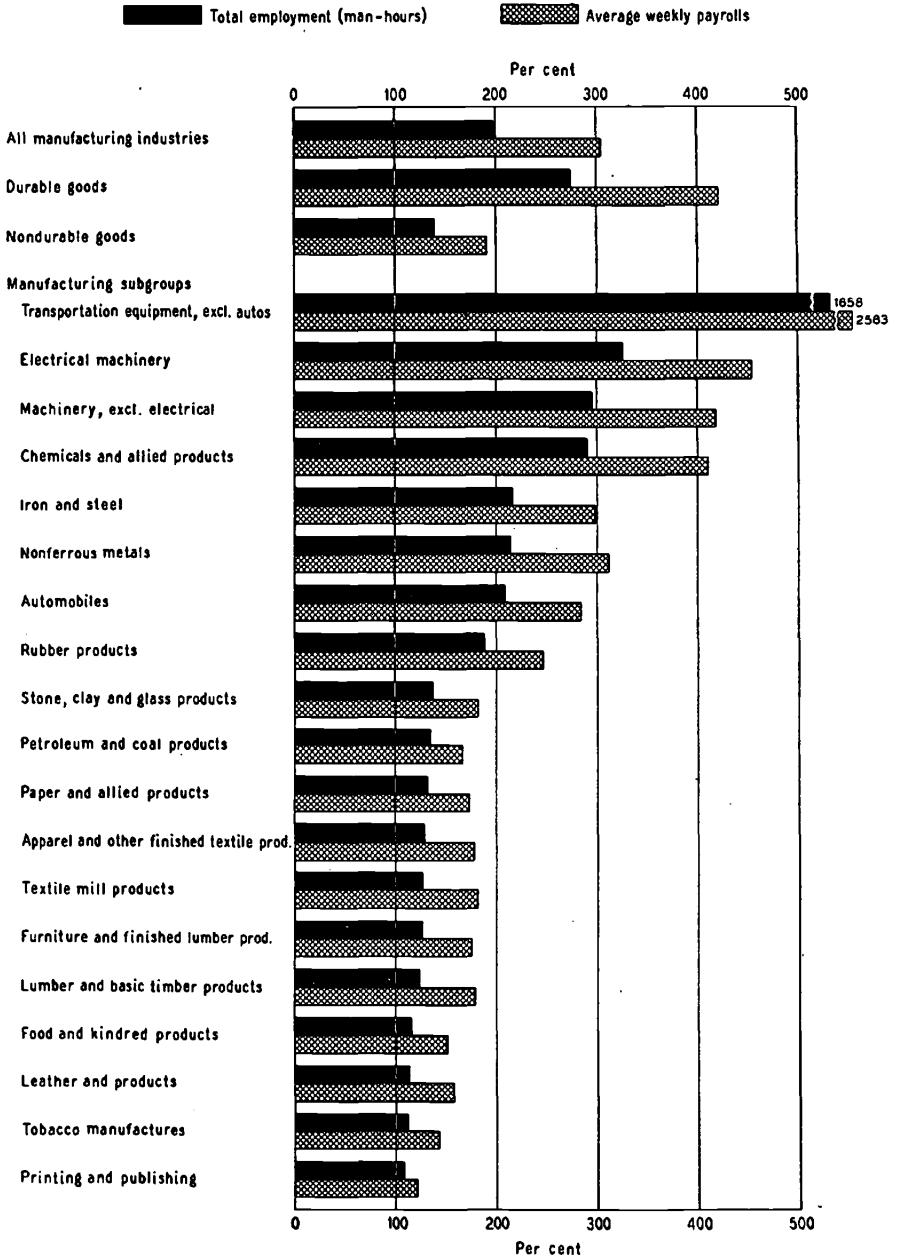
	PERCENTAGE CHANGE IN		
	Employment (man-hours per week)	Average hourly earnings	Average weekly payrolls
All manufacturing industries	+99	+53	+204
Durable goods	+174	+54	+321
Nondurable goods	+39	+37	+91
Iron and steel	+116	+38	+198
Electrical machinery	+226	+39	+354
Machinery, excluding electrical	+195	+42	+318
Automobiles	+108	+37	+184
Transportation equipment, excluding autos	+1,558	+56	+2,483
Nonferrous metals and products	+114	+46	+212
Lumber and basic timber products	+24	+44	+79
Furniture and finished lumber products	+26	+39	+75
Stone, clay and glass products	+37	+33	+82
Textile mill products	+26	+44	+82
Apparel and other finished textile products	+29	+38	+78
Leather and products	+14	+39	+58
Food and kindred products	+16	+30	+51
Tobacco manufactures	+12	+28	+43
Paper and allied products	+32	+31	+73
Printing and publishing	+8	+13	+22
Chemicals and allied products	+190	+41	+310
Petroleum and coal products	+35	+24	+67
Rubber products	+88	+31	+146

Measures of changes in employment and payrolls are from compilations of the U. S. Bureau of Labor Statistics. The percentage changes in average hourly earnings are derived from these. Similar percentages computed directly from Bureau of Labor Statistics measures of average hourly earnings show slightly different movements from 1939 to 1943.

For an explanation of apparent discrepancies between changes in average hourly earnings in individual industries and in the broader groups of industries, see footnote to Appendix Table 7.

CHART 7

Manufacturing Industries
 Changes in Employment and in Aggregate Wage Payments
 1939 - March 1943
 (1939 = 100)



to 54 per cent, for those producing nondurable goods 37 per cent. This record is graphically portrayed in Chart 7. The margin between the two members of each pair of bars is a measure of the change in average hourly earnings.

Nonmanufacturing industries show wide variations also in the movements of employment, aggregate payrolls, and average hourly earnings between 1939 and March 1943 (Table 13 and Chart 8). Advances in hourly earnings range from 39 per cent in quarrying and nonmetallic mining to 7 per cent for telephone and telegraph companies.

These widely different degrees of change in employment, production, and trade, in the average unit prices commanded by goods and services, and in the aggregate values of these goods and services reflect the varying physical needs of the war effort, extreme variations from market to market in the intensity of demand and the elasticity of supply, and differences in the effectiveness of inflationary controls. The individual volume-value differentials on which attention has

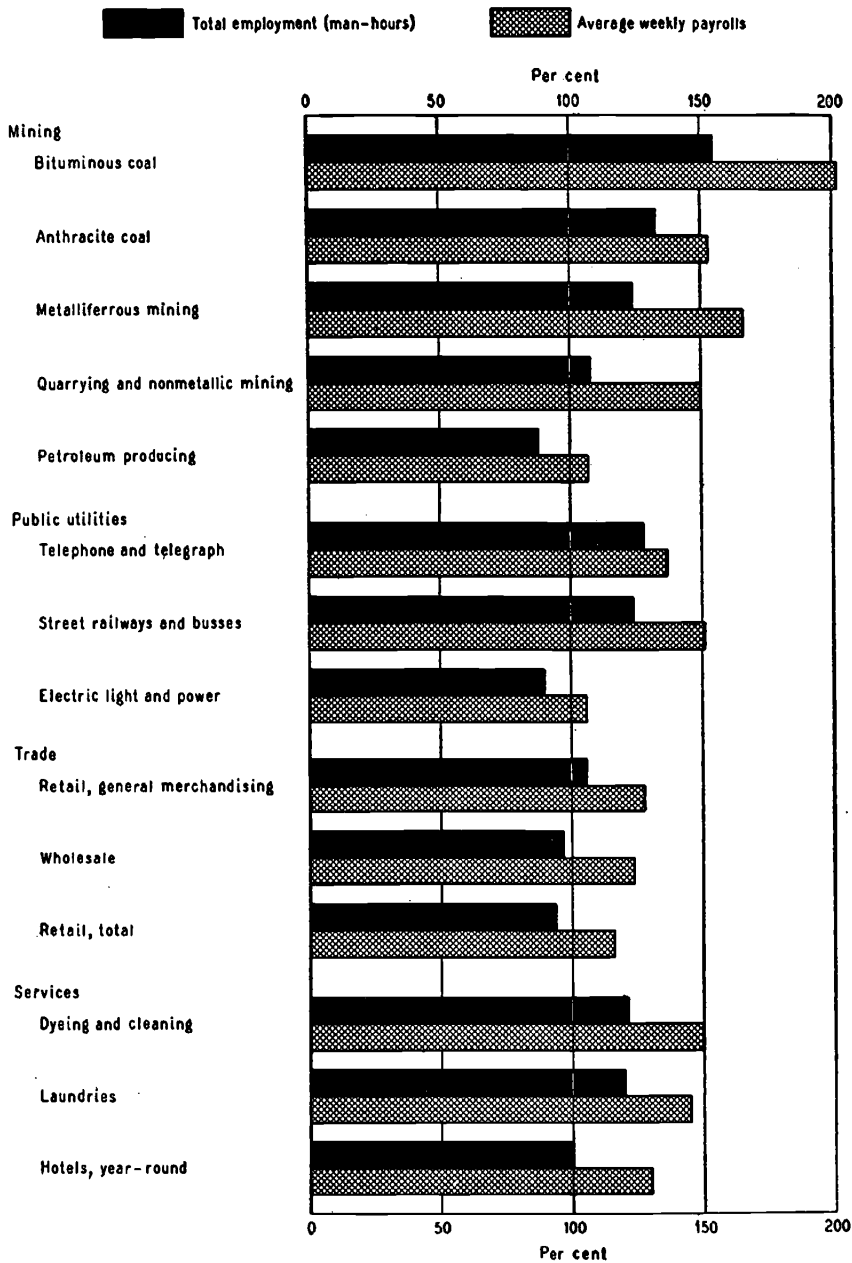
TABLE 13
Nonmanufacturing Industries
Changes in Employment, Hourly Earnings, and Wages¹
1939 to March 1943

	PERCENTAGE CHANGE IN		
	Employment (man-hours ² per week)	Average hourly earnings	Average weekly payrolls
<i>Mining</i>			
Anthracite coal	+33	+15	+53
Bituminous coal	+55	+30	+102
Metalliferous mining	+24	+34	+66
Quarrying and nonmetallic mining	+8	+39	+50
Petroleum producing	-12	+22	+7
<i>Public utilities</i>			
Telephone and telegraph	+28	+7	+37
Electric light and power	-10	+18	+6
Street railways and busses	+24	+22	+51
<i>Trade</i>			
Wholesale	-3	+28	+24
Retail	-6	+23	+16
Retail, general merchandising	+6	+21	+28
<i>Services</i>			
Hotels, year-round	0	+30	+30
Laundries	+20	+21	+45
Dyeing and cleaning	+21	+24	+50

¹ Figures on employment and payrolls are from compilations of the U. S. Bureau of Labor Statistics. Measures of average hourly earnings are derived from employment and payroll records.

² Data on hours are in process of revision by the Bureau of Labor Statistics.

CHART 8
Nonmanufacturing Industries
Changes in Employment and in Aggregate Wage Payments
1939 - March 1943
 (1939 = 100)



been centered in the preceding discussion do not, of course, constitute direct indexes of the intensity of a general force making for inflation. What we have is the interplay of a host of particular factors, shortages of supplies here, insistent demands there; bargaining power that is able to exploit a strategic advantage, or absence of such power; immunity to price controls in one economic segment, effectiveness of controls in another. Behind these specific factors there are circumstances and forces of wide import and effect—pressing national needs in the war effort and an outpouring of funds that exceeds the increase of productive power and of goods in the economy at large. But in their actual impact these more general forces and deficiencies are reflected in specific volume-value gaps. It is the totality of these varied and uneven gaps that constitutes inflation.

We may learn something about the particular features of the most recent inflationary rise by comparing certain of the volume and value changes of this period with those of two earlier periods (Table 14 and Chart 9). One covers 1914-19, when inflationary advances were

TABLE 14
Changes in Quantities, Unit Prices,
and in Aggregate Values during Three Periods of Economic Expansion*

		1914	1919	1921	1929	1939	1942	1939	First Quarter 1943	Second Quarter 1943
Total production ¹	quantity	100	110	100	174	100	162			
	price	100	211	100	99	100	133			
	value	100	232	100	172	100	215			
Agriculture ²	quantity	100	106	100	119	100	120			
	price	100	211	100	117	100	171			
	value	100	224	100	139	100	205			
Mining ³	quantity	100	115	100	175	100	122	100	114	119
	price	100	176	100	96	100	111	100	113	115
	value	100	202	100	168	100	135	100	129	137
Manufacturing ⁴	quantity	100	119	100	188	100	176	100	194	200
	price	100	211	100	92	100	124	100	124	125
	value	100	251	100	173	100	218	100	241	250
Construction ⁵	quantity	100	69	100	209	100	192	100	109	70
	price	100	234	100	100	100	120	100	124	125
	value	100	161	100	209	100	231	100	135	88
Employment and wages, mfg. ⁶										
	total employment	100	121	100	131	100	173	100	196	201
	average hourly earnings	100	214	100	111	100	140	100	152	156
	payrolls	100	259	100	146	100	242	100	298	314
Securities ⁷										
	quantity	100	438	100	658			100	108	134
	price	100	124	100	345			100	96	106
	value, derived	100	543	100	2,270			100	104	142
	value, actual						100	73	97	

* The periods compared are not expansion phases of business cycles.

¹ Quantity and unit price measurements are weighted averages of indexes of agriculture, mining, manufacturing, and construction given in this table. The weights, averages of

clear to all observers; the other covers 1921-29. The latter was a period of notable economic expansion, but the price advances that manifest inflation were restricted to certain areas of economic activity.

1927 and 1931 estimates of value added, are agriculture 22, mining 7, manufacturing 59, and construction 12. Value indexes are derived from quantity and unit price measures.

² Agricultural production is estimated by the Bureau of Agricultural Economics. Unit price is an average of farm prices. Value of agricultural production is derived from quantity and price measurements.

³ Mineral production is estimated by Harold Barger and Sam Schurr for 1914-29; for 1939-43 use is made of indexes of mineral production computed by the Board of Governors of the Federal Reserve System. The index of wholesale prices of raw minerals is that of the National Bureau of Economic Research. Value indexes are derived from quantity and price measures.

⁴ Manufacturing production 1914-29 is estimated by Solomon Fabricant; for 1939-43 the production index of the Board of Governors of the Federal Reserve System is used. The index of wholesale prices of manufactured goods is that of the National Bureau of Economic Research. Value indexes are derived from quantity and price measures.

⁵ Bradstreet's value of contracts awarded is used for 1914-19; for 1921-43 indexes of value of contracts awarded are computed by the Board of Governors of the Federal Reserve System from data supplied by F. W. Dodge Corporation. Unit price represents the index of construction costs computed by the American Appraisal Company. Volume of construction is derived from value and unit price measures.

⁶ Total employment, an index of man-hours worked in manufacturing industries 1914-29, is computed by Fabricant; for 1939-43 indexes of number employed and hours worked are those of the Bureau of Labor Statistics. Payroll data for 1914-29 are from the Census of Manufactures; for 1939-43 the Bureau of Labor Statistics index is used. Average hourly earnings are derived from payroll and employment measures.

⁷ For 1914-19 the quantity index measures the number of shares sold on the N. Y. Stock Exchange, excluding odd lots and stopped sales, as computed by the *New York Times*. The price index used for this period is the *New York Times* index of 50 stocks.

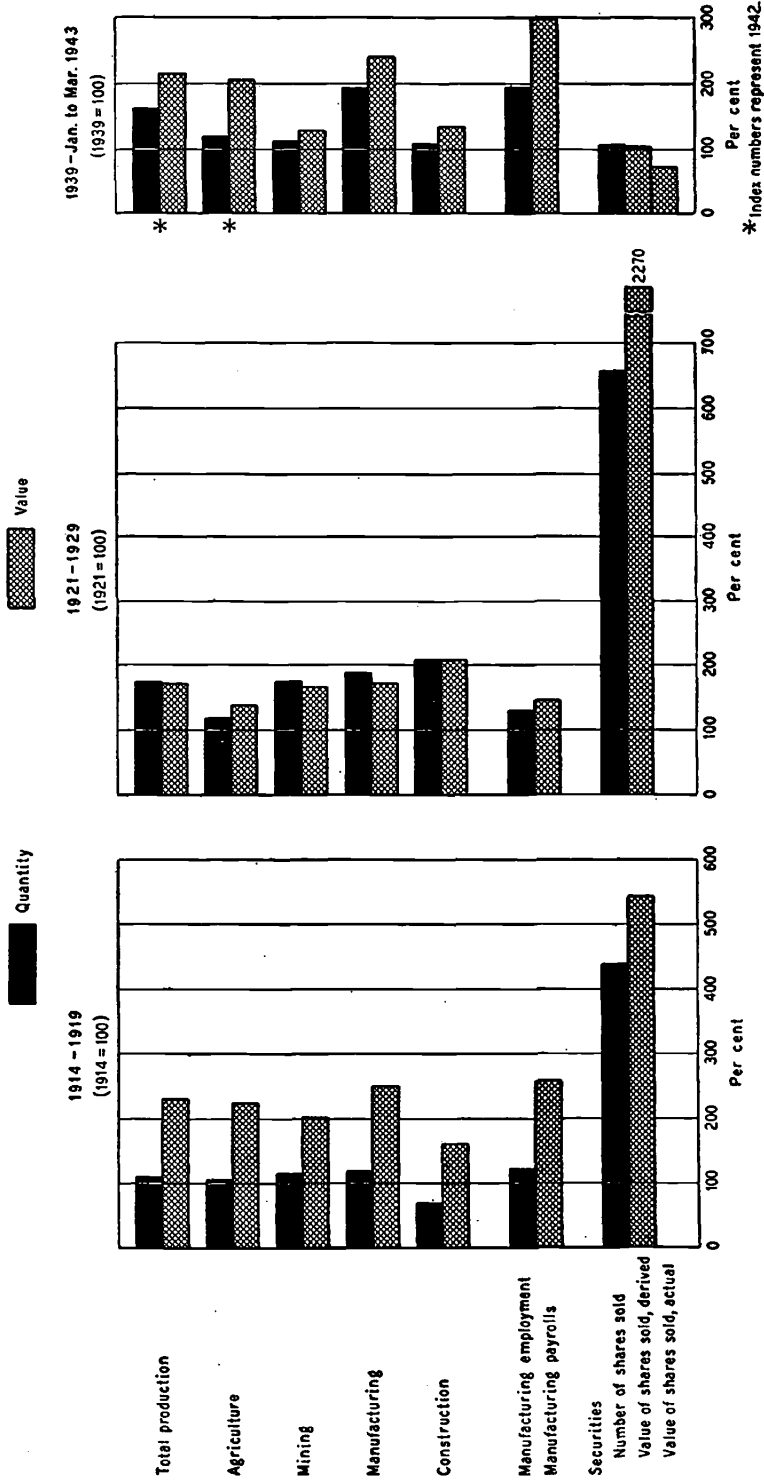
For 1921-29 the quantity index measures the number of shares sold on the N. Y. Stock Exchange, excluding odd lots and stopped sales, as computed by the *New York Times*. The price index is the combined index of 402 stocks computed by Standard and Poor's Corporation.

For 1939-43 the quantity index measures the number of shares sold on the N. Y. Stock Exchange, as compiled by the Securities and Exchange Commission. The price index is the average price of all listed shares on the N. Y. Stock Exchange, adjusted for stock split-ups, stock dividends, etc.

For each period the value series is derived from the price and quantity measurements. The record of value changes, thus derived, is in some degree formal. It would coincide with the actual change in the aggregate value of shares traded only if the composition of the volume of shares traded were to remain unchanged. If there is a shift in composition (such as would result from a swing to low-priced shares), the quantity, price and value measures would not be mutually consistent. Such shifts undoubtedly occurred in all three of the periods here covered. For the final period actual value figures are shown in italics below the derived measurements of value changes. In this period there was a definite shift to low-priced shares; the actual value relative is well below the derived figure. Although the derived value figures are formal, they are given here as indications of the degree to which changes in the prices of securities cause divergent movements of quantities and values in securities markets.

CHART 9

Changes in Quantities and in Aggregate Values during Three Periods of Economic Expansion



The volume increases of 1914-19 were modest. Manufacturing volume increased 19 per cent, the output of primary products by smaller amounts. A combined index shows an advance of 10 per cent. But the aggregate values of primary products and manufactured goods were more than doubled. Inflationary forces advanced unit prices to high levels. In the markets for securities 1919 brought a very much larger volume of transactions, but unit prices for stocks were only some 25 per cent higher than in 1914, as compared with advances of 75 to 135 per cent for major commodity groups. Farm realty values increased 36 per cent from 1914 to 1919, 65 per cent from 1914 to 1920.²⁴ These were substantial gains in a market normally sluggish. The advances in the labor market were greater. Manufacturing employment, measured in aggregate man-hours, was 21 per cent greater in 1919 than in 1914; payrolls were 159 per cent higher. Here, again, unit prices advanced: average hourly earnings of manufacturing labor were 114 per cent higher in 1919 than in 1914. It is clear that the inflationary pressure of 1914-19 fell on commodities—agricultural and mineral, raw and manufactured—and on the services of labor.

Between 1921 and 1929 we turned out goods in a stream that swelled with only minor interruptions. The production of commodities increased about 74 per cent, as against 10 per cent between 1914 and 1919. Yet the aggregate value of these goods increased only 72 per cent, materially less than the gain of 132 per cent in the earlier period. The explanation, of course, is to be found in average unit commodity prices, which declined slightly in the 'twenties, and rose sharply from 1914 to 1919. We find a similar contrast in the labor market. Total employment (aggregate man-hours worked) was 31 per cent greater in 1929 than in 1921. This exceeded the 1914-19 increase of 21 per cent. But payrolls increased only 46 per cent, as against 159 per cent in the earlier period. The price of a unit of labor (one man-hour) increased only 11 per cent from 1921 to 1929, as against an increase of 114 per cent from 1914 to 1919. It was not in commodity or in labor markets that the expanding purchasing power of the 'twenties pressed upon supplies.²⁵ Yet there was such pressure.

²⁴ From estimates of the Bureau of Agricultural Economics, on average value per acre of farm real estate.

²⁵ This statement, and the figures cited, do not tell the whole story of monetary movements and commodity production between 1921 and 1929. There is some justification for the view that inflationary forces affected commodity markets between 1921 and 1929, but that the inflation was concealed. Manufacturing productivity increased greatly

It was manifest in two major areas in the 'twenties—urban real estate values and the values of securities. For the first of these we have no systematic measurements of comprehensive coverage.²⁶ For securities, as represented by common stocks, we have records that indicate the dimensions of the expansion between 1921 and 1929. Trading in 1929, as measured by the number of shares sold, was six and one-half times as great as in 1921; the aggregate value of shares sold increased more than twenty-fold. Chart 9 gives an inadequate picture of this gain, for the vertical scale has to be broken if changes in other elements are to be appreciated. The index of average unit prices, the direct measure of the volume-value differential, was 345 in 1929, as compared with a base value of 100 in 1921.

The expanding force of purchasing power that could not be constrained within the limits of available physical quantities was felt primarily in commodity and labor markets between 1914 and 1919, and within these markets its influence was pervasive. In the 1920's this force was not directly manifest in commodity markets (although its presence was felt through the maintenance of prices that would otherwise have been forced down by productivity advances). It broke out with violence, however, in the markets for equity shares. Realty values in special areas (e.g., Florida) were also affected. With these two experiences of the fairly recent past we compare the records of 1939-43.

As we have seen, the pressures that generate volume-value differentials were strongest, during the last four years, in the markets for agricultural products and the services of labor. Commodities in general felt the upward push of values, as they did not during the 'twen-

(output per man-hour went up about 43 per cent), but there was no corresponding reduction of prices. (The average unit selling price of manufactured goods went down about 8 per cent. The average cost per unit of product of the services of agents of fabrication fell only 4 per cent.) In good part advancing fabricational costs and profits absorbed the productivity gains, with results very similar to those brought about by sharp advances in selling prices when there is no change in productivity.

²⁶ Statistics on the assessed valuation of real property (land and improvements) throw some light on changes in the value of real estate. The total value of such property in the United States increased 62 per cent from the fiscal year ending June 30, 1922 to the fiscal year ending June 30, 1930 (from *Financial Statistics of States*, U. S. Department of Commerce). In some degree this increase represents new structures, but in the main it reflects increased unit values of existing property. This is a very considerable advance, occurring during an eight-year period marked by a general decline in commodity prices.

The average value per acre of farm real estate declined about 25 per cent between 1921 and 1929.

ties, but the pressure, as judged by its consequences to date, was not as strong as between 1914 and 1919, or as pervasive. The more prompt and effective application of price controls in the markets for raw minerals and for durable manufactured goods was, of course, an important factor in this record. The recent movement has been selective inflation to a far greater degree than was the rise of 1914-19. In the second place, the initial impact of the latest rise was felt in commodity and labor markets and, to date, by far the greatest rise has been in these markets. There has been no such upward push of equity values as occurred in the 'twenties, nor was there a rise comparable to that of 1914-19.²⁷ Within the last year and a half, however, these laggard markets have been stimulated. Common stocks rose 53 per cent between April 1942 and June 1943. Average values per acre of farm land rose only 1 per cent from 1939 to 1941 (March 1 values). From March 1, 1941 to March 1, 1942 there was an advance of 7 per cent. During the next twelve months, to March 1, 1943, the largest annual increase since 1920 occurred—9 per cent.²⁸

The story of the latest economic expansion is, of course, unfinished. How effective commodity price controls will be we do not know. Whether the inflationary forces that are still clearly present and powerful will be kept in check by rigorous taxation and more extensive investment in government bonds and, if they are not, where and how they will make themselves felt as the expansion runs its course are matters that are yet to be determined.

III PRICE RELATIONS IN 1943

The price shifts discussed in the preceding section have created a system of price relations differing materially from those of 1939 and those of 1914. The unit values of some goods and services have risen to new high levels; others have lagged, and have lost in relative worth. These shifts affect the economic status of producing and consuming groups. The relations between physical outgo and physical income are altered. The relative attractiveness of occupations is modified. Stimulus to productive activity is enhanced or retarded. The relations now existing, after the stresses and upheavals of three and

²⁷ Perhaps equally significant are the contrasts among the records of volume of trading in the three periods. As compared with increases in number of shares sold of some 300 per cent in 1914-19, and 500 per cent in 1921-29, there was an advance of only 57 per cent between 1939 and March 1943.

²⁸ Estimates of the Bureau of Agricultural Economics.