Volume Title: Economic Tendencies in the United States: Aspects of Pre-War and Post-War Changes

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Volume Publisher: NBER

Volume ISBN: 0-87014-020-5

Volume URL: http://www.nber.org/books/mill32-1

Publication Date: 1932

Chapter Title: Other Economic Changes, 1901-1913

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Chapter URL: http://www.nber.org/chapters/c4854

Chapter pages in book: (p. 124 - 185)

CHAPTER IV

Other Economic Changes, 1901-1913

A NOTABLE period of economic expansion was under way in the United States at the opening of the twentieth century. The rising trend of commodity prices, following some three decades of almost unbroken decline, had generated a spirit of optimism in business. Rising prices helped, too, to improve the state of mind and the economic condition of the farmer, who had labored under debt burdens steadily enhanced by the increasing value of the monetary unit during the preceding decades. Industrial and agricultural production were accompanying prices on the upward climb. After the depression of the middle 'nineties both industry and agriculture had entered upon new stages, each year recording new high levels in the volume of output of staple commodities. Markets were at the same time widened, and manufacturers were finding outlets at home and abroad for their expanding production.

Iron and steel played prominent parts in this economic expansion. The steel industry had been growing in relative importance for thirty years. By the end of the nineteenth century steel was definitely in the saddle, and dominated the American industrial situation. Conditions in the steel industry constituted the prime barometer of business. Following the Civil War our released national energies were devoted to railroad construction. By 1900 the peak of activity in this industry had been passed, but steel was needed as never before for equipping the new industrial plants, for providing new rolling stock, for use in building construction. With the intensification of our efforts in foreign fields, overseas markets for steel were open for exploitation. This era was marked by the accumulation of capital funds and the construction of capital equipment at a rapid rate, perhaps more rapid than ever before in this country's history, and steel was the leading beneficiary. It was no coincidence that the first billion dollar corporation in this country was formed in 1901, and that this was the United States Steel Cor-

poration. Economic hegemony had passed from agriculture to steel, and the 'economic climate' of the early twentieth century experienced a corresponding change.

No summary of the general attributes of this period would be complete without reference to industrial combinations. Between 1899 and 1901 more combinations were formed than in any similar period in our history. The stimulus of widening markets and the benefits of mass production were powerful incentives to such combinations. The newer technological methods required an investment in plant and equipment far heavier than had been necessary under earlier conditions. The inducement to promoters and underwriters of quick, certain and large profits to be made through the pushing of a successful merger was another force working in the same direction. In 1901, the year with which this survey begins, Theodore Roosevelt's inaugural address dealt in considerable part with the evils of such combinations. The era of 'trust busting' was in prospect.

Perhaps most notable among the conditions characterizing the opening of this period was the optimism of the business world. The *Final Report* of the United States Industrial Commission, submitted in 1902, speaks in glowing terms of the fortunate state of affairs then prevailing. At the beginning of the nineteenth century, says the *Report,* "The people possessed neither wealth, knowledge, nor power. . . . For centuries the elements of applied science and of the modern arts had been germinating, concealed and unrecognized. At the commencement of the nineteenth century they began visibly to expand and the long-dormant industrial system reached large fruition in a single century." (p. 524)

In language even more strongly reminiscent of discussion during the recent post-war expansion, the *Report* deals with the effect of reduction of costs upon the extension of the market, and the reverse influence, upon production costs, of such extension. "Reduction of costs usually brings about a reduction of prices and an increase in amount and reliability of compensation of the producers. Every reduction of prices extends the market, often in much more than commensurate degree. Each extension of the market, by enlarging the scale of production, affords an opportunity still further to reduce costs and prices and to increase wages."(p. 536) The *Report* proceeds, "But the radical industrial changes of the nineteenth century and the crises and crashes, which at intervals of 10

to 20 years have been their accompaniment, are likely to be less severe in the future. Civilization and the industries are established upon a new basis, and progress hereafter will probably be smoother, although equally rapid." (p. 537) It is pointed out, further, that though temporary hardship may result from such improvement in methods of production, the increased consumption of goods which the cheapening of production makes possible will in the long run absorb the labor displaced. As an instance of this, "there are probably now demanded even a much larger number of horses merely for transporting people to and from the trains than were a century ago employed in the whole stage coach business." (p. 535) The frame of mind prevailing at the beginning of the twentieth century was marked by a buoyant optimism; there prevailed widespread confidence that a new path to plenty was open and that the way had been cleared to happiness and prosperity for all.

A Survey of Major Tendencies

The preceding chapters have traced the changes occurring between the turn of the century and the outbreak of the World War in production, prices and production costs in the United States. A study of economic changes which runs in terms of production and prices alone does not, of course, include all the factors affecting economic processes. In tracing economic processes in the large we should like to measure changes in the volume and cost of capital and credit, in the volume and character of domestic and foreign trade, in the national income and its various elements, and in numerous other economic factors. These desires far exceed the scope of the data and the possibility of present treatment. We must be content with a more restricted view of economic events during the years immediately preceding the war.

Certain aspects of the changes which occurred in the American economy between 1901 and 1913, aspects which are capable of quantitative treatment, are defined by the measurements in the following table. A graphic representation of these changes is given in Figure 27.

These exhibits do not give a complete account of the economic changes occurring during the period 1901-1913, but so far as they go they furnish an interesting picture of a developing economy. As a basic factor underlying the economic changes of this era we

TABLE 48

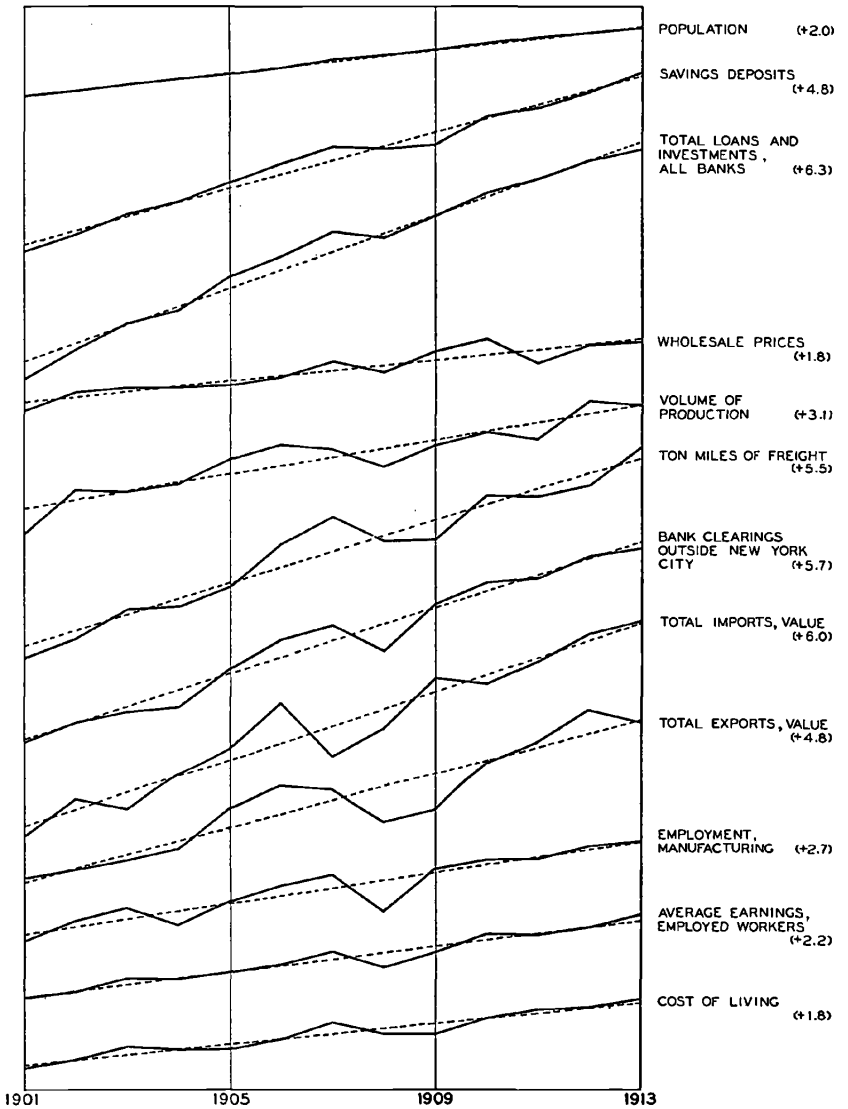
MOVEMENTS OF CERTAIN ECONOMIC ELEMENTS IN THE UNITED STATES, 1901-1913

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Economic element [a]	Absolute measurements			Index numbers		Average annual rate of change (per cent)	Index of instability of growth
	Unit	1901	1913	1901	1913		
Population	million	77	96	100	125	+2.0	0.3
Savings deposits	million dollars	2,597	4,727	100	182	+4.8	1.7
Total loans and investments, all banks	"	9,246	20,034	100	217	+6.3	2.4
Index of wholesale prices				100	126	+1.8	2.2
Index of production				100	156	+3.1	3.7
Ton miles of freight, railroads	billion ton miles	147	302	100	205	+5.5	4.3
Bank clearings, outside New York City	billion dollars	39	75	100	193	+5.7	3.0
Imports	million dollars	903	1,894	100	210	+6.0	4.6
Exports	"	1,355	2,330	100	172	+4.8	4.8
Employment (manufacturing industries)	thousand wage-earners	5,184	7,277	100	140	+2.7	2.7
Average annual earnings of employed workers (excluding farm labor)	dollars	508	675	100	133	+2.2	1.4
Cost of living index				100	127	+1.8	1.4

[a] The population figures are based on estimates made by W. I. King, in which the available information on births, deaths, and migration is used in interpolating for inter-censal years. While an appreciable margin of error enters into the estimates for individual years, they are better adapted to our purpose than are estimates based upon straight-line interpolation between census years. Data on savings deposits in the United States are from the *Report* of the Comptroller of the Currency, 1914, I, p. 87. Loans and investments, from the same source, p. 74, include loans, discounts and overdrafts, and bonds, stocks, etc., listed as resources of state, savings, and private banks, loan and trust companies and national banks. The wholesale price index is that of the U. S. Bureau of Labor Statistics. Production changes are measured by the index number explained in Chapter I. Data on the number of tons of freight carried one mile have been taken from *Statistics of Railways in the United States*, 1915, p. 37. Bank clearings for 159 cities (excluding New York City) are from the annual number of the *Financial Review*, 1916, p. 64. The import and export series are those compiled by the Bureau of Foreign and Domestic Commerce, Department of Commerce. Employment data are from *Recent Economic Changes*, National Bureau of Economic Research, New York, 1929, II, p. 450; they are census-year figures for manufacturing employment, with interpolations for non-census years based on annual indexes of employment compiled by Professors Cobb and Douglas. Employees' earnings and the cost of living index are from Paul H. Douglas, *Real Wages in the United States*, Houghton Mifflin Co., Boston, 1930, pp. 60, 392.

FIGURE 27

MOVEMENTS OF CERTAIN ECONOMIC ELEMENTS IN THE UNITED STATES, 1901-1913



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

have the steady advance of population, at a rate of 2.0 per cent a year. There were slight undulations in this steady growth, undulations with a mean annual amplitude approximating three-tenths of one per cent of the normal population.[1] These measurements of the rate of gain and of the oscillations in population define the scale of changes in the human factor, and furnish standards of comparison for use in evaluating economic changes.

In contrast to population changes we have the movements of the two factors already discussed, production and prices. While the human element increased at a rate of 2.0 per cent a year, with minor oscillations, the volume of physical goods increased at a rate of 3.1 per cent, a net gain per head of 1.1 per cent a year. Variations in the output of physical goods averaged 3.7 per cent a year, these swings having more than ten times the amplitude of the undulations in population. The relative movements of population and of the volume of physical goods are of obvious significance. From the relations between these two elements, growing at unequal rates, fluctuating over widely different ranges, are derived certain of the prime characteristics of an economic era. The price system, playing an instrumental but important rôle, was marked by a rising tendency. The rate of advance for wholesale prices was 1.8 per cent a year. Oscillations in the price level, defined by an index of 2.2, covered about eight times the average range of swings in population and about sixty per cent of the mean movement in the volume of production.

Of the other economic factors depicted in Figure 27, the important element of capital funds is represented by a single and inadequate series measuring deposits in the savings banks of the country. These deposits increased between 1901 and 1913 at a rate of 4.8 per cent a year, a figure which may well exceed the rate of growth of general capital funds during this period.[2]

[1] Deficiencies of the statistical record of births, deaths and migration during the period 1901-13 render it impossible to measure with any high degree of accuracy the year-to-year variations in the total population. The figure given, derived from King's estimates, is probably a maximum value, since it is based upon vital statistics for inter-censal years covering relatively small areas.

[2] In post-war years the rate of increase in total savings deposits was greater than the rate of increase in capital funds, as indicated by more comprehensive figures.

The production series treated in Chapter I throw some light on the growth of capital. Our rather limited sample indicated an average annual increase of 5.0 per cent in the production of goods to be used as capital equipment. The produc-

We are on firmer ground in dealing with the supply of credit. Data on book credits are not available, but the volume of bank credit, the most important element of the total, may be measured in terms of the total loans, discounts and investments of all banks in the United States. Between 1901 and 1913 the total volume of bank credit increased from 9,246 millions of dollars to 20,034 millions, the average annual rate of increase being 6.3 per cent. (The expansion of credit volume paralleled and, of course, was based in considerable part upon a steady increase in the world production of gold.) The figure defining the growth of credit can not be interpreted by itself, for it stands in close relation to changes in the volume of production and trade and in the level of prices. For the period 1901-1913 we have no direct and adequate measure of changes in the physical volume of domestic trade. If the rate of change in volume of production, which averaged 3.1 per cent a year, may serve as an indication of the rate of change in the number of physical units of goods changing hands, the increase in credit volume would appear to have been out of proportion to the demands of business. A rising price level accompanied the more rapid increase in credit volume.[1]

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tion of such equipment includes additions to and replacements of an existing supply of capital goods. Changes in increments are, obviously, not the same as changes in aggregate supply. The production index refers to physical goods; savings deposits are in dollars of changing purchasing power.

[1] The relation is not a simple one between volume of production, volume of credit and wholesale price level, although these are probably the major factors. In the first place, trade of all sorts, rather than production, should be measured. The volume of trade was probably increasing at a somewhat more rapid rate than the volume of measurable production. This period was marked by increasing fabrication of materials of many types, and by the taking over, by the factory and by artisans, of work formerly done in the home. (Net ton miles of freight carried by railroads, an index of one type of trade, increased at an annual rate of 5.5 per cent between 1901 and 1913.) Again, credit employed in connection with security transactions constitutes, to some extent, a separate reservoir. This is not distinguished as a separate item for this period. Another factor was the apparent decline in the average monthly velocity of circulation of bank deposits. Studies of the Federal Reserve Bank of New York indicate a decline in the velocity of circulation of demand deposits in the United States at a rate averaging 2.5 per cent a year during this period. This would tend, of course, to lessen the effective volume of credit. Perhaps more important is the inadequacy of the wholesale price index as a measure of changes in the purchasing power of the dollar in all markets. Snyder's index of the general price level, based upon a wider sample of price transactions, increased at a rate of 2.4 per cent a year, an advance substantially greater than that recorded for the wholesale price index. These and other limitations of the data render it impossible to establish any

The flunctuations in credit volume, as measured by an index of instability of 2.4, were of about the same order of magnitude as the variations in the price level, and were considerably smaller than the average annual variation in aggregate physical production. The volume of goods produced was the most variable of the factors so far considered.

The volume of export trade kept approximate pace with the volume of domestic production between 1901 and 1913. An increase of 4.8 per cent a year in aggregate export values may be taken to represent an advance of about 3 per cent a year in physical volume. Aggregate import values rose by 6.0 per cent a year, which, at the prevailing rate of price advance, represents an increase of the physical volume of imports at a rate close to 4 per cent a year. Oscillations of both imports and exports appear to have been of about the same order of magnitude as the fluctuations of production.

Of series reflecting domestic trade we have two, net ton miles of freight carried by railroads and bank clearings in 159 cities outside New York. The former, a series in physical units, increased between 1901 and 1913 at a rate of 5.5 per cent a year, while bank clearings increased in volume at a rate of 5.7 per cent. If we make allowance for the effect of changing prices upon bank clearings (using Snyder's price index), we secure 3.3 per cent as the approximate rate of increase in the volume of physical transactions which are represented by such clearings.[1] These figures indicate that the volume of commercial transactions at large was increasing at a rate slightly greater than that at which physical output was increasing, while the advance in volume of railroad transportation exceeded by a wider margin the increase in physical production.

In dealing with the volume of employment we are hampered by lack of comprehensive and accurate data. The estimated number of wage-earners in manufacturing industries increased from 5,184 thousands in 1901 to 7,277 thousands in 1913; the annual rate of increase averaged 2.7 per cent. This figure, which substantially ex-

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precise relations between changes in the series cited. The evidence is clear, however, that credit expansion occurred at a rate in excess of that required to finance the increasing volume of commercial transactions, and that an accompaniment, causal or consequential, was a rising price level.

[1] The assumption is here made that bank clearings outside New York represent, primarily, exchanges of physical goods. To some extent financial transactions affect such clearings.

ceeds the rate of gain in population, indicates that an increasing percentage of the population was employed in manufacturing industries. During this same period salaried workers engaged in manufacture increased in number at a rate of 5.0 per cent a year.

The data reviewed provide an outline picture of certain major tendencies of the pre-war era. We have measured the rate of change in population and have observed the minor oscillations as population changes from year to year. The major movements of production and exchange during this period show remarkable uniformity, when reduced to comparable terms. The physical volume of production, of domestic trade and of exports increased at rates close to 3 per cent a year. When aggregate values, not physical volumes, are measured, these rates run in the neighborhood of 5 per cent a year. The annual oscillations of the series relating to production, imports, exports, primary domestic distribution (represented by ton miles of freight carried) and employment do not differ widely in magnitude, averaging between 2.7 and 4.8 per cent. This is a range of variation from ten to fifteen times that characteristic of population. Such excess fluctuation of the economic series (excessive in relation to the changes in the number of producers and consumers for whom the economic system functions) may be taken to reflect instability arising from faults in the economic order, or defects inherent in an individualistic system of satisfying economic wants. Or it is, perhaps, a necessary accompaniment of economic growth and of a changing scale of human desires.

Changes in Distributive Shares

We pass to a more detailed account of the economic developments of the period 1901-1913. Dealing, first, with various elements of income, it is possible to approximate the trend of wages and to estimate, with a larger margin of error, changes in the receipts of stockholders and bondholders.

Wage Trends

The most comprehensive wage statistics compiled for this period are those of Paul H. Douglas.[1] They indicate that the per capita money earnings of employed workers of all groups, excluding farm labor, increased between 1901 and 1913 at an average rate of 2.2

[1] *Real Wages in the United States,* Houghton Mifflin Co., Boston, 1930.

per cent per year. (The index of wage level constructed by Carl Snyder agrees closely with this result, showing an average annual increase at a rate of 2.1 per cent.)[1] There is, of course, variation among the rates of change of earnings in different groups. For the most important single group, wage-earners in manufacturing plants, the average rate of increase in money earnings was 1.7 per cent a year. Brissenden's figures on the actual money earnings of factory workers, in which correction is made for unemployment, indicate the same rate of increase.[2]

If these earnings figures are to be compared with the physical volume series already presented, the effect of changing dollar values should be eliminated. This may be done with reasonable accuracy by means of Douglas' index, which shows an increase in the cost of living for working men's families at a rate of 1.8 per cent a year between 1901 and 1913.[3] Real earnings of all employed workers increased, therefore, at a rate of 0.4 per cent, while real earnings of manufacturing employees declined at a rate of 0.1 per cent. These movements are in sharp contrast with the concurrent increase in physical volume of production. Granted the accuracy of the wage and cost of living indexes, it would appear that increased industrial productivity did not result in any substantial addition to the real income of employed workers in general, while the real returns of manufacturing labor actually declined.[4]

[1] *Business Cycles and Business Measurements,* Macmillan Co., New York, 1927, p. 289.

[2] Paul F. Brissenden, *Earnings of Factory Workers, 1899-1927,* Census Monograph X, 1929.

[3] Douglas' cost of living index for the pre-war period is a combination of index numbers derived from quoted retail food prices and of estimates of changes in the retail prices of clothing, furniture, fuel and light, and tobacco and spirits based upon the wholesale prices of the commodities named. The adjustment of wholesale to retail prices has been based upon the divergence between the average wholesale and retail prices of 27 identical food commodities (from 1907 to 1914 this correction was made on the basis of the average wholesale and retail prices of 13 foods and of fuel and light, statistics on the cost of fuel and light becoming available in that year). Data on rents were not available. In view of the unavoidable deficiencies of the Douglas index, measurements relating to real earnings must be considered as subject to some degree of error. They remain, however, the best available estimates.

The use of this cost of living index as a deflator is open to question in cases in which remuneration in kind supplements money incomes. This is notably true of farm labor and of ministers. Estimates of changes in real earnings for these groups are probably least accurate.

[4] Different distributive shares are marked by differences in time lags in their adjustment to changing price levels. The real values of interest and dividend pay-

§ *Changes in earnings, by occupational groups.*—The general average of wage changes fails to reveal the diversities of the movements actually occurring among different employed groups. These movements are defined by the measurements in the following table, which are based, except where otherwise noted, upon the wage estimates of Paul H. Douglas. The series are shown graphically in Figures 28 and 29.

The three general measurements at the head of the table relate to somewhat different aspects of the problem. Douglas' index, purporting to measure the earnings of all groups of employed workers, exclusive of farm workers, shows an increase of money earnings at an average annual rate of 2.2 per cent, and of real earnings (i.e., in dollars of constant purchasing power) at a rate of 0.4 per cent. Snyder's index of wage level indicates an average annual increase in money wages at the rate of 2.1 per cent. The Bureau of Labor Statistics' index of hourly rates of pay among all employed workers, except agricultural workers, shows an increase of 2.4 per cent a year, which exceeds the rate of advance in earnings. The general trend of wages and earnings is clearly defined by those three independently constructed index numbers. Money earnings advanced at a rate slightly in excess of 2 per cent a year, while real earnings (earnings in terms of physical goods) increased at a rate somewhat less than 0.5 per cent a year. The advance of earnings fell slightly behind that of hourly wage rates, because of a shortening of the average working day during this period.

Among the main groups of employed workers the rates of advance in money earnings between 1901 and 1913 ranged from 0.6 per cent a year for government employees to 4.3 per cent for teachers. As regards absolute amounts, it is to be noted that teachers started at the lowest level in 1901, with annual average earnings of only $337, while government employees, in executive departments, started at the highest level, with average earnings of $1,047 a year. The real earnings of the latter group declined at the rate of 1.2 per cent a year; the real earnings of teachers increased at a rate of 2.5 per cent. Transportation workers and coal miners also increased their real earnings between 1901 and 1913. Postal employees, clerical and low salaried workers, manufacturing wage-earners, and ministers suffered slight declines in their real earnings. Least regular were the earnings of coal miners, for which the index of instability was 4.4 per cent. Government employees, with an average variation of only 0.3 per cent, had the most stable average income.[1]

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ments are subject to wide variations when measured as percentages of the national income. Rents of natural resources change slowly in money value, as do also salaries and professional fees. Wages have still a different time lag, in relation to changes in general price levels. Accordingly, statements as to changes in real wages must be interpreted with reference to conditions, as to such lags, in the terminal years of the period covered.—M. C. Rorty.

[1] Since these figures relate to employed workers they do not furnish accurate indications of the variations in earnings which accompany periods of unemployment.

TABLE 49

CHANGES IN EARNINGS OF EMPLOYED WORKERS, 1901-1913

(1) Occupational group	(2) Wage index, or absolute earnings in dollars 1901	(3) Wage index, or absolute earnings in dollars 1913	(4) Average annual rate of change (per cent)	(5) Index of instability	(6) Average annual rate of change in real earnings or in real wage rates [a] (per cent)
All groups of employed workers, excluding farm labor (Douglas)	$508	$675	+2.2	1.4	+0.4
Index of wage level (Snyder) [b]	100	128	+2.1	0.9	+0.3
Index of wages per hour, excluding farm labor (U. S. Bureau of Labor Statistics) [c]	100	135	+2.4	0.8	+0.6
Classes of employed workers (Douglas)					
Teachers	$337	$547	+4.3	0.8	+2.5
Railroad employees	$549	$760	+2.5	1.8	+0.7
Coal miners	$454	$621	+2.3	4.4	+0.5
Postal employees	$936	$1,124	+1.7	2.2	−0.1
Clerical and low salaried workers	$1,009	$1,236	+1.7	0.9	−0.1
Manufacturing wage-earners	$456	$578	+1.7	2.2	−0.1
Ministers	$730	$899	+1.7	1.5	−0.1
Government employees, executive departments	$1,047	$1,136	+0.6	0.3	−1.2
Manufacturing wage-earners (Douglas)					
Land vehicles	$500	$772	+3.4	3.1	+1.5
Clothing	$391	$533	+2.4	1.9	+0.5
Paper and printing	$503	$664	+2.1	1.8	+0.3
Leather and leather goods	$435	$562	+2.0	1.0	+0.1
Textiles	$325	$416	+1.8	2.5	0.0
Iron and steel	$553	$700	+1.7	2.2	−0.1
Tobacco products	$395	$453	+1.0	1.5	−0.8
Lumber and its products	$413	$527	+0.8	4.5	−1.0
Unskilled workers:					
Index of weekly earnings of unskilled workers (Hurlin) [d]	100	124	+1.7	0.8	−0.1
Index of weekly earnings of unskilled workers, manufacturing industries (Coombs) [e]	100	119	+1.1	1.8	−0.7
Farm labor, wages without board (Douglas)	$255	$360	+2.7	1.9	+0.8

[a] Douglas' cost of living index has been used in determining changes in real earnings.

[b] Snyder's index for this period (Snyder, *op. cit.*, pp. 137, 289) is a combination of the Department of Labor's index of the wages of unskilled labor and estimates, taken from Burgess' *Trend of School Costs*, of the wages of teachers and clerks.

[c] *Monthly Labor Review*, Feb. 1921, p. 74.

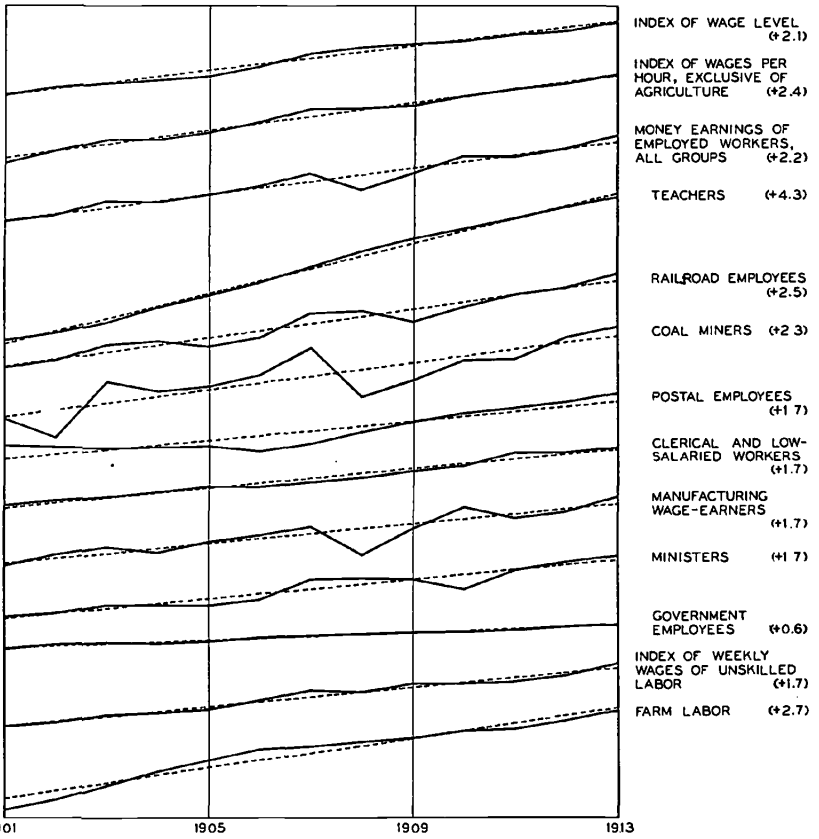
[d] Hurlin's estimates of the earnings of unskilled workers are based upon wage statistics for common labor in manufacturing industries, supplemented by data on the wages of building labor, railroad labor and farm labor without board. The index appears in Douglas, *op. cit.*, p. 175.

[e] Whitney Coombs, *Wages of Unskilled Labor in Manufacturing Industries*, p. 99.

FIGURE 28

CHANGES IN MONEY EARNINGS OF EMPLOYED WORKERS IN THE UNITED STATES, 1901-1913

MAJOR GROUPS



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

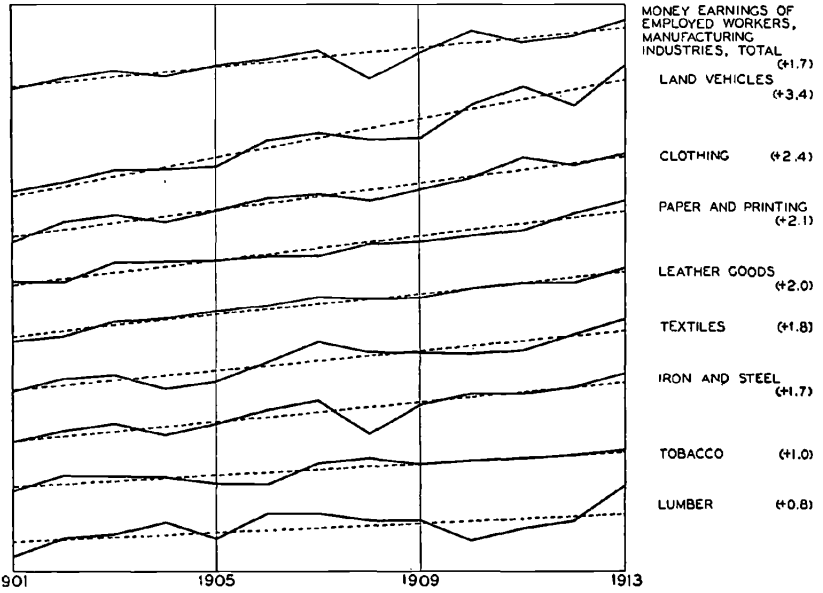
Measurements relating to the earnings of eight groups of workers in manufacturing industries are available. (See Figure 29.) For four of these, including workers in industries producing land vehicles, clothing, leather and leather goods, and in paper and printing establishments, real wages increased, at rates ranging from 0.1 to 1.5 per cent a year. Real earnings in textile industries showed no net change; there was a net decline in real wages in the iron and steel, tobacco products and lumber industries.

Two entries in the table relate to the earnings of unskilled workers. The real earnings of all unskilled labor declined slightly over this

FIGURE 29

CHANGES IN MONEY EARNINGS OF EMPLOYED WORKERS IN THE UNITED STATES, 1901-1913

MANUFACTURING INDUSTRIES



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

period; for unskilled factory workers the decline was more substantial, at a rate of 0.7 per cent a year. Heavy immigration was an important factor in preventing an advance in wages in this field. The expanding production and rising wealth of the years preceding the war brought no real gain to the large numbers of unskilled workers.

Farm labor entered upon this period at a level of absolute earnings far below that of any of the other groups of employed workers. The advance in real earnings between 1901 and 1913 averaged 0.8 per cent a year.

In studying the instability of earnings in manufacturing industries we may make use of a set of index numbers constructed by Paul F. Brissenden, in which account is taken of variation in earnings due to loss of employment.[1] From these data we have computed for each industrial group an index of instability, measuring the average degree of departure from regularity of growth.

[1] *Earnings of Factory Workers, 1899-1927,* Census Monograph X, p. 108. In view of the difficulties facing Brissenden in making his estimates of year-to-year changes in earnings, the indexes of instability of growth given in the text, which reflect these year-to-year fluctuations, must be considered as approximations only.

TABLE 50

MEASUREMENTS OF INSTABILITY OF GROWTH IN THE EARNINGS OF FACTORY WORKERS IN THE UNITED STATES, 1901-1913

Industrial group	Index of instability of growth in per capita earnings
Tobacco products	1.4
Paper and wood pulp	2.1
Boots and shoes	2.6
Silk goods	2.8
Clothing, men's	3.2
Leather, tanned	4.2
Automobiles [a]	4.4
Cotton manufactures	4.8
Iron and steel: steel works and rolling mills	5.9
Woolen and worsted goods	6.1
Knit goods	6.6
Cars, steam railroad	8.3
All factory workers	3.9

[a] Estimates of earnings in the automobile industry for inter-censal years prior to 1907 have been based upon changes in earnings in all industries. This has probably resulted in a measure which understates the actual degree of instability.

For all factory workers, the variation in annual per capita earnings averaged 3.9 per cent, as contrasted with average variations in the growth of the physical volume of manufacturing production amounting to some 4.7 per cent. Differences among industrial groups in respect of stability of growth are large. Greatest stability is found in the earnings of the workers in the tobacco industry. At the other extreme, fluctuations of earnings in the production of cars for steam railroads averaged 8.3 per cent a year.

Cash Receipts and Capital Gains of Stockholders

How did changes in the average returns to stockholders between 1901 and 1913 compare with changes in the earnings of industrial and other laborers? We do not have a complete record of corporation dividend disbursements during this period, but such a comparison may be made with reference to returns secured from a reasonably comprehensive sample. This sample includes 93 corporations (66 industrial and public utility corporations and 27 railroads), with aggregate stock outstanding in January, 1901, of a par value of approximately 3,820 millions of dollars. The shares

represented included over 60 per cent of those listed on the New York Stock Exchange in 1901.[1]

The present account runs in terms of total disbursements to those who in 1901 held stock in these companies. (The measurements apply also, of course, to one who held any given portion of the total stock outstanding in 1901.) Dividends paid on stock issued after 1901 (other than on stock dividends received by those holding stock in 1901) are excluded. Aggregate disbursements to stockholders, inclusive and exclusive of the cash values of subscription rights,[2] are shown in the following table.

TABLE 51

CASH INCOME RECEIVED FROM 1901 TO 1913, INCLUSIVE, BY THE HOLDERS OF ALL COMMON STOCK OUTSTANDING ON JANUARY 1, 1901

93 Industrial, Public Utility and Railroad Corporations [a]

Year	Cash income (millions of dollars)		Cash income, including rights, per $10,000 investment on January 1, 1901 (dollars)
	Including rights	Excluding rights	
1901	218.4	171.3	603.8
1902	209.8	167.8	580.1
1903	196.2	182.4	542.5
1904	200.5	166.2	554.4
1905	194.7	173.8	538.6
1906	251.9	197.8	696.5
1907 *	289.8	241.6	801.5
1908	218.3	208.3	603.6
1909	269.6	225.9	745.4
1910	261.1	247.0	721.9
1911	261.5	243.1	723.0
1912	254.1	248.6	702.6
1913 **	306.4	282.0	847.2
Total receipts, thirteen years	3,132.3	2,755.8	8,661.1
Average annual rate of change (per cent)...	+3.0	+4.4	+3.0
Index of instability...	8.2	5.1	8.2

The footnotes to this table appear on pp. 140 and 141.

[1] In later years the coverage is not as great, relatively, for the sample is limited to corporations in existence in 1901.

[2] It has been assumed that subscription rights were sold at market quotations and the proceeds added to the cash dividends received. Stock dividends have been considered as additions to the holdings of the investors.

Footnotes to Table 51.

* These entries include a 200 per cent extra dividend of the Adams Express Co., amounting to 24 millions of dollars. This disbursement, which was in the form of collateral trust bonds, has here been treated as a cash dividend, though in some respects it was equivalent to a stock dividend. Rates of change in the aggregate figures would be only slightly modified if the disbursement had been treated as a stock dividend.

** On February 15, 1913, some 39 millions of dollars were distributed to stockholders of the Standard Oil Co. of New Jersey as a result of the liquidation of loans necessitated by Federal dissolution proceedings. To prevent undue influence of such disbursements upon the averages, the weight given Standard Oil stock has been reduced (by one-half) to the approximate importance of these securities among all common stocks, as estimated from the listings on the New York Stock Exchange in 1901.

[a] Following are the corporations included in the sample.

Industrials and utilities (66)	Market value of stock as of January 1, 1901 (millions of dollars)
Adams Express Co.	18.0
Amalgamated Copper Co.	139.9
American Agricultural Chemical Co.	4.6
American Beet Sugar Co.	3.4
American Car and Foundry Co.	6.7
American Chicle Co.	5.2
American Cotton Oil Co.	6.3
American Express Co.	34.2
American Hide and Leather Co.	1.2
American Ice Securities Co.	9.0
American Radiator Co.	1.8
American Shipbuilding Co.	2.3
American Smelting and Refining Co.	26.8
American Sugar Refining Co.	53.6
American Telephone and Telegraph Co.	177.1
American Tobacco Co. (American Tobacco Trust, 1904)	61.0
American Type Founders Co.	2.3
Barney and Smith Car Co.	0.2
Brooklyn Union Gas Co.	26.8
Calumet and Hecla Mining Co.	82.3
Celluloid Co.	5.7
Colorado Fuel and Iron Co.	12.6
Consolidated Gas Co. of New York	142.0
Consolidated Tobacco Co. (American Tobacco Trust, 1904)	45.0
Consolidation Coal Co., Md.	6.1
Continental Tobacco Co. (American Tobacco Trust, 1904)	19.0
(Wm.) Cramp and Sons' Ship and Engine Bldg. Co.	3.8
Crucible Steel Co. of America	5.4
Diamond Match Co.	19.3
Distilling Co. of America (Distillers' Securities Corp.)	2.9
General Chemical Co.	4.2
General Electric Co.	41.4
International Paper Co.	4.3
International Steam Pump Co.	3.2
Lehigh Coal and Navigation Co.	18.1
Mergenthaler Linotype Co.	17.9
National Biscuit Co.	10.9
National Enameling and Stamping Co.	2.4
National Lead Co.	2.7
New York Air Brake Co.	9.7
North American Co.	7.5
Otis Elevator Co.	1.7
Pacific Coast Co.	4.0
Peoples' Gas, Light and Coke Co.	30.1
Philadelphia Co.	12.6
Pressed Steel Car Co.	6.3
Proctor and Gamble Co.	14.0
Pullman Co.	148.4
Republic Iron and Steel Co.	4.5
Singer (Sewing Machine) Manufacturing Co.	80.0
Sloss-Sheffield Steel and Iron Co.	1.7

Footnotes to Table 51—*cont.*

	Market value of stock as of January 1, 1901 (millions of dollars)
Standard Oil Co. of N. J. (one-half of the total stock outstanding)	390.0
Swift and Co.	20.3
Union Bag and Paper Co.	2.8
Union Ferry Co.	0.9
Union Typewriter Co.	3.6
United Fruit Co.	16.1
United Gas Improvement Co.	57.2
U. S. Cast Iron Pipe and Foundry Co.	0.6
U. S. Express Co.	5.5
U. S. Leather Co. (Central Leather Co.)	9.3
U. S. Rubber Co.	6.9
U. S. Steel Corp.	....
Virginia-Carolina Chemical Co.	6.9
Wells Fargo and Co.	11.0
Western Union Telegraph Co.	82.0
Westinghouse Air Brake Co.	40.1
Total (excluding U. S. Steel Corp.)	2,003.3
Railroads (27)	
Atchison, Topeka and Santa Fe Ry.	48.3
Atlantic Coast Line R. R.	11.5
Baltimore and Ohio R. R.	37.9
Buffalo, Rochester and Pittsburgh Ry.	4.8
Canadian Pacific Ry.	59.8
Chesapeake and Ohio Ry.	25.6
Chicago, Milwaukee and St. Paul Ry.	69.4
Chicago and North Western Ry.	67.3
Chicago, Rock Island and Pacific Ry.	60.8
Delaware, Lackawanna and Western R. R.	50.7
Erie R. R.	28.1
Illinois Central R. R.	87.4
Lehigh Valley R. R.	23.8
Missouri, Kansas and Texas Ry.	8.8
Missouri Pacific Ry.	36.0
New York Central and Hudson River R. R.	166.6
New York, New Haven and Hartford R. R.	115.4
Northern Pacific Ry.	68.1
Pennsylvania R. R.	225.7
Pere Marquette R. R.	4.2
Reading Co.	17.3
St. Louis and San Francisco R. R.	6.1
Seaboard Air Line Ry.	2.9
Southern Pacific Co.	86.8
Southern Railway	26.8
Toledo, St. Louis and Western R. R.	1.2
Union Pacific R. R.	76.9
Total	1,418.2
Grand total (excluding U. S. Steel Corp.)	3,421.5

The U. S. Steel Corporation, though not organized until February 25, 1901, was included in the sample, with an estimated weight based upon the stock outstanding on July 1, 1901. In this case it was assumed that the rate of return during the last two quarters prevailed during the entire year. The value of the investment as of January 1, 1901, (210.0 millions of dollars) was estimated on the basis of the change in the market value between January 1, 1901, and January 1, 1902, of the other stocks in the sample. In two other instances of considerable capital changes during the first part of 1901 (Amalgamated Copper Co. and American Telephone and Telegraph Co.) the stock outstanding at the middle of the year was taken as the weighting factor.

In measuring the results of the original investment in stock of the Standard Oil Co. and of the American Tobacco Trust, account has been taken of the returns accruing to securities received in the dissolution of parent companies in 1911.

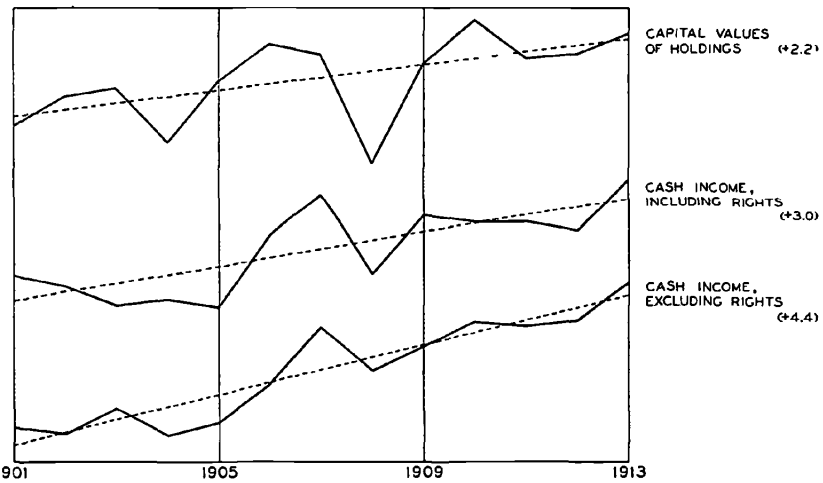
Aggregate dividend payments and the cash value of rights on this group of stocks in 1901 amounted to some 218 millions of dollars. From this relatively high level there was some decline prior to 1905, and an irregular advance thereafter. Over the entire thirteen-year period the annual rate of gain in cash disbursements to stockholders averaged 3.0 per cent. The degree of irregularity in this advance is measured by an index of instability of 8.2.

Dividend payments alone show a more rapid and a more regular growth. From an aggregate sum of 171 millions of dollars in 1901, such disbursements increased to 282 millions in 1913, a gain at a rate of 4.4 per cent a year, with an instability index of 5.1.

The entries in the last column record the changes in the absolute amounts received in dividends and subscription rights by one who in 1901 invested $10,000 in the common stock of the corporations represented in the sample, distributed in proportion to the stock outstanding in 1901.[1] The rate of gain is, of course, the same as that shown by aggregate cash income of all stockholders. The

FIGURE 30

GRAPHIC REPRESENTATION OF INVESTMENT EXPERIENCE OF HOLDERS OF COMMON STOCK IN 93 CORPORATIONS, 1901-1913



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

[1] Except for the reduction in the weight given the Standard Oil Co. of New Jersey. See note to preceding table.

figures indicate that the return on the capital investment amounted to slightly more than six per cent in 1901, declined to about five and one-half per cent in 1903-4-5, and stood close to eight and one-half per cent in 1913.

This gain in the cash receipts of stockholders was accompanied by an appreciation in the capital value of the assets represented by the stock outstanding in 1901. Measurements of the aggregate value of these stocks (plus the value of stock dividends) are given in the following table, together with the annual cash receipts. The data of the preceding table have been converted to relative form, with the year 1901 as 100, to facilitate comparison with the changes in the capital value of the investment. They are plotted in Figure 30.

TABLE 52

RELATIVE NUMBERS DEFINING THE INVESTMENT EXPERIENCE OF HOLDERS OF ALL COMMON STOCK OUTSTANDING ON JANUARY 1, 1901

93 Industrial, Public Utility and Railroad Corporations

Year	Cash income		Capital value [a]
	Including rights	Excluding rights	
1901	100	100	100
1902	96	98	110
1903	90	106	113
1904	92	97	94
1905	89	101	116
1906	115	115	131
1907	133	141	127
1908	100	122	87
1909	123	132	123
1910	120	144	143
1911	120	142	125
1912	116	145	127
1913	140	165	136
Average annual rate of change (per cent)...	+3.0	+4.4	+2.2
Index of instability...	8.2	5.1	7.8

[a] The market price as of January 1 of each year has been used to determine the capital value of the investment. For each company this price is multiplied by the number of shares of common stock outstanding on January 1, 1901, plus shares representing stock dividends declared after that date.

Over the thirteen-year period here covered, the capital value of

the stocks represented in the present sample increased 36 per cent. While cash income (dividends plus cash value of subscription rights) was increasing at a rate of 3.0 per cent a year, the capital value of the investment was advancing by 2.2 per cent a year. Both these gains exceeded the rate of advance in the level of wholesale prices (1.8 per cent a year).[1]

Industrial and Public Utility Stocks.—The experience of holders of industrial and public utility stocks over this period is recorded in the averages for 66 of the corporations included in the general

TABLE 53

CASH INCOME RECEIVED FROM 1901 TO 1913, INCLUSIVE, BY THE HOLDERS OF ALL COMMON STOCK OUTSTANDING ON JANUARY 1, 1901

66 Industrial and Public Utility Corporations [a]

Year	Cash income (millions of dollars)		Cash income, including rights, per $10,000 investment on January 1, 1901 (dollars)
	Including rights	Excluding rights	
1901	123.2	120.6	555.5
1902	132.4	115.7	597.0
1903	128.7	120.8	580.3
1904	129.4	104.4	583.5
1905	107.5	106.0	484.7
1906	124.4	120.9	560.9
1907	157.1	152.2	708.4
1908	114.6	114.5	516.7
1909	126.8	126.6	571.7
1910	154.5	154.5	696.6
1911	150.2	138.8	677.7
1912	151.2	151.1	681.8
1913	189.8	189.5	855.4
Total receipts, thirteen years	1,789.8	1,715.6	8,070.2
Average annual rate of change (per cent)...	+2.8	+3.6	+2.8
Index of instability...	9.3	10.1	9.3

[a] See the footnote to Table 51 for a list of these corporations. Note is there made of exceptional disbursements in 1907 and 1913.

[1] Note should be made of the possibility of bias in any sample covering a period of years, and composed of a constant number of concerns. Concerns coming into existence during the period covered are of necessity excluded, as are also

sample.[1] Table 53 shows the cash disbursements to those who, in 1901, held the common stock of these corporations.

The average rate of increase in the cash income of stockholders in these corporations was slightly lower than the rate of gain for all common stockholders. The rate is + 2.8 per cent a year, including rights, + 3.6 per cent, excluding rights. Variations in the growth of income are pronounced, approximating 10 per cent a year.

TABLE 54

RELATIVE NUMBERS DEFINING THE INVESTMENT EXPERIENCE OF HOLDERS OF ALL COMMON STOCK OUTSTANDING ON JANUARY 1, 1901

66 Industrial and Public Utility Corporations

Year	Cash income		Capital value [a]
	Including rights	Excluding rights	
1901	100	100	100
1902	107	96	100
1903	104	100	102
1904	105	87	86
1905	87	88	105
1906	101	100	119
1907	128	126	110
1908	93	95	75
1909	103	105	108
1910	125	128	127
1911	122	115	115
1912	123	125	116
1913	154	157	132
Average annual rate of change (per cent)...	+2.8	+3.6	+2.1
Index of instability...	9.3	10.1	8.1

[a] As determined from market values as of January 1 of each year. These index numbers of capital values of industrial and public utility stocks may be compared with the Dow-Jones index of stock prices (*Wall Street Journal*). This index, based on monthly averages of high and low prices of 12 industrial stocks, showed an average annual increase of 2.8 per cent between 1901 and 1913, and an index of instability of 9.7.

concerns going out of business during this period. A complete account of the fortunes of corporate stockholders would include both of these excluded groups. It is probable that the exclusion of new concerns (notably those which represent new industries) is of more importance than the exclusion of concerns disappearing during the period. If there is any consistent bias in the sample, as regards rate of increase in stockholders' returns, it is probably downward.

[1] The aggregate par value in 1901 of the industrial and public utility stocks included in the sample was 3,820 million dollars, 55 per cent of the total. As to number of shares, these stocks made up 51 per cent of the total sample.

Cash returns on the 1901 market value of these stocks amounted to about 5.6 per cent in 1901, 8.6 per cent in 1913. All figures for 1913 are swelled by the heavy Standard Oil disbursements of that year.

Reducing these figures to relative form, they may be compared with changes in the aggregate market value of the original investment. The several series appear in Table 54, on the preceding page.

A gain at the rate of 2.8 per cent a year in cash income was accompanied by an advance of 2.1 per cent in the capital value of the investment. This gain in aggregate value exceeded by only a small margin the advance in the level of wholesale prices. Fluctuations in capital value, as measured with reference to the line of average growth, averaged 8.1 per cent a year.

§ *Returns to industrial stockholders, other records.*—Compilations of dividend disbursements by industrial corporations have been made by various students of investment conditions. Measurements derived from these smaller samples, selected according to various criteria and yielding widely different results, are here given as matters of interest. There is no reason to doubt that the results secured from the much larger sample represented in the preceding tables furnish a more accurate record of the actual returns to stockholders as a class.

The figures in the following table are derived from four samples of industrial corporations, those in the Dow-Jones list and three other groups selected by E. L. Smith. The entries in column (2) show the changes in cash dividends received by one who invested $10,000 on January 1, 1901, equally divided among the twelve stocks in the Dow-Jones list. It is assumed that the original fund, plus accruals in the form of stock dividends and subscription rights, was liquidated every six months and redistributed equally among the same group of stocks.[1] In column (3) are given the cash returns secured by one who invested $10,000 on January 1, 1901, equally distributed among the stocks on the Dow-Jones list, without change thereafter.[2] In this case the cash values of subscription rights have been included in the income figures. In both compilations stock dividends have been included in the capital sums.

[1] These figures are based on revised compilations of Dwight C. Rose, *Investment Management,* Harpers, New York, 1928, pp. 134-137, 371 ff. The treatment of subscription rights differs from that followed in the analysis described above, but for this period, and for these stocks, rights were not of great importance.

[2] Except when necessitated by changes in the Dow-Jones list. In such cases the entire market value of the holdings in the discontinued stock was invested in the new security.

The entries in columns (4), (5) and (6) relate to lists of securities selected by E. L. Smith[1] in tracing the returns to common stocks. Column (4) gives the returns on ten industrial stocks with the best

TABLE 55

ESTIMATES OF CASH INCOME FROM EACH OF FIVE INVESTMENTS OF $10,000 MADE ON JANUARY 1, 1901, IN INDUSTRIAL COMMON STOCKS
1901-1913

(1)	(2)	(3)	(4)	(5)	(6)
	Dow-Jones sample[a]		E. L. Smith's selection		
Year	Returns from investment redistributed semi-annually (12 corporations)	Returns from fixed investment (12 corporations)	Returns from fixed investment based on: dividend record (10 corporations)	market activity (10 corporations)	market activity, ten different industries (10 corporations)
1901	$ 264	$ 360	$ 615	$ 818	$ 616
1902	334	354	751	589	514
1903	344	402	687	563	595
1904	254	285	742	510	394
1905	401	341	762	702	480
1906	630	655	1,085	1,041	731
1907	813	904	809	876	672
1908	735	807	737	858	763
1909	766	783	875	908	824
1910	801	768	773	1,068	962
1911	811	746	699	868	812
1912	963	887	674	1,040	984
1913	1,056	985	838	1,051	1,048
Total receipts, thirteen years ..	8,172	8,277	10,047	10,892	9,395
Average annual rate of change (per cent)	+11.7	+9.5	+0.7	+4.6	+6.5
Index of instability	13.4	16.4	9.6	12.5	10.8

[a] Not all the securities of the Dow-Jones sample over this period were common stocks. Exclusion of the few preferred stocks would not greatly alter the rate of growth. The entries in column (2) relate to cash dividends only, the values of subscription rights having been treated as additions to the capital sum.

[1] E. L. Smith, *Common Stocks as Long Term Investments,* Macmillan, New York, 1925, pp. 21-31. The data for these three samples (Tests 1, 2 and 3, respectively) were modified slightly to measure returns on a fixed investment of exactly $10,000.

dividend record for the period 1894-1900. The figures in column (5) measure returns on the ten industrial common stocks in which there had been the largest number of transactions for the week of January 12, 1901. The stocks in the third sample, column (6), were chosen to represent ten different industries; they were selected on the basis of market activity during the week of January 12, 1901. For each of the three samples an equal sum was invested in the ten stocks at the average price for the first week in January, and maintained throughout the period. The cash values of subscription rights and fractional stock dividends were added to cash income.

The Dow-Jones stocks yielded returns which showed a very rapid rate of increase between 1901 and 1913, a gain which was paralleled by a material advance in the capital value of the invested funds. Cash income increased at the high rate of 11.7 per cent a year, when the fund was redistributed semi-annually, and at the rate of 9.5 per cent a year when no such redistribution was made. The shifting of funds led to a relatively heavy concentration of investment from time to time in low-priced stocks, and these scored more rapid gains than high-priced shares.[1]

The rates of increase in cash income received by investors in the groups of securities represented in columns (4), (5) and (6) were distinctly lower than the rates derived from the Dow-Jones list of stocks. For the group selected on the basis of high yield, the gain was at the rate of 0.7 per cent a year; for the second group, selected on the basis of activity, the rate of gain was 4.6 per cent a year; for the third group, the gain averaged 6.5 per cent.

The risk to which the stockholder is traditionally subject is reflected in the measurements of instability relating to the series cited above. The average fluctuations in income from cash dividends ranged from 16.4 to 9.6 per cent a year. Fluctuations in capital value averaged 15.1 per cent a year for the redistributed funds represented by the entries in column (2), Table 55, and 8.1 per cent a year for the funds included in the large sample of 66 industrial corporations. In general, these fluctuations reflect variations in the rate of advance, not alternating gains and losses.

Railroad Stocks.—Turning now to railroads, we have the following record of cash received by those who on January 1, 1901, held all the outstanding stock of 27 leading roads. As in the case of industrial stocks, only cash dividends and the cash values of subscription rights have been included. Such rights constituted an important part of the income of railroad stockholders during this period.

[1] Differing modes of treating subscription rights would account for part of this difference.

TABLE 56

CASH INCOME RECEIVED FROM 1901 TO 1913, INCLUSIVE, BY THE HOLDERS OF ALL COMMON STOCK OUTSTANDING ON JANUARY 1, 1901

27 Railroads

Year	Cash income (millions of dollars)		Cash income, including rights, per $10,000 investment on January 1, 1901 (dollars)
	Including rights	Excluding rights	
1901	95.2	50.7	671.3
1902	77.4	52.1	545.8
1903	67.5	61.6	476.0
1904	71.1	61.8	501.3
1905	87.2	67.8	614.9
1906	127.5	76.9	898.3
1907	132.7	89.4	935.7
1908	103.7	93.8	731.2
1909	142.8	99.3	1,006.9
1910	106.6	92.5	751.7
1911	111.3	104.3	784.8
1912	102.9	97.5	726.3
1913	116.6	92.5	822.2
Total receipts, thirteen years	1,342.5	1,040.2	9,466.4
Average annual rate of change (per cent)...	+3.4	+5.8	+3.4
Index of instability...	15.7	8.0	15.7

In 1901, the cash income (including the cash value of rights) on this group of stocks constituted 6.7 per cent of the market value of the stock outstanding, a figure materially higher than that for 66 industrial stocks.[1] The return declined to less than 5 per cent in 1903. The average rate of increase in cash income over the thirteen-year period was 3.4 per cent a year. (The chief advance was recorded prior to 1910.)

If we reduce these income figures to relative terms, they may be compared with corresponding measurements of changes in the capital value of the fund invested in 1901 in railroad stocks.

[1] If dividend payments alone be included, the return in 1901 was considerably higher for industrial stocks (5.4 per cent of the market value for industrials, as against 3.6 per cent for rails). Subscription rights, particularly those given by the Pennsylvania Railroad, raised the yield on railroad stocks to the high figure cited in the text.

TABLE 57

RELATIVE NUMBERS DEFINING THE INVESTMENT EXPERIENCE OF HOLDERS OF ALL COMMON STOCK OUTSTANDING ON JANUARY 1, 1901

27 Railroads

Year	Cash income		Capital value [a]
	Including rights	Excluding rights	
1901	100	100	100
1902	81	103	124
1903	71	121	130
1904	75	122	104
1905	92	134	132
1906	134	152	149
1907	139	176	150
1908	109	185	106
1909	150	196	145
1910	112	182	164
1911	117	206	140
1912	108	192	141
1913	122	182	140
Average annual rate of change (per cent)...	+3.4	+5.8	+2.2
Index of instability...	15.7	8.0	10.2

[a] Determined from market values as of January 1 of each year.

The net advance between 1901 and 1913 in the capital value of the common stocks of these 27 railroads amounted to 40 per cent, as compared with a gain of 22 per cent in cash income (including rights).[1] The rate of gain in aggregate capital value averaged 2.2 per cent a year, a figure approximately the same as that for industrial stocks.

§ *Returns to railroad stockholders, other records.*—The above record may be supplemented by figures derived from five smaller samples of railroad stocks. These results are of interest, though they do not measure the actual experience of railroad stockholders at large as accurately as do figures derived from the more comprehensive sample previously cited.

[1] Cash income in 1901 included a considerable sum derived from the sale of subscription rights. The net advance between 1901 and 1913 in cash dividends alone amounted to over 80 per cent.

TABLE 58

ESTIMATES OF CASH INCOME FROM EACH OF FIVE INVESTMENTS OF $10,000 MADE ON JANUARY 1, 1901, IN RAILROAD COMMON STOCKS
1901-1913

(1)	(2)	(3)	(4)	(5)	(6)
	Dow-Jones sample [a]		E. L. Smith's selection [b]		
Year	Returns from investment redistributed semi-annually (20 corporations)	Returns from fixed investment (20 corporations)	Returns from fixed investment based on: size of stock issue (10 corporations)	dividend payments in 1900 (10 corporations)	failure to pay dividends in 1900 (10 corporations)
1901	$ 380	$ 551	$ 288	$ 426	$ 114
1902	406	557	316	464	135
1903	447	609	333	487	146
1904	414	482	331	490	146
1905	451	596	485	505	297
1906	502	772	631	563	406
1907	572	989	763	661	511
1908	532	637	884	747	754
1909	572	694	757	611	775
1910	618	724	852	635	876
1911	620	626	848	643	881
1912	601	716	847	628	764
1913	578	788	927	628	710
Total receipts, thirteen years ..	6,693	8,741	8,262	7,488	6,515
Average annual rate of change (per cent)	+4.1	+2.5	+10.2	+3.4	+16.6
Index of instability	5.2	10.5	14.8	6.9	27.7

[a] The Dow-Jones sample (20 stocks) included some preferred stocks during the early years. The returns in column (2), which assume an equal redistribution of the fund every six months and the addition of the values of subscription rights to the capital sum, are based upon D. C. Rose's calculations (*Investment Management*, pp. 378-379). Column (3) gives the returns on a fixed investment of approximately equal sums in the several Dow-Jones stocks. In this case the values of rights have been treated as cash income.

[b] Columns (4), (5) and (6) contain results of E. L. Smith's investigations (*Common Stocks as Long Term Investments*, pp. 60-67). Column (4) gives the cash income from equal investments in the common stock of the ten railroads having the largest outstanding issues of common and preferred stocks; column (5) gives the cash income from equal investments in the common stock of the ten largest railroads paying dividends on common stock in 1900; column (6) gives the cash income from equal investments in the common stock of the ten largest railroads which paid no dividends in 1900. Slight adjustments have been made in the data to give returns on original investments of exactly $10,000.

Investment Experience of Bondholders

The fortunes of one other important group of income recipients, bondholders, remain to be discussed. The compilations of Dwight C. Rose make it possible to measure the fluctuations in the value of a capital fund invested in the bonds included in the Dow-Jones index of bond prices,[1] and to determine the actual cash disbursements in the form of interest payments on such bonds.

TABLE 59

INVESTMENT EXPERIENCE OF A FUND OF $10,000 INVESTED IN BONDS IN JANUARY, 1901, AND REDISTRIBUTED SEMI-ANNUALLY TO MAINTAIN EQUAL DISTRIBUTION 1901-1913

(These bonds are those included in the Dow-Jones index of bond prices.)

Year	Interest paid per year	Value of fund [a]
1901	$406	$10,118
1902	408	10,198
1903	416	9,880
1904	420	9,716
1905	418	10,114
1906	418	10,046
1907	421	9,648
1908	424	9,066
1909	423	9,707
1910	431	9,544
1911	433	9,552
1912	436	9,375
1913	438	9,040
Average annual rate of change (per cent)	+0.6	−0.8
Index of instability.....	0.5	1.8

[a] Average of the market values as of January 1 and July 1 of each year.

The gain in actual cash return from this bond investment averaged 0.6 per cent a year between 1901 and 1913, while the value of the capital fund declined at a rate of 0.8 per cent a year. The changes in return are due to the shifting of the investment from

[1] For the first part of the period, the Dow-Jones index was based almost entirely upon railroad bonds, but later a number of public utility and industrial bonds were added to the sample. In 1901 the sample included fifteen bonds; by 1913, this had been increased to thirty-three bonds.

For the detailed record, see *Investment Management*, pp. 386-390.

lower to higher yielding bonds in the averaging process, as well as to changes in the sample.[1]

The notable steadiness of return, as evidenced by an index of instability of but 0.5, is a distinctive feature of bond investment. Fluctuations in the capital value of the invested funds were somewhat more pronounced (averaging 1.8 per cent per year), but the indexes of instability for both income and capital were distinctly lower than the corresponding measurements for equity securities.

Summary of Changes in Distributive Shares

Figures relating to the disbursement of the product of industry among different classes of income recipients are now brought together for comparison. The index numbers in the table on the next page (shown graphically in Figure 31) are based upon the data previously presented, and are subject to the limitations already indicated. These measurements do not, of course, relate to aggregate disbursements, or to the total shares of different productive agents. They measure changes in the average earnings per employee among two groups of employed workers, in the cash receipts of persons investing fixed sums in industrial, public utility and railroad common stocks on January 1, 1901, and in the cash receipts of a person investing similarly in industrial, public utility and railroad bonds. (In discussing returns to holders of industrial and railroad stocks reference has been made to the aggregate stocks of selected corporations, but the measurements given may be taken to define average returns to individuals.) Capital gains or losses by the investor in stocks or bonds are not here included. The wage series listed relate to the earnings of employed workers; losses due to lack of employment do not enter into the wage index numbers.

The smallest advances in income were recorded for bondholders. The average bondholder who had invested a fixed amount in 1901 and whose funds had been periodically redistributed to maintain equality, received 8 per cent more in actual cash returns in 1913 than in 1901.[2] The average manufacturing wage-earner received

[1] There were no defaults in interest payments on any of the bonds included in the Dow-Jones sample during this period.

[2] Had the investment been maintained without change among a fixed group of interest-paying bonds, the actual cash return would, of course, have remained constant. Bond yields were advancing during this period, however, so that the figure cited probably describes the true situation more accurately than would a constant index.

TABLE 60

INDEX NUMBERS OF INCOMES RECEIVED BY WAGE-EARNERS, STOCKHOLDERS AND BONDHOLDERS IN AMERICAN INDUSTRIES, 1901-1913

(In current dollars)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Average earnings of employed workers [a]		Cash receipts of holders of common stocks [b]			
Year	All groups	Manufacturing plants	All corporations	Industrial and public utility corporations	Railroads	Cash receipts of bondholders [c]
1901	100	100	100	100	100	100
1902	102	104	96	107	81	100
1903	107	107	90	104	71	102
1904	106	105	92	105	75	103
1905	109	108	89	87	92	103
1906	112	111	115	101	134	103
1907	117	114	133	128	139	104
1908	111	104	100	93	109	104
1909	117	114	123	103	150	104
1910	124	122	120	125	112	106
1911	124	118	120	122	117	107
1912	127	121	116	123	108	107
1913	133	127	140	154	122	108
Average annual rate of change (per cent) ..	+2.2	+1.7	+3.0	+2.8	+3.4	+0.6
Index of instability	1.4	2.2 (3.9)*	8.2	9.3	15.7	0.5

[a] Paul H. Douglas, *Real Wages in the United States*, Houghton Mifflin Co., Boston, 1930, p. 392.

[b] Dividends plus cash value of rights. See Tables 52, 54 and 57.

[c] See Table 59 above.

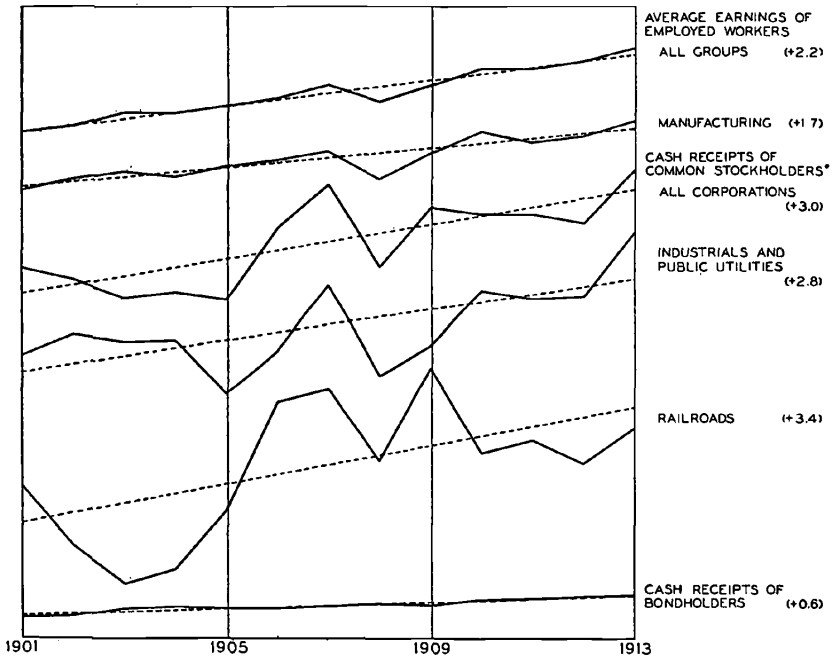
* Brissenden's index of the actual money earnings of factory workers gives a measure of instability of 3.9. In the construction of Brissenden's index account is taken of unemployment, whereas Douglas' index relates to the earnings of employed workers alone. The index of instability of Brissenden's series is a more exact measure of the actual fluctuations in earnings.

27 per cent more, while among employed workers of all classes, the average advance amounted to 33 per cent. For the holder of railroad stocks, who had invested a fixed sum on January 1, 1901, the cash return in 1913 exceeded by 22 per cent the cash return in 1901. The average holder of industrial stocks who had invested a fixed sum on January 1, 1901, received 54 per cent more in cash dividends (plus rights) in 1913 than in 1901. The average holder

FIGURE 31

CHANGES IN INCOMES RECEIVED BY WAGE-EARNERS, STOCKHOLDERS AND BONDHOLDERS IN AMERICAN INDUSTRIES, 1901-1913

(IN CURRENT DOLLARS)



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

* Index numbers derived from sample corporate returns.

of industrial and railroad stocks in combination received 40 per cent more in cash income in 1913 than in 1901.

It is clear from the annual figures that the 1913 returns to stockholders were exceptionally large. (They were affected by a special disbursement of 39 millions of dollars to stockholders of the Standard Oil Company of New Jersey.) In comparing the average annual rates of change given in the table, the distorting effect of a single exceptional figure is largely avoided. Lowest of these rates was the figure of 0.6 per cent for bondholders; highest was that of 3.4 per cent for railroad stockholders. Rates of gain in the earnings of manufacturing employees (1.7 per cent), for all workers (2.2 per cent) and for holders of common stocks in industrial and public utility corporations (2.8 per cent), fell between these limits.

Properly to interpret these income figures, we should consider also the accompanying changes in the values of capital assets. If we employ as base the value of each of these funds at the time of initial investment, January 1, 1901, and compare with this the liquidation value thirteen years later, on January 1, 1914, we have the index numbers given below.

TABLE 61

CHANGES IN THE VALUES OF CAPITAL ASSETS OF STOCKHOLDERS AND BONDHOLDERS, 1901-1914

Date	Index numbers of capital values		
	Industrial and public utility stocks	Railroad stocks	Bonds
Initial investment, January 1, 1901...	100.0	100.0	100.0
Liquidation value, January 1, 1914...	119.0	116.9	90.3

Over this period the capital value of the original investment advanced 19.0 per cent for industrial and public utility stocks, and 16.9 per cent for railroad stocks. There was a decline of almost 10 per cent in the market value of the bonds included in the sample.[1] (The figures for stocks relate to relatively large samples, 66 industrial and public utility corporations and 27 railroads. Much greater appreciation is shown by certain of the smaller samples. Measurements relating to bonds are based upon a relatively small sample, ranging from 15 issues in 1901 to 33 issues in 1913.)

There are, of course, no corresponding measurements relating to the value of the capital assets of employed workers. There is probably some appreciation in such capital assets, in the form of acquired skill and experience, during the earlier years of a worker's active employment, but if the element of depreciation due to advancing age be considered the net change is almost certainly negative. (This loss has probably been more pronounced in recent years.

[1] It should be noted that the liquidation date is January 1, 1914, whereas all rates of change in capital values are computed for the period January 1, 1901, to January 1, 1913. Market conditions at these two dates were quite different. The Dow-Jones index of stock prices shows values on January 1, 1914, to have been 16 per cent below those on January 1, 1913. The later date is employed in computing liquidation values because dividend payments made in the year 1913 have been included in returns to stockholders.

with increasing mechanization, than it was in the early years of this century.)

If we take account of concurrent changes in cash income and in the value of capital assets during the period 1901-1913, we find bondholders and employed workers at one end of the scale and stockholders at the other. The former, with steadier income, gained slightly in cash receipts, but suffered actual losses in values of capital assets. Stockholders gained at materially higher rates, as regards cash income, and benefited also from the appreciated value of capital assets.

Steadiness of income is of obvious importance. Indexes of instability, which measure the average percentage deviation of actual receipts from the values which would have been recorded had the rate of change between 1901 and 1913 been constant, are lowest for bondholders, next highest for wage-earners, highest for stockholders. Among employed workers in general the average variation in earnings, from year to year, measured from the line of constant growth, was 1.4 per cent. For employed factory workers the variation averaged 2.2 per cent. (The figures relate, it must be recalled, to variations in *average earnings,* which are much more stable than the earnings of separate individuals.) If account be taken of losses due to periods of unemployment, the measure of instability for this group becomes 3.9, indicating that the average earnings of factory workers oscillated from year to year by an amount equal to about 4 per cent of normal earnings. This is of the same order of magnitude as the measure defining the range of fluctuations in the physical volume of production. The instability of economic processes is directly reflected in the earnings of wage-workers.[1]

Widest of all were the variations in the cash income received by stockholders. Profits, being of the nature of a residual, are the most variable element of distribution. Fluctuations in the receipts of railroad stockholders averaged 15.7 per cent a year, while the

[1] As we have seen, the average variation in the physical production of individual industries is greater than the variation in the total stream of production. Changes in the aggregate are reduced by the offsetting effects of contrary movements in the output of individual industries. The weighted average of the indexes of instability for 31 series relating to the output of fabricated goods was 8.0, considerably greater than the figure of 4.7 derived from the index of total production of manufacturing industries. Similarly, an index of instability of earnings derived from data for different industries would be greater than the index of 3.9 given above, which was computed from aggregate payrolls and the aggregate number of employees of all manufacturing industries.

variations in the cash receipts of industrial stockholders averaged 9.3 per cent. For industrial and railroad stocks, in combination, variations averaged 8.2 per cent. Data on actual earnings per share, if available, would show a wider range of variation than do the dividend disbursements which are here cited. It is, of course, common corporate practice to stabilize dividends through the agency of surplus and undivided profits.

Comparison of Changes in Distributive Shares, in Dollars of Constant Purchasing Power

The index numbers in Table 60 measure changes in receipts in the form of current dollars, which were steadily declining in purchasing power between 1901 and 1913. A correction is needed if we are to measure changes in the actual command over goods represented by the dollars received by the different agents. Factors properly adapted to the correction of these several index numbers are not available. Douglas' cost of living index may be applied as deflator throughout, with the recognition that the corrections for the interest and dividend index numbers are probably not as accurate as the wage corrections. It is not likely, however, that cost trends during this period among articles for which the incomes of bondholders and stockholders were spent differed materially from the cost trends among articles entering into wage-earners' budgets. The index of wage-earners' living costs shows the same average annual rate of change between 1901 and 1913 as does the index of wholesale prices.

The corrected series, measuring changes in the purchasing power of the cash receipts of different economic agents, are given in Table 62.

With reference to consumable goods and services the person drawing his income from an investment in bonds, made in 1901, secured approximately 15 per cent less in 1913 than in 1901. The industrial wage-earner stood at approximately the same level in 1913 as in 1901, in respect to real income. A person representative of the average employed worker in all groups secured roughly 5 per cent more in 1913 than in 1901. The cash income of an investor in railroad stocks commanded 3 per cent less in 1913 than in 1901, though the rate of change over the thirteen-year period averaged

TABLE 62

INDEX NUMBERS OF INCOMES RECEIVED BY WAGE-EARNERS, STOCKHOLDERS AND BONDHOLDERS IN AMERICAN INDUSTRIES, 1901-1913 [a]

(In dollars of constant purchasing power)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Average earnings of employed workers		Receipts of holders of common stock			
Year	All groups	Manufacturing plants	All corporations	Industrial and public utility corporations	Railroads	Receipts of bondholders
1901	100	100	100	100	100	100
1902	99	101	93	105	79	98
1903	100	99	84	97	66	95
1904	100	98	86	99	70	97
1905	102	102	84	82	86	97
1906	102	101	105	92	121	93
1907	100	98	114	109	119	89
1908	99	93	89	83	97	93
1909	104	101	110	92	134	93
1910	105	103	101	106	95	90
1911	101	96	98	100	96	87
1912	103	98	95	100	88	87
1913	105	100	111	121	97	85
Average annual rate of change (per cent) ..	+0.4	−0.1	+1.2	+0.9	+1.7	−1.2

[a] The entries are the index numbers in Table 60 deflated by Douglas' index of the cost of living.

+1.7 per cent a year.[1] The years immediately following fell well below 1901. The trend for the period as a whole was a rising one. The real income of an investor in industrial stocks was 21 per cent higher in 1913 than in 1901, if we may accept the sample of 66 corporations as representative. (For this group the 1913 figure was exceptionally high.) The holder of industrial and railroad stocks in combination received approximately 11 per cent more in purchasing power in 1913 than in 1901.

There is, of course, an element of uncertainty in each of the above index numbers. The cost of living index is not perfect, the

[1] The year 1901 was marked by exceptionally high returns to railroad stockholders, if account be taken of the values of subscription rights, notably those of the Pennsylvania Railroad.

indexes of earnings of employees are not thoroughly accurate, and the dividend and interest records are not in all respects representative. Yet the general picture which these index numbers give is probably a faithful one. During the period of rising prices and of advancing living costs between 1901 and 1913 the status of the industrial wage-earner was not materially changed. Increased earnings barely kept pace with rising living costs. Employed workers in general were under the same necessity of fighting against rising prices, but the general average of real earnings advanced slightly. All those drawing incomes from securities with fixed rates of return suffered a loss in their command over goods and services. With reference to the trend over the period as a whole, the gains of railroad stockholders were substantial, though declines set in during the closing years. Gains were also recorded by those holding equity rights in industrial corporations. Stockholders were the residual claimants in an era of industrial expansion, occurring under institutional conditions which definitely limited the rewards of the other groups whose fortunes we have been able to follow.

These statements relate to the returns secured by individuals, not to aggregate amounts. At a later point reference is made to changes in the aggregate disbursements to different economic agents.

§ *On changes in the purchasing power of the capital assets of stockholders and bondholders.*—The above measurements relate to the purchasing power of current income. But the capital sums representing the investments of stockholders and bondholders were also changing in purchasing power. The measurement of these changes constitutes a problem differing somewhat from that faced in dealing with the purchasing power of current income. A large proportion of current income must, for purposes of day-to-day living, be converted into consumable goods and services. Invested capital funds are not ordinarily so converted. Such goods and services are bought, in general, only when the income from the investment is spent. The yield, in terms of real income, is a prime consideration of the investor. Yet, from the point of view of the private investor, the convertibility of capital funds into commodities, and into the services of labor, enters very definitely into the determination of the real value of such funds. In any survey of long-term economic changes account must be taken of alterations in the 'conversion value' of the capital assets of stockholders and bondholders.

If we assume that the capital sums representing the investments of stockholders and bondholders were, upon liquidation on January 1, 1914, expended for goods entering into the cost of living index, we find that substantial declines occurred between 1901 and 1914 in the real values of the capital assets of all classes of security holders. This de-

cline amounted to approximately eight per cent for holders of industrial and public utility stocks, nine per cent for holders of railroad stocks, and no less than 30 per cent for bondholders. It is true that the conversion of capital funds into consumable goods is a relatively rare occurrence, so that these figures do not, in general, represent realized losses. They do, however, represent potential losses in case of such conversion, and are therefore relevant to a consideration of the changing status of the investor.

If the conversion is to be made not into consumable goods but into tangible capital assets, the significant price changes are those relating to the services of labor and to the value of goods entering into capital equipment. An index of wages per hour (excluding the wages of farm labor) constructed by the U. S. Bureau of Labor Statistics, and an index of the prices of goods destined for use as capital equipment, constructed by the National Bureau of Economic Research, provide means of approximating changes in the value of capital funds when such conversion is contemplated. (These index numbers were averaged, with weights of 1 and 3, respectively, in securing the deflating index required.) Thus measured, we find that the purchasing power of the capital assets of holders of industrial and public utility stocks increased, over this period, by about four per cent; for railroad stockholders the gain amounted to about three per cent. During the same thirteen-year period the purchasing power of the capital assets of bondholders declined by approximately 20 per cent.

Foreign Trade and the Balance of International Payments

Changes in the Foreign Trade of the United States

Between 1901 and 1913 the value of aggregate imports of the United States increased from 903 to 1,894 millions of dollars, the average annual rate of increase being 6.0 per cent. Over the same period total exports increased from 1,355 to 2,330 millions of dollars, at an average rate of growth of 4.8 per cent a year. The general character of the changes occurring in our export and import trade is indicated by the two following tables and by Figures 32 and 33.

The five groups of imports increased between 1901 and 1913 at rates which ranged from 5.0 per cent a year for finished manufactures to 6.5 per cent a year for semi-manufactures. The degree of variation averaged about 6 per cent a year, except for semi-manufactures. In this group average annual deviations amounted to 9.9 per cent of the normal values.

Trends in our export trade were quite different from those

TABLE 63

FOREIGN TRADE OF THE UNITED STATES, 1901-1913

Changes in Aggregate Values of Imports, by Major Classes of Commodities

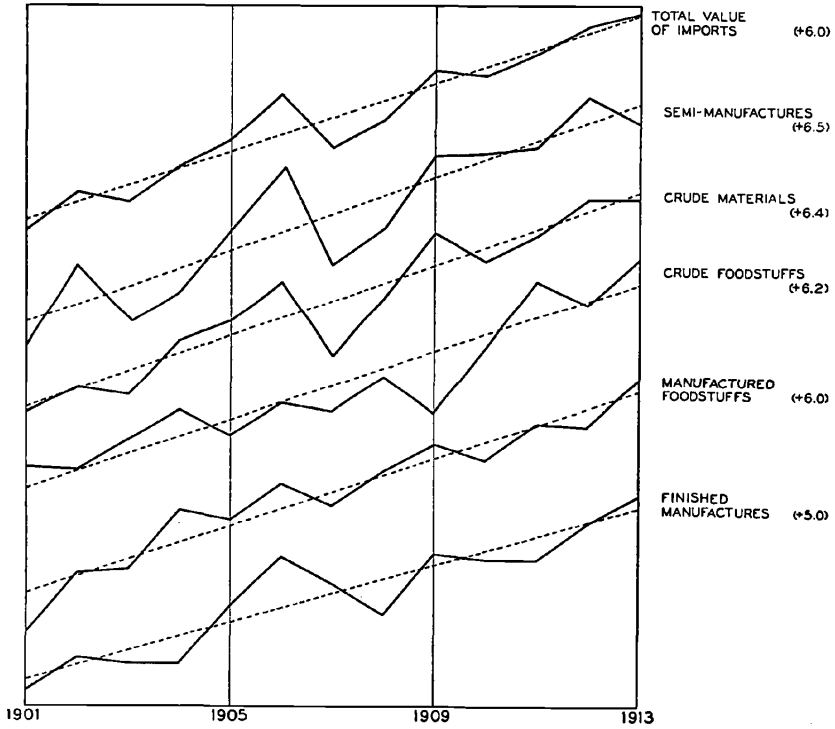
(1) Commodity group	(2) Absolute value [a] (millions of dollars) 1901	(3) Absolute value [a] (millions of dollars) 1913	(4) Average annual rate of change (per cent)	(5) Index of instability of growth
All commodities	903.3	1,893.9	+6.0	4.6
Semi-manufactures	147.7	319.3	+6.5	9.9
Crude materials	308.6	649.7	+6.4	6.3
Crude foodstuffs	120.3	247.9	+6.2	6.9
Manufactured foodstuffs	95.3	227.6	+6.0	5.2
Finished manufactures	231.4	449.3	+5.0	6.0

[a] Year beginning July 1.

FIGURE 32

FOREIGN TRADE OF THE UNITED STATES, 1901-1913

CHANGES IN AGGREGATE VALUES OF IMPORTS, BY MAJOR CLASSES OF COMMODITIES



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

TABLE 64

FOREIGN TRADE OF THE UNITED STATES, 1901-1913

Changes in Aggregate Values of Exports, by Major Classes of Commodities

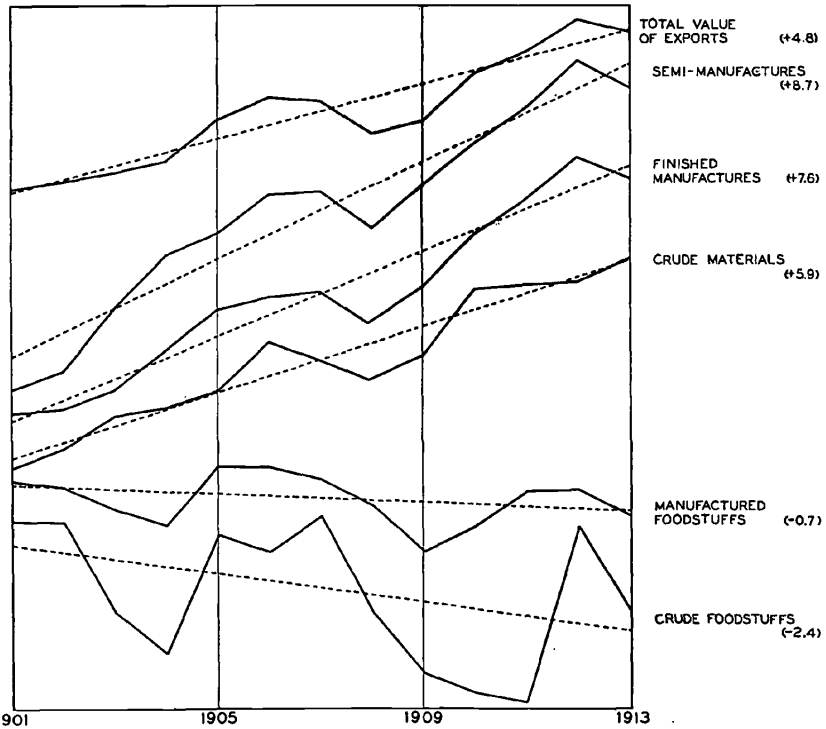
(1) Commodity group	(2) Absolute value[a] (millions of dollars) 1901	(3) Absolute value[a] (millions of dollars) 1913	(4) Average annual rate of change (per cent)	(5) Index of instability of growth
All commodities	1,355.5	2,329.7	+4.8	4.8
Semi-manufactures	132.2	374.2	+8.7	8.2
Finished manufactures	321.9	724.9	+7.6	5.8
Crude materials	387.7	799.8	+5.9	4.4
Manufactured foodstuffs	328.8	293.2	−0.7	6.3
Crude foodstuffs	184.8	137.5	−2.4	18.4

[a] Year beginning July 1.

FIGURE 33

FOREIGN TRADE OF THE UNITED STATES, 1901-1913

CHANGES IN AGGREGATE VALUES OF EXPORTS, BY MAJOR CLASSES OF COMMODITIES



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

prevailing among imports. Between 1901 and 1913 the exports of foodstuffs, both crude and manufactured, declined in value. Exports of all classes of non-foods increased at relatively high rates, ranging from 5.9 per cent a year for crude materials to 8.7 per cent a year for semi-manufactures. These unstable shifts are reflected in the changing composition of our export trade. Foodstuffs, which constituted 38 per cent of our total exports in 1901, made up only 18 per cent of the total in 1913. The proportion of the total consisting of crude materials increased from 29 to 34 per cent; the percentage of semi-manufactures increased from 10 to 16, while that of finished manufactures increased from 24 to 31.

The growth of export trade was most stable for crude materials, for which the index of instability was 4.4 per cent. For crude foodstuffs, at the other extreme, the average annual deviation from normal amounted to more than 18 per cent. This variation is due, presumably, to unstable world conditions of supply, an instability which imparts a highly speculative element to the production and marketing of agricultural products.

In brief summary:

The value of imports was increasing between 1901 and 1913 at the rate of 6.0 per cent a year, which was somewhat greater than the rate of approximately 5 per cent a year at which the stream of American domestic production (measured in dollars) was increasing. The value of aggregate exports was increasing at a rate of 4.8 per cent a year, about equal to the rate of change in the value of domestic production.

Crude materials constituted the largest single item among our imports, with finished manufactures second. The smallest portion consisted of manufactured foodstuffs. The most rapid increase between 1901 and 1913 was recorded for semi-manufactures, with crude materials and crude foodstuffs next in order. Among exports crude materials again bulked largest, with finished manufactures second and crude foodstuffs last. Exports of foodstuffs, crude and manufactured, declined between 1901 and 1913, while exports of semi-finished and finished manufactures rose most rapidly. These movements among commodities of import and export trade reflect, of course, the growth of American manufacturing industries and our declining importance as a source of raw food supplies for the world.

The Balance of International Payments

There are not available for the pre-war period accurate figures on the 'invisible' factors in international trade. Yet, if we are to understand the general position of the United States in the world economy, the survey of merchandise movements should be supplemented by some reference to the balance of international payments prior to the World War. The following table contains estimates of the major items in our balance of payments during the period 1896-1914.

TABLE 65

BALANCE OF INTERNATIONAL PAYMENTS OF THE UNITED STATES, 1896-1914 [a]

(Aggregates for nineteen years, in millions of dollars)

	Credit	Debit
Credit items		
Exports of merchandise and silver	32,128	
Exports of gold	1,219	
New capital borrowings from abroad	2,000	
Interest payments on American capital invested abroad	760	
Freight charges receivable	86	
Debit items		
Imports of merchandise and silver		22,866
Imports of gold		1,393
New capital loans by the United States		1,000
Interest payments on total foreign capital invested in the United States		3,800
Tourists' expenditures		3,230
Immigrants' remittances		2,850
Freight charges payable		727
Insurance premiums, commissions and miscellaneous items		570
	36,193	36,436

[a] This table is taken from "The Balance of Trade in the United States" by Charles J. Bullock, John H. Williams and Rufus S. Tucker, *Review of Economic Statistics,* July, 1919, pp. 231-232.

The data are totals for the entire period, built up from various estimates. As is explained in the original memoir, a considerable margin of error was involved in the making of certain of these estimates. The difference between the debit and credit items represents an unexplained discrepancy. The credit items do not include the money brought by immigrants, which is estimated at 300 million dollars.

For purposes of comparison with corresponding data for post-war years, it will be useful to summarize these figures within four general classes—items relating to the movements of goods and services, items relating to the service of debts and to charitable

and other remittances not arising out of the purchase of goods or services, items relating to the movement of capital, and items relating to gold and currency movements. These figures, reduced to annual averages, appear in the next table.

TABLE 66

SUMMARY OF PRE-WAR BALANCE OF INTERNATIONAL PAYMENTS OF THE UNITED STATES

(Annual averages for the period 1896-1914)

Class of transaction	Annual average (in millions of dollars) Credit	Debit
Export balance of goods and services, net [a]	+254	
Payment on debts, net [b]		−310
Net capital borrowings from abroad	+ 53	
Net imports of gold		− 9
	+307	−319
Correction for net discrepancy	+ 12	

[a] The net balance of the following items:

Excess of merchandise exports	+ 488
Tourist expenditures	− 170
Net freight charges	− 34
Insurance premiums, commissions, etc.	− 30

The plus sign on the net balance means that the United States exported more in the form of goods and services than it received.

[b] The sum of the following items:

Immigrant remittances	− 150
Net interest payable	− 160

The minus sign on this entry means that the United States paid more in the form of immigrant remittances and interest on debts than it received.

During this pre-war period of nineteen years the net balance on goods sold and services rendered by the United States averaged 254 millions of dollars a year. In addition, credits were established abroad to the amount of 53 millions of dollars a year through the borrowing of capital. Balancing these credits (with the discrepancy noted) were debits of 310 millions a year representing payments on debts (including immigrant remittances) and 9 millions a year covering gold importations. It is a balance sheet standing in interesting contrast to that of the post-war years.

CHANGES IN THE AGGREGATE REWARDS OF ECONOMIC CLASSES

It is suggestive to think of the basic economic changes occurring during a given era in terms of three broad streams, moving at vary-

ing rates and oscillating with varying amplitudes. First is the stream of human energies and needs represented by population, which was increasing between 1901 and 1913 at a rate of 2.0 per cent a year, with an average annual variation from constancy of growth amounting to 0.3 per cent. Next is the stream of physical goods produced by and for this population, a stream which increased during this pre-war era at a rate approximating 3.1 per cent a year, with an average variation (on an annual basis) of about 3.7 per cent. These are the fundamental movements. But the actual flow of goods, in the process of distribution to domestic and foreign consumers, takes place through the agency of money. It is pecuniary values, not goods, which are infinitely divisible, which are capable of economic manipulation, and which are the subjects of the accounting records that are of the essence of business. The stream which is the actual object of economic regulation, and in terms of which economic activities are carried on, is a stream of monetary values. This element grew at a rate approximating 4.9 per cent a year, and its fluctuations averaged 4.9 per cent a year.[1]

In certain important respects changes in aggregate values and in the values of products of different types are more significant than are changes in production or prices. For it is the contribution of a given group in the form of dollars' worth of products or services, not in physical units, which determines the rewards of that group. (The value contribution may vary, of course, because of changes in the number of physical units or of hours of service contributed, or because of changes in the prices of these units.) If we are interested in the pecuniary rewards of different groups of producers, we must trace changes in aggregate values, not changes in per-unit prices or in total volume of production. And if interest attaches to total real rewards, the aggregate value of the contribution of each group must be 'deflated', must be divided by an index of the changing costs of the goods which constitute the real rewards of the various agents of production.

If we had accurate data on the constituent elements of the total value stream an illuminating study of economic changes might be made. The contributions and the rewards of agricultural and non-

[1] That values increased at a more rapid rate than did the volume of physical goods is due, of course, to a rise in the level of prices. This rise, which averaged 1.8 per cent a year, was facilitated, if not stimulated, by an increase in the amount of money in circulation at a rate of 3.8 per cent, and by an increase in the loans and investments of all banks at an average annual rate of 6.3 per cent.

agricultural producers, of producers of raw materials and of manufactured goods, of producers of consumers' goods and producers' goods, might then be traced in detail. In each case one would measure the relative importance of price and volume in effecting changes in monetary rewards. Again, changes in the proportion of the total value stream going to important groups of income recipients—to wage-earners, to recipients of dividends, of interest, and of rents—might be defined. Correcting these value figures by proper factors,[1] it would be possible to measure changes in the actual quantities of goods (and services) going to each of these groups and, in certain cases, to reduce these to a per capita basis.

The data available do not permit such changes to be measured in detail, nor with complete accuracy. As approximations to the desired measurements, figures defining certain of the broader movements of the period prior to the war are summarized in Table 67. The entries in columns (3), (4) and (5) are plotted in Figure 34.

Between 1901 and 1913 the total value stream increased, as we have seen, at a rate approximating 4.9 per cent a year. This may be broken into three components—the aggregate values of raw farm products, of raw mineral products and of the products of fabrication in manufacturing industries.[2] The value of raw mineral products increased most rapidly, at an average annual rate of 5.9 per cent. Raw farm products increased in total value at a rate of 4.0 per cent a year. The aggregate value of manufacturing production (i.e., 'value added' in manufacturing operations) increased at a rate of about 4.9 per cent a year.[3] This last element has two component parts—the value contribution of labor, as measured by wages paid, and the value contribution of ownership and management, as measured by 'overhead expenses plus profits'. During this period aggregate wages increased at an average annual rate of 4.8 per cent a year. Aggregate overhead expenses plus profits increased at a rate of 5.0 per cent a year.

[1] In each case the deflator should be an index of the prices of the goods actually purchased by the members of the group in question. Such special index numbers are not, in general, available; use must be made of deflators which are not altogether appropriate.

[2] Products of forests and fisheries are omitted because of lack of data.

[3] This figure is based upon records for all manufacturing industries covering the four census years 1899, 1904, 1909 and 1914. For raw farm and mineral products the data are annual, covering the years 1901 to 1913. There is thus not perfect comparability among the different series. For the purpose of comparing general trends, however, the materials available may be used.

TABLE 67

ESTIMATES OF PRE-WAR TENDENCIES AMONG PRODUCERS OF ECONOMIC GOODS

Changes in Values of Products and in Command over Goods

(Entries define average annual rates of change. For manufacturing industries the figures relate to the period 1899-1914, for other industries to the period 1901-1913.)

(1)	(2)	(3)	(4)	(5)
		Change in command over goods and factors in such change		
Economic group	Change in aggregate value of product (per cent per year)	Change in aggregate command over goods [a] (per cent per year)	Change in command over goods attributable to alterations in purchasing power per unit (per cent per year)	Change in command over goods attributable to alterations in number of physical units (per cent per year)
All producers	+4.9	+3.1	——	+3.1
Producers of:				
Raw farm products...	+4.0	+2.2	+0.5	+1.7
Raw minerals	+5.9	+4.1	−1.5	+5.6
Manufactured goods:				
All agents of fabrication [b]	+4.9	+3.1	−1.3	+4.5
Labor	+4.8	+3.0	−1.1	+4.1
Ownership and management ..	+5.0	+3.2	−1.4	+4.7

[a] The index of wholesale prices of the U. S. Bureau of Labor Statistics has been used as a deflator throughout.

[b] These entries relate to all manufacturing industries covered by the Census of Manufactures.

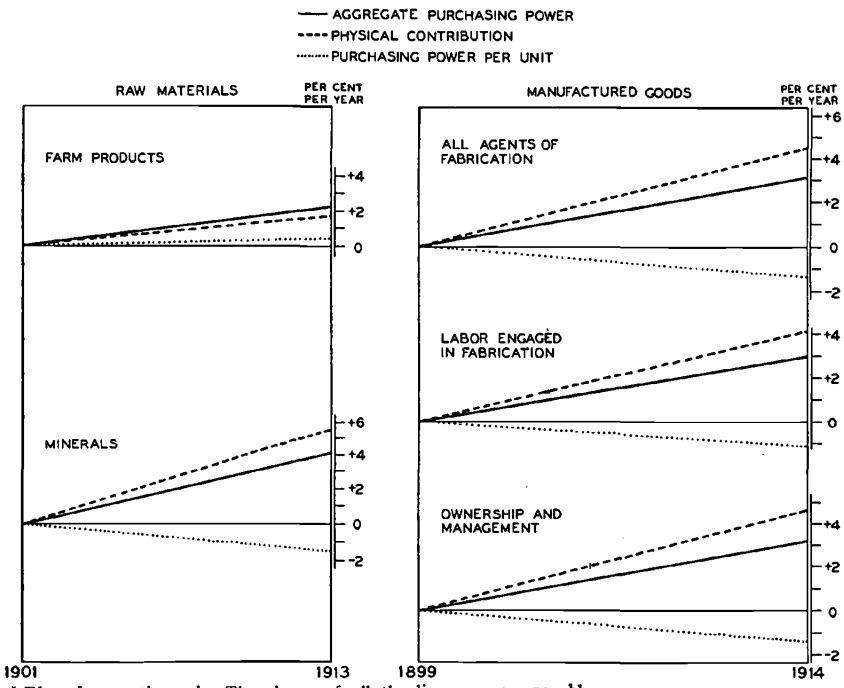
The measurement of changes in the physical contributions of different agents of fabrication is discussed in Chapter III. The index numbers there described have been adjusted in order to secure comparability with other entries in the table. The procedure followed in the correction of these index numbers, which are based on a sample of all manufacturing industries, involves the assumption that changes in per-unit costs of labor and other agents of fabrication are the same for both the excluded and included industries.

Deflating these several figures by an index of general wholesale prices we secure approximations to the changes in actual command over goods enjoyed by each of these broad producing groups. In view of the rather wide margins of error in the data, and in the process of deflation, these changes should be discussed in general terms only, without suggesting a misleadingly high degree of numerical accuracy. Broadly speaking, then, we may say that in the

FIGURE 34

GRAPHIC REPRESENTATION OF PRE-WAR TENDENCIES AMONG PRODUCERS OF RAW MATERIALS AND MANUFACTURED GOODS*

AVERAGE RATES OF CHANGE IN PURCHASING POWER PER UNIT OF GOODS PRODUCED, IN AGGREGATE PHYSICAL PRODUCTION AND IN AGGREGATE COMMAND OVER GOODS



* Plotted on ratio scale. The slopes of all the lines are comparable.

United States during the years preceding the war the volume of physical goods increased at a rate of some three per cent a year. That portion going to producers of farm products, in exchange for the sum total of their goods, increased at a rate of some two per cent a year; that going to producers of raw mineral products increased at a rate of about four per cent a year; the portion going to agents of fabrication increased at a rate of approximately three per cent a year. All groups shared in the increasing volume of goods, but a relatively larger proportion of the total went to mineral producers, a relatively smaller proportion to agricultural producers. The aggregate rewards of manufacturing producers increased at a rate about equal to the rate of advance in the total volume.

These changes in command over goods enjoyed by the different

producers are due to the combined influence of two factors—changes in the actual number of physical units contributed to the total volume of production, and changes in the real value per unit (that is, in the purchasing power, per unit, in terms of commodities in general) of the physical goods thus contributed. (The component elements of aggregate purchasing power are graphically portrayed in Figure 34.) The gain of some 2.2 per cent a year in the total purchasing power of farmers was due to an advance of about 1.7 per cent a year in volume of goods produced, and to a gain of about 0.5 per cent a year in the real value, per unit, of these goods.[1] Both factors, one based on physical contributions, one on favorable market relations, contributed to the gain of agricultural producers.

Quite different were the factors affecting the returns to the other groups. The real values, per unit, of raw mineral products declined at a rate of about 1.5 per cent a year, but so rapid was the advance in physical output (at a rate of 5.6 per cent a year) that the total purchasing power of these goods advanced at a rate of approximately 4.1 per cent a year. Among manufacturing industries the real value of the services of agents of fabrication, per unit of product, declined between 1899 and 1914 at a rate of 1.3 per cent a year. Here again rapidly increasing physical output more than offset this decline, yielding a net advance in command over goods in general at a rate of 3.1 per cent a year.

The separate records of manufacturing labor and ownership (plus management) do not differ materially from their joint record. The aggregate command over goods exercised by manufacturing labor as a whole, and by ownership and management as a whole, increased at rates in the neighborhood of three per cent a year for the industries included. In each case this was the result of rapidly increasing physical output (at rates falling between 4.1 and 4.7 per cent a year) and of a material decline in the market value (in terms of goods) of the contribution of each of these factors to each unit of manufactured goods produced.

§ *A further view of factors affecting the aggregate purchasing power of agents of fabrication.*—In measuring changes in the command over physical goods exercised by manufacturing labor and by ownership and management, we have distinguished two factors—the number of

[1] These measures relate to the wholesale value of farm products. Adequate data on farm prices are not available for this period.

physical units produced and the real value in exchange, per unit. We might, instead, differentiate the number of working units and the reward secured by each unit. In the case of manufacturing labor we would measure changes in the number of men employed and in the real wages paid. The product of the two would be the aggregate real reward of manufacturing labor. Salaried workers may be treated in the same manner. The composite 'ownership and management' presents greater difficulties. If we subtract salaries, for separate treatment, the remainder includes such items as rent, depreciation, interest and taxes, together with profits. This residue cannot be broken up into its elements.

Following are the estimates of average annual rates of change which we derive from data covering the period 1899-1914. As in the preceding table these are based upon all census returns, not those included in the sample cited in earlier chapters.

TABLE 68

CHANGES IN AGGREGATE REWARDS OF AGENTS OF FABRICATION, AND FACTORS IN SUCH CHANGES, 1899-1914

Manufacturing Industries of the United States

(Entries define average annual rates of change between 1899 and 1914)

(1)	(2)	(3)	(4)	(5)
		Change in command over goods and factors in such change		
Economic group	Change in aggregate receipts, in current dollars (per cent per year)	Change in aggregate command over goods [a] (per cent per year)	Change in command over goods attributable to alterations in real reward per worker (per cent per year)	Change in command over goods attributable to alterations in number of workers (per cent per year)
Wage-earners	+4.8	+2.9	+0.1	+2.8
Salaried workers	+8.0	+6.4	−0.2	+6.7
Other recipients of income from manufacturing enterprises	+4.2	+2.3	—	—

[a] Deflation has been effected by Douglas' index of cost of living. This is not entirely appropriate, since it was computed with reference to the budgets of wage-earners, but it may be used as a rough means of reduction to common terms.

Aggregate disbursements to wage-earners in manufacturing plants between 1899 and 1914 increased at an average annual rate of 4.8 per cent. This was equivalent to an increase of approximately 2.9 per cent a year in the aggregate volume of goods commanded by wage-earners.

The number of wage-earners increased at a rate of 2.8 per cent a year, however, so that the net gain in purchasing power (or real earnings) per wage-earner increased at a rate of but 0.1 per cent a year.[1]

For salaried workers aggregate money payments increased at a much more rapid rate, 8.0 per cent a year. This was equivalent to an increase of approximately 6.4 per cent a year in volume of goods commanded by these disbursements. Breaking this latter aggregate down into its elements, we find the number of salaried workers increasing at 6.7 per cent a year, real earnings per salaried worker dropping at a rate of 0.2 per cent a year.

Aggregate disbursements for overhead (less salaries) and profits increased at a rate of 4.2 per cent a year. This represents a gain in aggregate command over goods at a rate approximating 2.3 per cent a year, on the rather liberal assumption that the average cost of items for which these disbursements were expended changed at the same rate as did the elements of a workman's budget. Beyond this point we may not go at present. It would be illuminating if we could measure the actual change in the number of physical units of capital equipment employed in manufacturing industries during this period, and the change in the returns per unit. The improved and enlarged equipment of industry, made possible by new investment and by the ploughing back on an extensive scale of undistributed profits, is evidenced in part by the increased number of establishments, in part by the increased output per worker employed. But reasonably accurate estimates of the actual changes occurring in the amount of capital equipment in use are not now possible.[2]

Changes in the Aggregate Physical Contributions of Economic Classes, in Relation to their Aggregate Physical Rewards

In the preceding section an attempt has been made to measure changes in the aggregate value contributions of certain economic groups and changes in the command over goods exercised by those groups, during the years preceding the war. In seeking to trace the economic tendencies of this period it is desirable to take one further step. An index of aggregate purchasing power in dollars of constant value measures changes in what the community is giving, in physical units, for the services of a given group of producers. It

[1] At an earlier point a figure corresponding to this but based upon annual data for the years 1901 to 1913, as compiled by Paul H. Douglas, has been cited. This figure indicated a *decrease* in real per capita earnings at a rate of 0.1 per cent a year. The slight difference is due to the difference in the periods covered.

[2] The index of production of capital equipment given in Chapter I provides estimates of annual changes in output of *new* capital equipment. It does not apply to the existing *stock* of such equipment.

defines changes in what is being taken out of the stream of goods by that group of producers. We may secure a measurement of considerable significance by setting against this index one which defines changes in the aggregate physical contribution of that group of producers. That is, we secure the ratio of the aggregate physical contribution of a given group to the aggregate physical rewards, or the aggregate withdrawals from the stream of physical production, of that group. Values above unity (or above 100, in relative form) would indicate increasing contributions, on the part of a given group, with reference to remuneration received, while values below unity would indicate declining contributions, with reference to goods commanded in exchange. These matters are illustrated by the materials in the following table, relating to selected manufacturing industries.

TABLE 69

SHOWING ALTERATIONS OCCURRING BETWEEN 1899 AND 1914 IN THE TERMS OF EXCHANGE BETWEEN GIVEN GROUPS OF MANUFACTURING PRODUCERS AND ALL PRODUCERS [a]

(1) Manufacturing group	(2) Physical volume of production (fabrication) in 1914 (1899=100)	(3) Aggregate purchasing power of 'value added by manufacture' in 1914 (1899=100)	(4) Ratio of aggregate production to aggregate purchasing power in 1914 (1899=100)
All manufacturing industries included in the sample...	176.3	141.4	124.7
Steel works and rolling mills	178.6	121.8	146.6
Cotton goods	153.9	117.8	130.6
Slaughtering and meat packing	127.1	158.5	80.2

[a] These measurements relate to the specific products of fabrication, not to the total output. It is the contribution of agents of fabrication which is here in question. (This is the physical counterpart of 'value added by manufacture'.) Purchasing power is measured in terms of commodities in general, at wholesale, as these are represented in the index of wholesale prices of the U. S. Bureau of Labor Statistics.

For all manufacturing industries included in the sample (the list of commodities is given in Appendix IV) the physical volume of production increased 76.3 per cent between 1899 and 1914. The goods commanded in exchange increased in volume over the same

period by 41.4 per cent. The ratio of 176.3 to 141.4 is 1.247, or, in relative form, 124.7. This is the ratio which, we may say, defines changes in the social contribution of the given agents of production. An increase in the ratio means that more is being added to the total volume of goods, in comparison with the amount taken out as payment. A decline means that less is being contributed, in comparison with rewards received: that is, that the community is paying proportionately more, in terms of goods, for the products of the group in question. In the present case the ratio indicates a 25 per cent increase, between 1899 and 1914, in the contribution of these manufacturing industries, measured in relation to the real costs of their products. For every unit of goods taken out of the total volume of produced goods, these industries contributed 25 per cent more in 1914 than in 1899.[1]

The term 'social contribution' is perhaps misleading, as used above, in that it may imply an ethical standard. Changes in the ratio cited do not necessarily furnish any indication of the relative profitability of different industries. An advancing ratio may reflect economies due to mass production, or to any of a number of other factors. Declines in the ratio may be due to rising material

[1] Several reservations should be made with reference to this figure. It is based not on the complete list of census industries but upon 35 industries, for which alone adequate statistics of quantities produced are available. Again, the figure relates to the contribution of agents of fabrication, not to the volume of manufactured goods in its entirety. Finally, the deflating instrument is the index of wholesale prices of the U. S. Bureau of Labor Statistics, an index into which the products of these 35 industries do not enter, or enter with weights different from those assigned to them in the present study.

As was noted in Chapter I, there is clear evidence that the production index derived from the 35 industries for which production statistics were available between 1899 and 1914 understates the true rate of gain in manufacturing production. On the assumption that fabrication costs per unit of product changed during this period at the same rate among the industries excluded from our sample as among the 35 industries included, we have derived index numbers of physical volume of production for all industries included in the Census of Manufactures. (In deriving the production index numbers described in Chapter I account was also taken of the records of output per capita.) Using these results, we have the following figures for all manufacturing industries:

	Physical volume of production in 1914 (1899 = 100)	Aggregate purchasing power of 'value added by manufacture' in 1914 (1899 = 100)	Ratio of aggregate production to aggregate purchasing power in 1914 (1899 = 100)
All manufacturing industries	195.4	156.7	124.7

The ratio in the last column must, on the assumptions made, be equal to the ratio derived from the data for 35 industries.

costs, advancing costs of production, or to increasing profits per unit. The ratio itself is of considerable significance, as an indication of the contributions of different productive agents to the total volume of consumable goods, measured with reference to their real rewards, but reasons for specific changes in the ratio may not be assigned without detailed knowledge of individual industries.[1]

The three individual industries cited in Table 69 show considerable variations in the values of the ratios in column (4). Judged with reference to what the community paid for their products, in physical terms, steel works and rolling mills increased their contribution by the largest amount, almost 50 per cent, between 1899 and 1914. The real cost of these products was materially lowered. The cotton goods industry increased its contribution, similarly measured, by more than 30 per cent. There was a decline, however, of almost 20 per cent in the contribution of the slaughtering and meat packing industry, when set against the goods received in return.

[1] Another view of the meaning of this ratio is secured by considering the reciprocals of the measurements given. The reciprocal of 1.247 (the ratio from which the relative number 124.7 is derived) is .80. This ratio defines changes in the goods commanded by a given group, measured in relation to the physical contribution of that group. This is equivalent to an index of purchasing power per unit, in dollars of constant worth.

If we let p represent the price of a certain product, expressed as relative, q the physical amount produced, also in relative form, and P an index of the general level of wholesale prices, the aggregate purchasing power of the product in question, relative to the base year, is given by

$$\frac{pq}{P}.$$

The ratio of this value to the physical production, q, of the product in question,

$$\frac{pq/P}{q}$$

reduces to p/P, which is the ratio of the price of the product to the general index of wholesale prices. This measures the purchasing power per unit of the product in question, in wholesale markets.

It is obvious, yet significant, that the ratio of the aggregate physical remuneration of a given group of producers to the aggregate physical contribution of that group is equivalent to the per-unit purchasing power of goods produced by that group. The forces which define the social costs of the contributions of different groups of producers are focused in the markets where prices are set. If we view these prices merely in monetary terms we overlook much of the story they tell. In attempting to trace broad economic movements it is illuminating to view such measures of per-unit purchasing power as ratios between physical aggregates—between the aggregate amounts which groups of producers are able to take out of the total volume of goods produced and the aggregate amounts they contribute to that total. Changes in these ratios measure economic movements of large importance.

The real cost to the community of the products of this industry increased.

In the following table we bring together for comparison a number of ratios of the type discussed above. (The groups represented are not mutually exclusive.) These ratios give a bird's-eye view of the changing status of different groups of producers, with respect to their contributions to the general community of producers and consumers.[1] The caution should be repeated that in judging and comparing these ratios no questions of merit or of demerit enter. We may not say, on the basis of this evidence alone, why certain producers contribute proportionately more to the common pot, while others contribute proportionately less.

TABLE 70

SHOWING ALTERATIONS OCCURRING BETWEEN 1901 AND 1913 IN THE TERMS OF EXCHANGE BETWEEN GIVEN GROUPS OF PRODUCERS AND ALL PRODUCERS

Economic group [a]	Ratio of aggregate physical contribution to aggregate physical withdrawal in 1913 (1901=100)
Producers of:	
Chemicals and drugs	133
Metals and metal products	129
House-furnishings	110
Textile products	106
Foods	99
Building materials	99
Farm products	93
Fuel and lighting	92
Hides and leather products	91
Mineral products	114
Farm crops	101
Animal products	89
Forest products	86
Products of American farms	95
All other products	105
Producers' goods	102
Consumers' goods	98

[a] Most of the groups here listed contain both raw and processed goods.

[1] These ratios are based upon price quotations at wholesale. They differ from those given in Table 69, which relate to the specific services of fabricating agents.

The first nine entries are derived from the commodity classification employed in the construction of price index numbers by the United States Bureau of Labor Statistics. Four of these groups—producers of chemicals and drugs, metals and metal products, house-furnishings, and textile products—were increasing their contributions, with reference to their withdrawals from the common fund. The cost to the community of the aggregate contribution of each of five other groups—producers of foods, building materials, farm products, fuel and lighting, and hides and leather products—was rising. The four groups in the first set relate, in general, to products which have undergone a considerable degree of fabrication; those in the second set relate, in the main, to raw or slightly fabricated materials. The story of the pre-war era, as we have seen, is one of increasing social cost of raw materials, of declining social cost of fabrication charges.

The next division in the table distinguishes forest products, animal products, farm crops and mineral products, each group containing both raw and processed goods. (These entries are based upon price index numbers constructed by the National Bureau of Economic Research.) There was a material rise in the contribution of producers of mineral products, a very slight advance in that of producers and fabricators of farm crops. There was a decline, in relation to the social cost, in the contributions of producers of forest and animal products.

Lumping now all products of American farms, raw and processed, and all other products, raw and processed, we have the two next figures in the preceding table. These show an increase of 5 per cent, between 1901 and 1913, in the relative contribution of those producing and fabricating materials of non-farm origin, a decline of 5 per cent in the relative contribution of those producing and fabricating materials originating on American farms. (In each case the contribution is measured against aggregate rewards, in physical terms.)

In the final division, producers' goods and consumers' goods are distinguished. In 1913 the community was receiving more of the former type of goods, less of the latter, with reference to the goods given to producers as remuneration. The social cost of consumers' goods had increased, that of producers' goods had declined slightly. But the margin of difference is not pronounced.

§ *Contributions and rewards of agents of fabrication.*—This type of analysis may be applied to agents of production, as well as to industries, when the necessary data are available. This may be illustrated with reference to the contribution and the remuneration of manufacturing labor. A simple comparison may be set up by securing the ratio of the change in the aggregate contribution of labor [1] to the change in the aggregate remuneration of labor, between 1899 and 1914. (This is the reciprocal of the labor cost per unit of product, in dollars.) If we wish to shift the comparison to the level of physical contributions and rewards, the denominator of the fraction must be, not aggregate money wages, but the purchasing power of this aggregate. This change may be effected by dividing the aggregate wage figure by an index of living costs. The denominator thus secured measures changes in aggregate payments by the community to manufacturing wage-earners, in the form of consumable goods, housing, and other items entering into the cost of living. The ratio of the aggregate physical production of labor to aggregate physical rewards constitutes a measure similar to that employed in tracing alterations in the terms of exchange between different groups of industrial producers.[2]

The entries in the following table indicate the method of derivation and present results relating to wage-earners in selected manufacturing industries.

Between 1899 and 1914 the aggregate physical contribution of wage-earners in the 35 manufacturing industries here included increased 69.4 per cent,[3] while their aggregate reward (total wages corrected for changes in the cost of living) increased 38.1 per cent. The ratio of 169.4 to 138.1 is 1.227 or, in relative form, 122.7. The 'social contribution' of labor in these industries, measured with reference to the community's payments to labor, increased by some 23 per cent. For every unit of goods received as remuneration, manufacturing labor contributed

[1] In measuring changes in the quantities produced by wage-earners it is necessary to assume that the total contribution of labor, as of each of the other productive factors, increases proportionately with an increase of the volume of production in individual industries. Material alterations in methods of production may invalidate this assumption. It is true, of course, that improvements in the technical equipment of manufacturing industries have been a considerable factor in increasing the productivity of labor in recent years.

In combining data from different industries it is possible to take account of the varying importance of labor as a productive agent in the several industries, so that for manufacturing industries in general it is not necessary to assume equal increases in the output of the several productive agents. (See Chapter III for a series of index numbers defining changes in the physical output attributable to the several factors of production in manufacturing industries.)

[2] The reciprocal of this ratio is identical with an index of labor cost per unit of product, deflated by an index of the cost of living.

[3] We are here assuming that in individual industries the contribution of labor increases proportionately with an increase in the total output. Any increase recorded is, of course, a joint product of the several agents of production; we are not able to measure the specific productivity of the different agents.

TABLE 71

SHOWING ALTERATIONS OCCURRING BETWEEN 1899 AND 1914 IN THE TERMS OF EXCHANGE BETWEEN MANUFACTURING LABOR AND ALL PRODUCERS

Ratios of Aggregate Quantities Produced by Manufacturing Wage-earners to their Aggregate Purchasing Power [a]

Producing group	Physical volume of production in 1914 (1899=100)	Aggregate purchasing power of wages received in 1914 (1899=100)	Ratio of aggregate production to aggregate purchasing power in 1914 (1899=100)
Wage-earners in:			
All manufacturing industries included in the sample.....	169.4	138.1	122.7
Blast furnaces, iron and steel.	163.3	91.2	179.1
Petroleum refining	296.5	213.7	138.7
Steel works and rolling mills.	178.6	136.1	131.3
Cotton goods factories	153.9	127.0	121.1
Woolen and worsted goods factories	145.4	125.3	116.0
Flour and grist mills.....	114.1	111.7	102.1
Boot and shoe factories.....	131.4	133.8	98.2
Slaughtering and meat packing	127.1	137.7	92.3

[a] Aggregate purchasing power refers to command over items included in the Douglas cost of living index.

23 per cent more in 1914 than in 1899. Viewing this inversely, the real cost to the community of the contribution of manufacturing labor declined approximately 19 per cent.

This ratio varies considerably from industry to industry, as is clear from the cases cited above. In slaughtering and meat packing the physical contribution increased less than did the aggregate purchasing power of wages received; the ratio defining the 'social contribution' declined from 100.0 to 92.3 between 1899 and 1914. In the production of pig iron (in which great technical improvements were made) the volume of production increased some 63 per cent, while the aggregate real rewards of labor declined about 9 per cent. The index based on the ratio between the two increased from 100.0 to 179.1.

The ratios relating to labor have not the clearly defined meanings that those relating to the separate industries have, for there is no separate contribution made by wage-earners which can be divorced from the facilitating services of tools of all sorts. All references to 'the contribution of labor' must be taken to mean 'the contribution of labor utilizing the technical equipment available in the industry'. This is the same reservation that applies to indexes of per capita productivity.

One further comparison of somewhat the same sort is of interest. Recognizing that we cannot measure separately the output of the different agents of production, we may yet treat certain of the data relating to sellers of materials, wage-earners and the composite element of 'overhead costs plus profits' as though such separation were possible. As between sellers of materials and the different agents of fabrication there is a fairly clear distinction, easier to make and to measure than is that between wage-earners and the equipment they utilize. Measurements relating to changes in the aggregate contributions of these different agents and in their aggregate physical rewards are given in the next table.

TABLE 72

SHOWING ALTERATIONS OCCURRING BETWEEN 1899 AND 1914 IN THE AGGREGATE PRODUCTION OF DIFFERENT AGENTS, AND IN THEIR AGGREGATE REWARDS

(Data relating to 35 manufacturing industries of the United States)

Economic group	Physical contribution in 1914 (1899=100)	Aggregate purchasing power in 1914 [a] (1899=100)	Ratio of aggregate contribution to aggregate purchasing power in 1914 (1899=100)
All agents of production, manufacturing	163.3	152.9	106.8
Sellers of materials [b]	157.8	153.0	103.2
Agents of fabrication	176.3	136.5	129.2
Wage-earners	169.4	138.1	122.7
Others (represented in overhead costs plus profits)	180.4	135.2	133.4

[a] In computing purchasing power, the wholesale price index of the Bureau of Labor Statistics has been used in dealing with the total products of manufacturing industries. Douglas' cost of living index has been used for the different productive agents. This index is strictly applicable only to wage-earners but in default of better it has been used for all entries except the first. It is adequate for purposes of a rough comparison. The figures given above for agents of fabrication are not consistent with those in Table 69, which were deflated by an index of wholesale prices.

[b] 'Materials', as that term is used in the Census of Manufactures, include semi-processed goods, fuel, containers, etc., as well as raw materials proper.

The increasing degree of fabrication of manufactured goods, and the growing proportion of heavily fabricated goods in the total products of manufacture, is shown by the rather wide difference between the index numbers of production relating to materials and to fabrication. These numbers indicate an increase between 1899 and 1914 of about 58 per cent in quantity of materials used, of some 76 per cent in the contribution of fabricating agents. Over the same interval the aggregate purchasing power of sellers of materials increased by 53 per cent, while that of agents of fabrication advanced by 36 per cent. The ratio which defines changes in aggregate contribution, in relation to

changes in aggregate purchasing power, increased by 3 per cent for sellers of materials, by 29 per cent for agents of fabrication. (This latter figure is 25 per cent, if purchasing power be measured in terms of commodities at wholesale. The figure in the text relates to purchasing power in terms of items in the cost of living index.) The community was receiving much more in 1914 from agents of fabrication, in relation to their aggregate physical rewards, than in 1899. From sellers of materials (a term which here includes a considerable proportion of goods which are not raw materials proper) the gain was much less.

Among agents of fabrication a separation of contributions is largely fictitious, but it is possible to take some account of the increasing importance of the equipment represented by 'overhead'. The quantity index points to a gain of about 80 per cent in the volume of production attributable to ownership and management.[1] Setting this against the index measuring gain in aggregate purchasing power of this group, a ratio of 1.334 is secured. This is somewhat larger than the corresponding measure of 1.227 secured for wage-earners.[2]

In summary of these figures: From the point of view of the com-

[1] This is secured by weighting the production figures for separate industries, when combining them, by amounts proportioned to the importance of overhead costs plus profits in the several industries.

[2] As was pointed out in Chapter I, the physical volume of production of all manufacturing industries increased at a somewhat more rapid rate than did the output of the 35 industries for which statistics of production are available. On the assumption that prices and costs changed at the same rates among all industries as among the 35 we have studied, index numbers of production relating to all census industries may be constructed. Results based on these figures are given below. (In measuring changes in aggregate purchasing power use has been made of the same deflators employed in securing the entries in Table 72.)

Showing Alterations Occurring between 1899 and 1914 in the Aggregate Production of Different Agents and in the Aggregate Rewards of these Agents, Manufacturing Industries of the United States

Economic group	Physical contribution in 1914 (1899 = 100)	Aggregate purchasing power in 1914 (1899 = 100)	Ratio of aggregate contribution to aggregate purchasing power in 1914 (1899 = 100)
All agents of production, manufacturing	174.0	162.9	106.8
Sellers of materials	166.8	161.7	103.2
Agents of fabrication	195.4	151.3	129.2
Wage-earners	184.3	150.3	122.7
Others (represented in overhead costs plus profits)	202.8	152.0	133.4

The increases between 1899 and 1914 in the contribution and in the purchasing power of each of the several agents are higher than appears from the data for 35 industries. It is probably a necessary result of the increasing diversification of industry that an index of production based on standard commodities should understate the true rate of increase in physical output. The ratios which define the relation between changes in contributions and changes in rewards are identical with those relating to the samples of 35 industries, a fact which follows from the method employed in deriving the corrected quantity indexes.

munity at large, the aggregate contribution of manufacturing industries advanced during this fifteen-year pre-war period more rapidly than did the aggregate amount received by such industries in return for their wares. The community gained; the social cost of the services of manufacturing industries declined. The same is true with reference to the contributions and rewards of the several agents coöperating in these industries. The community's gain from the sellers of materials (which here includes semi-fabricated goods, fuel, etc.) was least. Substantial, however, were the gains from the services of wage-earners and of creditors, owners and managers. The aggregate contribution of wage-earners increased by about 23 per cent more than did the aggregate reward. The aggregate contribution of creditors, owners and managers increased some 33 per cent more than did the aggregate reward.[1] Difficulties of measurement affect both terms of these comparisons, physical output and purchasing power. The figures are not to be assumed to define accurately the changes taking place. The broad tendencies they reveal undoubtedly prevailed.

These various measurements of purchasing power changes bear upon, though they do not solve, a problem of considerable importance. During the pre-war period now under review expanding credit and increasing supplies of money stimulated, or permitted, a growth of aggregate values exceeding the growth in volume of physical goods and services. The volume of goods increased at a rate approximating 3.1 per cent a year between 1901 and 1913; aggregate values expanded at a rate of about 4.9 per cent a year. Rising prices account for the difference. New values not attributable to the production of goods or the rendering of services were created by this cheapening of money. Such new values carried with them command over goods just as potent as that carried by values attributable to the production of physical goods. To what economic groups did the values created by rising prices accrue? What economic groups lost in purchasing power as a result of the creation of these new values?

To answer these questions accurately and in detail would require a far more comprehensive knowledge of the economic processes of this period than we now possess. Changes in the individual rewards of different economic agents and in the aggregate rewards of different economic groups would occur with the passage of time, even though no change occurred in the value of money.

[1] The fact that the base year, 1899, was prosperous, while the given year, 1914, was depressed, would tend to raise this ratio. The rewards of this group were high in 1899, relatively low in 1914.

Fluctuations in the value of money constitute only one factor (though often a dominating one) in the interplay of forces affecting prices and values. We cannot disentangle this one factor from all other complicating influences. Yet certain of the alterations in purchasing power occurring during this era clearly reflect the influence of changing monetary values.

Our findings have indicated that between 1901 and 1913 the income of an average bondholder lost in purchasing power at a rate of 1.2 per cent a year, that the income of an average holder of common stocks increased in purchasing power at a rate of 1.2 per cent a year, and that the income of an average wage-earner increased in purchasing power at a rate of 0.4 per cent a year. That the real returns to bondholders declined, and that the real returns to wage-earners advanced so slowly, in spite of advancing productivity, is definitely attributable to the lagging of their monetary rewards during a period of rising prices. It is reasonable to assume that the gain in the real rewards of stockholders during this period is in part due to the same factor. When prices rise, and the real rewards of fixed claimants decline, the returns to the residual claimant are likely to advance.[1]

One could hazard opinions as to the part played by the monetary factor in effecting certain of the other changes in purchasing power which occurred during this period, changes affecting different industries, different income groups and different economic classes. But definite proof would be hard to give. The incidence of changing monetary values upon the structure of prices has never been charted. Indeed, the effects of inflation (or of deflation) are not necessarily the same at all times. A stream of new values may be poured into the economic system through various channels; the direction of pressure of the new values will vary correspondingly. But the addition (or subtraction) of such values may profoundly modify the distribution of the physical fruits of industry.

Diversity of Pre-war Economic Movements

The picture which remains in one's mind after a consideration of the various measurements presented is one of an economic

[1] This result is not inconsistent with the evidence that in manufacturing industries overhead costs plus profits declined, per unit of product, during this period. Increasing output might well lead to a gain in the rewards of stockholders, though profits, per unit of product, declined.

system surging forward on nearly all fronts, but with movements that were uneven and highly irregular when seen in detail. The various elements of the system were growing at widely different rates and fluctuating over widely different ranges. Population, production, the volume of credit, of capital, of foreign trade, the contributions and the rewards of different industrial groups and of different agents of production—all these were changing at diverse rates and with varying degrees of regularity. It was not a system which moved forward with its various elements in close agreement, with nicely coördinated reciprocal changes. It was a system in constant flux, whether viewed as a whole or in any of its parts.

The differing ranges of oscillation of the various elements of the economic system involve constant readjustment, constant shiftings, as new bases for the necessary coördination of working parts are sought. These are short-term adjustments, adaptations to swings which complete and return upon themselves with more or less regularity over a period of a few years. Of a different order are the readjustments called for by the divergent rates of growth of the various economic elements. Here are shifts which do not reverse themselves over such periods as that which is here studied. These tendencies persist, and adaptation to the changes they bring must involve more permanent alterations in the relations among working parts. How prompt and effective these short-term readjustments and these more permanent adaptations may be must depend upon the flexibility of the economic system.

The coördination of economic elements under a system of private enterprise and freedom of competition is left to the play of forces which are assumed to be automatic in character, and which work through the system of prices. The conditions under which prompt and complete readjustment to economic changes might be automatically effected have never been fully realized. At different times and in different places the degree of realization has varied. Such readjustment is presumably more difficult the less flexible the economy and the more severe the stresses to which the diversity of economic movements subjects it. In the comparison of prewar and post-war epochs we shall be concerned, among other things, with this aspect of the problem of economic coördination.