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# Factor Shares, 1850–1910

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IN RECENT years substantial interest has developed in the historical behavior of distributive shares, with particular emphasis on the secular stability or instability of labor's share in total income. In the absence of a comprehensive and integrated set of national income estimates for the nineteenth century, relatively little attention has been paid to the movement of distributive shares in that period. This paper proposes to review the available statistics to see if any tentative conclusions can be reached on the level and movement of shares between 1850 and 1910. More definitive findings must await upon the preparation of income statistics for that period.

It is almost axiomatic that the quality of statistics is an inverse function of their age. Before 1850 the data are valueless. Estimates for 1850 and 1860 are probably subject to wider margins of error than those for later years, although the reliability, even of the latter, is not particularly high. While too much skepticism would rule out almost any discussion of nineteenth century statistics, it is the user of these findings who must ultimately decide whether fragmentary statistics are better than none at all.

The estimates were carried through the first decade of the twentieth century to facilitate comparison with like estimates from 1909 on, which have been made by the National Bureau of Economic Research and the Department of Commerce.

## *Concepts of Distributive Shares*

W. I. KING

The term "factor shares" immediately brings to mind the typical textbook classification: wages as the earnings of labor, interest as the return on capital, rent as the return on land and natural resources, and profits as the share of the entrepreneur. To my knowledge, the only attempt to present estimates on this basis was that made by King in his pioneering work, *The Wealth and Income of the People of the United*

NOTE: The author is indebted to Harold Hochman for assistance in preparing the estimates contained in this paper, as well as for the preparation of Appendixes B and C.

*States*.[1] Only wages and salaries were treated in an "institutional" fashion, representing exclusively the compensation of hired workers, the earnings of self-employed from their own labor being included in profits. Rent, taken as "all recompense for the use of natural resources" (without improvements) was computed as 4 per cent of the value of land. Interest was estimated by taking a varying percentage (6 to 8 per cent) of the estimated value of physical capital goods. Profit was treated as a residual (i.e. the value of output minus the sum of wages and salaries, rent, and interest).

The shortcomings of such a method are obvious. Estimates of capital values are generally subject to wider margins of error than are income estimates, and assumptions about rates of return are necessarily quite arbitrary. A sounder approach would be to determine the rate of return implicit in independent estimates of income (property) shares and capital values.[2] No use, therefore, will be made of King's classification of property shares.

DEPARTMENT OF COMMERCE

*Classification*

Although modern share classifications in income accounts, as developed by Kuznets and the Department of Commerce, do contain functional elements, they can more aptly be characterized as legal or institutional, depending as they do on the form of property right or claim to income held by individuals or groups. Commerce, for example, distinguishes among employee compensation, income of unincorporated enterprises, corporate profits, rental income of persons, and net interest. As with King, employee compensation represents contractual payments (including supplements) to hired employees. The distinction between corporate and unincorporated enterprises is a legal one. Both include the earnings of all resources owned outright by the firm, as well as income arising from intangible assets (monopoly positions broadly construed). Since both are residually determined, they also reflect the effects of various types of windfall gains and losses. The major difference lies in the more nearly complete allowance for labor earnings in corporations' wage and salary payments.[3]

[1] Willford I. King, *Wealth and Income of the People of the United States*, Macmillan, 1915, pp. 154–157. King found the interest share to average 15 per cent, and the share of rent, 8 per cent, between 1850 and 1910, with no evident secular trend. Relative constancy of these shares would not be too surprising, since some of King's estimates of capital values were based on the assumption of a constant ratio of capital value to output (cf., e.g. p. 256).

[2] e.g. William Fellner, *Trends and Cycles in Economic Activity*, Holt, 1956, pp. 254–57; Simon Kuznets, "Long-Term Changes in the National Income of the U.S.A. since 1870," *Income and Wealth, Series* II, The Johns Hopkins Press, 1952, p. 86. Kuznets, however, makes use of King's estimates of rent and interest in his calculations.

[3] Other minor differences exist. For example, rent and interest payments received by unincorporated enterprises are treated as if received directly by individuals; if received by corporations, they are counted in the income of the receiving corporation.

Almost two-thirds of the "rental income of persons" in the Commerce series represents net rental income on nonfarm housing received by owners to whom rent is an incidental source of income.[4] Farm rents—whether they originate in the rental of dwellings or of land and buildings—paid to persons not living on farms comprise another 10 to 15 per cent of the total.[5] Most of the remainder is composed of net income received by persons from the rental of nonfarm business property (including structures as well as land). It is evident from the anatomy of this total that it can hardly be characterized as contractual and that it has little to do with income from land.

The interpretation of the "net interest" category in the Commerce accounts is even more complex, since imputed interest flows (for the services of financial intermediaries) form a large fraction of the total. Both monetary and imputed interest flows are netted in the various sectors of the economy, making the industrial origin of interest difficult to interpret. Furthermore, interest on government debt is excluded from interest as a distributive share, while interest on consumer debt is included. Obviously, this share measures neither the income of "capital" nor contractual interest payments.

*Application to 1850–1910*

The application of this breakdown to the nineteenth century would be a formidable task, and only a few comments will be attempted here. While no comprehensive data on corporate income exist for this early period, the share of income originating in corporations was undoubtedly substantially smaller than it is today. According to King's data, the proportion of private income originating in corporations rose from 44 per cent in 1900 to 51 per cent in 1910; in private nonagricultural income, from 55 per cent to 63 per cent.[6] Even if the relative importance of the corporation in the private nonagricultural sector had not increased between 1850 and 1900, the virtual halving of agriculture's weight in private income would have sufficed to raise the corporate share in private income from 35 per cent to 44 per cent. Little more is

[4] If income from rental housing is the recipient's major source of income, the "rental income" is counted under the income of unincorporated enterprises.

[5] The rental value of farm dwellings is counted as part of the gross income of the farm sector and appears in the income of unincorporated enterprises unless matched by a corresponding rental payment to a nonfarm landlord. Aside from a few years, "gross rental value of farm homes" and "gross rents paid to nonfarm landlords" have been roughly the same since 1910 (see *Survey of Current Business*, Dept. of Commerce, August 1954, pp. 22–23, Table 1). This statement does not apply to net rents, however.

[6] Computed from "revised" income data given in Table 1 below, and from King, p. 211. For Commerce data, the share of corporate income in private income rose from 56 per cent in 1929 to 63 per cent in 1953; in private income exclusive of agriculture, from 63 per cent to 68 per cent (computed from *National Income Supplement, 1954, Survey of Current Business*, Tables 12 and 13). The two income series and the percentages computed from them are not necessarily comparable.

known about the share of corporate profits. Some rough calculations made by the author in another connection, utilizing Goldsmith's estimates of corporate dividend payments and savings and his own tentative extrapolation of the Commerce series back to 1899, suggest that corporate profits rose from about 7 per cent of private income in 1899–1900 to 9 per cent in 1909–10, compared with over 12 per cent in 1929 and over 13 per cent at the present time.[7]

It is also likely that the Commerce concept of "net rental income of persons" was as relatively unimportant in the nineteenth century as it has been in the twentieth. In the Commerce series, net rental income from nonfarm housing was 4.6 per cent of private income in 1929 and 2.5 per cent in 1952. If this series is extrapolated back to the nineteenth century by means of Martin's estimates of net rents, such rents, as a percentage of King's "revised" income series (to be discussed subsequently), rose from 1 per cent in 1850 to somewhat under 4 per cent in 1870 and 1880, and to 5 per cent for 1890 through 1910.[8] Net farm rents paid to nonfarm landlords had been estimated annually by the Bureau of Agricultural Economics back to 1910. Towne and Rasmussen, in their paper in this volume, have extended the Bureau's series to cover the nineteenth century.

As might be expected from the increase in farm tenancy during the latter half of that century, such rental income was a rising proportion of income originating in agriculture. The declining importance of agriculture, however, more than offset the rise in tenancy; and farm rent paid to nonfarm landlords, as a percentage of private income, declined after 1880. In 1850 and 1860, it was 1 per cent; 1870 and 1880, 1½ per cent; 1890 through 1910, 1¼ per cent; by 1929 it had fallen to 0.6 per cent.[9] If rents from business property are excluded, rental income was probably somewhat more than 5 per cent of private income in 1870 and 1880, and about 6 per cent for 1890 through 1910, as contrasted with the 5.2 per cent in 1929 and 3 per cent in 1952 shown by Commerce data. No attempt will be made to develop a similar "guesstimate" for net interest.

## CLASSIFICATION EMPLOYED IN THIS PAPER

If we drop rent and interest and the legal distinction between business enterprises, we are left with a twofold classification of shares: wages and

[7] Raymond Goldsmith, *A Study of Saving in the United States*, Princeton University Press, 1955–56, calculated from data in Vol. 1, pp. 913–918, 941, and Vol. 3, p. 435.

[8] The series for "net rents on nonfarm dwellings" given by R. F. Martin (*National Income in the United States, 1799–1938*, National Industrial Conference Board, 1939, pp. 98–99) was linked at 1929 to the Commerce component of net rental income arising from rental housing and owner-occupied homes by raising the former series by 47 per cent (*Survey of Current Business*, June 1953, p. 18).

[9] Net rent paid to nonfarm landlords are from Towne and Rasmussen, Table 3, for 1850 and 1900, and from *The Farm Income Situation*, Department of Agriculture, July 1956, p. 21, for 1910 and 1929.

salaries representing the contractual income of hired workers, and the income of self-employed workers and property owners. The latter is a mixture arising from physical and intangible assets, the use of self-employed labor, and windfall profit and loss. By making an allowance for the labor income of self-employed workers, the preceding division can be converted into a variant of the factor classification with which we started: labor income as the earnings—monetary or imputed—of human beings; property income as the (residual) earnings of physical (land and capital goods) and intangible assets. It is with labor's share, viewed either as the share of hired workers or as the share attributable to all human labor, that the remainder of this paper is concerned.

*The Service Share*

There are, of course, alternative ways of allowing for the labor earnings of the self-employed. I imputed to the self-employed the average annual earnings of hired workers (i.e. total wages and salaries divided by total employees).[10] Self-employed or "entrepreneurial" labor income computed in this fashion plus employee compensation will be referred to hereafter as "service income" to distinguish it from the wage income of hired workers.

This method assumes that, on the average, the self-employed could earn an amount equal to the average compensation of employees. However, the "non-monetary advantages" of being self-employed may imply an imputed wage income lower than the average. Conversely, if the self-employed are more skilled than hired workers, if they perform more "managerial" tasks or work longer hours, the correct wage allowance would be higher.

In the absence of an external market test, any method, including this one, must remain somewhat arbitrary. Nevertheless, I believe it to be superior to other alternatives. Kuznets's method, which would assign the entire share of the income of unincorporated enterprises to income from personal services, makes no provision for the earnings of physical assets owned by self-employed.[11] The lack of estimates for the income of unincorporated enterprises for the nineteenth century precludes its use in any case.[12]

[10] Since for this period there are no separate estimates of salaries, as distinct from wages, it will be convenient hereafter to refer to the "wage and salary share" simply as the "wage share."

[11] See, for example, Simon Kuznets, *National Income: A Summary of Findings*, National Bureau of Economic Research, 1946, p. 9.

[12] A third method would be to impute a rent for the use of physical assets owned by enterprises on the basis of rental rates established for enterprises who rent their assets from others, with imputed labor income being determined as a residual. Outside of agriculture and residential housing, the absence of any significant amount of rental property precludes its use. Johnson used this method and the one employed in this paper for determining distributive shares in agriculture for 1910–46. While the year-to-year changes in labor's

*Adjusted Wage and Service Shares*

Data on the wage share will be presented along with that on the service share. Even if more fundamental factors affecting distributive shares were constant, the wage share would be subject to changes over time as a result of shifts in the proportion of hired to self-employed workers. A correction for such shifts can, however, be made along the lines used to determine service income. If the proportion of self-employed rises, compared with some base year, an amount can be deducted from wage income equal to the average annual earnings of employees times the number of self-employed it is necessary to allocate to employee status to keep the base year proportion of hired to total workers the same. The "adjusted" wage share will thus be invariant to this particular type of institutional change.

The adjustment factor for the self-employed can be expressed in a somewhat different form. If we denote by $w$, the wage share, and by $t$, the ratio of hired to total workers (employees plus self-employed), then the share of service income ($s$) is given by ($s = w/t$).[13] This formulation obviates the necessity for separate calculations of average annual earnings and service income. The wage share in year 1, adjusted to reflect the proportion of self-employed to hired workers that existed in the base year 0, is given by $[w_1' = (w_1/t_1)t_0]$.

The service share can also be expressed as the ratio of average annual earnings of employees ($m$) to annual output per worker ($n$).[14] This formulation permits the use of independently derived data on output per worker and wage rates to determine the level of and movement in labor's share. In fact, the prevailing practice of comparing changes in real wage rates with changes in productivity (real output per manhour)

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share yielded by the two techniques differ substantially, the average level and trend are quite similar. For example, labor's share for the entire period, with imputed wages treated as a residual, averaged 60 per cent; with rent treated as a residual and the wages of self-employed imputed directly, the average for labor's share was 62 per cent. Johnson also presents another method of imputing the labor income of farmers, analogous to that used by King, although he places little emphasis on the results produced by it. (D. Gale Johnson, "The Allocation of Agricultural Income," *Journal of Farm Economics*, November 1948, pp. 724–747.)

[13] Let $N$ be the employed labor force; $M$, wage and salary workers; $(N - M)$, self-employed; $Y$, national income; $W$, wage and salary income; $S$, income from labor services; $t = M/N$; $w = W/Y$; $s = S/Y$. Then:

$$S = W + (N - M)\frac{W}{M} = W\left[1 + \frac{(N - M)}{N} \cdot \frac{N}{M}\right] = W\left(1 + \frac{1 - t}{t}\right) = \frac{W}{t}$$

and $$s = \frac{W}{Yt} = \frac{w}{t}$$

[14] Dividing the numerator and the denominator of the equation in the preceding footnote by $M$,

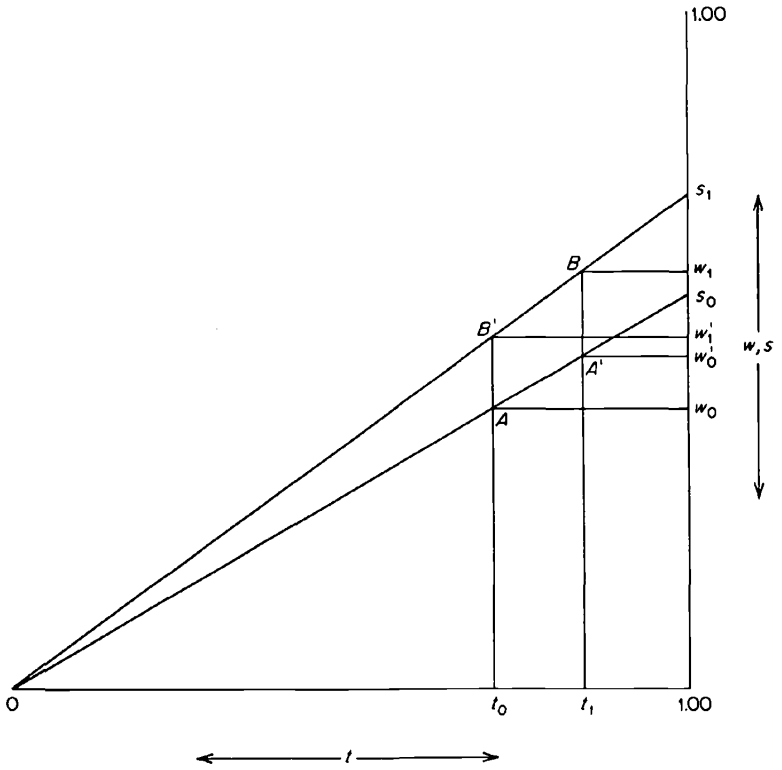
$$s = \frac{W/M}{Yt/M} = \frac{m}{YM/MN} = \frac{m}{n}$$

—if we ignore problems introduced by the price indexes with which the numerator and the denominator are deflated—shows nothing more than changes in labor's share, adjusted for the self-employed in precisely the way I have proposed.

The relationship among the concepts is illustrated in Chart 1, the horizontal axis of which measures the ratio of employees to total

CHART 1

Effect of Changes in the Ratio of Hired to Total Workers (t) Upon the Wage (w) and Service (s) Shares in Total Private Income




workers ($t$), and the vertical axis, the wage and service shares. Point $A$ expresses the fact that in year 0, the wage share was $w_0$ and the ratio of hired workers, $t_0$; point $B$ shows the same for year 1. The service share for year 0 is $s_0$ (the slope of the line $OA$) and for year 1, $s_1$ (the slope of the line $OB$). Adjusting the wage share in year 1 so as to reflect the same proportion of self-employed as existed in year 0 means moving back

along the line $OB$ to $B'$. The "adjusted" wage share is then $w_1'$, and the change in share is $(w_1' - w_0)$. Similarly, if year 1 is taken as the base for adjusting the ratio of self-employed, the change in share is $(w_1 - w_0')$.[15]

In imputing the labor income of the self-employed, one must assign to the self-employed in any sector the average annual earnings of employees in the same sector. An adjustment which imputes to self-employed the average earnings for all industries taken together leads to an overstatement of the service share, since the self-employed are concentrated in industries where average earnings and output per worker are relatively low. Over time it overstates a fall (or understates a rise) in the service share if there is a relative decline in those sectors in which average earnings are low and in which self-employed are important.

While ideally the adjustment should be carried through for as many sectors as possible, the scarcity of data for the nineteenth century precludes anything more than a breakdown between agriculture and all other private industries (hereafter referred to as "industry"). Experiments by the author for later years for which data are available indicate that the errors introduced by the use of such a two-sector model are quite small.

## *Concept of Income*

The preferable aggregate for studying income shares is national income at factor cost. Government production was excluded, where possible, since there is no way of making the valuation of its output comparable with the valuation used for the private sector. This is true whether the latter is valued in terms of market prices or factor costs. The factor cost method would require, as a minimum, the imputation of a return for the services of government-owned capital, a virtual impossibility for this early period.

All estimates are presented in terms of current prices. Shares are not affected if both the numerator and the denominator are deflated by the same price index. While different results would be achieved by deflating labor income by a different index (e.g. a cost of living index) from that used for total output (e.g. a price level for final products), it is not clear to me what interpretation should be placed on the outcome.

## *The Wage Share*

### KING'S ESTIMATES

The only estimates of income shares going back to 1850 are those made by King over forty years ago (Table 1). The share of wages in

[15] For a somewhat similar treatment, see E. H. Phelps-Brown and P. E. Hart, "The Share of Wages in the National Income," *Economic Journal*, June 1952, pp. 258–261.

TABLE 1

Wages and Income, by Sector, Census Years, 1849–1850 to 1909–1910
(billions of dollars)

| Year | AGRICULTURE | | | | INDUSTRY | | TOTAL PRIVATE | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Wages* | | *Income* | | *Wages* | *Income* | *Wages* | | *Income* | |
| | *King* (1) | *Rev.* (2) | *King* (3) | *Rev.* (4) | *King* (5) | *King* (6) | *King* (7) | *Rev.* (8) | *King* (9) | *Rev.* (10) |
| 1849–50 | 0.09 | 0.23 | 0.76 | 0.74 | 0.63 | 1.35 | 0.73 | 0.87 | 2.11 | 2.09 |
| 1859–60 | 0.15 | 0.34 | 1.09 | 1.30 | 1.08 | 2.39 | 1.23 | 1.42 | 3.47 | 3.69 |
| 1869–70 | 0.71 | 0.58 | 1.78 | 2.27 | 2.20 | 4.50 | 2.91 | 2.78 | 6.28 | 6.77 |
| 1879–80 | 0.67 | 0.50 | 1.48 | 2.31 | 2.72 | 5.46 | 3.39 | 3.23 | 6.93 | 7.77 |
| 1889–90 | 0.68 | 0.52 | 2.26 | 2.60 | 5.11 | 9.04 | 5.79 | 5.63 | 11.30 | 11.63 |
| 1899–1900 | 0.92 | 0.57 | 3.69 | 3.10 | 6.65 | 12.81 | 7.57 | 7.22 | 16.50 | 15.91 |
| 1909–10 | 1.42 | 0.75 | 6.84 | 5.11 | 11.57 | 21.10 | 13.00 | 12.32 | 27.94 | 26.20 |

In this and the following tables, detail will not necessarily add to totals because of rounding.

*King estimates:* King, pp. 138 and 261.

*Revised estimates: Col. 2*—See Appendix B. *Col. 4*—Towne–Rasmussen estimates adjusted to reflect net rather than gross farm income (see text). *Cols. 8 and 10*—Sum of cols. 2 and 5 and 4 and 6, respectively.

TABLE 2

Wages as a Percentage of Income, by Sector, Census Years, 1849–1850 and 1909–1910

| Year | AGRICULTURE | | | INDUSTRY | | TOTAL PRIVATE | | |
|---|---|---|---|---|---|---|---|---|
| | *King* (1) | *Rev.* (2) | *Adj.* (3) | *King* (4) | *Adj.* (5) | *King* (6) | *Rev.* (7) | *Adj.* (8) |
| 1849–50 | 12.2 | 31.5 | 32.9 | 47.1 | 46.1 | 34.5 | 41.5 | 41.4 |
| 1859–60 | 14.0 | 26.2 | 30.1 | 45.1 | 45.4 | 35.4 | 38.4 | 39.9 |
| 1869–70 | 39.9 | 25.8 | 19.4 | 48.9 | 50.3 | 46.3 | 41.1 | 40.0 |
| 1879–80 | 45.4 | 21.8 | 19.3 | 49.9 | 50.9 | 48.9 | 41.5 | 41.5 |
| 1889–90 | 30.1 | 20.0 | 21.5 | 56.6 | 56.8 | 51.3 | 48.4 | 48.9 |
| 1899–1900 | 25.0 | 18.5 | 20.2 | 51.9 | 51.5 | 45.9 | 45.4 | 45.4 |
| 1909–10 | 20.8 | 14.6 | 16.7 | 54.9 | 53.1 | 46.5 | 47.0 | 46.0 |

*King's and revised estimates:* Calculated from data in Table 1.

*Adjusted estimates* (revised estimates adjusted for changes in the percentage of hired workers to all gainfully occupied): *Col. 3*—Col. 2 divided by the percentage of hired to total in agriculture (Table 3, col. 1) and multiplied by the latter column's mean value (0.227). *Col. 5*—Col. 4 divided by the percentage of hired to total in industry (Table 3, col. 2) and multiplied by the latter column's mean value (0.846). *Col. 8*—The product of col. 3 and the percentage of agricultural to total income (Table 3, col. 5), plus the product of col. 5 and 100 per cent minus the percentage of agriculture to total income (Table 3, col. 5).

private income (excluding income originating in government), agriculture, and industry, as calculated from his data, are given in Table 2.[16] These figures indicate a sharp rise in the wage share in private income from 1860 to 1870, a further rise up to 1890, and a subsequent decline by 1910 to the 1870 level. While the wage share in industry rose rather steadily throughout the period, aside from the sharp peak reached in 1890, the share in agriculture fluctuated violently, virtually tripling over the period spanning the Civil War, and falling by more than one-half from 1880 to 1910. While part of the rise up through 1870 and 1880 may well be attributable to postwar dislocation and agricultural depression during these years, the character of the changes raises serious doubts as to the reliability of King's estimates of agricultural wages and income.[17] For example, King's data on wages imply that the average (annual) earnings of farm employees approximately tripled between 1860 and 1870, and close to doubled between 1870 and 1910. While farm wages rose, other estimates do not begin to reveal as substantial an increase.[18] The King series on agricultural income is also open to doubt; 1880 appears to be an underestimate, and 1900 and 1910 overestimates.[19]

## REVISIONS OF KING'S ESTIMATES

I have therefore made independent rough estimates of agricultural income and wages for these years. For income in 1910, I took the Department of Agriculture's estimate of farm net income (inclusive of mortgage interest and property taxes).[20] The Towne–Rasmussen estimates of farm gross product for the decade years 1850–1900 were then adjusted to the same net basis by deducting estimates for certain omitted expenses and for depreciation.[21] To correspond with King's

[16] Unless otherwise specified, all figures attributed to King have been taken from his Tables 23 and 30 (pp. 138 and 261–263). While King lists his estimates for 1850, 1860, etc., the data are for "census years" and are presumably some hybrid of measures for 1849, 1859, etc., and the following year (cf. Kuznets, "Long-Term Changes," p. 239).

[17] King, p. 162.

[18] Average earnings for King's series were obtained by dividing his wage bill by the estimates of hired workers in Appendix A. The wage series of the Department of Agriculture shows about a 15 per cent rise between 1869 and 1909 for wages without board and 20 per cent for wages with board. While the series does not go back prior to 1866, the data presented in Lebergott's paper in this volume indicate less than a 2 per cent increase for board rates between 1860 and 1870.

[19] Frederick Strauss and Louis H. Bean, *Gross Farm Income and Indices of Farm Production and Prices in the United States, 1869–1937*, Dept. of Agriculture, Tech. Bull. 703, December 1940, p. 15.

[20] *The Farm Income Situation*, Dept. of Agriculture, July 1956.

[21] Towne and Rasmussen, Table 1, "farm gross product, excluding improvements and home manufactures." Their estimates were reduced by 6 per cent to allow for certain expenses (mostly short-term interest) deducted in the Department of Agriculture series. (Such expenses were 6 per cent of farm gross product in 1910.) The 1910 estimate for the consumption of farm capital was extrapolated back to the decade years of the nineteenth

dates, the resulting series was extrapolated back one year on the basis of the Strauss and Bean series on gross farm income, and an average for the two adjoining years (1869–70, etc.) was used.[22]

For 1909–10, the wage bill was taken as equivalent to the Agriculture series on farmers' expenditures for hired labor.[23] For other years, this series was extrapolated backward on the basis of the estimates of hired farm workers contained in Appendix A of this paper and average monthly wages in agriculture without board, details for which are given in Appendix B.[24]

The procedure used assumes that the value of perquisites is measured by the difference between "with board" and "without board" wage rates. The series makes a partial allowance for daily wage rates for harvest and nonharvest labor, which moved somewhat differently from monthly rates during the nineteenth century. This series may overstate slightly the wage bill for earlier years. Data for later years indicate that the Agriculture series tends to rise by a somewhat greater proportion than does the product of hired employees and monthly wages without board.

The results of these calculations, together with King's estimates for purposes of comparison, are presented in Table 1. Table 2 shows the wage share in agriculture and in private income recomputed on the basis of the revised data.

The revisions eliminate entirely the fluctuations in the wage share in agriculture suggested by King's figures and reveal a continuous and substantial secular decline. The revisions for the wage share in private income raise the share by an average of 5 percentage points for 1850 and 1860, and reduce it by 6 percentage points for 1870 and 1880. The net result is relative stability up to 1880, with the increase over the entire period being concentrated between 1880 and 1890.

### INSTITUTIONAL CHANGES

Some of the rise in the wage share in private income indicated for the period as a whole may have been the result of two related developments —the decline in the proportion of self-employed to hired workers and

century by applying estimated depreciation rates to the Towne–Rasmussen estimates of gross investment in constant dollars and converting these estimates to current dollars by means of the implicit price deflators given in their Table 4. While the results achieved by this method were felt to be superior to those obtained by assuming a constant ratio of depreciation to gross product (equal to the 1910 ratio of 7 per cent), they are not materially different. All estimates for 1910 were taken from *The Farm Income Situation*.

[22] Strauss and Bean, p. 23, Table 8, "gross income, including estimates for 'omitted products,' calendar years."

[23] *Historical Statistics of the United States*, Dept. of Commerce, 1949, Series E 69, p. 97.

[24] The wage rate series was computed from George K. Holmes, *Wages of Farm Labor*, Dept. of Agriculture, Bureau of Statistics, Bull. 99, 1912. For 1850 and 1860, Lebergott's estimates of wage rates, contained in Table 2 of his paper in this volume, were utilized.

the decreasing importance of agriculture. As Table 3 shows, the weight of agriculture, whether measured by income or employment, was virtually cut in half between 1850 and 1910 while the proportion of hired to total gainfully occupied in the private sector rose substantially.

TABLE 3

Hired Workers as a Percentage of the Gainfully Occupied, by Sector, and Agricultural as a Percentage of Total Private Gainfully Occupied and Income, Census Years, 1849–1850 to 1909–1910

| | HIRED AS PERCENTAGE OF GAINFULLY OCCUPIED[a] | | | AGRICULTURAL AS PERCENTAGE OF TOTAL PRIVATE | |
|---|---|---|---|---|---|
| *Year* | *Agriculture*[b] (1) | *Industry* (2) | *Total Private*[b] (3) | *Gainfully Occupied*[ab] (4) | *Income* (5) |
| 1849–50 | 26.6 | 86.4 | 47.1 | 65.7 | 35.6 |
| 1859–60 | 24.2 | 83.9 | 47.5 | 60.9 | 35.4 |
| 1869–70 | 36.8 | 82.0 | 57.2 | 54.9 | 33.5 |
| 1879–80 | 31.3 | 83.0 | 56.5 | 51.2 | 27.8 |
| 1889–90 | 25.7 | 84.3 | 58.4 | 44.2 | 22.3 |
| 1899–1900 | 25.4 | 85.2 | 61.9 | 39.1 | 19.5 |
| 1909–10 | 24.1 | 87.3 | 66.8 | 32.5 | 19.5 |

[a] All gainfully occupied data refer to census of occupation dates: 1850, 1860, and so forth.

[b] Includes slaves (in 1850 and 1860) and unpaid family workers.

*Hired workers and gainfully occupied:* Calculated from estimates in Appendix A.
*Income:* Calculated from agricultural and total income (Table 1, cols. 4 and 10).

ADJUSTMENTS FOR CHANGES IN THE RATIO OF HIRED TO TOTAL WORKERS. While a more detailed description of the estimates of employees, self-employed, and slaves underlying Table 3 is provided in Appendix A, a few comments should be inserted here. The estimates are based ultimately on census of occupations data and hence reflect the number of gainfully occupied (ten years of age and over), not the number actually employed in the census year. Part-time as well as full-time workers are included, and the data cannot be adjusted to full-time equivalent units of employment. With the exception of farmers (1860–1910), and unpaid family workers on farms (1900 and 1910), census data do not distinguish between hired and unhired status. I accepted others' estimates of nonfarm entrepreneurs (Spurgeon Bell's for 1880–1910, Hourwich's for 1870, and King's for 1850 and 1860), and disregarded unpaid family workers in the nonfarm sector.

For agriculture, I carried back estimates of unpaid family workers in 1870 on the basis of the number of women and children employed in agriculture (since most unpaid family workers are from this group) and to 1850 on the basis of the number of farmers. Neither the 1850 nor the

1860 census of occupations covered slaves. Here I assumed that all slaves were employed in agriculture, and that the proportion of slaves ten years and over who were gainfully occupied was the same as that for the entire population ten years of age and over. It is evident that these estimates must be viewed with some reservations. In particular, the estimates for 1850 and 1860 are probably subject to wider margins of error than those for later years.

In Table 2, the "adjusted" wage shares are the "revised" shares recomputed on the basis of a constant proportion of hired to total workers (equal to the average proportion for the entire period) in each sector along the lines presented in the section on concepts. The adjusted wage share in private income in each year was obtained by multiplying the adjusted share in each sector by the weight of that sector in private income.[25]

For agriculture, the results are interesting indeed. The entire drop in the wage share between 1870 and 1900, and three-quarters of the drop between 1870 and 1910, was due to the relative decline in the proportion of hired to total farm workers, while the constancy in the share between 1860 and 1870 can be attributed almost entirely to the swelling of the ranks of hired labor as a result of the freeing of the slaves. For the period as a whole, however, less than 1 out of the 17 percentage point decline in the agricultural wage share can be accounted for by the fall in proportion of hired to total workers.

Within industry, the adjustment does little to account for the rise over the entire period. It suggests, however, that more than half of the rise occurred between 1860 and 1870.[26] Between 1870 and 1910, 3 out of the 7 percentage point rise in the wage share can be accounted for by the increase in hired employees relative to self-employed proprietors.

It may seem surprising at first that the adjusted share in private income parallels so closely the unadjusted share, since there was a substantial rise in the proportion of hired to total workers in the private economy. This paradox is explained by the fact that the secular rise in the hired worker ratio was the result of a (relative) shift of employment from agriculture to industry. In addition, the decade-to-decade changes in the ratio of hired to total workers within the two sectors largely offset

[25] Letting $y_a$ be the weight of agriculture in private income ($Y_a/Y$) and $y_b$ the weight of industry, and using the symbols previously defined, the adjusted wage share ($w'$) in any year $i$ is given by

$$w_i' = w_{ai}\frac{\bar{t}_a}{t_{ai}}y_{ai} + w_{bi}\frac{\bar{t}_b}{t_{bi}}y_{bi},$$

where

$$\bar{t}_a = \sum_{i=1}^{n}\frac{t_{ai}}{n}, \text{ etc.}$$

[26] I do not wish to stress this conclusion, since the estimates of hired workers relative to the number of gainfully occupied in industry may be overstated.

each other. Had the proportion of agricultural to total employment remained constant, the hired worker ratio for the private economy as a whole would have exhibited only minor decade-to-decade changes.[27]

ADJUSTMENTS FOR CHANGES IN SECTOR WEIGHTS. While changes in the proportion of employees to self-employed appear to be of limited significance in accounting for the rise in the wage share in private income, the same cannot be said for the relative decline of agriculture. Even if the wage share in each sector remained unchanged, the share in private income would rise as the weight of agriculture, which has a low wage share compared to industry's, declined. The extent of the share change in private income due to shifts in the weight of sectors, as distinguished from share changes within sectors, can be measured by methods made familiar by others.[28]

It can be determined how changes in wage shares within sectors between any two years would have affected the wage share in private income had the weight of each sector remained constant (and equal to its average weight in private income for the sixty-year period as a whole). The difference between the change that actually occurred and the one implied by the preceding calculation can then be attributed to changes in sector weights. The results of this calculation for the adjusted wage share for agriculture and industry are shown in Table 4. Average, rather than beginning or end-year, sector shares and income weights have been used, as a compromise to the "index number problem" posed by the significant decline in the weight of the farm sector from the beginning to the end of the period. To simplify the presentation of the results, however, deviations in Table 4 are measured from 1849–50 rather than from the means for the entire period.

It is evident from an examination of Table 4 that, aside from 1890, the decade-to-decade changes in the wage share in private income can be accounted for by the changing importance of agriculture. Nearly all of the 4.6 percentage point rise over the entire period, and more than three-fourths of the 6 percentage point increase between 1870 and 1910, was the result of the declining weight of agriculture, which almost completely offset the wage share rise within industry.

The effect of weight shifts within the nonagricultural sector of the economy can only be computed for the unadjusted wage share in industry income. Sectors for which separate data are given by King include mining, manufacturing, commercial and professional services, railroads, water transportation, street transportation, telephone and telegraph,

[27] If employment weights are kept constant at the average for the period as a whole, *t* for the private sector as a whole would be as follows: 1850, 50.6; 1860, 54.2; 1870, 59.5; 1880, 57.2; 1890, 55.1; 1900, 55.5; and 1910, 55.9.

[28] e.g. Simon Kuznets, *National Income and Its Composition, 1919–1938*, National Bureau of Economic Research, 1941, pp. 241–246; John T. Dunlop, *Wage Determination Under Trade Unions*, Macmillan, 1944, pp. 163–165.

TABLE 4

Changes in the Adjusted Wage Share in Total Private Income, by Source, Census Years, 1859–1860 to 1909–1910, Compared to 1849–1850
(percentage points)

| Year | INTRASECTOR CHANGE | | | INTERSECTOR CHANGE | TOTAL CHANGE |
|---|---|---|---|---|---|
| | *Agriculture* (1) | *Industry* (2) | *Total* (3) | (4) | (5) |
| 1859–60 | −0.8 | −0.5 | −1.3 | −0.2 | −1.5 |
| 1869–70 | −3.7 | +3.0 | −0.7 | −0.7 | −1.4 |
| 1879–80 | −3.8 | +3.4 | −0.4 | −0.5 | +0.1 |
| 1889–90 | −3.2 | +7.7 | +4.5 | +3.0 | +7.5 |
| 1899–1900 | −3.5 | +3.9 | +0.4 | +3.6 | +4.0 |
| 1909–10 | −4.5 | +5.1 | +0.6 | +4.0 | +4.6 |

Calculated from agricultural as a percentage of total income (Table 3, col. 5) and wage shares adjusted for changes in the percentage of hired workers (Table 2, cols. 3, 5, and 8) by a method which can be defined algebraically as follows:

Let $w_{ij}$ be the share of wages in sector $j$ in year 1, and $y_{ij}$ the weight of sector $j$ in private income in year $i$. Then the change in the wage share in private income ($w$) between years 1 and 2 is given by:

$$w_1 - w_2 = \sum_{j=1}^{m} \bar{y}_j(w_{1j} - w_{2j}) + \sum_{j=1}^{m} \bar{w}_j(y_{1j} - y_{2j}) + \sum_{j=1}^{m} (w_{1j} - w_{2j})(y_{1j} - y_{2j})$$

where $\bar{y}_j = \dfrac{\sum_{i=1}^{n} y_{ij}}{n}$ and $\bar{w}_j = \dfrac{\sum_{i=1}^{n} w_{ij}y_{ij}}{\sum_{i=1}^{n} y_{ij}}$

Col. 3 is equivalent to the first term of the above equation, the sum of the separate terms in cols. 1 and 2. I have arbitrarily assigned the third ("interaction") term to the intersector change alone, since the term is small and its separate presentation would serve no useful purpose.

light and power, and fisheries (although the last four account for less than 2 per cent of the total). The results of the calculation of intrasector and intersector shifts, which are summarized in Table 5, make it clear that weight shifts generally were quite unimportant in accounting for the increase in the wage share in this sector.[29]

The conclusions of this section are summarized in Table 6, which attempts to allocate the rise in the wage share in private income to (1) changes in the proportion of employees to total employed, (2) changes in sector weights, and (3) changes in the wage share within sectors.

[29] Approximately half of the 6 percentage point rise in the unadjusted share in industry income between 1870 and 1910 can be attributed to the rise in the proportion of employees to self-employed in that sector.

TABLE 5

Changes in the Unadjusted Wage Share in Industry Income, by Source, Census Years, 1859–1860 to 1909–1910, Compared to 1849–1850

(percentage points)

| *Year* | *Intrasector Change* (1) | *Intersector Change* (2) | *Total Change* (3) |
|---|---|---|---|
| 1859–60 | −1.7 | −0.3 | −2.0 |
| 1869–70 | +0.9 | +0.8 | +1.7 |
| 1879–80 | +2.4 | +0.4 | +2.8 |
| 1889–90 | +8.0 | +1.5 | +9.5 |
| 1899–1900 | +3.6 | +1.2 | +4.8 |
| 1909–10 | +7.7 | +0.1 | +7.8 |

Calculated from King's data (Tables XXX A–D, pp. 260–263) by the method defined in the footnotes to Table 4. "Intersector change" refers to the effect, on the wage share in industry income, of changes in weights among the individual sectors (mining, manufacturing, etc.) of which industry income is composed. "Intrasector change" refers to the effect of changes in the wage share within the individual sectors themselves.

TABLE 6

Changes in the Wage Share in Total Private Income, by Source, Census Year, 1849–1850 to 1869–1870, 1869–1870 to 1909–1910, and 1849–1850 to 1909–1910

(percentage points)

| *Period* | ADJUSTMENT FOR HIRED WORKERS (1) | INTERSECTOR CHANGE | | INTRASECTOR CHANGE | | TOTAL CHANGE (6) |
|---|---|---|---|---|---|---|
| | | *Between Agriculture and Industry* (2) | *Among Sectors of Industry* (3) | *Within Agriculture* (4) | *Within Sectors of Industry* (5) | |
| 1849–50 to 1869–70 | +1.0 | −0.7 | +0.5 | −3.7 | +2.5 | −0.4 |
| 1869–70 to 1909–10 | −0.1 | +4.7 | −0.4 | −0.8 | +2.5 | +5.9 |
| 1949–50 to 1909–10 | +0.9 | +4.0 | +0.1 | −4.5 | +5.0 | +5.5 |

In the following descriptions the differences are those between the appropriate census years.

*Adjustment for hired workers:* Differences in unadjusted wage shares minus differences in the adjusted shares (Table 2, cols. 8 and 7).

*Intersector change:* (A) *Between Agriculture and Industry* (Col. 2)—Differences in the intersectoral change in the wage share between agriculture and industry, adjusted data (Table 4, col. 4). (B) *Among the sectors composing Industry* (Col. 3)—Differences in the intersectoral change in the wage share among the various sectors making up industry income (Table 5, col. 2), multiplied by the weight of industry income in private income (1.00 minus the percentage of agricultural to private income, in Table 3, col. 5).

*Intrasector change:* (A) *Within Agriculture* (Col. 4)—Differences in intrasectoral changes in the agricultural wage share (Table 4, col. 1). (B) *Within the individual sectors of Industry:* Differences in the amount of the wage share attributable to the change in the wage share within industry (Table 4, col. 2), minus that part of the latter change which is attributable to intersectoral changes *within* industry itself (col. 3 above).

*Total change:* Actual differences in revised but unadjusted data (Table 2, col. 7).

## *The Service Share*

ESTIMATES YIELDED BY KING'S ESTIMATES (REVISED) AND IMPUTED VALUES FOR THE SELF-EMPLOYED

For the self-employed it is necessary to determine who the self-employed are. While the position of farmers and nonfarm proprietors is obvious, that of unpaid family labor is arguable. However, I do not subscribe to the patriarchal notion that such labor is part of the proprietor's property income; the family itself, rather than the proprietor alone, is, after all, the economic unit within which decisions concerning the furnishing of human labor are reached. I imputed to this group, as well as other categories of self-employed, the average annual earnings of hired workers.

But the allowance for unpaid family workers is undoubtedly overstated since such workers probably do not work as many hours per year as hired farm labor, nor do they necessarily command the same wage rate. It is impossible, however, to make a quantitative adjustment for these two factors. To permit the reader to exercise his own judgment, I have shown this share separately and calculated service income exclusive of such an allowance. Since my method probably underestimates the labor earnings of proprietors for the same reasons that it tends to overestimate that for unpaid family workers, the share exclusive of unpaid family workers may be understated. The results, together with the share of hired workers (i.e. the wage share as given in Table 2) and the imputed labor income of proprietors, are presented in Table 7.

*Comparison with Movements in the Wage Share*[30]

Table 7 reveals that, for private income, although the direction of change from decade to decade was similar for both the wage and the service shares, the net change over the period as a whole was quite different. While the wage share rose by about 6 percentage points, or 13 per cent, the service share fell by the same number of percentage points, or about 9 per cent. Exclusive of the labor income of unpaid family workers, it fell by 2.6 percentage points, or 4 per cent. From 1850 to 1870, the wage share changed little, whereas the service share (inclusive of unpaid family labor) fell by over 5 percentage points. From 1870 to 1910, the latter was approximately stable, while the former rose by 6 percentage points. The explanation for the diversity in movement lies in the relatively small weight given to agriculture in the wage share in private income because of the large proportion of

[30] The share of service income in agricultural or industry income must, by definition, change in the same proportion as the adjusted wage share. Hence, the discussion in the previous section of the relation between the actual and adjusted wage shares in these two sectors is relevant to the service share as well.

TABLE 7

Service Income as a Percentage of Total Income, by Sector and Component, Census Years, 1849–1850 to 1909–1910

| Year | AGRICULTURE | | | | | INDUSTRY | | | TOTAL PRIVATE | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Hired Workers* (1) | *Farmers* (2) | *Unpaid Family Workers* (3) | *Total: Unpaid Family Workers Excl.* (4) | *Incl.* (5) | *Hired Workers* (6) | *Pro-prietors* (7) | *Total* (8) | *Hired Workers* (9) | *Farmers and Pro-prietors* (10) | *Unpaid Family Workers* (11) | *Total: Unpaid Family Workers Excl.* (12) | *Incl.* (13) |
| 1849–50 | 31.5 | 44.8 | 17.0 | 76.3 | 93.3 | 47.1 | 7.4 | 54.5 | 41.5 | 20.8 | 6.0 | 62.3 | 68.3 |
| 1859–60 | 26.2 | 43.9 | 15.8 | 70.1 | 85.9 | 45.1 | 8.6 | 53.7 | 38.4 | 21.1 | 5.6 | 59.5 | 65.1 |
| 1869–70 | 25.8 | 32.1 | 12.3 | 57.9 | 70.2 | 48.9 | 10.7 | 59.5 | 41.1 | 17.8 | 4.1 | 58.9 | 63.0 |
| 1879–80 | 21.8 | 34.9 | 13.0 | 56.7 | 69.7 | 49.9 | 10.2 | 60.1 | 41.5 | 17.6 | 3.9 | 59.1 | 63.0 |
| 1889–90 | 20.0 | 42.0 | 15.6 | 62.0 | 77.6 | 56.6 | 10.5 | 67.1 | 48.4 | 17.6 | 3.5 | 66.0 | 69.5 |
| 1899–1900 | 18.5 | 38.6 | 15.8 | 57.1 | 72.9 | 51.9 | 9.0 | 60.9 | 45.4 | 14.7 | 3.1 | 60.1 | 63.2 |
| 1909–10 | 14.6 | 32.3 | 13.6 | 46.9 | 60.5 | 54.9 | 7.9 | 62.8 | 47.0 | 12.7 | 2.7 | 59.7 | 62.4 |

*Agriculture: Col. 1*—Wages as a percentage of agricultural income, revised (Table 2, col. 2). *Col. 2*—Col. 4 minus col. 1. *Col. 3*—Col. 5 minus col. 4. *Col. 4*—Col. 1, divided by hired workers as a percentage of gainfully occupied in agriculture exclusive of unpaid family workers and slaves (Appendix Table A–1, line 1 divided by line 3). *Col. 5*—Col. 1, divided by hired workers as a percentage of gainfully occupied in agriculture exclusive of slaves (Appendix Table A–1, line 1 divided by the sum of lines 3 and 4).

*Industry: Col. 6*—Wages as a percentage of industry income, King (Table 2, col. 4). *Col. 7*—Col. 8 minus col. 6. *Col. 8*—Col. 6 divided by hired workers as a percentage of all industry workers (Table 3, col. 2).

*Total private: Col. 9*—Wages as a percentage of total income, revised (Table 2, col. 7). *Col. 10*—Col. 12 minus col. 9. *Col. 11*—Col. 13 minus col. 12. *Col. 12*—The product of col. 4 and of agricultural income as a percentage of total private income (Table 3, col. 5) plus the product of col. 8 and 1.00 minus agricultural income as a percentage of total private income (Table 3, col. 5). *Col. 13*—The product of col. 5 and of agricultural income as a percentage of total private income (Table 3, col. 5) plus the product of col. 8 and 1.00 minus agricultural income as a percentage of total private income.

agricultural self-employed. When an allowance is made for the latter's labor income, the fall in the service share in agriculture was more than enough to offset the moderate rise that occurred in industry.

The effect on the two shares of weight shifts between sectors is shown in Table 8. In an earlier section I pointed out that nearly all of the close

TABLE 8

Changes in the Service Share, Including Unpaid Family Workers, in Total Private Income, by Source, Census Years, 1859–1860 to 1909–1910, Compared to 1849–1850

(percentage points)

| *Year* | *Intrasector Change* | *Intersector Change* | *Total Change* |
|---|---|---|---|
| 1859–60 | −2.6 | −0.6 | −3.2 |
| 1869–70 | −2.9 | −2.4 | −5.3 |
| 1879–80 | −2.5 | −2.6 | −5.1 |
| 1889–90 | +4.7 | −3.5 | +1.2 |
| 1899–1900 | −1.1 | −4.0 | −5.1 |
| 1909–10 | −3.1 | −2.8 | −5.9 |

Calculated from agricultural income as a percentage of total income (Table 3, col. 5) and from the service income shares in total income (Table 7, cols. 5, 8, and 13) by the method defined in the footnotes to Table 4.

to 5 percentage point *rise* in the private wage share resulted from the declining weight of agriculture in private income. Close to a half of the 6 percentage point *fall* in the service share (inclusive of unpaid family workers) can be attributed to the same factor. The paradox arises from the fact that, in contrast to the wage shares, the average share of service income in agriculture for the period as a whole (70 per cent) exceeded that for industry (60 per cent). For the last forty years, the average difference between the two shares was much less, and the importance of weight shifts between, say, 1870 and 1910 was correspondingly reduced. In effect, the amount the service share gained by the increasing importance of industry was more than offset by its loss from agriculture.

*Adjustments for Slaves*

The change in the service share in private income between 1850 and 1870 is difficult to interpret, not only because of the uncertain quality of the data but because of fundamental institutional changes associated with the abolition of slavery. The estimates for the service share for 1850 and 1860 given in Table 7 make no allowance in the numerator for labor income which might be imputed to slaves, although the entire value added by slaves to production is included in the denominator (income). The elimination of slavery would increase the numerator without necessarily altering the denominator. This

suggests that the best way of securing estimates of the service share comparable with those of a non-slave economy would be to impute the labor income of slaves in the same manner as that of self-employed labor. If the purpose is to determine the share of property income in the slave economy itself, a different procedure would be called for, since the income imputed to slaves accrues in fact to the slave owner. If slaves are to be treated in the same way as other types of assets owned by slaveholders (e.g. farm animals), the correct method would be to deduct their cost of maintenance from income produced by slaves. The usual basis for computing incomes in a capitalist economy with a "free" labor force is, of course quite different: labor incomes are measured gross of any maintenance or necessary consumption of workers, whereas property incomes are taken as a pure surplus, net of repair, maintenance, and depreciation of the underlying physical assets—a difference which constitutes one of the most important justifications for the twofold classification between labor and property income in such a society.

There is, however, the practical difficulty of not knowing how much to allow for such maintenance. One method would be to deduct the imputed labor income of slaves as maintenance. While undoubtedly expressing the upper limit for the service share in a society with slaves, it has the uncomfortable implication that slave ownership yields no profit at all, if the slave holder has the option of hiring free labor instead. While some writers have argued that slave ownership was not proving profitable just prior to the Civil War,[31] this position is hard to reconcile with the market values being placed on slaves at that time, unless slaves were looked upon as items of (business) conspicuous consumption or waste, analogous to company-owned golf courses and plush office buildings today.

Merely to give some idea of the magnitudes involved, I assumed in computing Table 9 that the cost of maintaining slaves was one-third of the average earnings of hired farm workers (method 1).[32] The table also shows the service share if the average annual earnings of farm labor are imputed to slaves (method 2).

[31] e.g. Louis M. Hacker, *The Triumph of American Capitalism*, Columbia University Press, 1940, pp. 301–306, 317–321. Hacker argues that the rate of return earned on slaves, in view of their market prices, was quite low. The calculations of Alfred Conrad and John Meyer ("The Economics of Slavery in the Ante-bellum South," *Journal of Political Economy*, April 1958) indicate, on the other hand, that about the same return (5 to 7 per cent) was being realized on slave ownership as on alternative forms of investment.

[32] Average annual earnings (without board) of farm workers were in the neighborhood of $200 in 1850 and 1860. According to Conrad and Meyer, Table 4, the "cash costs" of food, clothing and medical care for slaves in the period preceding the Civil War were from $26.50 to $42.00. Taking the mean value of about $34 and doubling it (to make a rough allowance for maintenance of slaves not so gainfully occupied) gives $68. It is necessary to take "cash costs" since the imputed value of products produced and consumed on farms is included in agricultural output.

TABLE 9

The Service Share, Including Unpaid Family Workers, as a Percentage of Agricultural and Total Private Income with Alternative Adjustments for Slaves, 1849–1850 and 1859–1860

| | AGRICULTURE | | TOTAL PRIVATE | |
|---|---|---|---|---|
| | *1849–50* | *1859–60* | *1849–50* | *1859–60* |
| Method 1: Slave maintenance equal to one-third of average earnings of farm workers | 101.9 | 92.4 | 70.4 | 66.9 |
| Method 2: Average earnings of hired workers imputed to slaves | 118.6 | 108.7 | 77.3 | 73.2 |
| No allowance for earnings or maintenance of slaves | 93.3 | 85.9 | 68.3 | 65.1 |

The figures that include allowance for earnings or maintenance were calculated from data in Table 1 and Appendix A by methods given in the text. The figures that make no allowance are from Table 7, cols. 5 and 13.

If method 1 is accepted as preferable, the fall in the service share produced by factors other than the abolition of slavery exceeded that revealed by 8 and 9 percentage points. If we accept the second method, the elimination of slavery raised labor's share in private income by about 2 percentage points.

ESTIMATES YIELDED BY INDEPENDENT DATA

Since the preceding estimates are based in large part on King's data, it would be desirable to check the results by the use of alternative sources of data. We have Kuznets's decade estimates of net national product back to 1869. As his estimates were derived mainly by a product approach, there are no accompanying estimates of income by industrial origin or distributive shares. It was necessary, therefore, to compare output per worker with independently derived estimates of average annual earnings (a procedure discussed in the section on concepts). As noted, this method contains an implicit adjustment for the labor income of the self-employed. The estimates presented are thus relevant to the service share (including unpaid family workers), rather than to the wage share.[33]

Kuznets's figures for net national product in current prices were adjusted, by the use of estimates made by John Kendrick, to make them comparable conceptually with the present Department of Commerce definition of net national product.[34] They were then reduced to net

[33] It would, of course, be possible to obtain estimates of the wage share by comparing net output per employee with average annual earnings. Kuznets, however, does not provide estimates of employees with his product figures.

[34] See Appendix C for details on the sources and methods, as well as for the estimates themselves. Government purchases of goods and services and unpaid services of financial

private product by deducting Kendrick's estimates for the compensation of government employees. Private product per worker was obtained by dividing the figures for private product by estimates of the labor force prepared by Kuznets in conjunction with his product series, less Kendrick's estimates of government employment. Average annual earnings were built up by constructing separate series on earnings in agriculture and industry and combining the two series on the basis of given year employment weights.[35]

The series for average annual earnings in agriculture is the same as that used for the revision of King's estimates of wages (described fully in Appendix B). For earnings in the nonagricultural sector, I used Paul Douglas's series on nonfarm average annual earnings, from which I excluded the earnings of government employees. Douglas's series was extended back to 1870 and 1880 by the use of Lebergott's estimates of the daily wages of nonfarm laborers, and I interpolated between those years on the basis of the movement of the wage index prepared by Phelps-Brown and Hopkins from the estimates of Mitchell and Falkner.[36]

Since it was necessary to prepare separate estimates of earnings in the farm and nonfarm sectors, the service share in the two sectors could be shown if Kuznets's product per worker estimates could be so segregated. I attempted such a division by subtracting from Kuznets's figures decade average estimates of agricultural income, using the sources and methods employed in connection with King's series, the residual being treated as income originating in the nonagricultural or industry sector. Employment in each sector was obtained by subtracting from Kuznets's estimates of the labor force (net of government employment) estimates of those gainfully occupied in agriculture given in Appendix A and converted to decade averages by straight-line interpolation between census years. The foregoing outline of method

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intermediaries were added, and public investment and personal tax and nontax payments were deducted. I am indebted to Kuznets and Kendrick for making their estimates available to me in advance of publication.

[35] Use of fixed employment weights, or combining the two series without regard to differences in the level of earnings between the two sectors, would understate significantly the average rise in earnings for the private sector. Between 1869–78 and 1904–13, for example, average earnings for the private sector rose from $351 to $493, or by 40 per cent. Use of fixed employment weights would reduce the increase to 20 per cent, since earnings in industry rose by only 19 per cent, and in agriculture, by 25 per cent. Series for average annual earnings, calculated for both variable and fixed employment weights, can be found in Appendix C, Table C–5. If the proportion of hired workers rather than of all gainfully occupied had been used as weights, the *level* of earnings would have been raised to $412 and $603 respectively, and the percentage increase would have been raised from 40 per cent to 46 per cent.

[36] Paul H. Douglas, *Real Wages in the United States, 1890–1926*, Houghton-Mifflin, 1930, pp. 392–393; Lebergott's Table 2; E. H. Phelps-Brown and Sheila V. Hopkins, "The Course of Wage Rates in Five Countries," *Oxford Economic Papers*, June 1950, pp. 49–50.

suggests that less reliance should be based on the sector product per worker figures than on those for the private economy as a whole.

The resulting estimates for the share of service income are presented in Table 10. By and large, the results are in agreement with those for

TABLE 10

The Service Share, Including Unpaid Family Workers, as a Percentage of Income Originating in Agriculture, Industry, and Net Private Product, Decade Averages, 1869–1878 to 1904–1913

| *Decade* | *Agriculture* | *Industry* | *Net Private Product* |
|---|---|---|---|
| 1869–78 | 75.0 | 72.6 | 73.4 |
| 1874–83 | 67.8 | 60.8 | 62.8 |
| 1879–88 | 68.9 | 60.8 | 62.9 |
| 1884–93 | 75.1 | 66.4 | 68.4 |
| 1889–98 | 78.6 | 69.4 | 71.4 |
| 1894–1903 | 74.4 | 66.4 | 68.0 |
| 1899–1908 | 70.1 | 62.6 | 64.0 |
| 1904–13 | 64.6 | 62.6 | 62.9 |

Calculated from data in Appendix Tables C–4 and C–5.

census years presented in Table 7, which is not surprising for the agricultural share since the two series are from the same source. The comparison merely shows the effect of taking decade averages rather than census year figures. For 1869–98, the use of decade averages increases the degree of fluctuation in the service share.

Apart from the first decade (1869–78), the correspondence between the level and movement of the service shares for private and industry income is reasonably close. The direction of change from period to period is similar and comparable to the pattern displayed by the two agricultural series. The estimates based on decade averages show about the same net movement over the period as a whole: a modest 2 percentage point rise in industry income and virtually no change in private income.

On the other hand, the series based on decade averages shows more than a 10 percentage point drop in the service share in private income between 1869–78 and 1874–83, whereas the series for census years exhibits no change between 1870 and 1880. As suggested by the results for agriculture, part of this divergent movement may be a consequence of averaging in years with significantly different service shares than those prevailing in 1870 and 1880. Deficiencies in the underlying data are probably a more important source of the difference. In view of King's failure to specify adequately the sources and methods employed, it is impossible to assess the reliability of the census year estimates. With

respect to the decade averages Kuznets himself suggests that, because of possible understatement in the 1870 census, his estimate for gross national product for that year may be understated by as much as 10 per cent. This would produce an understatement of about 5 per cent for the decade average 1869–78, and 2½ per cent for 1874–83. King's and Martin's figures for the same year exceed Kuznets's by 29 and 31 per cent, respectively. In addition, the percentage increase in real output from 1869–78 to 1879–88 is quite large, larger than that for any other decade.[37] There may be errors associated with the omission in earlier years of certain products which have declined greatly in importance. Allowance for this would probably serve to raise the product estimates for the first decade (and possibly the one or two following), but not by enough to eliminate entirely the 14 per cent fall in the service share for both industry and the private economy between the beginning and the end of the period indicated by Kuznets's data. We are at least safe in concluding that there is no evidence of any increase in labor's share in private income between 1870 and 1910, and that any increase in the share in industry income must have been modest or nonexistent.

## *Summary*

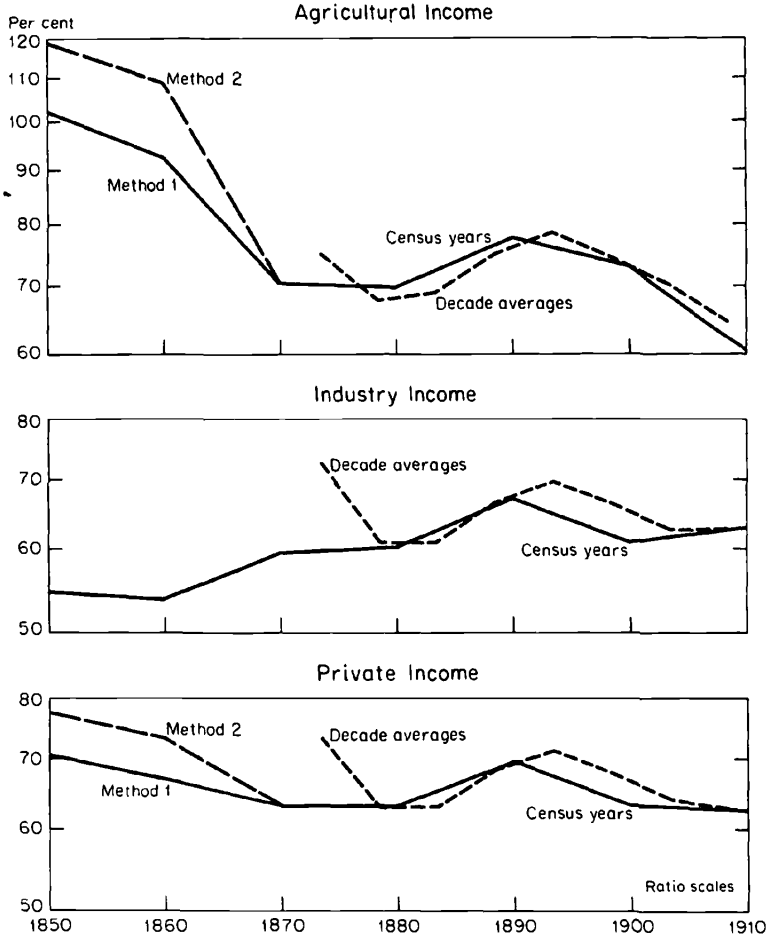
My findings can be conveniently summarized in the form of a series of graphs. Chart 2 portrays movements in the service shares (including the imputed labor earnings of unpaid family workers), by sector, the figures for decade averages being assumed to apply to the midpoint of the decade. The two estimates for 1850 and 1860, for agriculture and private income, embody the alternative methods of dealing with slavery developed in Table 9. The series indicate, for the period as a whole, a significant fall in the service share in agriculture, a modest rise in the nonagricultural sector, and a moderate decline for the private sector as a whole. They exhibit rather similar fluctuations: each series remained unchanged or even declined from the early 1870's to the early 1880's; rose to a peak in the early or mid-1890's, and (with one exception) declined steadily thereafter. "Stability" of labor's share in this period would hardly appear to be a warranted conclusion.

The next two charts summarize the results for the wage (and salary) share. As has been pointed out, the wage share can be expected to rise secularly as the proportion of self-employed to hired workers declines, and as agriculture declines relative to industry, in terms of employment and income (since the wage share in agriculture is relatively low). The magnitude of these institutional changes is charted in Chart 3. Chart 4 shows the actual (unadjusted) wage shares in agriculture and industry,

[37] Cf. Kuznets, "Long-Term Changes," pp. 37–38 and 239–240; also, his *National Product since 1869*, National Bureau of Economic Research, 1946, pp. 59–62 and 85–89.

## CHART 2

Share of Service Income, Including Unpaid Family Workers, in Agriculture, Industry, and Total Private Income, 1850–1910

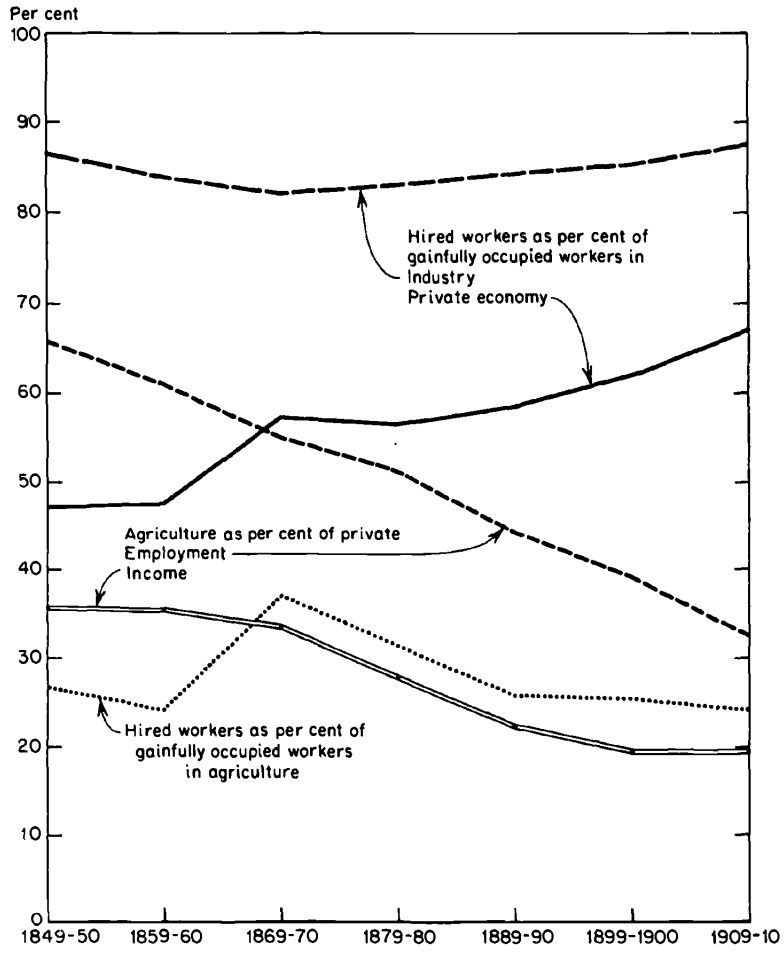



Source: Census years, Tables 7 and 9; decade averages, Table 10.

and the shares adjusted so as to eliminate the effect of changes in the ratio of self-employed to hired workers. Only the adjusted share in private income is plotted. It differs only slightly from the unadjusted share, despite the sharp upward trend in the proportion of hired to total workers for the private sector as a whole. The latter development reflects the shift in employment from agriculture to industry; when the

CHART 3

Institutional Changes, 1845–1850 to 1909–1910



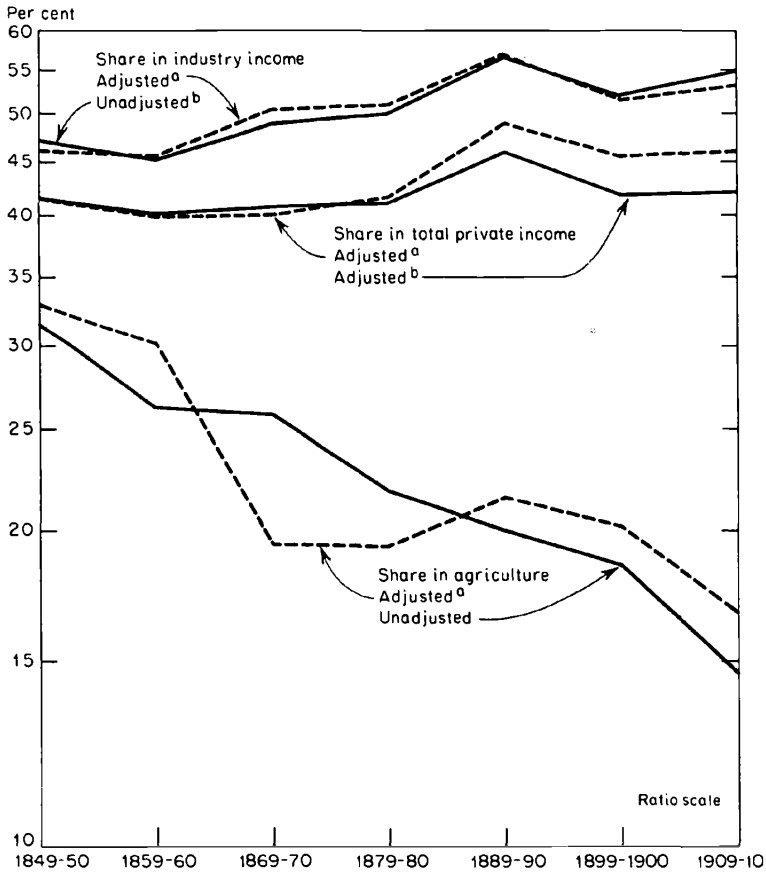

Source: Table 3.

effects on the private wage share of this weight shift are eliminated (by using constant income weights in combining the agricultural and industry wage shares), the rise in the wage share over the period as a whole is virtually eliminated.

A word of caution should, perhaps, be repeated. The estimates of income, of wages, and of gainfully occupied persons on which the preceding conclusions are based are rough and subject to error. While this is especially true of the estimates for 1850 and 1860, even those for

## CHART 4

**Share of Wages in Agriculture, Industry, and Total Private Income, Adjusted and Unadjusted for Certain Institutional Changes, 1849–1850 to 1909–1910**




Source: Tables 2 and 4.

[a] Adjusted to reflect a constant percentage of hired workers to gainfully occupied, equal to average for 1849–50 to 1909–10.

[b] Weights of Agriculture and Industry equal to average, 1849–1850 to 1909–1910.

the 1870's may not be above reproach. Thus the more cautious may want to restrict their attention to the last half of the sixty-year period covered by this paper. The data for 1880 to 1910 support the conclusion that labor's share showed little net change over the entire period, although it rose sharply in the 1890's and declined thereafter.

I have been almost entirely concerned with concepts of distributive shares, and their measurement, during the last half of the nineteenth

century and the first decade of the twentieth. Particular attention has been paid to labor's share (and by implication, the property share). The only explanations that have been provided for the changes observed have been institutional ones: changes in the proportion of self-employed workers (proprietors and unpaid family workers) to employees, the declining importance of agriculture relative to industry, and the abolition of slavery. The effect of such factors as cyclical fluctuations, movements in money wages and prices, secular changes in the ratio of capital to labor, innovations, and possible changes in the degree of monopoly, on the movement of distributive shares in this period warrants further attention.

## *APPENDIX A*

## *Estimates of Hired Workers, Self-employed, and Slaves in Agriculture, Industry, and the Total Private Sector Census Years, 1850–1910*

TABLE A-1

Composition of the Labor Force, by Sector, Census Years, 1850–1910 (millions)

| *Sector* | *1850* | *1860* | *1870* | *1880* | *1890* | *1900* | *1910* |
|---|---|---|---|---|---|---|---|
| Agriculture | | | | | | | |
| 1. Hired workers | 1.30 | 1.50 | 2.52 | 2.69 | 2.54 | 2.78 | 2.80 |
| 2. Farmers | 1.85 | 2.51 | 3.13 | 4.30 | 5.38 | 5.77 | 6.18 |
| 3. Total, excluding unpaid labor | 3.15 | 4.01 | 5.65 | 6.98 | 7.94 | 8.55 | 8.98 |
| 4. Unpaid family workers | 0.70 | 0.90 | 1.20 | 1.60 | 2.00 | 2.36 | 2.61 |
| 5. Slaves | 1.05 | 1.30 | | | | | |
| 6. Total gainfully occupied | 4.90 | 6.21 | 6.85 | 8.59 | 9.94 | 10.91 | 11.59 |
| Industry | | | | | | | |
| 7. Hired workers | 2.22 | 3.35 | 4.62 | 6.80 | 10.57 | 14.50 | 21.00 |
| 8. Proprietors | 0.35 | 0.64 | 1.01 | 1.39 | 1.97 | 2.51 | 3.05 |
| 9. Total gainfully occupied | 2.57 | 3.99 | 5.63 | 8.18 | 12.54 | 17.01 | 24.05 |
| Total Private | | | | | | | |
| 10. Hired workers | 3.52 | 4.85 | 7.14 | 9.48 | 13.13 | 17.27 | 23.81 |
| 11. Farmers and proprietors | 2.20 | 3.15 | 4.14 | 5.69 | 7.35 | 8.29 | 9.23 |
| 12. Total, excluding unpaid labor | 5.72 | 7.99 | 11.28 | 15.17 | 20.48 | 25.56 | 33.04 |
| 13. Unpaid family workers | 0.70 | 0.90 | 1.20 | 1.60 | 2.00 | 2.36 | 2.61 |
| 14. Slaves | 1.05 | 1.30 | | | | | |
| 15. Total gainfully occupied | 7.47 | 10.20 | 12.48 | 16.77 | 22.48 | 27.92 | 35.65 |
| 16. Government employees | 0.23 | 0.33 | 0.44 | 0.62 | 0.84 | 1.15 | 1.72 |
| 17. Total gainfully occupied | 7.70 | 10.53 | 12.92 | 17.39 | 23.32 | 29.07 | 37.37 |

*Agriculture*

*Line 1:* Line 6 minus the sum of lines 2, 4, and 5.

*Line 2:* For 1870–1910, *1940 Census of Population*, Alba M. Edwards, *Comparative Occupational Statistics for the United States, 1870–1910*, p. 104 (includes a very small number of managers and foremen); for 1860, *1900 Census of the United States, Occupations at the Twelfth Census*, p. liii ("farmers, planters, and overseers"). Since the census figure of 2,391,000 farmers for 1850 includes an undetermined number of farm laborers, I have assumed that farmers in 1850 were a somewhat smaller proportion (38 per cent) of those engaged in agricultural pursuits than they were in 1860 (40 per cent). The ratio of farmers to all agricultural laborers rose steadily from 1860 to 1890. Of the 3,307,000 reported by the 1860 census to be gainfully occupied in agriculture in 1860, 76 per cent were farmers. My estimate for 1850 implies that 77 per cent of those reported by the 1850 census to be engaged in agriculture were farmers.

*Line 3:* Line 6 minus the sum of lines 4 and 5.

*Line 4:* All unpaid family workers were assumed to be gainfully occupied in agricultural pursuits. *1910*—Edwards (pp. 62 and 73) gives an unadjusted figure of 3,311,000, from which I deducted nine-tenths of the 1910 overcount of farm workers, most of whom were presumably unpaid family workers (see Edwards, pp. 137–138). *1900—Occupations at the Twelfth Census*, p. xxxii. *1870–90*—All children ten to fifteen years and all females gainfully occupied in agriculture (Edwards, pp. 97–98), in millions, 1870 (0.91), 1880 (1.26), and 1890 (1.57), multiplied by 1.3, the ratio of unpaid family workers to children and females in agriculture in 1900 (1.25) and 1910 (1.29), when the children and females were 1.89 million and 2.03 million, respectively, and rounded to the nearest 100,000. For 1920, the ratio was 1.21; for 1930, 1.32 (calculated from Edwards, pp. 62, 73, 97, 98, and 104, two-thirds of the 1920 undercount being assumed to apply to unpaid family workers). *1850 and 1860*—Line 2 multiplied by 0.38, the ratio of unpaid family workers to farmers, 1870 (0.38), 1880 (0.38), 1890 (0.38), rounded to the nearest 100,000. This ratio was 0.41 and 0.43 in 1900 and 1910, respectively.

*Line 5:* All slaves were assumed to be gainfully occupied in agricultural pursuits. Slave population ten years and over (*1850 Census of the United States*, J. D. B. DeBow, *Compendium*, p. 91, and *1860 Census of the United States, Population of the United States in 1860*, pp. 596–597) multiplied by 0.48 (the proportion assumed to be gainfully occupied).

*Line 6:* Edwards, p. 142. Includes slaves in 1850 and 1860, and unpaid family workers.

*Industry*

*Line 7:* Line 9 minus line 8.

*Line 8: 1880–1910*—Spurgeon Bell, *Productivity, Wages, and National Income*, The Brookings Institution, 1940, p. 10. *1870*—Isaac A. Hourwich, "The Social-Economic Classes of the Population of the United States," *Journal of Political Economy*, March 1911, p. 214, "entrepreneurs," plus one-fourth of "professional" (Bell's "professional enterprisers" were 25 per cent of Hourwich's "professional" group in 1880, and 24 per cent in 1890). *1850 and 1860*—Line 11 minus line 2.

*Line 9:* Line 15 minus line 6.

*Total Private*

*Line 10:* Line 15 minus the sum of lines 11, 13, and 14.

*Line 11: 1870–1910*—The sum of lines 2 and 8. *1850 and 1860*—Willford I. King, *Wealth and Income of the People of the United States*, Macmillan, 1915, p. 264.

*Line 12:* Line 15 minus the sum of lines 13 and 14.

*Line 13:* Same as line 4.

*Line 14:* Same as line 5.

*Line 15:* Line 17 minus line 16.

*Line 16: 1870–1910*—Unpublished estimates of government employment by John Kendrick, to be published in his forthcoming study of productivity. *1850 and 1860*—Estimated as 3 per cent of the gainfully occupied in 1850 and 3.2 per cent in 1860. Government workers as a percentage of the total gainfully occupied were 3.4 per cent in 1870 and 3.6 per cent in 1880.

*Line 17:* Edwards, p. 142. Includes slaves in 1850 and 1860, and unpaid family workers.

# *APPENDIX B*

## *Sources and Methods for Deriving Average Annual Earnings and the Wage Bill in Agriculture*

The deficiencies of King's estimates of the agricultural wage bill, 1850–1910, have made it necessary to turn to other sources in order to construct a series that will more adequately reflect movements of agricultural wages. The series is a weighted average of the wage rate estimates for the various categories of employment in given years that are presented in George K. Holmes's *Wages of Farm Labor* (Dept. of Agriculture, Bureau of Statistics, Bull. 99, 1912), combined into a series of monthly wages through a method similar to that used by Paul Douglas in *Real Wages in the United States, 1890–1926* (Houghton-Mifflin, 1930, p. 187).

The wage rates from Holmes are for hired male labor "without board" for the United States as a whole, the differential between the "with board" and "without board" rates being presumed to measure the value of perquisites furnished by the employer. The three separate wages series presented by Holmes—per month in hiring by the year (Table 11, p. 29); day labor in harvest work (Table 17, pp. 36–37); other day labor (Table 19, pp. 40–41)—were combined on the basis of a weight of 60 per cent for monthly labor, 15 per cent for harvest labor, and 25 per cent for other daily labor, after the latter two had been converted to a monthly basis by multiplying the relevant day rate by fifteen days and twenty days respectively. (Douglas used a 60 per cent weight for monthly labor and a 40 per cent weight for daily labor, after having converted day rates to an equivalent monthly rate by using a factor of 20.) Since no data on monthly rates for hiring by the year were given for the years between 1890 and 1909, it was necessary to interpolate these figures on the basis of the movement of monthly rates for "hiring by the year and season," 1891–1909, and of the movement of day rates, 1890–91. All 1866–78 wage estimates, which were given in terms of gold prices, were converted to current dollars by dividing by the "value in gold of one currency dollar in the New York Market" (Holmes, Table 9, p. 25).

The wage bill for hired workers for 1909–10 is the Department of Agriculture's estimate, as given in *Historical Statistics of the United States* (Dept. of Commerce, 1949, Table E–69), "farmers' expenditures for hired labor, including value of perquisites." Before 1909, this series was carried back on the basis of the above series for average monthly wages and the number of hired workers given in Appendix A, by raising the product of the two series (the "monthly wage bill") by 10.3, the latter being the ratio of the 1909–10 monthly wage bill to "farmers' (annual) expenditure for hired labor."

To obtain the decade averages of annual earnings in agriculture used in Appendix C, estimates of 1869–1909 monthly wages not reported by Holmes were obtained by straight-line interpolation between the dates for which estimates were available. Average annual earnings were obtained by multiplying average monthly wages by 10.3, which can be interpreted as the average number of months worked per year. The series was extended to cover 1910–13 on the basis of Douglas's series on "average monthly rate of wages" (Table 62, p. 186).

The monthly wage series derived from Holmes was carried back to 1850 and 1860 on the basis of Lebergott's estimates of monthly wage rates for farm laborers with board (Table 2 of his paper in this volume). This procedure assumes that with-board and without-board rates changed in the same proportion during this period. Secularly, where living standards are rising, one would expect the with-board rate to rise by a greater proportion than the without-board rate. From 1869 to 1909, according to the Holmes data, the former rose by 34 per cent and the latter by 20 per cent.

Lebergott's 1870–1900 estimates were not utilized, since they are based on with-board rates throughout. His series, however, moves almost identically with Holmes's series as originally published for monthly wages with board, hiring by the year. The difference for 1899 arises from a difference in the method of interpolation between 1889 and 1909.

| | *1870* | *1880* | *1889* | *1899* |
|---|---|---|---|---|
| Lebergott, with board | 100 | 84 | 100 | 94 |
| Holmes, with board | 100 | 86 | 98 | 101 |
| Present, without board | 100 | 81 | 86 | 87 |

# *APPENDIX C*
## *Estimates of Output per Worker and Average Annual Earnings, Decade Averages*

TABLE C-1
Net Private Product, by Sector, 1869–1878 to 1904–1913
(billions of current dollars)

| *Decade* | *Agriculture* (1) | *Industry* (2) | *Total Private* (3) |
|---|---|---|---|
| 1869–78 | 2.12 | 4.61 | 6.73 |
| 1874–83 | 2.41 | 6.12 | 8.53 |
| 1879–88 | 2.62 | 7.51 | 10.13 |
| 1884–93 | 2.63 | 8.54 | 11.17 |
| 1889–98 | 2.56 | 9.57 | 12.13 |
| 1894–1903 | 2.94 | 12.17 | 15.11 |
| 1899–1908 | 3.76 | 17.13 | 20.89 |
| 1904–13 | 4.70 | 22.78 | 27.48 |

*Col. 1: 1910–13*—Dept. of Agriculture estimates of farm net product (inclusive of mortgage interest and property taxes), *Farm Income Situation*, July 1956. *Decade years, 1870–1910*—Estimates of farm gross product prepared by Towne and Rasmussen in this volume, Table 1, adjusted to the same net basis by deducting estimates for certain omitted expenses and depreciation (see footnote 21 for details). *Non-decade years, 1869–1909*—Towne and Rasmussen's total gross output, exclusive of rental value of farm dwellings, was interpolated on the basis of the Strauss and Bean series for "gross income, including estimates for 'omitted products' " (Frederick Strauss and Louis H. Bean, *Gross Farm Income and Indices of Farm Production and Prices in the United States, 1869–1937*, Dept. of Agriculture, Tech. Bull. 703, December 1940, p. 23, Table 8). The allowance for intermediate products consumed (as a percentage to be applied against total gross output), the rental value of farm dwellings, and farm depreciation were interpolated between decade years on a straight-line basis.

*Col. 2:* Col. 3 minus col. 1.

*Col. 3:* Kuznets' revised estimates of net national product (Variant III), to be published as a supplement to the National Bureau's summary volume on capital formation and financing, adjusted to the Dept. of Commerce concept on the basis of estimates to be published in a forthcoming study of productivity by John Kendrick, who has kindly made his estimates available to me. To convert to net private product, I deducted Kendrick's estimates of compensation of government employees and excluded from Kuznets' estimates of capital consumption, depreciation on government construction. While the resulting figures represent the preferable concept for my purposes, they differ little from data for NNP by Kuznets in "Long-Term Changes in the National Income of the U.S.A. since 1870," *Income and Wealth, Series* II, Johns Hopkins Press, 1952, p. 30, col. 4 of Table 1.

TABLE C-2

Private Gainfully Occupied, by Sector, 1869–1878 to 1904–1913
(millions)

| Decade | *Agriculture* (1) | *Industry* (2) | *Total Private* (3) |
|---|---|---|---|
| 1869–78 | 7.47 | 6.60 | 14.07 |
| 1874–83 | 8.31 | 7.94 | 16.25 |
| 1879–88 | 9.05 | 9.68 | 18.73 |
| 1884–93 | 9.71 | 11.61 | 21.32 |
| 1889–98 | 10.28 | 13.81 | 24.09 |
| 1894–1903 | 10.76 | 16.46 | 27.22 |
| 1899–1908 | 11.15 | 19.81 | 30.96 |
| 1904–13 | 11.45 | 23.60 | 35.05 |

*Col. 1: Census years, 1870–1910*—Line 6 of Table A-1. *Noncensus years*—Interpolated on a straight-line basis between census years.
*Col. 2:* Col. 3 minus col. 1.
*Col. 3:* Kuznets' revised estimates of the labor force, from which I have deducted estimates of government employment by John Kendrick. Source same as col. 3, Table C-1.

TABLE C-3

Income and Employment, by Sector, 1869–1878 to 1904–1913
(per cent)

| | INCOME | | EMPLOYMENT | |
|---|---|---|---|---|
| Decade | *Agriculture* (1) | *Industry* (2) | *Agriculture* (3) | *Industry* (4) |
| 1869–78 | 31.5 | 68.5 | 53.1 | 46.9 |
| 1874–83 | 28.2 | 71.8 | 51.1 | 48.9 |
| 1879–88 | 25.9 | 74.1 | 48.3 | 51.7 |
| 1884–93 | 23.5 | 76.5 | 45.6 | 54.4 |
| 1889–98 | 21.1 | 78.9 | 42.7 | 57.3 |
| 1894–1903? | 19.5 | 80.5 | 39.5 | 60.5 |
| 1899–1908 | 18.0 | 82.0 | 36.0 | 64.0 |
| 1904–13 | 17.1 | 82.9 | 32.6 | 67.4 |

Derived from data in Tables C-1 and C-2.

TABLE C-4

Output per Worker, by Sector, 1869–1878 to 1904–1913
(dollars)

| Decade | *Agriculture* (1) | *Industry* (2) | *Total Private* (3) |
|---|---|---|---|
| 1869–78 | 283 | 698 | 478 |
| 1874–83 | 290 | 770 | 525 |
| 1879–88 | 289 | 776 | 541 |
| 1884–93 | 270 | 736 | 524 |
| 1889–98 | 248 | 694 | 504 |
| 1894–1903 | 273 | 739 | 555 |
| 1899–1908 | 338 | 864 | 675 |
| 1904–13 | 411 | 965 | 784 |

Derived from data in Tables C-1 and C-2.

TABLE C-5

Earnings per Worker, by Sector, 1869–1878 to 1904–1913
(dollars)

| | | | *Total Private* | |
|---|---|---|---|---|
| | | | Employment Weights: | |
| Decade | *Agriculture* (1) | *Industry* (2) | *Current Year* (3) | *Constant* (4) |
| 1869–78 | 213 | 507 | 351 | 379 |
| 1874–83 | 197 | 468 | 329 | 349 |
| 1879–88 | 199 | 472 | 340 | 353 |
| 1884–94 | 203 | 488 | 358 | 364 |
| 1889–98 | 195 | 482 | 359 | 357 |
| 1894–1903 | 203 | 491 | 377 | 366 |
| 1899–1908 | 237 | 541 | 432 | 408 |
| 1904–13 | 265 | 604 | 493 | 456 |

*Col. 1:* Decade averages of the average annual earnings series for agriculture, sources and methods for which are given in Appendix B.

*Col. 2: 1890–1913*—Based on Paul Douglas's estimates of average annual earnings in all industries (excluding farm labor), weighted by the relative number employed in each year (*Real Wages in the United States, 1890–1926*, Houghton-Mifflin, 1930, pp. 392–3). I recomputed Douglas's series so as to exclude the earnings of government employees, by using his employment weights (p. 390). I extrapolated Douglas's series back to census years (1880 and 1870) on the basis of Lebergott's estimates of average daily earnings of nonfarm laborers given in his paper in this volume, Table 2. For intracensus years, Lebergott's figures were interpolated on the basis of the wage index prepared by E. H. Phelps-Brown and Sheila V. Hopkins, "The Course of Wage Rates in Five Countries," *Oxford Economic Papers*, June, 1950, pp. 49–50. Their series is based on the Mitchell series (for 1870–80) and on the Falkner series.

*Col. 3:* Col. 1 times col. 3, Table C-3, plus col. 3 times col. 4, Table C-3.

*Col. 4:* Col. 1 times the mean of col. 3, Table C-3 (= 43.6 per cent), plus col. 2 times the mean of col. 4, Table C-3 (= 56.4 per cent).

## COMMENT

EDWARD F. DENISON, Committee for Economic Development

Edward Budd's paper is in many respects, particularly in the application and presentation of techniques, excellent. But his findings cannot be viewed as established. Budd analyzes changes in income distribution by type of payment from 1850 to 1910, with major emphasis upon changes in labor's share. The analysis focuses on a determination of the effects upon income distribution of changes in the division of the labor force between agriculture and industrial employment and between wage labor and self-employment. Procedurally, this determination is conducted effectively.

However, the crucial question—what substantive conclusions are the data good enough to substantiate?—is treated rather meagerly. Budd relies upon the estimates of Willford King, published in 1915, with the exception that he revised King's estimates of wages and total income in agriculture. This revision is critical. Possibly the most interesting question raised by Budd's paper is what effect this revision would have upon King's own analysis of his data.

### ADJUSTMENTS

The following passages from King indicate his view of changes in the wage share.[1] After each quotation, I shall compare the relevant estimates of King and Budd. If Budd's figures are correct, King was to a disturbing extent engaged in rationalizing changes that did not happen. King's analysis is in terms of national income and Budd's of private income, but this does little to explain the discrepancy in movement; nearly all of it stems from Budd's revision in agriculture.[2]

"The combined share of interest and profits," said King, "showed a striking decline between 1860 and 1870 and has since tended to remain practically constant. The decline was probably largely a result of the freeing of the slaves and the destruction of capital due to the Civil War. When the slaves were largely transformed into wage earners, the natural

[1] Direct quotations are from pages 162, 163, and 170 of *The Wealth and Income of the People of the United States*, Macmillan.

[2] Wages as a percentage of total income in the three series are as follows:

| *Year* | *King's National Income* | *King's Private Income* | *Budd's Private Income* |
|---|---|---|---|
| 1850 | 35.8 | 34.5 | 41.5 |
| 1860 | 37.2 | 35.4 | 38.4 |
| 1870 | 48.6 | 46.3 | 41.1 |
| 1880 | 51.5 | 48.9 | 41.5 |
| 1890 | 53.5 | 51.3 | 48.4 |
| 1900 | 47.3 | 45.9 | 45.4 |
| 1910 | 46.9 | 46.5 | 47.0 |

outcome was a large increase in the wages bill at the expense of interest and profits. . . . Since rent has constituted a share relatively stationary and comparatively unimportant in amount, wages have been practically the complement of the combined factors of interest and profits. The great rise of the share of wages during the decade 1860 to 1870 has therefore just been accounted for in explaining the fall of interest and profits."

This "great rise" in King's data was 11.4 percentage points. Budd has cut this to 2.7 points.

"The rise in percentage received by wages," King goes on, "continued slowly until 1890 and has since been gradually declining. . . . The most probable causes for the decline of the last two decades are perhaps the disappearance of free land, with the attendant increase in the pressure upon our natural resources, and the great influx from abroad of labor of a low degree of efficiency. Whether these are or are not the correct explanations of the changing trend, the fact remains that the total share going to labor has, of recent years, been falling off despite the efforts of labor unions and combinations."

The decline in the wage share from 1890 to 1910, to which King referred, was 6.6 percentage points. Budd's decline is only 1.4 points, scarcely enough to merit comment. This revision is especially important since the 1890–1910 decline was an integral part of what King viewed as his most important finding, that "the American laborer has been unable to withstand the continuous onslaught of the alien hosts [of immigrants]." In this period, according to King, immigration prevented any further rise in real wages; it shifted the distribution of income against wages; and this in turn was making the size distribution of income more unequal. Unrestricted immigration, he concluded, must stop.

"From 1880 to 1900," King says, "average profits increased enormously, almost trebling in amount and far outstripping average wages in purchasing power. It must, however, be remembered that, in 1880, profits were far below normal."

This was written on the basis of a drop in the wage share from 1880 to 1900 of 4.2 percentage points. In Budd's revision this has been transformed into a 3.9 point increase.

Whether Budd's revision of King's figures is warranted, I do not know. Certainly, King's series look peculiar; they are scarcely described in his book, and from that source at least, they are impossible to appraise or reproduce. On the other hand, King must have been aware of the peculiarities that Budd points out, yet he not only retained them unaltered but drew important conclusions from their behavior. It is not clear whether Budd had access to any primary source materials that were not available to King.

King does not regard his agricultural figures as particularly deficient, but as of "moderate quality." If they are as bad as Budd's revision implies, King's nonagricultural series may be equally suspect. After all, 43 per cent of King's private nonagricultural income and 44 per cent of his private nonagricultural wages, in 1910, arose in his "commercial and professional services" industry. Total income in the latter is described by King only as having been "roughly estimated on the basis of a constant ratio to the product of urban population and average income." His brief descriptions of methodology in other industries are not reassuring.

King's checks of his estimates, employing alternative estimating procedures, refer to *total*, not nonagricultural, income.[3] Had he changed his agricultural figures to those introduced by Budd, King might have made compensating changes in his nonfarm estimates. If not, he would have lost the comfort that these checks provided.

Budd is, commendably, much more cautious than King about stating substantive conclusions as to changes in the wage share. He does note that for the period as a whole the data indicate a rise in the wage share of private income—even though, according to his estimates, the wage share in agriculture declined. He finds that some of the increase in the wage share of private income may have been the result of the decline in the proportion of self-employed to hired workers, and of the decreasing importance of agriculture.

I would be inclined to reverse the reasoning process. The known decreasing importance of agriculture and the growing importance of the corporate form of organization increased the proportion of the economy in which the wage share is relatively high. This development *must* have raised the wage share of total private income during the period after the Civil War, allowing for cyclical fluctuations, unless a revolution was taking place in income distribution in comparable industries and types of business organization. The data do not warrant conclusions on whether or not there was any shift in income distribution within *comparable* sectors.

## IMPUTATIONS

Much of Budd's paper deals not with the wage share but with the broader concept of service income, inclusive of imputed labor returns to proprietors and unpaid family workers. The same questions of statistical reliability apply here, and I find little comfort in the ingenious check Budd has applied to test the reasonableness of his results. Aside from this, I am unwilling to accept the imputations employed here.

[3] See pp. 126 and 127 and especially p. 159, footnote 3, which describes a check on total wages and salaries.

The procedure of assigning proprietors and unpaid family workers a labor income equal to the average income of employees is altogether arbitrary. Even if the assumption were correct that proprietors *could* earn that amount if they worked for wages, the question is not what they might have earned, but what they did earn.

Such plausibility as the assumption might otherwise possess disappears if one looks at a size distribution of proprietors' income. Based on data for recent years, the bulk of nonfarm proprietors' income is received by the small fraction of proprietors that operate large firms, in which property income may very well predominate. Most proprietors are in small firms. Few have entrepreneurial income as large as the average earnings of employees, and the average income of those who do not is only a small fraction of that of employees. Budd's assumption implies, then, that the vast majority of proprietors have satisfactory labor incomes but large negative property incomes. Were the at least equally tenable assumption to be made, that the rate of return on capital was similar to that in corporations, and labor instead of property income obtained as a residual, the results would be altogether different. I suggest that a principal reason few proprietors have incomes as large as the average employee is simply that much of the time they are underemployed.

I prefer not to allocate noncorporate profits between labor and property shares at all, since the results can only yield back the assumption that is made. But if one *must* allocate, a preferable procedure would be to assume the division between labor and property inputs and income to be the same in noncorporate as in corporate firms. A test for 1952 showed that this procedure would yield an average labor income per nonfarm proprietor about two-thirds that of employees.[4]

Unpaid family workers pose an apparently insuperable problem in applying the average-wage procedure. If earnings are imputed to proprietors by this method, presumably some allowance must be made for this group, too. But this necessitates knowing some meaningful number of unpaid family workers. Data from alternative sources differ wildly even for recent years, for reasons which are unknown. For example, the *1940 Census of Population* reported that there were 189,381 "unpaid family workers" in retail trade while the *1939 Census of Business* reported 923,878 "family workers paid no stipulated wage" in retail trade. More than half of the latter were reported to be full-time workers. Similar differences exist in other nonfarm industries between population census and establishment-type census data.

The discrepancy in farm statistics is equally striking. For 1940, one

[4] This is without inclusion of unpaid family workers in the denominator of the calculations. Their inclusion would further reduce the fraction.

derives 2.9 million from the agricultural census as against 1.2 million from the population census.[5]

Again, the Census Bureau found in 1945 that in the collection of sample data for the *Monthly Report on the Labor Force* a slight change in questioning procedure greatly affected its estimate of the number of unpaid family workers on farms.

I shall not comment on other aspects of Budd's procedures because, if the data were adequate to support them, I would have no serious quarrel with their use. One must ask, however, whether Budd's standardization procedures are not extracting something from King's estimates that King did not put in. Had King himself applied these techniques, would he have used them to analyze or to adjust his series?

We return, then, to the key question, whether the data can support any analysis or conclusion with respect to the distribution of income by type. My impression is, obviously, that they cannot.

## REPLY by Mr. Budd

Edward Denison rightly emphasizes the tentative nature of my findings on labor's share arising from the uncertain character of the underlying data. Denison focuses his entire attention on the census year figures, which are based largely on King's estimates of income and of wage and salary payments and does not consider the statistics underlying the decade averages. While Denison emphasizes the extent to which my adjustments of King's estimates have altered the latter's empirical findings and made unnecessary, perhaps, some of the explanations King offered for the changes he observed, I do not believe these remarks are really pertinent to an assessment of the quality of the estimates themselves.

### ADJUSTMENTS

King's data for agriculture were not used, since better estimates, giving more reasonable results, are available for the agricultural sector. For the nonagricultural sector, the very absence of data which rendered it expedient to use King's estimates also makes it difficult, if not impossible, to determine the reliability of the latter. There are, however, certain comparisons which may assist the reader in making a judgment

[5] The *1940 Census of Agriculture* shows that on 5,081,848 reporting farms, 7,940,727 operators and "unpaid members of his family" worked the equivalent of two or more days the week of March 24th to 30th. The tabulation was restricted to persons fourteen years old and over. If the conventional assumption of one operator per farm is adopted, there were, according to this source, 2,858,879 unpaid family workers fourteen years or more of age who worked on farms two days or more the week of March 24th to 30th, 1940. The *1940 Census of Population*, however, reports only 1,168,472 employed unpaid family workers in agriculture (which includes agricultural services as well as farms) for the same week (and only 18,469 who were "experienced, seeking work").

on this matter. The daily wage rate (or earnings) implied in King's estimates of wages and salaries can be obtained by dividing the latter series by the product of my estimates of employees and of average hours worked per year (assumed to be 311). A comparison of this series with Lebergott's series for nonfarm laborers (this volume, Table 2) which can be taken as a rough indication of earnings outside of agriculture, shows, with the possible exception of 1890, a remarkable degree of similarity:

| | *1850* | *1860* | *1870* | *1880* | *1890* | *1900* |
|---|---|---|---|---|---|---|
| | (current dollars) | | | | | |
| King | 0.92 | 1.03 | 1.53 | 1.29 | 1.55 | 1.47 |
| Lebergott | 0.90 | 1.04 | 1.57 | 1.28 | 1.39 | 1.44 |

No alternative estimates covering all of nonagricultural income for this entire period have been prepared. Gallman, however, has provided us with estimates of value added in mining and manufacturing (this volume, Tables A–4 and A–5) which can be compared with King's figures for the same two sectors (constituting about 40 per cent of his nonagricultural income). The two sets of estimates differ very little:

| | *1849–50* | *1859–60* | *1869–70* | *1879–80* | *1889–90* | *1899–1900* |
|---|---|---|---|---|---|---|
| | (billions of current dollars) | | | | | |
| King | 0.45 | 0.86 | 1.75 | 2.01 | 4.14 | 5.68 |
| Gallman | 0.46 | 0.85 | 1.76 | 2.12 | 4.01 | 5.51 |

For private income as a whole, one further check can be made by using Kuznets' census year estimates of net national product from 1869 on. A comparison between this series and King's is provided in the following table, in which I have used, for King, my revised series reflecting my estimate of agricultural income (rather than King's), and have adjusted Kuznets' series to reflect private net national product (Commerce concept) along the lines indicated in my Appendix C. The Kuznets figures represent the average for the two adjoining years, 1869–70, etc. In the third line of the table, I have adjusted Kuznets's series for an omission in Shaw's commodity output estimates (on which the former are based) which has been pointed out by Gallman (this volume, footnote 3).

| | *1869–70* | *1879–80* | *1889–90* | *1899–1900* | *1909–10* |
|---|---|---|---|---|---|
| | (billions of current dollars) | | | | |
| King | 6.8 | 7.8 | 11.6 | 15.9 | 26.2 |
| Kuznets | 5.7 | 9.0 | 11.3 | 15.9 | 29.1 |
| Kuznets (revised) | 6.5 | 9.2 | 11.4 | 15.9 | 29.1 |

If we use the revised Kuznets series for comparison, the major differences are for 1879–80 and 1909–10. An estimate I have made of NNP for 1909–10 also suggests that King's figure may be as much as 8 to 10 per cent too low.

It is interesting to determine how the estimates of the wage share in private income for census years would be affected if King's estimates were scrapped entirely, and the sources referred to above (and given in more detail in Appendix C of my paper) were used instead. In the table below, the figures for King are taken from Table 1 of my paper. For the Kuznets series, the Kuznets NNP data have been adjusted for the Shaw omission. The wage total underlying this series is the product of the number of employees in my Appendix A and the Lebergott–Douglas daily wage series referred to in my Appendix C.

| | *1869–70* | *1879–80* | *1889–90* | *1899–1900* | *1909–10* |
|---|---|---|---|---|---|
| | | | (per cent) | | |
| King | 41.1 | 41.5 | 48.4 | 45.4 | 47.0 |
| Kuznets | 43.7 | 34.5 | 44.6 | 44.6 | 44.8 |

For the two periods in which Denison shows such interest—1880–1900, and 1890–1900—the Kuznets series indicates the same direction of change as my revision of King: a rise in the former period, and approximate stability in the latter. For the forty-year period as a whole, however, the Kuznets series suggests approximate stability rather than a rise.

IMPUTATIONS

The other major question raised by Denison concerns the share of service income. While only the wage and salary share may be relevant to certain questions, for the distribution of income between the owners of human labor and of nonhuman resources, some method of imputation, however "arbitrary," must be developed, whether the imputation is approached from the labor or the property side. And for questions of secular movement, the question of whether one picks unity or some particular fraction, such as two-thirds, for converting the earnings of employees to the labor earnings of self-employed, is not of great importance. Denison's own suggested method—applying the division of income within corporations to unincorporated enterprises—suffers from even more difficulties than the one used. On the average, corporate and noncorporate firms differ radically in size and operate generally in different industries. Small corporations, which are most nearly comparable to unincorporated firms, are normally closely held as well, and the distribution of such corporations' earnings between profits and

executive salaries is more a function of other considerations (such as taxes) than of the values of the stockholders' labor services to the firm involved. The use of Denison's method for the nineteenth century is precluded in any case by the absence of data on corporate and non-corporate earnings.

While I would concur with Denison on the unsatisfactory character of statistics on unpaid family workers, the major problem is getting them *out* of the census data for the early years, not putting the admittedly poor estimates back in. It is primarily for this reason that the service share inclusive of unpaid family workers received emphasis in my paper.