

This PDF is a selection from an out-of-print volume from the National Bureau of Economic Research

Volume Title: Trends in the American Economy in the Nineteenth Century

Volume Author/Editor: The Conference on Research in Income and Wealth

Volume Publisher: Princeton University Press

Volume ISBN: 0-870-14180-5

Volume URL: <http://www.nber.org/books/unkn60-1>

Publication Date: 1960

Chapter Title: Interregional Differences in Per Capita Income, Population, and Total Income, 1840-1950

Chapter Author: Richard Easterlin

Chapter URL: <http://www.nber.org/chapters/c2475>

Chapter pages in book: (p. 73 - 140)

# Interregional Differences in Per Capita Income, Population, and Total Income, 1840-1950

RICHARD A. EASTERLIN

UNIVERSITY OF PENNSYLVANIA  
AND NATIONAL BUREAU OF ECONOMIC RESEARCH

IN A homogeneous and infinitely mobile society with economic motivation supreme, regional differences in per capita income would be negligible. The geographic distribution of population would be substantially the same as that of income, and, with rates of natural increase everywhere the same, constant over time.

But productive factors are heterogeneous and imperfectly mobile, and economic considerations do not rule alone. New techniques and changing product demands impinge with varying impact on the different areas of the country, and fertility and mortality vary. The real world presents a picture of differences among regions in the level and trend of per capita income, and of disparate and changing regional distributions of population and total income.

The main task of the present paper has been to construct estimates of these differences in the United States. The estimates of total income, population, labor force, and various components for each state and region at each of seven dates from 1840 to 1950 comprise an extensive body of data. They lend themselves to many lines of analysis, and only some of the more important features are noted here.

The state income concept used is personal income, as defined by the Department of Commerce, and relates to the income received by the residents of a state.<sup>1</sup> The principal types of nonmonetary income included are the value of food and fuel produced and consumed by farmers and the net rental value of owner-occupied dwellings. The estimates are in current dollars; no adjustment was made for differences among regions or changes over time in the purchasing power of money. Throughout the discussion "per capita income" refers to income per head of the total population.

<sup>1</sup> Charles F. Schwartz and Robert E. Graham, Jr., *Personal Income by States since 1929*, Supplement to the *Survey of Current Business*, Dept. of Commerce, 1956, pp. 49-50 and 57ff.

Note: Radivoj Ristic provided extensive assistance in the preparation of this paper. The author is also indebted to Robert E. Gallman for generous help, to Charles F. Schwartz for his useful comments as discussant of the paper, and to Charlotte Boschan for programming and carrying out certain calculations on the IBM 704. The machine time for these calculations was contributed by the International Business Machines Corporation.

The analysis of per capita and total income rests on observations for 1840, 1880, 1900, and decennial years from 1920 through 1950. Three basic series are used:

1. 1930-50—The new Department of Commerce series for state personal income.<sup>2</sup>

2. 1880, 1900, and 1920—Series developed in a previous study,<sup>3</sup> conceptually quite close to the Commerce series, differing chiefly in that wages, salaries, and entrepreneurial income are distributed according to the state in which payment is made, rather than where the recipient lives.

3. 1840, 1880, and 1900—Estimates of income originating in commodity production and distribution given in Appendixes A and B.<sup>4</sup> For the present analysis, the 1840 and 1880 data under (3) were used to extrapolate the personal income series to 1840 on the assumption that for each region the ratio of the 1840 to the 1880 share in personal income was the same as the corresponding ratio for income originating in commodity production and distribution. (An adjustment of less than 0.5 per cent was necessary to assure that the estimated 1840 regional shares in personal income totaled 100 per cent.) A rough test of the assumption and an analysis of the discontinuity introduced by changes in the income concept is given in Appendix C.

In the estimates for 1920, 1930, 1940, and 1950, an attempt was made to secure a better approximation to secular levels by averaging annual estimates covering the reference cycle centered nearest to each date, as indicated by the reference chronology of the National Bureau of Economic Research. Thus, technically, the estimates for these years are cycle averages for 1919-21, 1927-32, 1937-44, and 1948-53. While the cycle midpoints vary somewhat, all fall within six months of July 1 of the year ending in zero,<sup>5</sup> and each cycle average has been treated as an acceptable approximation of the secular level on July 1 of the initial decade year.

Although the basic estimates were made by states, the analysis is based principally on regions. The regional classification used corresponds to the Bureau of the Census's geographic divisions, except that Delaware and Maryland are included in the Middle Atlantic rather

<sup>2</sup> *ibid.*, pp. 38 and 140-141.

<sup>3</sup> Richard A. Easterlin, "State Income Estimates," in Simon Kuznets and Dorothy S. Thomas, *Population Redistribution and Economic Growth, United States, 1870-1950*, Vol. I. *Methodological Considerations and Reference Tables*, American Philosophical Society, 1957, p. 753.

<sup>4</sup> Two estimates, differing somewhat in industrial scope, are given for 1840, one including and one excluding "commerce." Since neither is perfectly comparable with the estimates for the two later dates, I used the more comprehensive one. However, the results would not have been significantly altered if I had used the other estimate.

<sup>5</sup> The exact midpoints are July 1, 1920; January 1, 1930; January 1, 1941; and January 1, 1951.

than the South Atlantic region, and the District of Columbia is omitted.<sup>6</sup> Appendix Table A-1 indicates the states included in the estimates in 1840 and 1880, the two dates for which all forty-eight states are not covered. The boundaries of Wisconsin and Iowa territories in 1840 exceeded their later state boundaries, but subsequent population censuses indicate few people lived in the areas later excluded. Also the 1840 estimate for Virginia includes West Virginia, and the 1880 estimate for Dakota includes both North and South Dakota.

Numbers carry an unfortunate aura of precision, and before proceeding to the analysis, a word of caution is in order on the statistical reliability of the estimates. A reading of Appendix B of the present paper, in which the 1840 estimate is derived, or of the description of the basic 1880 and 1900 estimates in the author's previously cited study, will reveal the various points at which an attempt was made to check the estimates by testing assumptions, exploiting alternative sources of data, and so on. It will also reveal, however, the points at which lack of data (or imagination) prevented the development of adequate checks. And there is no denying that the data available for estimates as far back as a century or more are much inferior to those now at hand. How serious these shortcomings are cannot be specified with precision. The most that can be safely said is that the reliability of the estimates undoubtedly improves through time with the quality of the basic data. (Part III of the Department of Commerce study cited above provides an admirable discussion of the quality of the most recent estimates.) The analysis undertaken below assumes some confidence in the reliability of the estimates for the present purpose. But this is an assumption which the reader is advised to test by careful perusal of the descriptions of the estimates themselves.

### *Population*

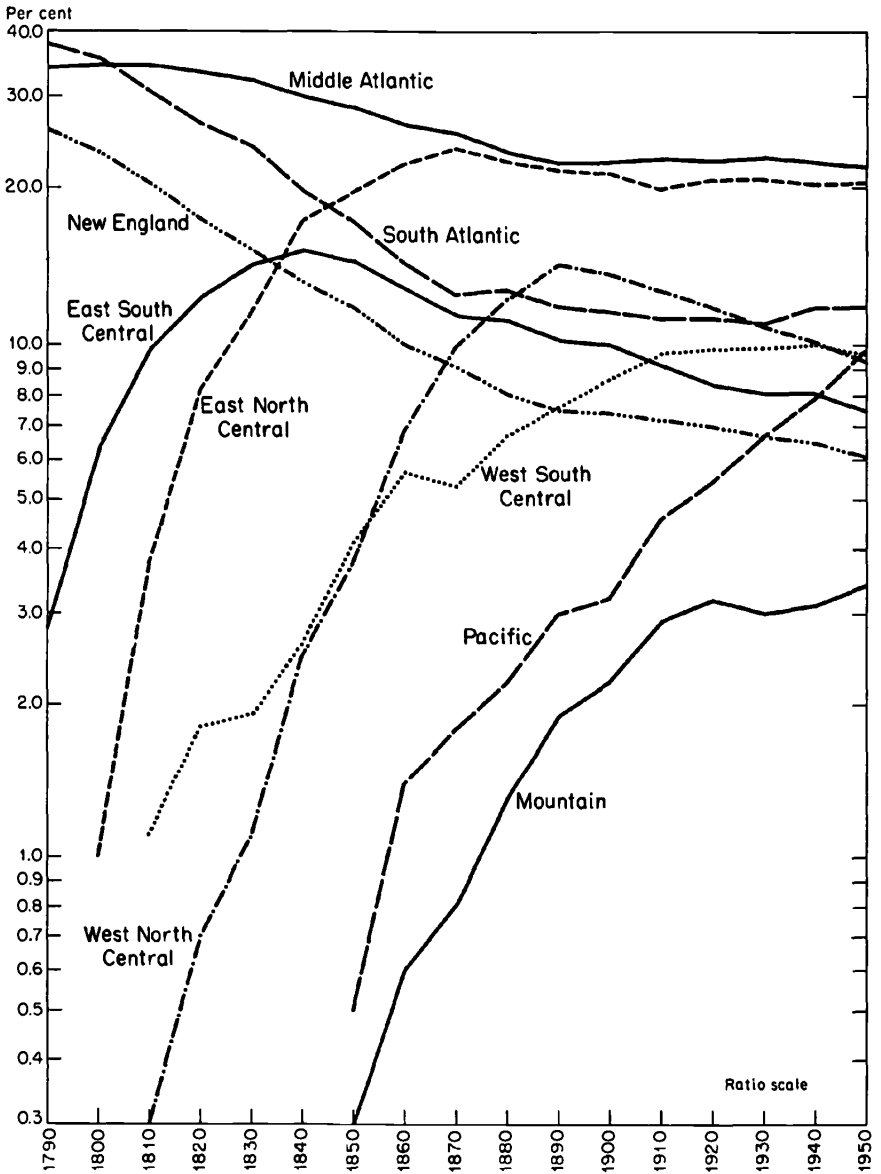
A brief review of population changes provides a convenient starting point for the analysis, since it permits the establishment of a fairly continuous background against which the more intermittent observations on income may be studied. The differences in population trends since 1790 in the various regions are shown in Chart 1. (See also

<sup>6</sup> *New England*: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut; *Middle Atlantic*: New York, New Jersey, Pennsylvania, Delaware, and Maryland; *East North Central*: Ohio, Indiana, Illinois, Michigan, and Wisconsin; *West North Central*: Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas; *South Atlantic*: Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida; *East South Central*: Kentucky, Tennessee, Alabama, and Mississippi; *West South Central*: Arkansas, Louisiana, Oklahoma, and Texas; *Mountain*: Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, and Nevada; and *Pacific*: Washington, Oregon, and California.

OUTPUT GROWTH AND PRICE TRENDS: U.S.

CHART 1

Regional Percentage Share in National Population, 1790-1950



INTERREGIONAL INCOME DIFFERENCES

Appendix Table D-1.) Each point indicates the percentage share of the region in the national population total at a given date. An upward sloping line indicates a percentage rate of growth faster than the national average, a downward one, a rate slower.

The most striking feature is the surge of population in successive regions as the United States expanded westward—first the East South Central, then the East North Central, followed by the West South and West North Central, and finally the Mountain and Pacific regions entered a phase of very rapid expansion. By 1840, when our income data begin, this expansion had run its course in the East South Central region, which had just reached its maximum share in the countrywide total. Expansion had also proceeded quite far in the East North Central, though the peak share for this region was not reached until 1870. The West North and West South Central regions were still in a very early stage of growth, with the peak in the former not due until 1890, and in the latter, until 1910 if the peak is dated from the point at which a marked leveling off takes place. The Mountain and Pacific regions commenced significant development in 1850, a decade after the initial income observation. In the Mountain region comparative stability in population share set in around 1920, but in the Pacific, alone of all the regions, the population share is still growing noticeably. In most regions, the process of expansion from a negligible share to the maximum took from seventy to one hundred years.

In the three regions which reached their maximum during the nineteenth century, a subsequent decline in population share occurred as newer areas farther west expanded. Thus these regions followed the pattern of the older New England, Middle Atlantic, and South Atlantic regions, which showed declines from 1820 or earlier.

The magnitude of the shifts is indicated by the following tabulation of percentage shares (in this and subsequent tables detail may not add to totals because of rounding):

	1790	1840	1890	1950
East Coast (New England, Middle and South Atlantic)	97	63	42	40
East Central (East North and East South Central)	3	32	32	28
West Central (West North and West South Central)		5	22	19
West (Mountain and Pacific)			5	13

How did the movement of income in each region, both total and per capita, compare with that in population? The following sections provide a summary answer.

*The Newer Regions*

Since the rapid expansion of population in the newer regions was such a dominating feature, the patterns of change in the East and West North Central, Mountain, and Pacific regions are considered first. The West South Central, which is the only other region experiencing rapid population growth relative to the countrywide trend after 1840, is more readily considered with the other southern regions.

In Chart 2, the regional figure for population, total income, and per capita income is shown as a percentage of the United States value at each date to bring out movements relative to the nation as a whole. As in the case of Chart 1, an upward sloping line for a given magnitude indicates a percentage rate of growth higher than the national average, a downward one, a rate lower. It should be noted that the population data are plotted at decennial intervals from 1840 onward, the income data at 1840, 1880, 1900, and decennial intervals from 1920 onward.

The first point of note is that in all four of these regions there was a tendency for per capita income to converge sharply toward the national average during the period in which population was growing most rapidly relative to the countrywide trend. For example, between 1840 and 1880, while the share of the East North Central region in total population was increasing from around 17 to 22 per cent, per capita income rose from 67 to 102 per cent of the national average. (Table D-2.) However, the patterns for the Mountain and Pacific regions contrast with those for the East and West North Central in that, in addition to the later dating, the per capita movement was from a point well above the average downward, while in the latter two, it was from a point below upward.

In each region there was considerable agreement in the terminal dates of the phase of rapid convergence of per capita income and that of rapid expansion of population share, though comparison of the timing of the two movements is limited by the scarcity of observations. The present estimates indicate the following tentative results:

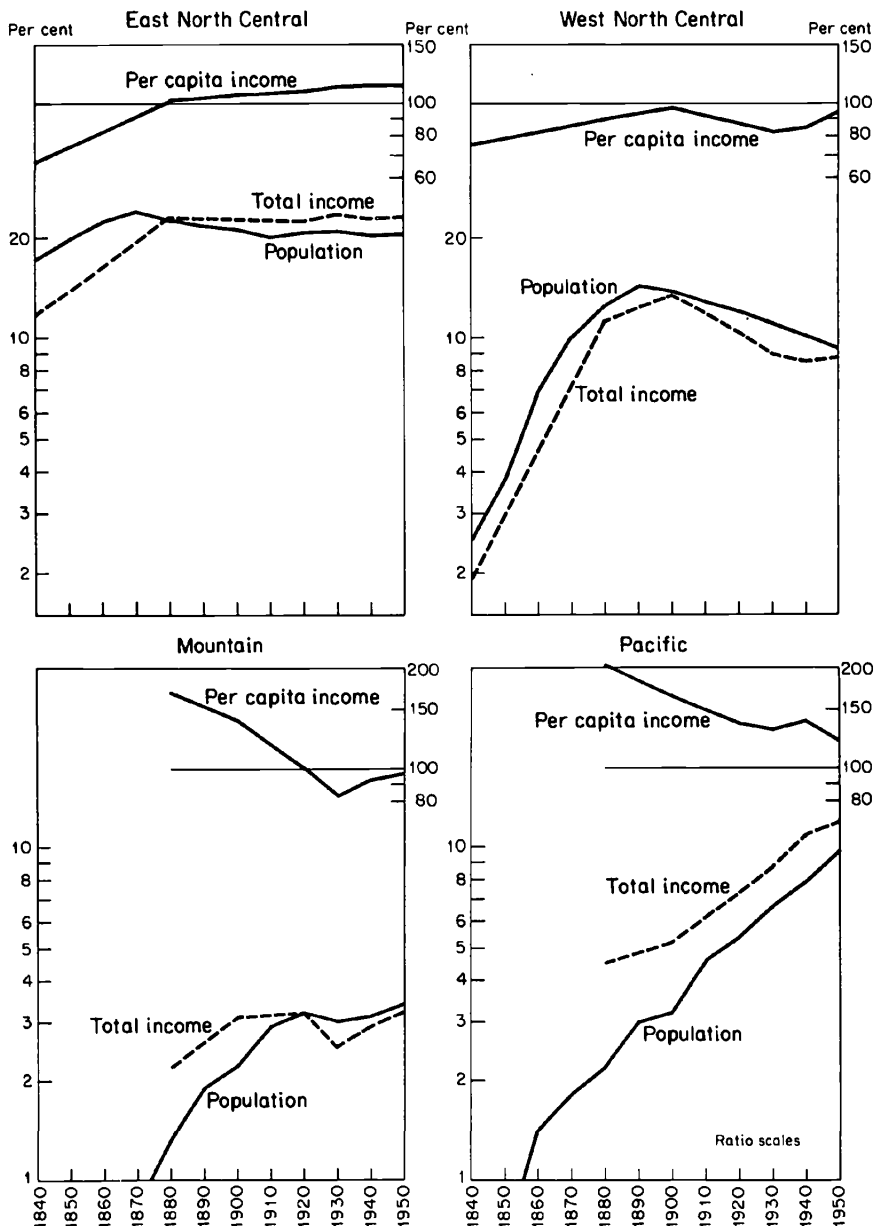
<i>Region</i>	<i>Terminal Date</i>	
	<i>Initial Convergence of Per Capita Income</i>	<i>Initial Expansion of Population Share</i>
East North Central	1880	1870
West North Central	1900	1890
Mountain	1920	1920

From this it would seem that the two movements tended to end within a decade of each other.

INTERREGIONAL INCOME DIFFERENCES

CHART 2

Regional per Capita Income as Percentage of National Level, and Regional Percentage Share in National Total Personal Income and Population, Central and Western Regions, 1840-1950





In the three regions where the initial phase of rapid change ran its full course, the subsequent pattern of movement in relative per capita income varied, reflecting the differing course of economic opportunity in the regions. In the East North Central, the trend was strongest, showing a persistent slight improvement relative to the average. In the other two regions, per capita income fell somewhat below the average and then in recent decades recovered. In all four regions, the movement of the share in total income, which, of course, was the joint product of the change in population share and in relative per capita income, resemble, by and large, the movement in the population share.

The typical pattern in these regions, then, consisted of an initial phase—usually lasting six or seven decades—of rapid expansion in population and income shares accompanied by convergence of per capita income toward the national average. Cessation of rapid growth in the population and income shares tended to occur around the time that per capita income reached the average—probably within a decade. Following the initial phase, the differential movement in income and population varied from region to region.

While comprehensive explanation of these patterns is beyond the scope of the present analysis, some light can be thrown on the differences in income level or trend by examining the underlying detail on income and labor force. The discussion focuses on the explanation of per capita rather than total income, since this brings into view more important explanatory factors. Five underlying components of per capita income are considered:

1. Per worker<sup>7</sup> service income (wages, salaries, and proprietors' income) in agricultural industry.
2. Per worker service income in nonagricultural industry.<sup>8</sup>
3. Labor force industrialization—the proportion of the labor force engaged in nonagricultural industry.
4. Participation rate—the percentage of the total population in the labor force.
5. Per capita property income (dividends, interest, and rent).

The manner in which the first, second, and fifth components enter into the determination of total income per capita is obvious. The third, labor force industrialization, is included because service income per worker in nonagricultural industry is generally higher than in agriculture, and differences among regions in the distribution of the labor force between low income agriculture and high income nonagricultural industry will therefore give rise to regional differences in per capita income, even in the absence of differences in income per worker within

<sup>7</sup> Worker is used for member of the labor force.

<sup>8</sup> It would have been preferable of course to examine finer industrial or occupational categories, but data were not available.

INTERREGIONAL INCOME DIFFERENCES

each industrial sector. The fourth, participation rate, is included because two regions with identical averages of service income per worker in industry as a whole may differ in per capita income because they differ in the distribution of the population between workers and dependents.<sup>9</sup>

As noted above, there is a break in the nature of the income concept at 1880. In analyzing the total income trend, the 1840 and 1880 data on income originating in commodity production and distribution were used to extrapolate the 1880 value for personal income to 1840. However, a similar procedure was not attempted for the components. Instead, the trend in the following 1840–80 components was treated as representative of the pre-1880 trend in the specified 1880–1950 factors:

<i>1840–80 Component</i>	<i>1880–1950 Component</i>
Income originating per worker in agriculture	Agricultural service income per worker
Income originating per worker in nonagricultural commodity production and distribution	Nonagricultural service income per worker
Percentage of nonagricultural to total labor force in commodity production and distribution	Labor force industrialization
Percentage of total labor force in commodity production and distribution to population	Participation rate

Since the present aim is chiefly to establish directions of movement, the treatment of these items as equivalent seems valid. Unfortunately, it was not possible to secure a satisfactory indicator for property income per capita from 1840 to 1880.

Appendix Tables D-3 and D-4 provide the data on which the component analysis rests. The reliability of the estimates for the components is of course less than for total income per capita, in part because the estimate for a component is typically subject to a wider margin of error than for the aggregate, in part because the labor force estimates are less reliable than population estimates. The latter is particularly true for 1840 (see Appendix B). Also, no estimates were made for 1940, and instead of cycle averages for 1927–32 and 1948–53, estimates for 1929 and 1949–51 were used to interpret the patterns for the former dates. (The 1949–51 estimate differs slightly in concept from that for 1948–53 since it rests on the old “income payments” series of the

<sup>9</sup> To account fully—in a proximate sense—for per capita income differences, several additional factors would have to be distinguished. Cf. *Easterlin*, “Growth of Income in United States Regions” in Kuznets and Thomas, Vol. II [forthcoming], Appendixes A and B.

OUTPUT GROWTH AND PRICE TRENDS: U.S.

Department of Commerce.) These difficulties caution against too rigid interpretation of the figures given in the tables, particularly where changes of only a few percentage points are involved. However, the movements are usually quite substantial, and the patterns sufficiently consistent to support the present analysis.

What light do the components throw on the trend in relative per capita income in the newer regions? The following tabulation, based on Tables D-3 and D-4, brings out some of the salient features for the East North Central region. Since we are interested in differential movements, the regional figure for each component is expressed as a percentage of the United States value:

	1840	1880 <i>comparable to</i>		1950
<i>East North Central</i>		1840	1950	
Total income per capita	71	108	102	112
Service income worker				
Agricultural	85	137	133	110
Nonagricultural	80	99	103	111
Labor force industrialization	87	96	98	104
Participation rate	88	93	93	103
Property income per capita			97	108

This shows that below average per capita income in this region in 1840 was associated with below average levels in all components, and that convergence of per capita income toward the national average between 1840 and 1880 reflected improvements in these same components. Also, the subsequent upward tendency of per capita income relative to the national level was due to similar upward movements in all components except agricultural income per worker.

In the West North Central region the initially low level of relative per capita income was due to all factors except the participation rate, the high level of the latter compared to the East North Central region reflecting the more recent impact of substantial in-migration:<sup>10</sup>

	1840	1900 <i>comparable to</i>		1950
<i>West North Central</i>		1840	1950	
Total income per capita	79	106	97	95
Service income per worker				
Agricultural	80	149	144	125
Nonagricultural	85	111	108	95
Labor force industrialization	71	67	82	86
Participation rate	104	94	93	99
Property income per capita			77	88

<sup>10</sup> See the discussion of participation rates in connection with Appendix Table B-12.

INTERREGIONAL INCOME DIFFERENCES

The similarity of movement of agricultural income per worker to that in the East North Central region is noteworthy. In the period of early convergence of per capita income—through 1880 in the case of the East North Central and through 1900 in the case of the West North Central—agricultural income per worker rose from below to noticeably above the national average. After this a tendency toward relative decline set in.

The initial convergence of per capita income in the West North Central region was associated with the movement in both agricultural and nonagricultural income per worker, but unlike the pattern for the East North Central region, not with improvement in the other two components. The decline in relative per capita income from 1900 to 1930 and subsequent recovery was associated most consistently with the movements in property income per capita and nonagricultural income per worker. (See Table D-4.)

The Mountain region provides an interesting comparison with the two North Central regions in their early stages of development. As shown below, in this region the very high initial level of relative per

<i>Mountain</i>	<i>1880</i>	<i>1920</i>	<i>1950</i>
Total income per capita	168	100	95
Service income per worker			
Agricultural	88	150	154
Nonagricultural	130	104	96
Labor force industrialization	145	90	94
Participation rate	125	96	94
Property income per capita	61	74	87

capita income was due in part to a relatively high level of nonagricultural income per worker and of labor force industrialization (the region had almost as high a proportion of the labor force in nonagricultural industry as the New England and Middle Atlantic regions). The importance of these two factors reflected in turn the predominance of mining activity in the early stage of development of most states in this region; in some, the proportion of the labor force in mining was higher than 30 per cent.<sup>11</sup> In contrast, in the two North Central regions, where early development was predominantly agricultural, total income per capita was initially below the national average. Also important in accounting for the high income level in the Mountain region in 1880 was the exceptionally high participation rate, a characteristic already noted in the West North Central region in 1840 and connected with substantial recent in-migration.

Following early mining development, the Mountain region experienced

<sup>11</sup> Cf. Ann R. Miller and Carol P. Brainerd, "Labor Force Estimates," in Kuznets and Thomas, Vol. 1, Table L-5, pp. 623-631.

OUTPUT GROWTH AND PRICE TRENDS: U.S.

rapid agricultural expansion. This was accompanied, as in the case of the two central regions, by a rise in agricultural income per worker from below to well above the national average. In the Mountain region, however, the rise failed to increase relative per capita income. Instead, the level dropped sharply toward the countrywide average. This was partly the result of the agricultural expansion itself, which, though accompanied by a sharp rise in agricultural income per worker, brought a rapid decline in the region's relative degree of labor force industrialization. Thus, while in the United States as a whole the percentage of the labor force in nonagricultural industry rose from around 50 to almost 75 per cent between 1880 and 1920, in the Mountain region there was actually a decline—from around 73 to 67 per cent. In contrast, in the North Central regions, where agricultural expansion was not preceded by mining development, a decline in relative industrialization and the consequent drag on per capita income growth either did not occur, or (as in the case of the West North Central) was quite moderate.

Also important in the convergence of per capita income toward the national average in the Mountain region were the relative declines in the participation rate and nonagricultural income per worker. The decline in the participation rate reflected, among other things, a rising proportion of females in the population, probably due in part to a similar shift in the sex composition of migrants as agriculture assumed an increasing and mining a decreasing role in attracting population, and in part to an increase in the importance in population growth of natural increase, which of course is characterized by a roughly equal sex distribution. Had there been no change in the relative level of any other factor after 1880, the decline in the participation rate alone would have been sufficient to reduce per capita income from 168 to 131 per cent of the national average by 1920—more than half of the actual decline.

Finally, in the Pacific region, as in the Mountain, the initially high level of per capita income was accompanied by relatively high levels of nonagricultural income per worker, labor force industrialization, and participation rate, but in addition, agricultural income per worker and property income per capita were noticeably above average—indeed, even more so than the other three components:

<i>Pacific</i>	1880	1920	1950
Total income per capita	204	135	120
Service income per worker			
Agricultural	212	204	159
Nonagricultural	136	107	110
Labor force industrialization	137	110	105
Participation rate	123	108	104
Property income per capita	165	149	123

In this region all the components contributed to convergence of per capita income, though the effects of nonagricultural income per worker, labor force industrialization, and participation rate were wholly or chiefly concentrated in the period up to 1920, while that of agricultural income per worker occurred largely after that date.

### *The Southern Regions*

Turning to the three southern regions (Chart 3), one is struck immediately by the drastic decline between 1840 and 1880 in relative per capita income. Indeed, the underlying current dollar estimates, which, if anything, would probably be biased upward relative to constant dollar figures, suggest that not only the relative but the absolute level declined during this period. In every southern state, the 1880 level of per capita income originating in commodity production and distribution was below, or at best only slightly above that of 1840 (Appendix A, Tables A-1 and A-2). If valid, the implication—that two decades after the start of the Civil War the South may have been little better off than two decades before—attests strikingly to the impact of that war and the subsequent disruption on the southern economy. Of course, not all the deterioration was necessarily associated with the war. Indeed, it would be of great interest to have income estimates for 1860 to see whether there is evidence of decline in the relative position of the South in the pre-Civil War period, and also for 1870, to determine whether the decade of the seventies brought any improvement in income level.

Improvement did occur in the absolute level of per capita income—still measured in current dollars but now with relatively complete coverage—between 1880 and 1900 in most southern states, Louisiana being the only noteworthy exception.<sup>12</sup> The rate of growth, however, varied considerably from state to state. On the average, there was no marked trend relative to the country as a whole, and as Chart 3 shows, relative per capita income in each of the three regions was about the same in 1900 as in 1880.

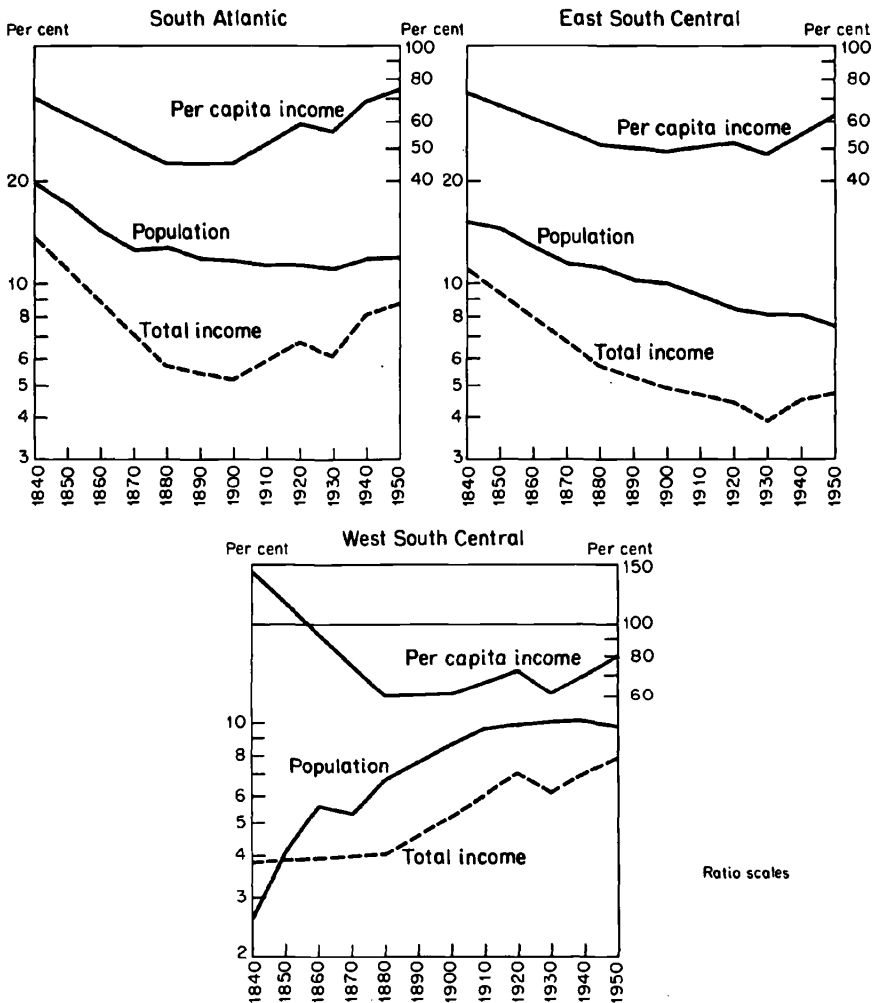
Commencing around 1900, however (the correct date might vary as much as a decade or so), a sharp upswing took place in relative per capita income in the South Atlantic and West South Central regions, and a mild upswing in the East South Central. Indeed, the average rates of growth between 1900 and 1920 in the two former regions were the highest in the country. In 1930 a noticeable setback occurred, so great in two of the regions—the East and West South Central—as to wipe out the relative gains achieved by 1920. But recovery was rapid. By 1940, all three regions had largely regained or even surpassed the 1920 level, and by 1950 relative per capita incomes were substantially

<sup>12</sup> Easterlin, Table Y-1, p. 753.

OUTPUT GROWTH AND PRICE TRENDS: U.S.

CHART 3

Regional per Capita Income as Percentage of National Level, and Regional Percentage Share in National Total Personal Income and Population, Southern Regions, 1840-1950



INTERREGIONAL INCOME DIFFERENCES

above 1900. Indeed, for the first time the relative income standing in one of the regions—the South Atlantic—exceeded that of 1840. Moreover, the recovery was widely diffused among the individual states—every one showed a noticeably higher relative standing in 1950 than in 1900, and in only two was there an intervening census date at which the 1950 level was exceeded (West Virginia in 1920 and Florida in 1940).

The South Atlantic and East South Central regions showed largely similar movements in total income share. For a good part of the period the share declined, as both relative per capita income and the population share decreased, but later the share swung upward, reflecting the improvement in relative per capita income. The West South Central region did not show a declining phase since the early decline in relative per capita income was more than offset by the sharp expansion in population share.

In summary, in all three regions the curve of relative per capita income traced a rough U-shaped pattern, starting below the national average in 1840 (except in the West South Central), dropping to a much lower level in 1880, then leveling off, and starting to rise—around 1900 in the South Atlantic, (consistently) around 1930 in the other two—although if income data between the dates of 1840 and 1880 were available, the first stage would probably prove to be largely concentrated in a much shorter span of time. The income share of the South Atlantic and East South Central regions, like relative per capita income, traced a U-shaped pattern, with the phase of upswing dating from the recovery of relative per capita income. The income share of the West South Central region changed very little between 1840 and 1880 and then turned upward.

As the following tabulation (based on Tables D-3 and D-4) shows, the below average level of total income per capita in the South Atlantic region was consistently associated with less than average levels of income per worker in agricultural and nonagricultural industry, of labor force industrialization, and (at least since 1880) of property income per capita:

	1840	1880	1950	
		<i>comparable to</i>		
<i>South Atlantic</i>		1840	1950	
Total income per capita	84	54	45	71
Service income per worker				
Agricultural	86	56	59	70
Nonagricultural	79	71	59	77
Labor force industrialization	49	34	51	93
Participation rate	114	114	102	96
Property income per capita			38	60



OUTPUT GROWTH AND PRICE TRENDS: U.S.

The relative standing of the participation rate was the only exception to the otherwise consistently unfavorable picture. The striking deterioration in relative income level between 1840 and 1880 reflected a sharp drop relative to the national average in agricultural income per worker. Also, despite the already low relative position in 1840, there was some increase in the lag in labor force industrialization and in nonagricultural income per worker. The partial recovery of relative per capita income by 1950 was associated with improved relative levels of income per worker in agricultural and nonagricultural industry, of labor force industrialization, and of property income per capita.

The East South Central region followed a pattern in most respects quite similar to that for the South Atlantic:

	1840	1880		1950
		<i>comparable to</i>		
<i>East South Central</i>		1840	1950	
Total income per capita	85	60	51	61
Service income per worker				
Agricultural	90	66	69	53
Nonagricultural	87	89	79	76
Labor force industrialization	38	28	45	83
Participation rate	112	109	97	90
Property income per capita			39	44

The principal difference was that the improvement in relative per capita income between 1880 and 1950 was chiefly associated with improvement in relative labor force industrialization. This helps explain the smaller magnitude of improvement in this region compared to the South Atlantic.

The above average level of per capita income in the West South Central region in 1840 was due primarily to the agricultural and commercial prosperity of Louisiana (the state dominating the regional total) and was reflected in very high relative levels of income per worker in agricultural and nonagricultural industry:

	1840	1880		1950
		<i>comparable to</i>		
<i>West South Central</i>		1840	1950	
Total income per capita	160	67	60	81
Service income per worker				
Agricultural	137	70	75	104
Nonagricultural	207	107	94	87
Labor force industrialization	67	29	49	92
Participation rate	110	110	99	93
Property income per capita			42	69

## INTERREGIONAL INCOME DIFFERENCES

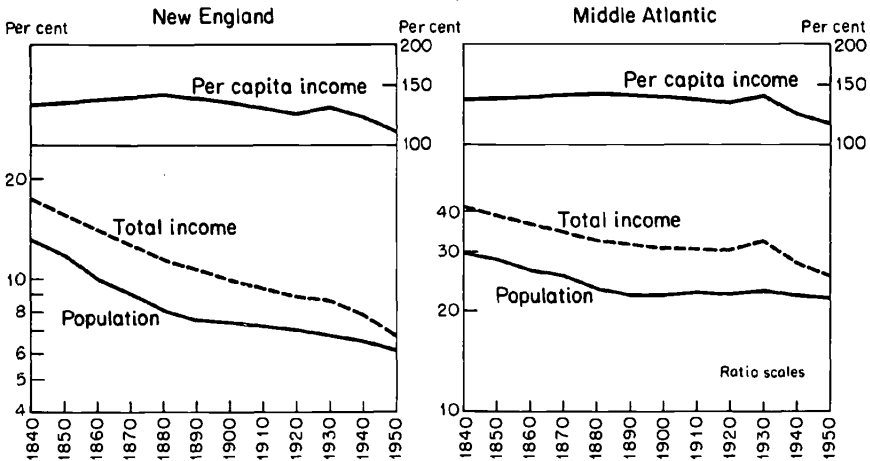
As in the South Atlantic region, the sharp decline in relative per capita income between 1840 and 1880 was associated with declines in all factors except the participation rate.<sup>13</sup> A significant rise in labor force industrialization contributed to the subsequent improvement, as in the case of the other southern regions, and improvements in agricultural income per worker and property income per capita also worked in this direction.

### *The Northeastern Regions*

What of income trends in the New England and Middle Atlantic regions—did per capita income keep pace with the growth of the countrywide average, or fall behind? Chart 4 suggests that in the

CHART 4

**Regional per Capita Income as Percentage of National Level, and Regional Percentage Share in National Total Personal Income and Population, Eastern Regions, 1840-1950**



first part of the period, through 1880, both regions increased slightly the margin by which they exceeded the countrywide average, that is, per capita income grew slightly faster than the national rate. One should be careful, however, not to infer a smooth trend for this period. The increase in the relative margins of these two regions between 1840 and 1880 may be viewed as the other side of the precipitous drop in relative

<sup>13</sup> In 1880, but not 1840, the West South Central region included Texas. But the trends also stand out clearly in Arkansas and Louisiana alone, the two states comprising the region in 1840.

income position of the southern regions.<sup>14</sup> Conceivably, if we had sufficient data, this increase would appear, at least in some of the eastern states, as an abrupt break in an otherwise converging trend during the 1840–1880 period. Some support for this possibility derives from the fact that two New England states, Massachusetts and Rhode Island, did not conform to the regional pattern from 1840 to 1880, but showed a marked decline in their margin of excess over the national average.

After 1880, per capita income in these regions tended to converge toward the national average. In New England, the tendency was well pronounced from the beginning. In the Middle Atlantic region, the movement was rather slight until after 1930, when it became very substantial.

Both regions showed a noticeable break in trend between 1920 and 1930; indeed, in the Middle Atlantic region it was so great as to raise relative per capita income in 1930 almost to the 1880 level. We have already noticed a similar break with regard to the three southern regions, and reference to Chart 2 suggests that a like interpretation might be placed on the 1930 standings of the West North Central and Mountain regions. In fact, the only regions for which there is no clear evidence of interruption in trend in 1930 are the East North Central and the Pacific (though the latter—alone of all the regions—does show such a break in 1940). The evidence seems to suggest that the period around 1930 represented a somewhat exceptional situation with regard to the trend in interregional income differentials, though conceivably it is the 1920 configuration that should be so viewed. Both possibilities deserve further exploration. It may be noted that Kuznets's national data for the upper income groups show a swing similar to the state income data—an increase during the 20's in the deviation from the average of the per capita level of these groups, followed by a subsequent marked decline.<sup>15</sup>

In both the New England and Middle Atlantic regions the share in total income tended to decline steadily—between 1840 and 1880 because the population share declined; after 1880, chiefly because relative per capita income declined, though in New England, the diminishing population share also contributed noticeably. In the Middle Atlantic region a break in trend parallel to that in relative per capita income occurred in 1930.

Thus, the typical picture for these two regions is one of decline relative to the countrywide movement. With regard to income share this movement persisted throughout the full period; in the case of

<sup>14</sup> Per capita income in the two Central regions grew more rapidly than in the Eastern; hence, the improvement in relative income position of the two Eastern regions reflects basically improvement relative to the South.

<sup>15</sup> Cf. Simon Kuznets, *Shares of Upper Income Groups in Income and Savings*, National Bureau of Economic Research, 1953, p. 591.

INTERREGIONAL INCOME DIFFERENCES

population share, it was concentrated chiefly in the period before 1890 though noticeable decline continued in New England after that date; with respect to relative per capita income, it occurred in New England from 1880 onward, in the Middle Atlantic region chiefly after 1930.

Of the factors affecting relative per capita income in New England, the role played by the degree of labor force industrialization was particularly significant. This is shown by the following tabulation:

<i>New England</i>	1840	1880		1950
		<i>comparable to</i>		
		1840	1950	
Total income per capita	128	137	141	108
Service income per worker				
Agricultural	105	109	111	97
Nonagricultural	107	95	95	97
Labor force industrialization	185	203	155	110
Participation rate	101	108	113	105
Property income per capita			164	135

The consistently high level of relative per capita income was clearly associated with an exceptional advantage in labor force industrialization—particularly in the nineteenth century, when the proportion of the labor force in nonagricultural industry was as much as 50 per cent or more above the national average. Furthermore, the increase between 1840 and 1880 in the percentage excess of per capita income over the national average and the subsequent decline between 1880 and 1950 was accompanied by corresponding movements in labor force industrialization.

Of the other factors, two should particularly be noted. The first, relative property income per capita, was particularly high in New England, and contributed to high relative per capita income and also to the convergence toward the national level between 1880 and 1950. The other, nonagricultural income per worker, is noteworthy because, contrary to what might be expected, it appears to have played only a small part in affecting the differential income position of the region. The level hovered close to the national average, and the trend actually ran counter to that in total income per capita.

As shown on next page, the foregoing remarks for New England apply also to the Middle Atlantic region. A difference occurs in the case of the participation rate which in the Middle Atlantic region moved against the trend in per capita income rather than reinforcing it as in New England. In addition, the excess of agricultural income per worker over the national average was much greater in the Middle Atlantic region than in New England, except in 1950.

OUTPUT GROWTH AND PRICE TRENDS: U.S.

	1840	1880 <i>comparable to</i>		1950
<i>Middle Atlantic</i>		1840	1950	
Total income per capita	119	123	141	118
Service income per worker				
Agricultural	130	154	144	94
Nonagricultural	106	100	102	109
Labor force industrialization	154	183	150	110
Participation rate	90	88	103	105
Property income per capita		172		135

*The Country as a Whole*

Up to this point the analysis has been primarily concerned with the patterns in individual regions. If the nine regions are now ranked at each date by size of per capita income, are there any which stand out as consistently higher or lower? And what of the average magnitude of regional income differences—did it tend to grow or diminish over time? Finally, what underlying components were chiefly associated with the changing size of the per capita differences?

Let us look first at the regional ranks. In 1840 the West South Central region was highest. Next were the Middle Atlantic and New England regions, with roughly equal income levels, and finally, the two North Central regions and the South Atlantic and East South Central, clustered together.<sup>16</sup> But eliminating the slaves and their income from the figures for the southern regions would shift the South Atlantic and East South Central noticeably above the North Central and considerably closer to New England and the Middle Atlantic.<sup>17</sup>

The changes in rank between 1840 and 1880 were substantial. The Mountain and Pacific regions, newly added to the array, topped the

<sup>16</sup> The ranking is on the basis of the personal income figures extrapolated from 1880 (Appendix Table D-2). If the regions were ranked by per capita level of income originating in commodity production and distribution (Table A-1), the Middle Atlantic region would drop below New England, and the South Atlantic and East South Central would rise above the two Central regions though not as high as the Middle Atlantic.

<sup>17</sup> Seaman estimates the average cost of supporting each slave at \$30 in 1840 (Ezra Seaman, *Essays on the Progress of Nations*, Scribner, 1852, p. 462). Accepting this figure, one finds the per capita level of income originating in commodity production and distribution in the southern regions to be altered as follows:

	<i>Total Population</i>	<i>Free Population</i>
South Atlantic	\$ 55	\$ 71
East South Central	55	67
West South Central	104	157

This compares with estimates for the total population in the East and West North Central regions of \$46 and \$51, respectively, and for the Middle Atlantic of \$77 (Table A-1).

## INTERREGIONAL INCOME DIFFERENCES

standings by a significant margin. New England and the Middle Atlantic region came next, close together as in 1840. These were followed at some distance by the two North Central regions, which no longer ranked with the South Atlantic and East South Central, but were markedly higher. Then, dropping from first to seventh place came the West South Central, and finally, at the bottom, the East South Central and South Atlantic.

By contrast, the changes after 1880 were much less drastic. The Pacific region generally retained the lead. After 1900 the Middle Atlantic region rose from third to second rank and the East North Central from fifth to fourth, and, then, in 1950 the latter moved up again to third, displacing New England. The most drastic shift occurred with respect to the Mountain region, which, between 1880 and 1920 dropped sharply from second to fifth rank, and in 1950 was only slightly ahead of the West North Central. The three southern regions, though noticeably improving their relative income level during the period, remained at the bottom of the array. The only change occurred in 1920, when the South Atlantic moved from last position into eighth, displacing the East South Central.

Was the average tendency towards convergence or divergence of per capita income levels? To secure the fullest answer to this question differences among states rather than among regions were examined. For each state the percentage point deviation of per capita income from the national average was computed, then, for each date the deviations were averaged arithmetically, disregarding sign. A second average, similar to the first, was also calculated, except that the deviation for each state was weighted by the state share in the national population total, so as to minimize the effect on the average of states with large deviations but relatively small populations. The following indicates, for income originating in commodity production and distribution, the unweighted and weighted arithmetic mean deviation of state per capita income from the national average at the specified date, in percentage points:

	<i>Unweighted Mean</i>	<i>Weighted Mean</i>
1840 (including commerce)	25	26
1840 (excluding commerce)	23	20
1880	45	28
1900	36	27

According to the figures for the unweighted mean, there was a marked widening in state per capita income differences between the middle and latter part of the nineteenth century. The weighted mean too shows an increase, but the magnitude is much smaller, because the effect on the

OUTPUT GROWTH AND PRICE TRENDS: U.S.

average of the large deviations of the western states in 1880 and 1900 is substantially reduced by the weighting procedure.<sup>18</sup>

For the period from 1880 onward, a similar calculation was performed for personal income per capita. To secure a more complete picture of the trend, observations were added for all cycles from 1927 through 1955. In dating the results below, cycles are designated by their initial and terminal dates. In every case from 1919-21 on, the calculation rests on cycle averages, computed by the IBM 704 program, so as to isolate the secular tendencies as much as possible. The following tabulation shows the arithmetic mean deviation of state personal income per capita from the national level at the indicated date:

	<i>Unweighted Mean</i>	<i>Weighted Mean</i>
1880	47	35
1900	34	33
1919-21	24	28
1927-32	29	32
1929-37	30	32
1932-38	29	30
1937-44	25	25
1938-46	22	23
1944-48	18	19
1946-49	17	18
1948-53	18	18
1949-54	18	18
1953-57	18	18

In general, the picture—based on our fragmentary data—is one of a decline in interstate differences in per capita income from 1880 to 1920, an increase in the next decade of substantial magnitude but not sufficient to wipe out the preceding decline, and a subsequent drop at an unprecedented rate through the late forties. By the end of the period, interstate differences were markedly less than in 1880. Moreover, if the 1840-1900 series for the unweighted mean is taken as continuous

<sup>18</sup> An objection may be raised because the number of states changes from twenty-nine in 1840 to forty-six in 1880 and forty-eight in 1900. However, there is no obvious statistical reason why this should bias the result, since the new states may enter with deviations either greater or less than average. Nevertheless, recomputing the 1880 and 1900 mean deviations, and limiting the calculation to the twenty-nine states of 1840, gives the following results:

	<i>Unweighted Mean</i>	<i>Weighted Mean</i>
1880	29	27
1900	28	27

While the magnitude of the average deviation is usually reduced, particularly for the unweighted mean, the conclusion that the average deviation rose between 1840 and 1880 still holds.

INTERREGIONAL INCOME DIFFERENCES

with the series for 1880 to the present (as seems reasonable, judging from the overlap values for 1880 and 1900), interstate differences today are found to be noticeably less than in 1840. The figures for the weighted mean suggest the same, even without allowance for the likely downward bias of the 1840-1900 series indicated by comparison of the overlap values. This suggests that differences among states in per capita income today may be less—indeed, noticeably less—than at any time in over a century. However, in the most recent decade interstate differences have, on the average, been remarkably stable.

Did all of the components show a similar movement, or were some more closely associated with the trend in regional differences in per capita income than others? To answer this, the arithmetic mean of the regional deviations from the national level was computed for each component at each date from Tables D-3 and D-4. The procedure was identical with that described above, except that the data were for regions rather than states, and the calculation was performed for the unweighted mean only. For income originating in commodity production and distribution the average regional deviations in 1840 and 1880 were, in percentage points:

	1840	1880
Total income per capita	20	40
Service income per worker		
Agricultural	19	38
Nonagricultural	27	13
Labor force industrialization	47	64
Participation rate	9	11

For per capita income the sharp rise in the average regional deviation—from 20 to 40 per cent—was accompanied by a noticeable divergence in regional levels of agricultural income per worker and labor force industrialization. Surprisingly, however, regional levels of nonagricultural income per worker converged during this period, thus offsetting in part the tendency towards divergence arising from other sources.<sup>19</sup>

For personal income and its components, the average regional deviations from 1880 to 1950 were:

	1880	1900	1920	1930	1950
Total income per capita	46	37	26	31	17
Service income per worker					
Agricultural	35	39	41	33	26
Nonagricultural	17	16	10	14	11
Labor force industrialization	41	30	21	18	9
Participation rate	9	6	6	5	5
Property income per capita	50	46	40	48	28

<sup>19</sup> The inference that convergence in a component contributed to convergence in total income per capita is valid only if there is positive correlation between the two—a condition which is satisfied by all components.



Convergence of per capita income over the period as a whole was accompanied by substantial convergence in agricultural and non-agricultural income per worker, labor force industrialization, participation rate, and property income per capita. Thus all of the components distinguished here contributed to the narrowing of per capita income differences between 1880 and 1950, though not necessarily continuously or to an equal extent. The widening of per capita income differences between 1920 and 1930 was associated with divergence in nonagricultural income per worker and property income per capita; interregional differences in the other three components narrowed even during this period.

We have covered a great deal of ground in relatively short compass. What general impression remains? On the one hand there was the wide variety of experience. Trends in population and in total and per capita income varied among regions at a given time and within the same region over time. In addition, the relative influence of the underlying components of per capita income differed in time and space. Amid the variety, however, there was important evidence of stability. Changes in population and income shares became less marked. Per capita income levels tended on the whole to converge, reflecting at least in part growing uniformity among regions in the underlying components. Significant changes in shares and widening of per capita differences may still occur in the future, of course, for the impact of the changing conditions of economic development is always uncertain. Yet the impression remains of a great geographic area becoming more and more welded into a single economic unit and of growing balance among the parts—in short, of a more efficient geographic allocation of resources.

### *General Notes to Appendixes*

Calculations were carried through on unrounded figures. Detail does not necessarily add to totals because of rounding.

In 1840, Virginia includes West Virginia, Wisconsin includes eastern Minnesota, and Iowa includes western Minnesota and the eastern part of North and South Dakota.

In 1880 and 1900, "Dakota" includes North and South Dakota

At all dates, the District of Columbia has been omitted.

The Middle Atlantic region includes Delaware and Maryland, the South Atlantic region excludes them and also excludes the District of Columbia.

INTERREGIONAL INCOME DIFFERENCES

APPENDIX A

Tables of Basic Data, 1840, 1880, and 1900

For a discussion of the sources and methods underlying the estimates, see Appendix B.

TABLE A-1  
Income Originating, Total Population and Labor Force, and per Capita and per Worker Income Originating, Commodity Production and Distribution, by Region and State, 1840  
(A indicates estimates that include commerce, B ones that do not include it)

States	Total Income (mill. current dollars)		Nonagricultural Income		Total Population		Total Labor Force		Agricultural Labor Force		Nonagricultural Labor Force		Total Income per Capita		Total Income per Worker		Agricultural Income per Worker		Nonagricultural Income per Worker	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
U.S.	1,103	935	663	440	271	17,020	4,835	4,629	3,828	1,007	801	65	55	228	202	173	437	339		
New Eng.	186	157	72	114	86	2,235	640	578	394	246	184	83	70	291	272	182	465	466		
Maine	29	25	15	14	8	502	137	124	102	36	22	57	46	209	188	146	390	385		
N.H.	18	17	11	7	6	285	79	77	60	20	18	64	59	229	216	182	369	330		
Vt.	19	18	14	5	4	292	88	86	73	15	13	65	61	217	207	193	338	283		
Mass.	79	63	17	62	46	738	209	174	88	121	86	107	86	379	366	199	509	537		
R.I.	13	11	2	10	9	109	36	32	15	21	18	118	102	361	345	170	494	489		
Conn.	28	25	12	16	13	310	91	85	57	34	28	91	81	309	294	208	479	468		
Mid. Atlan.	390	316	198	192	118	5,074	1,295	1,218	879	416	339	77	62	302	259	225	462	348		
N.Y.	194	150	94	100	57	2,429	675	631	456	219	175	80	62	288	238	206	458	323		
N.J.	31	27	16	15	11	373	91	86	59	32	27	83	73	341	316	276	458	404		
Pa.	130	109	68	62	41	1,724	398	377	267	132	110	75	63	326	290	255	470	373		
Del.	5	5	3	2	2	78	21	20	16	5	4	68	60	250	235	185	451	430		
Md.	30	24	17	13	7	470	109	104	82	27	22	63	51	271	233	207	464	330		

continued on next page

OUTPUT GROWTH AND PRICE TRENDS: U.S.

TABLE A-1 concluded

States	Total Income (mill. current dollars)		Nongr- tural Income		Total Population	Total Labor Force (thousands)		Agricul- tural Labor Force		Nongr- tural Labor Force		Total Income per Capita (current dollars)		Total Income per Worker		Agricul- tural Income per Worker		Nongr- tural Income per Worker	
	A	B	A	B		A	B	A	B	A	B	A	B	A	B	A	B	A	B
E. No. Cent.	135	115	46	27	2,925	734	713	601	132	111	46	39	184	162	147	348	239		
Ohio	73	61	28	16	1,520	363	351	284	80	67	48	40	201	173	157	356	241		
Ind.	28	25	7	4	686	173	170	149	25	21	41	36	160	145	137	301	202		
Ill.	22	20	6	4	476	122	119	105	17	14	47	41	182	165	154	357	248		
Mich.	9	8	6	3	212	64	64	56	8	7	44	39	144	132	116	352	261		
Wis.	2	2	1	2	31	10	10	7	3	3	80	62	239	200	132	471	383		
W. No. Cent.	22	18	7	3	427	126	121	107	19	14	51	42	173	150	140	372	228		
Iowa	2	1	1	a	43	13	13	11	2	2	38	32	125	106	101	240	135		
Mo.	20	17	6	3	384	112	108	96	16	12	53	44	180	155	144	391	242		
So. Atlan.	182	165	48	21	3,334	1,083	1,064	973	110	91	55	50	168	155	148	343	232		
Va.	68	60	18	10	1,240	385	375	319	66	56	54	48	176	159	154	278	186		
N.C.	38	36	7	5	753	243	241	226	17	15	51	48	157	150	139	391	321		
S.C.	33	30	28	6	594	211	209	198	13	10	56	51	158	146	139	436	269		
Ga.	39	36	34	6	691	227	224	216	12	9	57	52	172	160	155	483	287		
Fla.	4	3	2	1	54	16	15	14	2	1	69	55	231	197	171	610	509		
E. So. Cent.	142	131	117	24	2,575	817	805	752	65	53	55	51	174	162	156	380	253		
Ky.	40	36	30	10	780	226	221	198	28	24	52	47	178	164	153	357	259		
Tenn.	39	36	32	6	829	248	246	228	20	18	47	43	156	147	142	314	209		
Ala.	31	28	27	5	591	197	194	187	10	7	53	48	159	146	142	457	255		
Miss.	31	30	28	3	376	145	144	140	6	4	84	79	216	207	201	586	401		
W. So. Cent.	47	32	29	18	450	141	130	121	20	9	104	72	331	250	238	904	413		
Ark.	7	6	6	1	98	30	30	28	2	1	68	65	224	214	194	795	659		
La.	40	26	23	16	352	111	100	93	18	8	113	74	359	261	251	913	374		

<sup>a</sup> Less than \$500,000.

INTERREGIONAL INCOME DIFFERENCES

TABLE A-2  
Income Originating, Total Population and Labor Force, and per Capita and per Worker Income Originating, Commodity Production and Distribution, by Region and State, 1880

States	Total Income (mill. current dollars)	Agricul- tural Income	Nonagri- cultural Income	Total Popula- tion	Total Labor Force (thousands)	Agricul- tural Labor Force	Nonagri- cultural Labor Force	Total Income per Capita (current dollars)	Total Income per Worker	Agricul- tural Income per Worker	Nonagri- cultural Income per Worker
U.S.	4,731	2,181	2,550	49,978	13,091	8,637	4,454	95	361	252	572
New Eng.	520	96	424	4,010	1,129	350	779	130	460	274	544
Maine	57	20	38	649	182	97	85	88	316	205	442
N.H.	41	11	30	347	110	49	61	118	372	231	487
Vt.	35	20	15	332	91	62	30	104	379	318	506
Mass.	254	24	231	1,783	485	79	406	143	525	297	569
R.I.	42	4	38	276	84	13	71	150	493	282	532
Conn.	91	18	73	623	176	50	126	146	515	355	578
Mid. Atlan.	1,349	393	956	11,578	2,679	1,014	1,665	116	504	388	574
N.Y.	622	183	439	5,083	1,151	437	714	122	540	419	615
N.J.	141	33	108	1,131	262	73	189	124	537	449	570
Pa.	490	139	351	4,283	1,020	372	647	114	480	373	542
Del.	16	7	9	147	40	22	17	108	398	316	503
Md.	80	31	49	935	207	109	98	86	389	286	505
E. No. Cent.	1,142	634	507	11,207	2,732	1,838	894	102	418	345	567
Ohio	312	161	151	3,198	733	459	274	98	425	350	551
Ind.	184	115	69	1,978	502	376	126	93	366	306	546
Ill.	349	199	150	3,078	733	494	240	113	476	403	627
Mich.	173	89	84	1,637	441	285	156	106	393	314	536
Wis.	124	71	53	1,316	322	224	98	94	384	315	543

continued on next page

OUTPUT GROWTH AND PRICE TRENDS: U.S.

TABLE A-2 continued

States	Total Income (mill. current dollars)		Total Population	Total Labor Force (thousands)		Agricultural Labor Force (thousands)		Nonagricultural Labor Force (thousands)		Total Income per Capita (current dollars)	Total Income per Worker (current dollars)	Agricultural Income per Worker (current dollars)	Nonagricultural Income per Worker (current dollars)
	Total Income	Agricultural Income		Nonagricultural Income	Total Labor Force	Agricultural Labor Force	Nonagricultural Labor Force	Total Income per Capita	Total Income per Worker				
W. No. Cent.	553	335	217	6,157	1,576	1,233	342	90	351	272	635		
Minn.	76	44	32	781	198	149	48	97	385	296	661		
Iowa	171	121	50	1,625	415	334	81	105	411	362	613		
Mo.	177	93	84	2,168	530	396	134	82	334	234	626		
Dak.	14	5	9	135	46	32	13	105	312	149	711		
Neb.	42	27	15	452	121	99	23	93	346	275	655		
Kan.	73	46	27	996	266	223	43	73	275	205	640		
So. Atlan.	326	236	90	6,338	1,885	1,664	221	51	173	142	407		
Va.	77	46	30	1,513	384	305	79	51	200	152	386		
W. Va.	33	19	15	618	149	119	30	54	224	158	487		
N.C.	65	53	12	1,400	418	383	35	46	155	139	334		
S.C.	50	42	8	996	344	322	23	51	146	130	376		
Ga.	87	68	19	1,542	513	470	43	56	170	145	449		
Fla.	13	8	6	270	77	65	12	48	168	115	457		
E. So. Cent.	317	241	77	5,585	1,599	1,449	150	57	198	166	510		
Ky.	95	61	34	1,649	417	351	66	58	229	173	524		
Tenn.	79	58	21	1,542	372	329	43	52	214	178	490		
Ala.	71	57	14	1,262	438	411	27	56	161	139	505		
Miss.	72	64	8	1,132	372	358	15	64	193	180	514		
W. So. Cent.	211	153	58	3,334	959	865	94	63	220	177	613		
Ark.	50	44	6	802	234	223	11	62	212	197	531		
La.	65	43	22	940	286	245	41	69	227	175	542		
Tex.	96	66	30	1,592	438	396	42	60	219	167	704		

continued on next page

INTERREGIONAL INCOME DIFFERENCES

TABLE A-2 concluded

States	Total Income (mill. current dollars)	Agricul- tural Income (mill. current dollars)	Nonagri- cultural Income	Total Popula- tion	Total Labor Force (thousands)	Agricul- tural Labor Force (thousands)	Nonagri- cultural Labor Force	Total Income per Capita (current dollars)	Total Income per Worker (current dollars)	Agricul- tural Income per Worker	Nonagri- cultural Income per Worker
Mountain	111	16	95	653	209	78	132	170	532	206	724
Mont.	9	2	8	39	16	5	10	240	602	326	740
Ida.	8	1	6	33	13	4	8	230	591	312	744
Wyo.	3	a	3	21	5	2	3	154	598	199	837
Colo.	43	4	38	194	74	16	58	221	580	288	658
N.M.	7	2	5	120	32	23	9	59	220	74	585
Ariz.	10	1	9	40	16	4	12	237	605	137	785
Utah	12	3	8	144	31	18	13	81	378	174	660
Nev.	20	3	17	62	22	5	18	318	879	517	983
Pacific	203	77	126	1,115	323	148	176	182	628	524	716
Wash.	10	4	6	75	24	15	9	140	437	278	688
Ore.	25	14	11	175	54	35	19	143	465	394	597
Cal.	168	59	108	865	245	98	148	194	683	607	733

a Less than \$500,000.

OUTPUT GROWTH AND PRICE TRENDS: U.S.

TABLE A-3  
Income Originating, Total Population and Labor Force, and per Capita and per Worker Income Originating, Commodity Production and Distribution, by Region and State, 1900

States	Total Income (mill. current dollars)	Agricultural Income	Nongri-cultural Income	Total Population	Total Labor Force	Agricultural Labor Force	Nongri-cultural Labor Force	Total Income per Capita	Total Income per Worker	Agricultural Income per Worker	Nongri-cultural Income per Worker
				(thousands)	(thousands)	(thousands)	(thousands)	(current dollars)	(current dollars)	(current dollars)	(current dollars)
U.S.	8,570	2,956	5,613	75,716	20,405	11,387	9,018	113	420	260	622
New Eng.	822	93	729	5,592	1,570	326	1,244	147	524	286	586
Maine	78	20	58	694	199	89	110	112	389	222	525
N.H.	57	11	46	412	132	42	90	138	430	254	511
Vt.	40	15	25	344	99	54	45	118	409	284	561
Mass.	436	26	410	2,805	745	78	667	156	585	338	614
R.I.	69	4	65	429	130	12	117	161	533	320	555
Conn.	142	17	125	908	265	50	215	156	537	337	583
Mid. Atlan.	2,333	340	1,993	16,828	4,152	1,030	3,122	139	562	330	638
N.Y.	1,029	147	882	7,269	1,675	417	1,258	142	614	353	701
N.J.	268	30	238	1,884	468	82	386	142	572	368	615
Pa.	894	125	769	6,302	1,681	390	1,290	142	532	321	596
Del.	23	6	16	185	51	22	29	125	448	291	569
Md.	119	31	88	1,188	277	118	158	100	430	261	555
E. No. Cent.	1,921	689	1,232	15,986	3,999	2,018	1,981	120	480	341	622
Ohio	516	160	356	4,158	1,052	468	584	124	491	343	609
Ind.	278	125	153	2,516	645	385	260	111	432	325	590
Ill.	646	224	422	4,822	1,138	619	681	134	567	431	681
Mich.	260	87	173	2,421	646	347	299	107	402	250	579
Wis.	221	93	128	2,069	519	300	219	107	426	310	584

continued on next page

INTERREGIONAL INCOME DIFFERENCES

TABLE A-3 continued

States	Total Income (mill. current dollars)	Agricul- tural Income (mill. current dollars)	Nonagri- cultural Income	Total Popula- tion	Total Labor Force (thousands)	Agricul- tural Labor Force (thousands)	Nonagri- cultural Labor Force	Total Income per Capita (current dollars)	Total Income per Worker (current dollars)	Agricul- tural Income per Worker (current dollars)	Nonagri- cultural Income per Worker (current dollars)
W. No. Cent.	1,247	712	535	10,347	2,622	1,844	777	120	476	386	688
Minn.	208	97	112	1,751	442	281	161	119	471	344	694
Iowa	307	204	104	2,232	563	404	159	138	546	505	651
Mo.	308	129	179	3,107	775	502	273	99	398	257	658
Dak.	100	74	26	721	194	164	31	139	514	449	860
Neb.	143	93	50	1,066	266	202	64	134	538	460	781
Kan.	180	116	64	1,470	381	291	90	122	472	397	715
So. Atlan. Va.	538	294	244	8,792	2,705	2,108	597	61	199	139	409
W. Va.	123	59	63	1,854	489	345	144	66	250	172	439
N. C.	76	27	49	959	267	169	97	79	286	162	502
S. C.	102	64	38	1,894	611	497	114	54	167	130	333
Ga.	76	51	25	1,340	494	422	72	57	154	122	347
Fla.	125	77	49	2,216	692	572	120	56	181	134	405
	35	14	21	528	154	104	50	67	230	140	417
E. So. Cent. Ky.	481	282	199	7,548	2,357	1,959	398	64	204	144	500
Tenn.	148	77	71	2,147	574	443	131	69	258	174	540
Ala.	114	66	57	2,021	564	450	114	61	217	146	497
Miss.	97	74	48	1,829	653	548	106	62	174	120	456
			23	1,551	565	519	46	62	171	142	495
W. So. Cent. Ark.	506	326	180	6,532	1,865	1,590	275	77	271	205	654
La.	83	54	30	1,312	416	363	53	63	200	147	564
Okla.	101	54	47	1,382	412	332	80	73	246	162	590
Tex.	65	45	20	790	222	198	24	82	291	228	805
	256	173	83	3,049	814	697	118	84	315	249	705

continued on next page



OUTPUT GROWTH AND PRICE TRENDS: U.S.

TABLE A-3 concluded

States	Total Income (mill. current dollars)		Nonagri- cultural Income	Total Popula- tion	Total Labor Force ( thousands )		Nonagri- cultural Labor Force	Total Income per Capita ( current dollars )	Total Income per Worker	Agricul- tural Income per Worker	Nonagri- cultural Income per Worker
	Agricul- tural Income	Agricul- tural Income			Total Labor Force	Agricul- tural Labor Force					
Mountain	299	78	220	1,675	477	217	260	178	626	360	848
Mont.	66	16	50	243	85	31	54	271	776	525	920
Ida.	28	11	17	162	49	30	20	173	567	359	885
Wyo.	22	7	15	92	34	16	19	237	643	458	797
Colo.	94	20	75	540	142	49	93	175	664	405	799
N.M.	20	6	14	195	52	35	18	103	383	183	782
Ariz.	25	4	20	123	40	18	23	200	612	250	895
Utah	32	10	22	277	60	33	27	114	531	297	820
Nev.	12	4	8	42	14	7	7	281	850	583	1,093
Pacific	424	143	281	2,417	659	294	364	176	644	486	772
Wash.	94	23	71	518	160	64	96	181	588	364	737
Ore.	62	25	37	414	118	67	51	150	523	375	716
Cal.	269	95	174	1,485	381	164	217	181	706	579	801

## APPENDIX B

*Derivation of Estimates: 1840, 1880, and 1900*

The income concept used in the estimates presented in Appendix A is income originating in commodity production and distribution in each state. It includes payments for the provision of labor and property services (wages, salaries, proprietors' income, rents, interest, and dividends) and income in kind (food and fuel produced and consumed by farmers, and the net rental value of owner-occupied farm and non-farm dwellings) distributed by state on a "where paid" rather than "where received" basis. Commodity production and distribution covers agriculture, mining, construction, manufacturing, transportation, public utilities, and (in 1840) trade. Not included is income originating in finance, insurance, and real estate (other than services of owner-occupied dwellings); in the service industries (domestic, personal, professional, recreational services, and so forth); and in government. The decision to limit the industrial scope of the estimates was based on lack of data for the service sectors in 1840, for which not even labor force data were available. Two variants of the 1840 estimate are presented, one including and one excluding income from "commerce," that is, transportation and trade.

The 1840 estimate is basically that of Seaman, revised somewhat and adjusted for comparability with the later estimates. The bulk of this appendix is devoted to an analysis of his estimate and to my reasons for accepting his figures rather than attempting to construct a new estimate. The 1880 and 1900 estimates are mine, adjusted so far as possible to the scope of the present concept.

Despite adjustment, there remain elements of incomparability between the 1840 and 1880-1900 estimates. Unlike the estimates for the later dates, the 1840 estimate refers to gross rather than net income originating; that is, no deduction was made for depreciation in arriving at the income total. In addition, the 1840 estimate includes the value of agricultural improvements done by the farmer (clearing, draining, fencing, and so forth) but excludes income from the services of dwellings. There is also some disparity in industrial coverage. The 1880 and 1900 estimates include transportation but not trade; hence the 1840 estimate including commerce is somewhat broader in coverage (including both transportation and trade), while that excluding commerce is somewhat narrower (omitting both). A reliable separation of the two sectors in 1840, or the addition of the trade sector in 1880 and 1900, was not possible from the available data. In addition, the construction sector in 1840 covers only house-building. Finally, the estimates differ in the division between agricultural and nonagricultural industry, because the 1880 and 1900 estimates include all income from forestry

and fishing under agriculture, while the 1840 estimate includes in agriculture only the income from production of fuelwood (though this is larger in amount than the income from other forestry and fishing activities included under nonagricultural industry).

These comments on the industrial scope of the income estimates and of shifts in scope between 1840 and 1880-1900 also apply to the labor force estimates in Appendix A.

#### INCOME ESTIMATE FOR 1840

Two fairly detailed estimates of state income for 1840 were prepared by contemporary writers: one by George Tucker, Professor of Moral Philosophy and Political Economy at the University of Virginia, published in 1843, the other by Ezra C. Seaman, lawyer and one-time federal and state government official, first published in 1848 and revised in 1852.<sup>20</sup> This posed as an alternative to preparation of an entirely new estimate the possibility of using one of the earlier estimates. Clearly, the estimator living at the time has an advantage over one who comes later in his greater familiarity with sources of data, and probably a better notion of the reasonableness of the figures. On the other hand, the concepts and methods of the later estimator are more likely to conform to the needs and standards of present day analysis.

At first glance, the two estimates are surprisingly close.<sup>21</sup> The national totals, which fall on either side of a billion dollars, differ by less than 10 per cent, and many of the state figures are reasonably close. However, closer investigation reveals that the similarity is largely the consequence of substantial offsetting differences in the estimates for income originating in agriculture and in commerce. Tucker's estimate of agricultural income for the nation as a whole exceeds Seaman's by \$114 million, or over 20 per cent, while his estimate for commerce is \$71 million less, more than 40 per cent. Examination of the construction of the estimates shows the superiority of Seaman's procedures both conceptually and in degree of refinement. For example, in estimating agricultural income Seaman makes a more consistent allowance for the possibility of duplication arising from the use of part of the output for seed and feed. His estimate for commerce draws more fully on available information, utilizing data on both employment and capital whereas

<sup>20</sup> George Tucker, *Progress of the United States in Population and Wealth in Fifty Years*, Press of Hunt's Merchants' Magazine, 1843, ch. xx, and Seaman, ch. xiv (see footnote 17, above). An earlier edition of Seaman's work was published in 1846, and followed by two supplements, in 1847 and 1848. The 1848 supplement contains the first set of state income estimates, which were incorporated in revised form in the 1852 edition. Unless otherwise specified, citations of Seaman are to the 1852 edition. A third edition, in two volumes, was issued in 1868, but the state income estimates were unchanged.

<sup>21</sup> See the comparison in Seaman, *Supplement to Essays on the Progress of Nations*, No. II, Baker and Scribner, 1848, pp. 147-48.

Tucker uses only the latter. Indeed, Seaman's concepts and techniques prove to be surprisingly up-to-date. For example, Seaman develops two separate estimates of national income, one, by summing income originating in various industries, the other, as the total of final products of the economy. Some of the components of the latter are estimated by use of a crude commodity flow technique similar to the more elaborate one currently employed by the Department of Commerce.

I therefore discarded Tucker's estimate and decided to subject Seaman's to more intensive examination, and concluded that with one important exception (the estimate of income from production of animal products) Seaman's figures were acceptable. In the following sections, a detailed discussion is presented of Seaman's sources and methods and the evaluation on which this conclusion was based. It may be helpful at this point, however, to summarize briefly the principal findings.

Conceptually, Seaman's estimate relates to gross income originating in commodity production and distribution in each state. His estimate is "gross" only in that no allowance is made for capital consumed in the process of production. Though no specific citations are given, Seaman's estimate obviously is based for the most part on data in the federal census of 1840.<sup>22</sup> In his preface (page ix), Seaman indicated that "the works most frequently consulted, in addition to official documents and reports, have been 'Hunt's Merchants' Magazine,' 'The American Almanac,' 'British Almanac and Companion,' 'Annuaire of France,' 'McCulloch's Statistics,' 'Commercial Dictionary and Universal Gazetteer,' 'Porter's Progress of the Nation,' 'Hallam's Middle Ages,' 'Jacob on the Precious Metals,' 'Brand's Encyclopedia of Science and Art,' 'Gibbon's Rome,' 'Mosheim's Church History,' and 'Murray's Geography'." It is clear, too, that Seaman had Tucker's work at hand.

Seaman developed an estimate of income originating in each state in each of six industrial sectors: agriculture, manufacturing, mining, commerce, fisheries, and forestry. The method differs among the sectors according to the nature of the underlying data. For the most important sector, agriculture, the census provided chiefly data only on quantity of output, and Seaman derived his income estimate by valuing each type of output at the average price in each state, 1840-46, after allowing for the portion consumed in production as seed and feed. For manufacturing, the census reported "value manufactured" (sales and probably additions to inventories) in census year prices. To determine income originating in each state, Seaman reduced the value totals for each industry by the nationwide ratio of materials to value manufactured.

<sup>22</sup> In a few cases Seaman corrected the basic census data. Generally his arguments for the corrections are convincing and I accepted them throughout, but had the census been followed completely, the estimates would have been substantially the same.

For the other principal industrial sector, commerce, the census gave information on labor force and on capital invested in the industry in each state. Seaman converted these to income estimates by applying an average wage to the former (with a slight allowance for interstate variation) and an average rate of return to the latter.

While Seaman's statement of his procedures is fairly detailed, especially considering the standards of his day, there is some uncertainty, chiefly with regard to the sources Seaman used in moving from the census data to the income estimates. Of course, some uncertainty is present to some extent in every income estimate, since no estimator could state (and no reasonable consumer want) every detail of his procedure. Nevertheless, I undertook to reconstruct Seaman's estimates to determine the size of the uncertainty. Starting with the census materials and drawing on such other relevant sources as could be readily identified, I used Seaman's methods to derive an estimate of agricultural and nonagricultural income state by state. With a few exceptions, the reconstructed estimate for agricultural income fell within 10 per cent of Seaman's, while for no state did the difference in nonagricultural income exceed 6 per cent. These differences seem well within the margin of error of the estimates. In the detailed discussion below, where there is uncertainty about Seaman's procedure, I have indicated how I attempted to reconstruct his estimate.

Finally I attempted to evaluate Seaman's estimates. For the country-wide totals I had the recent estimates by Robert Gallman of value added in agriculture, manufacturing, and mining.<sup>23</sup> To evaluate the accuracy of the figures which Seaman used in transforming the census data into an income estimate for each state—such as the pattern of interstate variation in prices of different agricultural products, the allowances for seed and feed consumed in agricultural production, and the deduction for materials consumed in manufacturing production—I drew chiefly on the 1848 report of the Commissioner of Patents, Tucker's study, and the 1850 federal census. On the whole, the outside sources supported Seaman's estimates quite well. One important exception developed, however. Seaman's estimate of income from animal products appeared to be badly understated. I therefore introduced a revised estimate for income from this source, following chiefly Gallman's procedure. In addition, to improve comparability with the 1880 and 1900 estimates, the value of home manufactures was eliminated from agricultural income, and income from the production of fuelwood was shifted from the nonagricultural to the agricultural sector.

<sup>23</sup> Robert E. Gallman, "Value Added by Agriculture, Mining and Manufacturing in the United States, 1840-1880," unpublished Ph.D. dissertation, University of Pennsylvania, 1956. Gallman's paper in the present volume incorporates some revision of these estimates, but these are not significant for our purpose.

*Agricultural Income*

SEAMAN'S ESTIMATE. For most crops, the 1840 census provided information on physical output only during the census year. Seaman reduced the output totals of wheat, barley, oats, rye, buckwheat, and potatoes to allow for the portion of the crop consumed as seed. He excluded the output of hay completely on the ground that it was used almost entirely for feed in agriculture except in the New England and Middle Atlantic states, where he reduced output by either a third or a half, on the ground that the remainder was sold by the farmer to the commercial cities and large towns for horses and mules used for non-agricultural purposes.

The output totals after the adjustments were valued at the prices received by farmers, to obtain the contribution of crop production to gross farm income. In describing the prices used, Seaman states (page 452): "In estimating the annual value of products, my aim has been to estimate their average value during the last seven or eight years at the places of production, or where they are sold by the producer." The average price applicable to the output in the nation as a whole is given for each crop. However, in deriving the state estimates, Seaman introduced an allowance for differences in the prices received by farmers in different states. The state prices which he used are actually given for only five crops (though important ones): wheat, corn, oats, potatoes, and sugar. In reconstructing Seaman's estimates, I used Tucker's state prices for barley, rye, buckwheat, hemp and flax, wool, tobacco, rice, and cotton, adjusting the price of the first four in each state proportionately to secure Seaman's nationwide average price. For all other crops I used Seaman's average price for the country as a whole, with no allowance for state-to-state variation.

Seaman also included at full value the census return on value of produce of market gardeners and added an allowance for the products of domestic gardens not returned by the census. In reconstructing his estimates the latter was distributed by state in proportion to the state distribution of the agricultural labor force.

For livestock products, the census reported the value of the annual output of poultry and of dairy products. Seaman thought the returns low and included them at full value, together with additional allowances for the net output of eggs and poultry not returned by the census and for milk and cream consumed by farmers. In reconstructing Seaman's estimates, I distributed the former by state in accordance with the census distribution of poultry, and the latter in accordance with the census distribution of dairy products.

The census provided no information on the annual slaughter and net increase of cattle, sheep, swine, and horses and mules, reporting only the total stock as of June 1, 1840. Seaman's estimate of the annual

OUTPUT GROWTH AND PRICE TRENDS: U.S.

income from these livestock (other than from dairy products) is quite crude. The adjustment of his estimates is discussed below.

The census also reported the annual value of the products of orchards, of nurseries and florists, and of family goods (home manufactures). The first two Seaman included at full value, and the last he reduced by half to allow for materials purchased from the nonagricultural sector. Finally, he included an allowance for capital formation in kind in the form of clearing and fencing land, and "draining and other agricultural improvements." In reconstructing his estimates I distributed both by state (following his brief description on pages 452-453) in accordance with the share of each state in the decade increase in population.

Table B-1 summarizes the reconstruction of Seaman's state estimates of agricultural income. On the whole the results are good. For most

TABLE B-1  
Distribution of States by Percentage Deviation of Reconstructed  
Agricultural Income Estimate from Seaman's, 1840

<i>Deviation<sup>a</sup></i> (per cent)	<i>All</i> <i>States</i>	<i>East</i>	<i>Central</i>	<i>South</i> <i>Atlantic</i>	<i>South</i> <i>Central</i>
10 and over <sup>b</sup>	2		2		
5 to 9.9	7	1	5		1
0 to 4.9	8	2		3	3
-0.1 to -5	5	3		1	1
-5.1 to -10	4	3			1
Less than -10 <sup>c</sup>	3	2		1	
Total	29	11	7	5	6

<sup>a</sup> Deviation of reconstructed estimate from Seaman's for United States as a whole was 0.04 per cent.

<sup>b</sup> Includes Illinois, 20 per cent, and Iowa, 25.

<sup>c</sup> Includes New Jersey, -11 per cent, Delaware, -12, and South Carolina, -22.

states the reconstructed total is close to that given by Seaman. In all but five the difference is less than 10 per cent. Moreover, the regional pattern of differences between the two estimates conforms to what might have been expected. In all of the eastern states except three (Maine, New Hampshire, and Vermont), the reconstructed total falls short of Seaman's, while in every central state the opposite is true. In deriving the reconstructed totals, I made no allowance for interstate price variation for certain crops though Seaman undoubtedly did. Since prices were generally above the countrywide average in the East and below average in the West (see, for example, Tables B-2 and B-5), the effect of the assumption of uniform prices for certain items would be to lower my total relative to Seaman's for the eastern states, and to raise it for the central states.

## INTERREGIONAL INCOME DIFFERENCES

In two of the five states for which the difference exceeds 10 per cent (New Jersey and Delaware), a higher allowance for interstate price variation in the reconstructed estimate would probably have reduced the deviation to less than 10 per cent. Such an allowance would have worked in the same direction in Illinois and Iowa, where its effect would probably have been greater than in most of the other central states, since prices were generally somewhat lower in the two states.<sup>24</sup> Also the small base for computing the percentage difference for Iowa tends to exaggerate the discrepancy.

For the remaining state for which the difference is large, South Carolina, an explanation in terms of price variation does not seem reasonable, especially considering the close correspondence of the reconstructed and Seaman totals for other states in the region. Possibly Seaman made a computing error in the case of South Carolina, a possibility supported by a comparison of Seaman's agricultural income estimates and Tucker's, in which Seaman's estimate for South Carolina appears noticeably out of line. Leaving aside the four frontier states of Michigan, Wisconsin, Iowa, and Missouri, Tucker's estimate is always higher except for South Carolina. In the present estimates, however, I accepted the Seaman estimate since the effect of adjustment would have been relatively small, particularly on the patterns of regional (as opposed to state) income variation.

EVALUATION. Granted that the uncertainty in the sources and methods underlying Seaman's estimate is of relatively small quantitative significance, are the adjustments Seaman made in moving from the basic census data to his income estimate acceptable? Aside from his estimate of income from animal products, this calls chiefly for evaluation of the deductions for seed and feed, of the differences in state prices, and of the adjustments for undercoverage of the census.

As a check on Seaman's deductions for seed and feed, we have the independent estimates of Gallman, derived by extrapolating backward the Department of Agriculture estimates for 1869 and after. The tabulation shown on next page compares the percentage of crop entering gross income (output after deduction for seed and feed as a percentage of the initial total) according to the two estimators.<sup>25</sup> The striking difference in the adjustments for corn and oats is due to differences in estimating the output of animal products. Seaman made no deduction for feed for the two crops and estimated the value of animal products over and above the value of feed. Gallman made a direct estimate of the value of animal products in full, and consequently

<sup>24</sup> Cf. Seaman, p. 366, Tucker, pp. 172-194, and *Annual Report of the Commissioner of Patents for the Year 1848*, H. Exec. Doc. 59, 1849, pp. 647-685.

<sup>25</sup> Cf. Seaman, pp. 453-454 (the percentage for hay is a weighted average of the state percentages discussed above in the text), and Gallman, p. 159.



OUTPUT GROWTH AND PRICE TRENDS: U.S.

	<i>Seaman</i>	<i>Gallman</i>
Wheat	89	85
Corn	100	18
Oats	92	30
Barley	89	85
Rye	89	74
Buckwheat	92	69
Hay	19	18
Potatoes:		
Irish	92	77
Sweet		85

reduced the output of corn and oats to allow for the portions included in the animal products estimate as feed. For the remaining crops, the allowances for seed and feed are sufficiently close for one to conclude that use of Gallman's percentages instead of Seaman's would have had little effect on the state estimates. The two crops for which Seaman and Gallman differ most, buckwheat and rye, account for a very small part of agricultural output compared to the crops for which they are in close agreement.

Seaman did not allow for possible duplication arising from the inclusion of goods purchased from the nonagricultural sector in the value of agricultural output. But this probably does not impair the accuracy of his estimates since the principal purchase of this type was manufactured fertilizer, which Gallman (pp. 189-190) suggests was unimportant in 1840.

Of the five crops for which Seaman specified the price used in valuing state output, one, sugar, is highly concentrated geographically. Hence the evaluation of the reasonableness of Seaman's pattern of interstate price variation was limited to four crops, though important ones: wheat, oats, corn, and potatoes. For comparison, I employed the prices used by Tucker in constructing his income estimates and also those reported in the 1848 Patent Office report (pp. 646-647), which were "compiled from a number of returns in the different States; and in some instances, perhaps, eight or ten—in others, not more than four to six; and in one or two instances, perhaps, not more than two. The extremes are given, and the replies ranged from these; but in many instances there was almost an entire similarity in the judgments formed in the case of the most prominent crops. . . . For a few of the states, as no returns were received in answer to our circular, there are no records made."

Table B-2 summarizes the comparison of wheat and corn prices. The results for oats and potatoes were similar. Since both Seaman and Tucker show fairly little price variation within the principal regions,

INTERREGIONAL INCOME DIFFERENCES

TABLE B-2  
Range in Price per Bushel Received by Farmers for Wheat and Corn,  
Three Sources, by Region and State  
(cents)

	WHEAT			CORN		
	<i>Seaman</i> <sup>a</sup>	<i>Tucker</i> <sup>b</sup>	<i>Patent Office</i> <sup>c</sup>	<i>Seaman</i> <sup>a</sup>	<i>Tucker</i> <sup>b</sup>	<i>Patent Office</i> <sup>c</sup>
United States	77	80		28	35	
New England	112½	125		62½-67	60-75	
Maine			125-150			75-100
New Hampshire			125-150			75-100
Vermont			100-175			50-100
Massachusetts			150			80-90
Middle Atlantic	87½-112½	100		40-62½	50-62½	
New York			100-125			37½-75
New Jersey			110-125			50-75
Pennsylvania			75-125			33-100
Maryland			100			
Central <sup>d</sup>	50-60	50 <sup>e</sup>		15-25	20-25	
Ohio			60-100			10-60
Indiana			45-75			16-35
Illinois			62½-80			12½-25
Michigan			62½-100			25-40
Iowa			50-75			10-20
Kentucky			75			25
Tennessee			50-95			25
South Atlantic	50-112½	100		20-50	40-50	
Virginia			62½-100			33-60
South Carolina			100			40-75
Georgia			60-75			20-40
South Central <sup>d</sup>	100-112½	100		25-40	40-50	
Alabama			50-100			25-50
Mississippi						50

<sup>a</sup> Average of 1840-46. Source: Seaman, p. 366.

<sup>b</sup> Average of 1840 and 1843. Source: Tucker, pp. 172-194 (value of product divided by output).

<sup>c</sup> 1848. Source: 1848 Patent Office report, pp. 647-657.

<sup>d</sup> For this table only, Kentucky and Tennessee were included in the Central and excluded from the South Central region.

<sup>e</sup> Except Tennessee, 75 cents.

only the price range in each region is presented. The 1848 Patent Office report's price range for each state is reproduced in full.

Seaman's prices are an average for 1840-46, Tucker's an average for 1840 and 1843, those in the 1848 Patent Office report refer to 1848; hence there is no reason to expect the levels to be the same, but the pattern of interregional variation does show fair similarity. Prices in the central states are generally lower than elsewhere. Also there is a

tendency for prices to be lower as one moves down the eastern seaboard from the New England to the Middle Atlantic and South Atlantic states. Finally, the magnitudes of interstate price differences appear reasonably consistent among the several sources. Thus the interstate price differences assumed by Seaman for these crops seem consistent with other evidence.

In evaluating Seaman's adjustment for undercoverage of the census, we have again the estimates of Gallman, though they are not entirely independent since Gallman was guided in part by Seaman's work. But Gallman could compare his adjustments with estimates for subsequent dates, and to that extent they may be taken as independent. On the whole, his results support Seaman's, as indicated in the following tabulation of their estimates of the value of products omitted from the agricultural census (in millions of dollars):<sup>26</sup>

	<i>Seaman</i>	<i>Gallman</i>
Improvements <sup>a</sup>	32	26
Milk and cream	11	20
Poultry and eggs	3	13
Products of domestic gardens	10	6
Other <sup>b</sup>	—	7
Total	56	72

<sup>a</sup> Clearing, fencing, draining, and other improvements.

<sup>b</sup> Peas and beans, molasses, honey, and flaxseed.

Seaman's adjustments raise his agricultural income total by around 10 per cent. Had I used Gallman's, the increase would have been only slightly greater. For some items the two estimators differ, but not importantly. Gallman also estimated several other items not covered by the census but their total value is small and would add only a little over 1 per cent to Seaman's income total. I therefore accepted Seaman's adjustments.

How does Seaman's nationwide agricultural income estimate compare with Gallman's? The difference is startling at first sight. Seaman's income total is about \$540 million, Gallman's about \$730 million. A detailed reconciliation, however, shows much greater correspondence.<sup>27</sup> Indeed, the difference is almost wholly explained by four factors: (1) the excess of Gallman's estimate for income from animal products over Seaman's (\$94 million); (2) the higher level of prices at which Gallman's estimate is valued (accounting for about \$50 million of the discrepancy); (3) Gallman's inclusion of forest products, chiefly firewood, in agricultural income while Seaman classified this under forestry

<sup>26</sup> Seaman, p. 454, and Gallman, pp. 105, and 349-350.

<sup>27</sup> I am indebted to Gallman for providing this reconciliation.

(\$26 million); and (4) Gallman's inclusion of family goods without deducting Seaman's allowance of 50 per cent for materials (\$14 million). In my adjustments I substantially eliminated the discrepancies arising from the treatment of animal products and of forest products. The treatment of family goods is not relevant since I eliminated family goods from Seaman's estimate to improve comparability with the 1880 and 1900 data. This leaves only the discrepancy due to valuation, and this appears reasonable, since there was a sharp decline in prices between the census year of 1839-40, the valuation base used by Gallman, and the years 1840-46 used by Seaman.

ADJUSTMENTS TO SEAMAN ESTIMATE. The most important adjustment was to the estimate of income from animal products—that is, income (other than from dairy products) from the production of swine, cattle, sheep, and horses and mules. The 1840 census reported only the total stock of each type of livestock on hand as of June 1. Seaman did not attempt to estimate directly the total value of animals slaughtered or added to stock during the year. Instead he included in his agricultural estimate the output of all grains (after deducting an allowance for seed) at their full value plus an estimate of the value of output of each type of livestock beyond the grain consumed by that type (pages 451-455). In another place (pages 277-278), however, Seaman estimated national product from the final product side. In the process he made an estimate of the output of pork and beef which is of use in appraising his estimate of income from animal products.

Gallman's study suggests that Seaman's implicit estimate of income from animal products is much too low, probably by around \$90 million. The principal issue in choosing between the Gallman and Seaman estimates is the consistency of the estimate of pork production (which accounted for about 70 per cent of the income from animal products in 1840) with the census returns on Indian corn and on hog inventories. A reasonable estimate for 1840 is that it took about seven bushels of corn to raise one hundred pounds of pork, and that the ratio of hogs slaughtered to the January 1 inventory was around 100 per cent.<sup>28</sup> Testing the estimate of pork production against the census returns by means of these conversion factors, one finds that Seaman's estimate is low with regard to both returns, while Gallman's is reasonably consistent.<sup>29</sup> Seaman attempted such a test for the corn return and concluded

<sup>28</sup> For the corn conversion ratio, see Seaman, p. 275 and Gallman, p. 121. The slaughter ratio, given by Gallman (p. 118), is the same as that used by Strauss and Bean for the latter part of the nineteenth century (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. 116).

<sup>29</sup> Cf. Gallman, pp. 122-123. The census corn return provides the only independent test of the Gallman estimate, since he derived his estimate of pork output from the census inventory figure.

OUTPUT GROWTH AND PRICE TRENDS: U.S.

that the census return on corn was too high rather than his pork production figure too low. But, as Gallman pointed out, Seaman's conclusion seems doubtful because of the continuing high returns for corn at later censuses and because he overlooked the inconsistency between his estimate of pork production and the census return on hog inventories.

Seaman's estimate would appear to draw support from the 1850 census return for animals fattened. Indeed, on this basis he concluded that his 1840 figure for income from animal production was too high, not too low, while Gallman's estimate for 1850 is \$161 million larger than the census figure of \$109 million. However, Gallman (p. 106) gave good reason for believing that the census returns were grossly understated during these years. Possibly the returns referred only to sales of slaughtered animals. For 1869 Strauss and Bean (pp. 112-123) secured an estimate of gross income from animal production which, after allowance for conceptual differences, is reasonably close to Gallman's, which exceeds the census return by \$520 million.

In view of the evidence favoring Gallman's figures, I revised Seaman's estimate. First the value of Indian corn and the value of swine and cattle produced in excess of that included in the corn total was eliminated

TABLE B-3  
Example of Adjustment of Seaman's Estimate of Agricultural Income, 1840  
(millions of dollars)

	United States	Pennsylvania
Seaman's agricultural income <sup>a</sup>	540	53
<i>Less:</i> <sup>b</sup>		
Family goods	14	1
Indian corn	106	7
Swine	14	1
Cattle	38	4
<i>Add:</i> <sup>c</sup>		
Fuelwood	40	4
Indian corn	20	1
Pork	174	15
Beef	62	6
<i>Equals:</i> Revised estimate	664	68

<sup>a</sup> Seaman, p. 461.

<sup>b</sup> *Family goods*: Value (1840 census *Compendium*, p. 359) multiplied by 0.5. *Indian corn*: United States, Seaman, p. 453; Pennsylvania, quantity (*Compendium*, p. 144) multiplied by price (Seaman, p. 366). *Swine and cattle*: United States, Seaman, p. 454; Pennsylvania, quantity (*Compendium*, p. 359) multiplied by price (Seaman, p. 454).

<sup>c</sup> *Fuelwood*: Seaman, p. 462. *Indian corn*: Same as in footnote b except that a deduction of 81.5 per cent of total value was made for seed and feed (cf. Gallman, p. 159). *Pork and beef*: Table B-4.

## INTERREGIONAL INCOME DIFFERENCES

from Seaman's estimates (Table B-3).<sup>30</sup> Since this eliminated corn used for purposes other than animal production, it was necessary to add back an estimate for the value of corn production going to non-feed purposes. My procedure in estimating pork and beef production generally followed the lines laid down by Gallman (pp. 104-126), and is illustrated in Table B-4. The allowance for interstate differences in

TABLE B-4  
 Estimate of Value of Pork and Beef Production,  
 United States and Pennsylvania, 1840

	<i>All States</i>	<i>Pennsylvania</i>
<b>Pork:</b>		
Swine inventory, June 1, 1840 (thous.) <sup>a</sup>	26,297	1,504
Swine slaughtered, census year 1840 (mill. lbs. live weight) <sup>b</sup>	4,536	260
Interstate price relative (%) <sup>c</sup>		200
Adjustment for price differences among states (mill. lbs. live weight) <sup>d</sup>	5,906	519
Value of pork production (\$ mill.) <sup>e</sup>	174	15
<b>Beef:</b>		
Total cattle inventory, June 1, 1840 (thous.)	14,968	1,173
Ratio of beef cattle to all cattle, 1850 (%)		49
Beef cattle inventory, June 1, 1840 (thous.) <sup>a</sup>	8,043	571
Beef cattle slaughtered, census year 1840 (mill. lbs. live weight) <sup>b</sup>	2,738	194
Interstate price relative (%) <sup>c</sup>		167
Adjustment for price differences among states (mill. lbs. live weight) <sup>d</sup>	3,310	325
Value of beef production (\$ mill.) <sup>e</sup>	62	6

<sup>a</sup> *Pork*: 1840 Census of the United States, *Compendium*, p. 359. *Beef*: Total cattle inventory, June 1, 1840 (*ibid.*, p. 359) times ratio of "other cattle" to "total neat cattle," 1850 (1850 Census of the United States, *Compendium*, p. 170) divided by 100, except all states entry, which is the sum of state entries.

<sup>b</sup> *Pork*: Swine inventory, June 1, 1840, times the ratio (0.1725) of swine slaughtered during the census year 1840 as estimated by Gallman (pp. 117-123 and 146) to the swine inventory on hand June 1, 1840. *Beef*: Beef cattle inventory, June 1, 1840, times the ratio (0.304) of cattle slaughtered during the census year 1840 as estimated by Gallman (pp. 123-126 and 346) to the beef cattle inventory on hand June 1, 1840.

<sup>c</sup> From Table B-5.

<sup>d</sup> Swine or beef cattle slaughtered times interstate price relative, except all states entry, which is the sum of state entries.

<sup>e</sup> *Pork*: Preceding line times the national total for the value of pork production (\$174 million), obtained as the product of live weight slaughtered (4,537 mill. lbs.) and the mean price (\$0.038 per lb.) for 1840 and 1844-45, as estimated by Gallman (p. 169), divided by the all states price adjustment (5,906). *Beef*: Preceding line times the national total for the value of beef production (\$62 million), obtained as the product of live weight slaughtered (2,739 mill. lbs.) and the mean price (\$0.023 per lb.) for 1840 and 1844-45, as estimated by Gallman (p. 169), divided by the all states price adjustment (3,310).

<sup>30</sup> The adjustments relating to family goods and fuelwood in the table are discussed later.

OUTPUT GROWTH AND PRICE TRENDS: U.S.

prices (Table B-5) was based chiefly on data in the 1848 Patent House report, but since data were not given for every state, the pattern was filled out on the basis of related data given by Tucker and Seaman.<sup>31</sup>

TABLE B-5  
Farm Price per Pound Live Weight of Pork and Beef by State  
Relative to the Price in Ohio, 1840  
(per cent)

	<i>Pork</i>	<i>Beef</i>
All New England states	225	200
All Middle Atlantic states	200	167
Ohio, Michigan, and Wisconsin	100	100
Indiana and Illinois	90	80
Iowa and Missouri	80	80
Virginia and North and South Carolina	150	133
Georgia and Florida	125	90
Kentucky and Tennessee	100	90
Alabama and Mississippi	125	90
Arkansas and Louisiana	125	90

Based chiefly on data from the 1848 Patent Office report, pp. 673ff.

Table B-6 summarizes the effects of the revision of Seaman's estimate of income from pork and beef production. Agricultural income in the nation as a whole is raised about 18 per cent. In the states the change ranges from a decrease of 5 per cent in Delaware to an increase of almost

TABLE B-6  
Distribution of States by Percentage Change in Agricultural Income  
Resulting from Revision of Estimate for Income from Pork and Beef  
Production, 1840

<i>Change<sup>a</sup></i> (per cent)	<i>All</i> <i>States</i>	<i>East</i>	<i>Central</i>	<i>South</i> <i>Atlantic</i>	<i>South</i> <i>Central</i>
30 and over <sup>b</sup>	3			1	2
25-29.9	3		2		1
20-24.9	6	3	2	1	
15-19.9	6	1	2	2	1
10-14.9	5	2	1	1	1
5-9.9	3	3			
0-4.9	2	1			1
Less than 0 <sup>c</sup>	1	1			
Total	29	11	7	5	6

<sup>a</sup> Percentage change for all states combined was 18 per cent.

<sup>b</sup> Includes Arkansas, 38 per cent, Tennessee, 38, and Florida, 31.

<sup>c</sup> Includes Delaware, -5 per cent.

<sup>31</sup> Tucker, pp. 172-194 (prices were derived by dividing value aggregates by quantities of output), and Seaman, pp. 366, 454.

INTERREGIONAL INCOME DIFFERENCES

40 per cent in Arkansas, with about three-fifths of the states showing an increase between 10 and 25 per cent. In most Eastern states the revision is smaller than elsewhere, chiefly because of the relatively smaller importance of livestock as a source of agricultural income.

To determine the importance in the estimate of the assumed pattern of interstate differences in pork and beef prices, I made an alternative calculation of agricultural income for each state on the assumption of no price variation among states. The range of the changes in Seaman's estimates resulting from the assumption of no price variation is compared below with the changes when the pattern of Table B-5 is used:

	<i>No Price Variation</i>	<i>Price Variation of Table B-5</i>
All states	-17 to +62	-5 to +38
East	-17 to +10	-5 to +24
Central	+23 to +62	+12 to +28
South Atlantic	+10 to +42	+15 to +31
South Central	+6 to +61	+4 to +38

Clearly, if no price variation had been assumed, the effect of the revision would have varied much more widely among states. The changes would have ranged from about -17 per cent to +62 per cent, rather than between -6 and +39 per cent. The eastern states would have shown a much smaller upward revision or often a downward revision, while the central states would have shown a much greater upward revision. Thus the allowance for state variations in the price of beef and pork has a noticeable effect on the estimate of interstate differences in agricultural income. As indicated above, the pattern of variation used in the present estimates is supported, on the whole, by data in the 1848 Patent Office report and in the Tucker and Seaman studies. But it must be recognized that the allowance is crude, and that use of a partially different pattern would have altered the results somewhat.

The revision differs from Gallman's estimate of income from animal products because of the use of different years for valuation. Also, I did not attempt to allow for the value of the annual increase of pork and beef or for the annual output of veal, and continued to use Seaman's estimates for income from the production of sheep, horses, and mules, and as a consequence of the latter, oats. Except for the difference in valuation base, the magnitudes involved were small compared to the value of pork and beef output (Gallman, p. 46) and the possible effect on interstate differences therefore was not large.

In other adjustments of Seaman's estimate, I eliminated the value of family goods and shifted from the nonagricultural to the agricultural



sector the income originating in the production of fuelwood, including fuelwood consumed by farmers (Table B-3). The adjustments were made to improve comparability with the estimates for 1880 and 1900. Other income from forestry and fishing was not shifted to agriculture because a corresponding shift for the labor force in forestry and fishing was not possible. The net change due to both adjustments in Seaman's countrywide total was an increase of 5 per cent. In most eastern and central states the increase was 4 to 8 per cent. In the southern states, where fuelwood is less important, the change was generally between zero and +4 per cent.

*Nonagricultural Income*

SEAMAN'S ESTIMATE. Seaman's estimate of the distribution of non-agricultural income by sector is as follows (in millions of dollars):<sup>32</sup>

Manufactures	220
Commerce	168
Mining	27
Lumber	15
Fisheries	10
	<hr/>
Total	440

Because of the predominant importance of manufactures and commerce in the nonagricultural total, my evaluation of Seaman's method was confined to the two sectors.

About forty industry classifications are distinguished in the 1840 census returns on manufactures, among them a category "houses." Hence the returns include the value of housing construction as well as manufacturing activity. On the other hand, the manufacture of bar and cast iron was included with the mining returns. For most industries, so far as value data are concerned, the census reported only the value of the annual output, presumably including both sales and additions to inventories. Seaman adjusted the census returns for houses for two obvious errors (p. 765), and for apparent undercoverage of flouring, saw, and oil mills. He also added a relatively small allowance for repairs to housing. Net product originating in each state was obtained by reducing the value of output data for each industry in the state by the countrywide ratio of raw materials to value of output in that industry.

Under "commerce," the 1840 census reported the number of establishments and amount of capital invested in the following activities: commercial and commission houses in foreign trade (including capital invested in navigation); retail, dry goods, grocery, and other stores;

<sup>32</sup> Seaman, pp. 461-462. The District of Columbia is excluded.

INTERREGIONAL INCOME DIFFERENCES

lumber yards; and butchers, packers, and so forth. In addition, the occupational returns reported the numbers engaged in commerce, navigating the ocean, and internal navigation. In his estimate of income in commerce Seaman included all these activities and added 10 per cent to the capital returns to allow for omissions. Hence his coverage conforms closely to the modern category of trade and transportation.

Seaman derived his estimate by assuming the same rate of return, 12½ per cent, on commercial capital of all types in every state. To this he added an estimate of labor income by multiplying the returns for numbers engaged by an assumed average wage. The average wage was taken as the same throughout the country (\$600), except that in the case of the census category of "commerce," he assumed a noticeably higher wage (\$1,000) to prevail in New York, Boston, Philadelphia, Baltimore, and New Orleans. Finally he added a small allowance for the estimated income from railroads and canals.

Table B-7 indicates the extent to which my reconstructed estimates of nonagricultural income approximated Seaman's (the footnote to

TABLE B-7  
Distribution of States by Percentage Deviation of Reconstructed  
Nonagricultural Income Estimate from Seaman's, 1840

<i>Deviation<sup>a</sup></i> (per cent)	<i>All</i> <i>States</i>	<i>East</i>	<i>Central</i>	<i>South</i> <i>Atlantic</i>	<i>South</i> <i>Central</i>
4.0 to 5.9	3	1			2
2.0 to 3.9	5	1	3	1	
0 to 1.9	5	1		1	3
-0.1 to -2.0	8	5	1	1	1
-2.1 to -4.0	5	2	3		
-4.1 to -6.0	3	1		2	
<b>Total</b>	<b>29</b>	<b>11</b>	<b>7</b>	<b>5</b>	<b>6</b>

<sup>a</sup> Deviation of reconstructed from Seaman's estimate for the United States as a whole was -1.8 per cent.

The reconstructed nonagricultural estimate was derived following the description in Seaman's *Essays*, pp. 455-465, and in his *Supplement*, pp. 131-133, 137-146. For the items for which Seaman's method of distributing by state was uncertain, I used the following procedures. *Printing and binding*: State distribution of capital invested as reported by the 1840 census. *Houses built*: The distribution including Seaman's corrections (*Essays*, p. 465) was used. *Repairs of houses*: State distribution of stock of dwelling houses and furniture as estimated by Seaman (*Supplement*, p. 153). The total for the slave states was distributed on the basis of population. *Pig and cast iron*: State distribution of tons of cast iron produced as reported by the 1840 census. *Income or tolls on canals and railroads*: omitted.

the table gives the derivation of the reconstructed estimate). The reconstruction yielded even better results than the one for agriculture. In no state was the deviation from the original Seaman estimate over 6 per cent and in most considerably less. From this we may conclude

that the few items for which Seaman's procedure is uncertain (see the note to the table) introduce only a small margin of uncertainty in his estimates. There is a slight downward bias in the reconstructed figures because of the omission of income from railroads and canals, which omission also largely accounts for the regional pattern of the deviations between the two sets of figures.

EVALUATION. Gallman's estimate of the national total of income originating in manufacturing in 1839-40 supports Seaman's fairly well. After adjusting the latter for the principal differences in scope (that is, excluding housing and including manufacture of pig and cast iron), Seaman's estimate comes to about \$220 million, while Gallman's is \$240 million. In some details the estimates of course differ somewhat more.

Seaman's deductions for materials consumed can be checked against the federal census of 1850 and the New York state censuses of 1835 and 1845. Table B-8 compares for each of the twenty principal industry classifications of 1840 the ratio used by Seaman with those shown by the censuses. On the whole, Seaman's ratios stand up fairly well. The principal exception is in leather manufactures, where Seaman's allowance for materials appears too small. However, if the 1850 census ratio had been used instead, the countrywide total for manufacturing income would have been reduced less than 4 per cent and that for non-agricultural industry as a whole by less than 2 per cent.

Seaman's procedure may be criticized because it does not allow for duplication in the manufacturing total other than raw materials; for example, for items such as state and local property taxes, containers, office supplies, and services. However, their value in 1840 was probably small compared to raw materials.

Another objection to Seaman's technique is that it does not allow for interstate differences in the ratio of raw materials to value of product within an industry, but it is unlikely that allowance for this type of variation would alter the estimates much. Tucker, in deriving his estimate for manufacturing, assumed the same ratio of raw materials to value of product,  $33\frac{1}{3}$  per cent, in every industry except milling. Yet his results, not only with regard to the national total, but state by state, were quite similar to Seaman's. Tucker's countrywide total was around 9 per cent higher than Seaman's and in most states his manufacturing total was between zero and 10 per cent higher. (This finding also supports the conclusion of the preceding paragraph—that allowance for sources of duplication other than raw materials would not have altered the estimates significantly.) In the few states for which the difference appears greater, Tucker's calculations generally were in error. The reason for the similarity in results is that the composition of manufacturing in a state typically varies from industries with low raw

INTERREGIONAL INCOME DIFFERENCES

materials ratios to those with high, so that Seaman's allowances for interindustry variation tend to cancel for manufacturing as a whole. It is likely that the same would be true if interstate as well as interindustry variation were taken into account.

TABLE B-8  
Ratio of Value of Raw Materials to Gross Value Product in Principal Manufacturing Industries, Seaman and Alternative Sources  
(dollar figures in millions)

Materials	Net value product <sup>a</sup> 1840	Percentage ratio of value of raw materials to gross value product			
		Seaman <sup>a</sup> 1840	U.S. Census <sup>b</sup> 1850	N. Y. State Census <sup>c</sup> 1835	Census <sup>c</sup> 1845
Cotton	\$28	40 <sup>f</sup>	58	54	39
Leather manufactures	25	25	50		
All other manufactures	24	33			
Mills	24	75	83	79	75
Houses	22	45	43		
Wool	9	55	63	60	67
Bricks and lime	8	20	29		
Carriages and wagons	8	30	33		
Machinery	7	33	40		
Repairs of houses	6	40	43		
Furniture	5	30	36		
Hats, caps, bonnets, etc.	5	40	50		
Distilled liquors	4	60	67	74	75
Mixed manufactures	4	40	63		
Various metals	4	60	53		
Hardware, cutlery, etc.	4	45	41		
Tobacco	4	40	54		
Ships	4	50	44		
Paper	3	50	54	52	53
Total, specified industries	196				
Total, all industries	220				

<sup>a</sup> Seaman, pp. 455-556.

<sup>b</sup> 1850 census, *Digest of the Statistics of Manufactures*, 35th Cong., 2d sess., S. Exec. Doc. 39, 1859.

<sup>c</sup> *Census of the State of New York for 1835, and for 1845*.

There seems little possibility of securing reliable tests of Seaman's procedures in estimating income originating in commerce. His methods necessarily yield a little interstate income variation, because he assumes higher earnings levels in five cities than elsewhere. To avoid reliance on Seaman's assumptions I made two sets of estimates, one including and one excluding income from commerce.

OUTPUT GROWTH AND PRICE TRENDS: U.S.

INCOME ESTIMATES FOR 1880 AND 1900

I derived the estimates for 1880 and 1900 in a previous study (Easterlin, pp. 753-757). However, two adjustments were necessary to make the figures which related to personal income and covered all industries,

TABLE B-9

Personal Income and Income Originating in Commodity Production and Distribution: Reconciliation of United States Totals by Type and Industrial Sector, 1880 and 1900 (millions of current dollars)

	Total Income (1)	Service Income		Property Income			
		Total (2)	Agri- cultural (3)	Nonagri- cultural (4)	Total (5)	Agri- cultural (6)	Nonagri- cultural (7)
1880							
Personal income <sup>a</sup>	8,740	7,373	1,968	5,405	1,367	213	1,154
Less income originating in:							
Private households <sup>b</sup>	3,722	557		557	491		491
Other service industries <sup>c</sup>			2,674	2,674			
Miscellaneous <sup>d</sup>			287			287	
Equals income originat- ing in commodity pro- duction and distribu- tion	4,731	4,142	1,968	2,174	589	213	376
1900							
Personal income <sup>a</sup>	15,390	12,866	2,613	10,253	2,524	343	2,181
Less income originating in:							
Private households <sup>b</sup>	6,272	769		769	651		651
Other service industries <sup>c</sup>			4,852	4,852			
Miscellaneous <sup>d</sup>			550			550	
Equals income originat- ing in commodity pro- duction and distribu- tion	8,569	7,245	2,613	4,632	1,324	343	981

<sup>a</sup> Cols. 1-5: Easterlin, Table 4.1, p. 705. Cols. 6 and 7: Obtained by distributing the property income total (*ibid.*) between agriculture and nonagriculture according to the proportions shown in *ibid.*, Table 4.2, p. 711.

<sup>b</sup> Col. 4: Obtained by multiplying the countrywide interindustry relative (*ibid.*, Table 4.4, p. 723) by average service income per worker in nonagricultural industry as a whole (*ibid.*, Table Y-4, p. 756), and then by the industry labor force (Miller and Brainerd, Table L-5, p. 623). Col. 7: The entry for "all other industries" (Easterlin, Table 4.2) was multiplied by the ratio of total property income in Table 4.1 to that in Table 4.2.

<sup>c</sup> Col. 4: Same procedure as for col. 4 in footnote b.

<sup>d</sup> Imputed rents and mortgage interest on nonfarm owner-occupied homes (*ibid.*, Table 4.2) multiplied by the ratio of total property income in Table 4.1 to that in Table 4.2.

INTERREGIONAL INCOME DIFFERENCES

more comparable with those for 1840 (Table B-9). First, income originating in industries engaged in providing services other than commodity distribution was eliminated. In terms of the industry classification used in the earlier 1880 estimate, these industries comprise the private households industry and "all other" (trade, finance, insurance, real estate, government, and service industries other than private households). In addition, imputed rents and mortgage interest on nonfarm owner-occupied houses were deducted.

Second, the 1880 and 1900 countrywide totals for service and for property income originating in agriculture and in nonagricultural commodity production and distribution were distributed by state. For agricultural service income, the same distribution was used as in my original estimates (p. 755). For service income originating in nonagricultural commodity production and distribution, an estimate was obtained for each state by subtracting income originating in private households and other service industries from the nonagricultural total (Table B-10, lines 1-5). The sum of the state estimates derived in this way differed only slightly from the countrywide total shown in Table

TABLE B-10

Derivation of Estimate for Service and Property Income Originating in Nonagricultural Commodity Production and Distribution, and of Property Income Originating in Agriculture, Pennsylvania, 1880

	<i>All Nonagri- culture</i> (1)	<i>Private House- holds</i> (2)	<i>Other Service Industries</i> (3)	<i>Agri- culture</i> (4)	<i>Nonagri- cultural Commodity Production</i> (5)
Service income per worker:					
1. United States average (\$)	622	471	876		
2. Pa. relative to all states (%)	96	110	103		
3. Pa. (\$)	598	518	900		
4. Pa. labor force (thous.)	1,084	117	320		647
5. Pa. service income (\$ mill.)	648	60	288		300
6. Property income, United States (\$ mill.)				213	376
7. Share of industry's income-originating wealth located in Pa. (%)				11.2	12.6
8. Property income, Pa. (\$ mill.)				24	48

*Service income originating:* Line 1—Col. 1, Easterlin, Table Y-4, p. 736; cols. 2 and 3, countrywide interindustry relative (*ibid.*, Table 4.4, p. 723) times col. 1. Line 2—Col. 1, Table Y-4, p. 756; entry for Pennsylvania divided by U.S. average. Cols. 2 and 3, from underlying worksheets. Line 3—Line 1 times line 2 divided by 100. Line 4—Miller and Brainerd, p. 629. Line 5—Line 3 times line 4, except col. 5. obtained by subtracting cols. 2 and 3 from col. 1.

*Property income originating:* Line 6—Table B-9, col. 6. Line 7—Easterlin, Table 4.5, col. 1, p. 728. Line 8—Line 6 times line 7.

B-9, and the state entries were therefore adjusted proportionately to secure a sum equal to the latter total.

The countrywide total of property income originating in agriculture (Table B-9) was distributed by state according to the share of the nation's income-originating agricultural property located in each state, on the assumption that the rate of yield on agricultural property was the same in all states. A similar procedure was followed for the countrywide total of property income originating in nonagricultural commodity production and distribution, but since separate estimates of nonagricultural wealth employed in the commodity producing and in the service industries were unavailable, the state distribution of all nonagricultural wealth was used in allocating the income total to each state (Table B-10, lines 6-8).

#### POPULATION AND LABOR FORCE

##### *Estimate for 1840*

The 1840 population figures are those given in the 1840 census (*Compendium*, pp. 7-103). The labor force estimates too are derived from the census (from the returns on "persons employed") but with several changes. First, in accordance with the decision to limit the industrial scope to commodity production and distribution, I did not include persons reported under "learned professions and engineers." In addition, I somewhat revised the returns for agriculture in a number of states, and for nonagricultural industry in Rhode Island. Table B-11 shows the states for which a revised estimate was made and compares the total state labor force after revision with that reported in the census. For the United States as a whole, the revisions raise the census total only about 2 per cent, but for several states the change is between 10 and 20 per cent.

The industrial scope of the 1840 census inquiry on industry of employment was fairly specific. Seven categories were distinguished: mining; agriculture; commerce; manufactures and trades; navigation of the ocean; navigation of canals, lakes, and rivers; and learned professions and engineers. However, no limits for characteristics such as age, sex, and color, were placed on the segment of the population to which the inquiry was to be addressed. Nor was there any established tradition in this regard. The only previous inquiry had been twenty years earlier and was similarly unspecific. (In contrast the 1850 inquiry was limited to the free male population over fifteen years of age.) Seaman thought that the employment returns were considerably less accurate than the population returns and that in several states the range of the population covered by the employment inquiry differed noticeably from that typically covered.<sup>33</sup>

<sup>33</sup> Seaman, "Essays," pp. 297-298, and "Supplement," p. 151, note.

INTERREGIONAL INCOME DIFFERENCES

TABLE B-11  
Revised and Census Figures for State Labor Force in Commodity  
Production and Distribution, 1840

<i>United States</i>	<i>Total labor force (thousands)</i>		<i>Deviation of revised from census labor force</i>	
	<i>Census<sup>a</sup></i>	<i>Revised<sup>b</sup></i>	<i>Thousands</i>	<i>As % of Census Labor Force</i>
	4,730	4,835	104	2
<b>East:</b>				
New Hampshire	98	79	-18	-19
Rhode Island	41	36	-6	-14
New Jersey	89	91	2	2
Pennsylvania	339	398	59	18
Maryland	99	109	10	10
<b>Central:</b>				
Ohio	352	363	11	3
Iowa	13	13	1	4
Missouri	109	112	4	4
<b>South:</b>				
North Carolina	234	243	9	4
Georgia	221	227	6	3
Florida	14	16	2	13
Alabama	188	198	10	5
Arkansas	28	30	2	7
Louisiana	97	111	14	14

<sup>a</sup> Entry for each state is the sum of the census returns on persons employed in the following industries: mining, agriculture, commerce, manufactures and trades, navigation of the ocean, and navigation of canals, lakes, and rivers, as reported in the 1840 census, *Compendium*, pp. 7-103.

<sup>b</sup> The census return for the following counties or towns was adjusted as described in the text: *New Hampshire*—Coos, and Grafton; *Rhode Island*—Smithfield; *New Jersey*—Morris; *Pennsylvania*—Adams, Berks, Dauphin, Lancaster, Lebanon, Lehigh, Monroe, Northampton, Wayne, Bedford, Clearfield, Clinton, Columbia, Huntingdon, Venango, and Westmoreland; *Maryland*—Anne Arundel (adjusted for overenumeration), Carroll, Cecil, Frederick, Somerset, Washington, and Worcester; *Ohio*—Carroll, Harden, Jefferson, and Paulding; *Iowa*—Delaware and Jackson; *Missouri*—Buchanan, Daviess, Linn, and Livingston; *North Carolina*—Currituck, Cartaret, Martin, and Rutherford; *Georgia*—Baker, Bryan, Dade, Houston, Irwin, Montgomery, Tatnall, and Ware; *Florida*—Nassau, Jackson, and Washington; *Alabama*—Marion, Dale, Henry, Jefferson, and Tuscaloosa; *Arkansas*—Crittenden, Desha, Sevier, and White; *Louisiana*—St. Charles, St. John Baptist, Avoyelle, Caddo, St. Landry, St. Mary's.

The percentage of reported labor force to total population ("reported" participation rate) exhibits some disturbing intra-regional variations, which differences in underlying economic and demographic characteristics do not seem to explain (Table B-12, col. 1). For example, in the East, New Hampshire and Rhode Island seem exceptionally high, and Pennsylvania, Maryland, and possibly New Jersey, exceptionally low. In the South, Florida appears quite low.



OUTPUT GROWTH AND PRICE TRENDS: U.S.

TABLE B-12  
Specified Item as Percentage of Population in Each State, 1840

	<i>Total Labor Force Census</i> (1)	<i>Force Revised</i> (2)	<i>Males of Working Age<sup>a</sup></i> (3)	<i>Slaves</i> (4)	<i>Urban Population<sup>b</sup></i> (5)
United States	28	28	26	15	8
New England					
Maine	27	27	26	0	3
New Hampshire	34	28	27	c	0
Vermont	30	30	27	0	0
Massachusetts	28	28	30	0	22
Rhode Island	38	33	28	c	21
Connecticut	29	29	28	c	4
Middle Atlantic					
New York	28	28	28	c	19
New Jersey	24	24	27	c	5
Pennsylvania	20	23	26	c	14
Delaware	27	27	26	3	0
Maryland	21	23	26	19	22
East North Central					
Ohio	23	24	26	c	3
Indiana	25	25	25	c	0
Illinois	26	26	28	c	0
Michigan	30	30	30	0	0
Wisconsin	34	34	42	c	0
West North Central					
Iowa	30	31	32	c	0
Missouri	28	29	26	15	4
South Atlantic					
Virginia	31	31	24	36	3
North Carolina	31	32	23	33	0
South Carolina	36	36	24	55	5
Georgia	32	33	24	41	2
Florida	26	30	31	47	0
East South Central					
Kentucky	29	29	25	23	3
Tennessee	30	30	23	22	0
Alabama	32	33	24	43	2
Mississippi	39	39	26	52	0
West South Central					
Arkansas	28	30	27	20	0
Louisiana	28	32	31	48	29

<sup>a</sup> White males, ages fifteen to fifty-nine, free colored and slave males, ages twenty-four to fifty-four, and one-half of free colored and slave males, ages ten to twenty-three.

<sup>b</sup> Inhabitants of towns of 10,000 or more population.

<sup>c</sup> Below the level for rounding.

The population data are given in Table A-1. The dividend used in calculating each percentage was obtained as follows: *Col. 1* derived in same manner as *Col. 1* of Table B-11. *Col. 2*, Table A-1. *Col. 3*, the sum of the age classes in footnote a, as given in the 1840 census (*Compendium*, pp. 4-102). *Col. 4*, Tucker, p. 51. *Col. 5*, *ibid.*, p. 132.

## INTERREGIONAL INCOME DIFFERENCES

Examination of the county returns for each state suggested one important source of the variation. In seventeen states there are one or more counties for which no returns, or negligible returns, were made of persons employed. All of these counties, however, show returns on population and industry.<sup>34</sup> The most heinous example is Berks County, Pennsylvania, which with a population of 64,569 reported no employment in any industry.

In view of this clear source of error, I decided to revise the census labor force returns by attempting at least a minimum estimate of the labor force in these counties. The revision was limited to twelve states in which the population size of the counties involved implied a labor force revision exceeding 2 per cent. I assumed 100 per cent labor force participation for all white males from age fifteen through fifty-nine and for all colored males, free and slave, from age twenty-four through fifty-four, and 50 per cent participation for all colored males from age ten through twenty-three. The disparity in age categories between the white and colored population was necessitated by a corresponding difference in the census categories. All females, and males in other age groups, were assumed to have zero labor force participation.

Ordinarily, one would expect this procedure to yield a reasonable, if rough, estimate of the minimum labor force. However, the limitation of the industrial scope of the 1840 census presents a difficulty. If all the foregoing assumptions were valid for a county, but part of the labor force was employed in service industries, then the census labor force return would be that much smaller than the number of males of working age. But the counties in question were almost wholly agricultural, while the industries omitted by the census were largely urban. Hence the likelihood of a significant proportion of working males having been employed in the service industries in these counties is quite small.

Because in two states, Pennsylvania and Maryland, even the revised estimate seemed low, I computed the reported participation rate in every county. I did this also for New Jersey, which was not included in the first round of adjustments. More counties showed a reported labor force quite low relative to population. Where the reported participation rate was less than 20 per cent, I raised the labor force figure for the county by the excess of the males of working age (calculated as above) over the reported figure.

The additions to the state labor force derived by the foregoing adjustments were allocated wholly to agriculture, since the counties concerned were primarily agricultural and since the state pattern of agricultural income per worker showed questionable intra-regional

<sup>34</sup> Except two, Hillsborough and Mosquito Counties, Florida, which show no returns for industry, because the only persons living there were at military posts. I excluded them from the revision.

variations, usually affecting the states with doubtful labor force returns. This was not true of the state pattern for nonagricultural income per worker.

The foregoing procedures refer to all states listed in Table B-11 except New Hampshire and Rhode Island, where the apparent problem was overenumeration rather than underenumeration. For two New Hampshire counties the reported participation rate was 74 and 64 per cent. Their combined reported labor force of some 34,000 persons was about 6,000 greater than the total number of males *and females* between the ages of fifteen and fifty-nine. A revised estimate was made on the assumption that the percentage of labor force to population was about the same as in other counties in the state (30 per cent). Since their reported labor force was almost wholly agricultural, all of the overenumeration was assumed to apply to the agricultural returns. In Rhode Island, the reported participation rate for the city of Smithfield was almost 100 per cent, so an adjustment similar to that for New Hampshire was made, except that the correct ratio of labor force to population was assumed to be 40 per cent and the overenumeration was assumed to be distributed between agricultural and nonagricultural industry (excluding commerce) in the same proportion as the enumerated labor force.

Table B-12 shows the effect of the revisions. Most of the glaring inconsistencies no longer appear in the second column, and differences in basic demographic and economic characteristics largely explain the remaining interstate differences. The third column shows that in most states the general level of the participation rate conforms fairly closely to the proportion in the population of males of working age, a proportion that seldom varies widely. Most of the exceptions occur in states which had recently experienced substantial in-migration, which tends to increase the proportion of males of working age (e.g. Wisconsin).

However, the proportion of working males in the population is clearly not enough to account for most of the variation. If it did, the southern states should have low participation rates. Instead they tend to have the highest. This is primarily because of their proportion of slaves to total population (col. 4). Many women and child slaves were employed in field labor in 1840 and so were included in the census returns on employment (cf. Tucker, p. 139), which makes for a high participation rate in states with large slave populations. Indeed, even in the latter part of the nineteenth century the participation rates for these states tend to be high because of the employment of Negro women and children in agriculture.<sup>35</sup> Florida, however, appears as an exception.

<sup>35</sup> Cf. Miller and Brainerd, p. 598, and Ann R. Miller, "Trends in Labor Force Participation Rates, United States, 1890-1950," presented at the World Population Conference, Rome, 1954, p. 5.

Despite a high proportion of slaves and also of males of working age, it shows one of the lowest participation rates in the South. Possibly even its revised labor force estimate is low.

A third factor in interstate differences in participation rate is variation in degree of urbanization (col. 5). This is particularly relevant to analysis of the 1840 returns because of the omission of service occupations from the labor force. Since such occupations were concentrated chiefly in urban areas, rural states should show higher participation rates, other things being equal. In general, the rural character of most of the southern and central states made for relatively high participation rates compared to the East. Within the South, Louisiana provides a noteworthy example of the influence of the urbanization rate; it had a higher proportion of slaves and of working males than did North Carolina, Georgia, or Alabama. But because of its high urbanization rate, its participation rate is lower than those of the other three.

In view of their high degree of urbanization, the participation rates in Massachusetts and particularly Rhode Island appear surprisingly high. The explanation is the importance there of textile manufactures. The industry employed many women as well as men, and both were included in the census returns. Indeed, Tucker (p. 139) thinks that the only branch of industry covered by the census in which many white females were returned was textile manufactures. As a consequence, the participation rates for textile towns run quite high; for example, the rate is 45 for Lowell, Massachusetts, but only 20 for Boston. When one considers that perhaps 40 per cent of the income originating in Rhode Island was accounted for by textile manufacture, the state's high participation rate even after revision becomes more comprehensible. Again, the participation rates for these states in the latter part of the nineteenth century support this earlier pattern.<sup>36</sup>

Urbanization, together with differences in the proportion of working males, appears to account for most of the variation among the Eastern states in the revised participation rates. However, New Jersey, Pennsylvania, and Maryland still seem relatively low, apparently largely because of exceptionally low participation rates for their principal cities. For example, the rate for New York is 20 per cent and for Brooklyn 26, but for Philadelphia it is around 18, Pittsburgh around 15, and Baltimore 12. These low rates may reflect a disproportionate concentration of the industries omitted from the census, though they probably are chiefly due to poor enumeration.

Thus the revised estimates of labor force, as judged by variations in state participation rates and the principal relevant explanatory variables, present a more reasonable picture than the original census returns.

<sup>36</sup> See footnote 35.

There are some states, however, which still seem somewhat out of line, notably Florida, New Jersey, Pennsylvania, and Maryland.

#### POPULATION AND LABOR FORCE ESTIMATES FOR 1880 AND 1900

The population figures in Appendix A are those given by the census.<sup>37</sup> The labor force data are estimates by Miller and Brainerd (pp. 609–631, Tables L-4 and L-5). For the present analysis, nonagricultural industry was limited to mining, construction, manufacturing, and transportation, communications, and public utilities; and forestry and fishing was included with agriculture.

### APPENDIX C

#### *Effects of Changes in Nature and Scope of Income Concept*

The series for 1840–80, that for 1880–1920, and that for 1927–55 differ in the nature and scope of the income concept. In this appendix the discontinuity introduced by these differences is examined.

#### CHANGE IN 1880

The most important difference in scope between the 1840–80 and the 1880–1920 series is the omission from the former of income originating in trade (except in 1840), finance, insurance, real estate, and services, including government, and of imputed rents and mortgage interest on nonfarm owner-occupied homes. A reconciliation of the countrywide income totals for the two concepts was presented in Table B-9. In addition, a significant source of disparity exists in the state estimates, since in the 1840–80 figures income was allocated by state on a “where paid” basis, while in those for 1880–1920 service income (wages, salaries, and proprietors’ income) was allocated in this way but property income (dividends, interest, and rents) was allocated on a “where received” basis.

In the following analysis, the overlap comparisons for income reflect all three sources of discrepancy; those for labor force reflect only the difference in industrial scope. The income comparison is not fully satisfactory because in constructing the service estimates I assumed that relative interstate differences in per worker income were the same as in manufacturing. Although correlation analysis tends to support the assumption, still the service income estimates are not wholly independent of those for commodity production.

Table C-1 shows that in 1880 and 1900, commodity production and distribution accounted for roughly 55 per cent of income and 70 to 75 per cent of the labor force in all industries. The difference between the

<sup>37</sup> 1950 *Census of Population*, Vol. 1, *Number of Inhabitants*, Table 6, pp. 1–8 and 1–9.

INTERREGIONAL INCOME DIFFERENCES

TABLE C-1

Income Originating in and Labor Force in Commodity Production and Distribution Compared with Personal Income and Total Labor Force, 1840, 1880, and 1900

	1840		1880	1900
	Including Commerce	Excluding Commerce		
Commodity income (\$ mill.) <sup>a</sup>			4,731	8,570
Personal income (\$ mill.) <sup>b</sup>			8,740	15,390
Commodity income as % of personal income			54	56
Commodity labor force (thous.) <sup>a</sup>	4,835	4,629	13,091	20,405
All industries labor force (thous.) <sup>c</sup>	5,524	5,524	17,326	28,946
Commodity labor force as % of all industries labor force	88	84	76	70

<sup>a</sup> From tables in Appendix A. Industrial sectors included are agriculture, mining, manufacturing, construction, and, in the estimate "including commerce," transportation and trade.

<sup>b</sup> From Easterlin, Table Y-1, p. 753.

<sup>c</sup> 1840: From Solomon Fabricant, "The Changing Industrial Distribution of Gainful Workers: Comments on the Decennial Statistics, 1820-1940," in Volume Eleven (1949) of Studies in Income and Wealth, p. 42. Fabricant's figure was increased by 104,000 to adjust for my revisions of the census labor force data (see Appendix B). 1880 and 1900: From Miller and Brainerd, Table L-4.

two percentages reflects, of course, a lower average level of income per worker in commodity production and distribution than in industry as a whole—the former runs about 70 to 80 per cent of the latter. The lower level in commodity production and distribution results chiefly from the relatively low level of income per worker in agriculture.

In 1840 commodity production and distribution accounted for a somewhat larger share of the labor force than it did later, and this implies somewhat better coverage of income. If we assume that income per worker in commodity production and distribution relative to that in industry as a whole was the same in 1840 as in 1880, the coverage of income in 1840 would be around 60 per cent.

A comparison for 1880 shows that in most states the coverage of both income and labor force was somewhat better than in the country as a whole (Table C-2). For example, thirty-three of forty-six states had a higher percentage of personal income originating in commodity production and distribution than the national average (in 1900, thirty-eight of forty-seven). Particularly among the southern states the coverage was better than average, except for Virginia, Kentucky, and Louisiana. The coverage tended to be below average in New York, Maryland, Massachusetts, New Jersey, and California. Their income coverage ran

OUTPUT GROWTH AND PRICE TRENDS: U.S.

TABLE C-2  
Distribution of States by Percentage of Commodity Income to Personal  
Income and of Commodity Labor Force to Total Labor Force, 1880

	<i>All States</i>	<i>East</i>	<i>Central</i>	<i>South</i>	<i>West</i>
Commodity income <sup>a</sup> as percentage of personal income: <sup>b</sup>					
80-84	1				1
75-79	2			2	
70-74	2			2	
65-69	2			2	
60-64	13	1	5	4	3
55-59	10	2	4	1	3
50-54	11	5	2	2	2
45-49	4	2			2
40-44	1	1			
	—	—	—	—	—
Total	46	11	11	13	11
Commodity labor force <sup>a</sup> as percentage of total labor force: <sup>c</sup>					
90-94	1			1	
85-89	5			5	
80-84	7		1	5	1
75-79	17	3	8	2	4
70-74	9	4	2		3
65-69	4	2			2
60-64	3	2			1
	—	—	—	—	—
Total	46	11	11	13	11

<sup>a</sup> For industrial sectors covered in commodity income and commodity labor force, see Table C-1, note a.

<sup>b</sup> For the United States as a whole, income originating in commodity production and distribution was 54 per cent of personal income.

<sup>c</sup> For the United States as a whole, the labor force in commodity production and distribution was 76 per cent of that in all industries.

Computed from the same sources as those for 1880 given in Table C-1.

around 40 to 50 per cent, their labor force coverage around 60 to 70 per cent. This was also true for 1900.

For the 1880-1900 period, the two income concepts may be compared with respect to trend as well as level. Table C-3 compares the trends in regional shares in total income rather than absolute amounts, since the 1880 shares in personal income were extrapolated backward on the basis of the 1840-80 movement of shares in income originating in commodity production and distribution. The table indicates that the movement in regional shares was quite similar. For example, for income originating in commodity production and distribution, the ratio

INTERREGIONAL INCOME DIFFERENCES

TABLE C-3

Movement of Regional Share in Income Originating in Commodity Production and Distribution Compared with that of Share in Personal Income, 1880-1900

Region	Share in 1900 divided by share in 1880		Percentage Difference $\frac{(1) - (2)}{(2)} \times 100$
	Commodity Income <sup>a</sup> (1)	Personal Income <sup>b</sup> (2)	
New England	0.87	0.87	0
Middle Atlantic	0.95	0.94	1
East North Central	0.93	0.98	-5
West North Central	1.24	1.20	4
South Atlantic	0.91	0.91	0
East South Central	0.84	0.86	-2
West South Central	1.32	1.30	2
Mountain	1.48	1.41	5
Pacific	1.15	1.14	1

<sup>a</sup> See Table C-1, note a. Computed from Appendix A.

<sup>b</sup> Computed from data in Easterlin, Table Y-1, p. 753.

of the 1900 share of the East North Central region to the 1880 share is 0.93; for personal income, 0.98—a difference of only 5 per cent. In other regions the difference is even less. A similar calculation for the individual states also shows that with few exceptions—the most important are Dakota (North and South combined), Montana, and Wyoming—the two series yield similar trends in total income share.

CHANGE AFTER 1920

The principal conceptual shift between the 1880-1920 series and that from 1927 on is that in the earlier series property income is distributed by state on a “where received” basis, service income on a “where paid” basis, but in the later series all income is allocated on a “where received” basis. In my previous study (page 704), an overlap calculation for 1949-51, based on Department of Commerce data for six states, indicated that the percentage change in total income due to a shift from a partial to total residence basis is as follows:

Maryland	+8	New York	-2
Virginia	+7	Maine	-2
New Jersey	+6		
New Hampshire	+3		

In the personal income series used here, Schwartz and Graham (pages 100-102) adjusted eight more states; Kentucky, Ohio, Indiana, Illinois, Connecticut, Massachusetts, South Carolina, and Georgia and reported the current effect of the adjustment for three states: New York -2.5 per cent, Connecticut +3 per cent, and New Jersey +6 per cent.



OUTPUT GROWTH AND PRICE TRENDS: U.S.

Since they relate to recent years, the figures must overstate the degree of discontinuity in the present series due to this source, because the shift in concept occurs between 1920 and 1927 when interstate commuting, the underlying source of the disparity, was less important. For example, Schwartz and Graham (p. 100) indicate that while currently about 40 per cent of private payroll disbursements in the District of Columbia is transferred to Maryland and Virginia, the comparable figure for 1929 is only 10 per cent.

We may conclude that the conceptual break between the 1880-1920 and 1927-55 series is of minor quantitative significance.

APPENDIX D

*Analytical Tables Underlying Text*

In the following tables the regional value for an item is expressed as a percentage of the national value for the corresponding item.

TABLE D-1  
Regional Percentage Share in National Population, Census Years, 1790-1950

Year	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific
1790	26	34			38	3			
1800	23	34	1		35	6			
1810	20	34	4	a	30	10	1		
1820	17	33	8	1	26	12	2		
1830	15	32	12	1	24	14	2		
1840	13	30	17	2	20	15	3		
1850	12	28	20	4	17	14	4	a	a
1860	10	26	22	7	14	13	6	1	1
1870	9	25	24	10	12	11	5	1	2
1880	8	23	22	12	13	11	7	1	2
1890	8	22	22	14	12	10	8	2	3
1900	7	22	21	14	12	10	9	2	3
1910	7	23	20	13	11	9	10	3	5
1920	7	23	21	12	11	8	10	3	5
1930	7	23	21	11	11	8	10	3	7
1940	6	22	20	10	12	8	10	3	8
1950	6	22	20	9	12	8	10	3	10

<sup>a</sup> Less than 0.5 per cent.

1790-1920: Calculated from data in the 1950 *Census of Population*, Vol. 1, *Number of Inhabitants*, Table 6, pp. 1-8 and 1-9. 1930-50: Calculated from cycle averages for 1927-32, 1937-44, and 1948-53 derived from annual data in Schwartz and Graham, Table 3, pp. 144-145, except for the 1927 and 1928 data which are from *Current Population Reports*, Bureau of the Census, Series P-25, no. 139, June 27, 1956, p. 4.

INTERREGIONAL INCOME DIFFERENCES

TABLE D-2  
Regional per Capita Income as Percentage of National Level, and Regional Percentage Share in National Total of Personal Income, Selected Years, 1840-1950

	<i>New Eng- land</i>	<i>Middle Atlan- tic</i>	<i>East North Cen- tral</i>	<i>West North Cen- tral</i>	<i>South Atlan- tic</i>	<i>East South Cen- tral</i>	<i>West South Cen- tral</i>	<i>Moun- tain</i>	<i>Paci- fic</i>
1840									
Per capita	132	136	67	75	70	73	144		
Personal	17	41	12	2	14	11	4		
1880									
Per capita	141	141	102	90	45	51	60	168	204
Personal	11	33	23	11	6	6	4	2	4
1900									
Per capita	134	139	106	97	45	49	61	139	163
Personal	10	31	22	13	5	5	5	3	5
1920									
Per capita	124	134	108	87	59	52	72	100	135
Personal	9	30	22	10	7	4	7	3	7
1930									
Per capita	129	140	111	82	56	48	61	83	130
Personal	9	32	23	9	6	4	6	2	9
1940									
Per capita	121	124	112	84	69	55	70	92	138
Personal	8	28	23	8	8	4	7	3	11
1950									
Per capita	109	116	112	94	74	62	80	96	121
Personal	7	25	23	9	9	5	8	3	12

*Personal income:* 1840—Obtained by extrapolation as described in the text on the basis of the total income data in Appendix A. 1880, 1900, and 1920—Calculated from personal income data in Easterlin, Table Y-1, p. 753. 1930-50—Original data are cycle averages for, respectively, 1927-32, 1937-44, and 1948-53, computed from Schwartz and Graham, Table 1, pp. 140-141, except for the 1927 and 1928 data, which are from *ibid.*, Table V, p. 38.

Entries for personal income as a percentage of the national level were calculated from unrounded figures by dividing the regional share in personal income by the regional share in population (Table D-1).

OUTPUT GROWTH AND PRICE TRENDS: U.S.

TABLE D-3

Commodity Production and Distribution: Regional per Capita Income and Specified Components as Percentage of the National Level, 1840, 1880, and 1900

	<i>New Eng- land</i>	<i>Middle Atlan- tic</i>	<i>East North Cen- tral</i>	<i>West North Cen- tral</i>	<i>South Atlan- tic</i>	<i>East South Cen- tral</i>	<i>West South Cen- tral</i>	<i>Moun- tain</i>	<i>Paci- fic</i>
<b>1840, INCLUDING COMMERCE</b>									
<b>Income:</b>									
Per capita, total	128	119	71	79	84	85	160		
Per worker, total	127	132	80	76	74	76	145		
Per worker, agricultural	105	130	85	80	86	90	137		
Per worker, nonagricultural	107	106	80	85	79	87	207		
Participation rate <sup>a</sup>	101	90	88	104	114	112	110		
Labor force industrialization <sup>b</sup>	185	154	87	71	49	38	67		
<b>1840, EXCLUDING COMMERCE<sup>c</sup></b>									
<b>Income:</b>									
Per capita, total	128	114	72	77	90	92	132		
Per worker, total	135	128	80	74	77	80	124		
Per worker, nonagricultural	137	103	71	67	68	74	122		
Participation rate <sup>a</sup>	95	88	90	104	117	115	106		
Labor force industrialization <sup>b</sup>	184	161	90	65	50	38	39		
<b>1880</b>									
<b>Income:</b>									
Per capita, total	137	123	108	95	54	60	67	180	192
Per worker, total	127	139	116	97	48	55	61	147	174
Per worker, agricultural	109	154	137	108	56	66	70	82	207
Per worker, nonagricultural	95	100	99	111	71	89	107	126	125
Participation rate <sup>a</sup>	108	88	93	98	114	109	110	122	111
Labor force industrialization <sup>b</sup>	203	183	96	64	34	28	29	185	160
<b>1900</b>									
<b>Income:</b>									
Per capita, total	130	122	106	106	54	56	68	158	155
Per worker, total	125	134	114	113	47	49	65	149	153
Per worker, agricultural	110	127	132	149	54	56	79	139	187
Per worker, nonagricultural	94	103	100	111	66	80	105	136	124
Participation rate <sup>a</sup>	104	92	93	94	114	116	106	106	101
Labor force industrialization <sup>b</sup>	179	170	112	67	50	38	33	123	125

<sup>a</sup> Percentage of total labor force to population.

<sup>b</sup> Percentage of nonagricultural labor force to total labor force.

<sup>c</sup> See above for agricultural income per worker.

Calculated from Appendix A.

INTERREGIONAL INCOME DIFFERENCES

TABLE D-4  
Regional Personal Income per Capita and Specified Components  
as Percentage of the National Level, Selected Years, 1880-1950

	<i>New Eng- land</i>	<i>Middle Atlan- tic</i>	<i>East North Cen- tral</i>	<i>West North Cen- tral</i>	<i>South Atlan- tic</i>	<i>East South Cen- tral</i>	<i>West South Cen- tral</i>	<i>Moun- tain</i>	<i>Pa- cific</i>
1880									
Income per capita:									
Personal	141	141	102	90	45	51	60	168	204
Property	164	172	97	72	38	39	42	61	165
Service	137	135	103	93	46	53	64	188	211
Participation rate <sup>a</sup>	113	103	93	94	102	97	99	125	123
Service income per worker:									
All industry	121	132	110	99	46	55	64	150	172
Agricultural	111	144	133	108	59	69	75	88	212
Nonagricultural	95	102	103	112	59	79	94	130	136
Labor force industrializa- tion <sup>b</sup>	155	150	98	77	51	45	49	145	137
1900									
Income per capita:									
Personal	134	139	106	97	45	49	61	139	163
Property	146	176	99	77	32	32	50	90	175
Service	131	131	108	101	48	52	63	149	160
Participation rate <sup>a</sup>	111	105	96	93	99	100	93	104	112
Service income per worker:									
All industry	118	125	112	108	48	52	68	144	142
Agricultural	117	123	125	144	57	59	83	149	189
Nonagricultural	97	104	104	108	60	75	92	134	122
Labor force industrializa- tion <sup>b</sup>	142	140	108	82	61	53	52	111	118
1920									
Income per capita:									
Personal	124	134	108	87	59	52	72	100	135
Property	145	157	101	78	43	33	65	74	149
Service	120	129	110	89	63	57	74	106	132
Participation rate <sup>a</sup>	111	106	100	94	94	95	92	96	108
Service income per worker:									
All industry	108	121	110	95	67	60	80	110	122
Agricultural	145	146	124	111	70	55	85	150	204
Nonagricultural	97	110	104	96	75	78	92	104	107
Labor force industrializa- tion <sup>b</sup>	125	125	110	86	73	62	70	90	110

continued on next page

OUTPUT GROWTH AND PRICE TRENDS: U.S.

TABLE D-4, concluded

	<i>New Eng- land</i>	<i>Middle Atlan- tic</i>	<i>East North Cen- tral</i>	<i>West North Cen- tral</i>	<i>South Atlan- tic</i>	<i>East South Cen- tral</i>	<i>West South Cen- tral</i>	<i>Moun- tain</i>	<i>Pa- cific</i>
1930									
Income per capita:									
Personal	126	137	115	82	55	50	62	82	128
Property	147	173	104	59	38	32	48	57	139
Service	120	128	118	88	60	55	66	89	125
Participation rate <sup>a</sup>	106	105	101	96	94	95	93	95	110
Service income per worker:									
All industry	113	122	117	92	63	58	71	94	114
Agricultural	132	118	124	136	64	65	83	124	171
Nonagricultural	102	111	112	91	71	70	79	95	105
Labor force industrializa- tion <sup>b</sup>	120	120	109	85	80	67	76	88	109
1950									
Income per capita:									
Personal	108	118	112	95	71	61	81	95	120
Property	135	135	108	88	60	44	69	87	123
Service	104	117	115	96	72	61	81	96	118
Participation rate <sup>a</sup>	105	105	103	99	96	90	93	94	104
Service income per worker:									
All industry	99	112	112	97	75	68	87	102	114
Agricultural	97	94	110	125	70	53	104	154	159
Nonagricultural	97	109	111	95	77	76	87	96	110
Labor force industrializa- tion <sup>b</sup>	110	110	104	86	93	83	92	94	105

<sup>a</sup> Percentage of total labor force to population.

<sup>b</sup> Percentage of nonagricultural labor force to total labor force.

*Income:* All dates except 1930 calculated from data in Easterlin, Tables Y-1 through Y-5, pp. 753-757; 1930: 1929 data were used from Schwartz and Graham, Tables 4 through 61, pp. 146-203, on the assumption that the figures for this date were more likely to approximate secular levels than those for 1930. Agricultural service income was calculated as the sum of farm wage and salary disbursements and farm proprietors' income. Nonagricultural service income was obtained as the sum of the corresponding nonfarm items, plus other labor income.

*Labor force:* All dates calculated from data in Miller and Brainerd, Table L-4, pp. 609-621; for 1880 and 1900, the labor force in forestry and fisheries, as given in their Table L-5, pp. 623-631, is included with agriculture, to conform to the scope of the income estimates.

*Population:* All dates calculated from data in 1950 *Census of Population*, Vol. 1, *Number of Inhabitants*, Table 6, pp. 1-8 and 1-9.