

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

Volume Title: Productivity Trends in the United States

Volume Author/Editor: John W. Kendrick, assisted by Maude R. Pech

Volume Publisher: UMI

Volume ISBN: 0-87014-070-1

Volume URL: <http://www.nber.org/books/kend61-1>

Publication Date: 1961

Chapter Title: APPENDIX B Agriculture, Forestry, and Fisheries

Chapter Author: John W. Kendrick

Chapter URL: <http://www.nber.org/chapters/c2247>

Chapter pages in book: (p. 343 - 367)

APPENDIX B

Agriculture, Forestry, and Fisheries

It is convenient to treat this segment in terms of two major groupings: farming and all other groups combined. Farming is by far the most important of these. It accounted for 98 per cent of national income originating in the segment in 1929 (more in earlier years), and 94 per cent in 1957. Farming occupies such a distinctive position in the economy—both because of its processes and products and because of the rural location of the resources engaged—that it is often treated as a “sector” in the national accounts. Unusually complete historical data are available, particularly for the period since 1910, making possible estimates of capital as well as of labor inputs, and of net as well as of gross output.

The remaining three groups (agricultural services, forestry, and fisheries) are combined, primarily for the purpose of presenting estimates of employment and manhours worked. Capital estimates are not available. Adequate output measures are lacking, although it is possible to construct a crude series of fisheries output (shown in the final section of this appendix). In the case of agricultural services it can be argued that the product is included in gross farm output.

Farm Output

There is a greater choice of indexes of the physical volume of output in farming than in other segments of the economy. In this study we use basically two measures: one relating to gross output and the other to net output (real value added). These are both parts of the Commerce Department constant-dollar national product estimates;¹ as such they are based primarily on information supplied by the Department of Agriculture. These estimates are available only for the period since 1910, but it has been possible to extend them to 1869 on the basis of estimates by Strauss and Bean.² The gross output index is comparable in concept and in movement with the Agriculture Department index of farm output, and we use the latter for output per manhour comparisons by major types of

¹ See *Survey of Current Business*, Dept. of Commerce: “Gross National Farm Product in Constant Dollars, 1910–50,” September 1951; “Farm Income and Gross Farm Product,” August 1954; “Note on Gross Farm Product,” October 1958.

² 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, Technical Bulletin No. 703, 1940.

APPENDIX B

livestock and crop production. Other farm output indexes have been described and compared by Tostlebe;³ we shall allude to them in the course of describing the indexes used here.

GROSS FARM OUTPUT

The Commerce measure of gross farm output is obtained by summing the deflated values of the following items: cash receipts from farm marketings and Commodity Credit Corporation loans, net change in farm inventories, farm products consumed directly in farm households, and the gross rental value of farm homes. It is necessary to add inventory change to sales (marketings) in order to approximate production. Since a significant (although declining) portion of farm output is consumed on farms where produced, this must be added to production for the market or to inventory in order to arrive at total output. In the national accounts, the rental value of farm residences is also included as part of the income and product of the farm sector. It is perhaps somewhat artificial to regard farming as an "enclave" within the economy and treat farm residences apart from nonfarm residences whose rental value is included in the real estate industry. However, estimates of the real stock of farm buildings cover both residential and nonresidential structures, and a separation would be arbitrary. Also, farm houses are used to some extent for productive purposes as well as for dwellings.

The Department of Commerce estimates have embodied several different weight-bases: 1939, 1947-49, and 1954. The several implicit deflators for total output do not differ substantially in movement; in line with our general procedure of using changing weights, however, and for comparability with the farm output index of the Agriculture Department, we used the 1939-base deflators through 1940, the 1947-49-base deflators from 1940 to 1953, and the 1954 base thereafter. Also, the four major components were recombined, using average prices in the several successive pairs of key years described in Appendix A. The constant-dollar estimates so obtained were linked forward and backward in time from the 1929 current values, since 1929 is the comparison base used for the tables.

This gross output measure differs from that used by Tostlebe in estimating farm capital coefficients in two respects. Tostlebe excluded the rental value of farm residences from gross farm income, and he deflated the current values by the over-all index (1929 = 100) of prices received by farmers. The movement of the two series is nevertheless quite close. Inclusion of the real rental value of farm homes makes less than 1 per cent difference in the increase of gross output between 1910 and 1953, and the simpler deflation procedure used by Tostlebe likewise has little effect.

³ Alvin S. Tostlebe, *Capital in Agriculture: Its Formation and Financing since 1870*, Princeton University Press (for NBER), 1957, Appendix H.

AGRICULTURE, FORESTRY, AND FISHERIES

In comparison with our gross output measure, the Department of Agriculture index of farm output shows slightly less increase over the period 1910-53. The Agriculture index is designed to show the annual volume of farm production available for eventual human use through marketings or home consumption. Thus, the production of seeds is excluded; and in combining livestock and crop production to form total farm output, the value of feed consumed (other than pasture) is excluded from the weight given livestock because it is already included in crop production. To the extent that feed and seed are produced and consumed in the production process on the same farm, they are not included in our measure; to the extent that they enter into marketings, they are included, and our measure is more gross than that of Agriculture. The practical difference, however, is small. Department of Agriculture economists used 1947-49 price weights for the period since 1940, and a 1935-39 base for earlier years.

Harold Barger and Hans H. Landsberg⁴ likewise attempted to measure farm output net of intermediate products produced and consumed within the farm sector. Their measure is somewhat more net than the Department's in that it excludes milk fed to calves, eggs used for hatching, and the like; but the trend of their index is very similar to that of the farm output index, showing only a slightly smaller increase between 1910-14 and 1935-39. Since the Agriculture Department measure was available on a current basis, it seemed preferable to use this index rather than to attempt to carry forward the closely similar Barger and Landsberg index.

Also comparable with our measure of gross farm output is the index of farm production since 1869, prepared by Strauss and Bean for the Department of Agriculture and the National Bureau of Economic Research.⁵ Strauss and Bean attempted to measure the output sold by farm producers to the nonfarm economy and that consumed in the producers' households. The output of feed and seed was generally excluded, although interstate sales of grain crops could not be eliminated. Livestock production for sale was adjusted for inventory change; data were not at hand regarding the value of changes in crop inventories; but the production trend should not be affected seriously by this omission since crop inventories are only about one-fourth the value of all inventories. A geometric mean of farm prices in 1910-14 and in the current year was used for weighting physical units.

Despite the several conceptual differences, the Strauss and Bean index exhibits virtually the same trend as ours over the period 1910-37. Therefore, we have extrapolated our estimates of real gross output, exclusive of

⁴ *American Agriculture, 1899-1937: A Study of Output, Employment and Productivity*, New York (NBER), 1942.

⁵ Strauss and Bean, *op. cit.*, p. 126.

APPENDIX B

the rental value of farm homes, by the Strauss and Bean calendar-year index back to 1869, splicing the two series by the 1910 overlap. The real gross rental value of farm homes was extrapolated by Tostlebe's estimates of the real stock of farm buildings. Estimates by Goldsmith indicated that residences comprised a virtually constant proportion of the total between 1900 and 1929⁶ (although a rising proportion after 1929), and our extrapolation procedure implies that the proportion was constant prior to 1900.

NET FARM OUTPUT

Net farm output is gross farm output, as defined above, less farmers' purchases of intermediate products consumed in the production process.⁷ These include feed, seed, fertilizer, motor fuel, irrigation aids, insecticides, veterinary services, and other items charged to current expense. Some items represent market purchases by farmers from each other, but most of them represent purchases from the nonfarm economy. Their deduction yields an output figure which is net in the sense that it represents the value added by farming to the national product. Estimation of net output is particularly important in the farm sector because, due to a large relative increase in purchases from other industries, net output has risen significantly less than gross output (see Table B-1).

As defined, net farm output is equivalent to the national product originating in farming as estimated by the Department of Commerce, with one qualification. The Department deducts gross rents paid to nonfarm landlords, as well as intermediate products, in order to arrive at the farm gross national product (gross only of capital consumption allowances). By Commerce definition, farm product is confined to the net output produced by factors located within the sector. In our measure, however, we include the portion of farm output that represents the return to capital used in farming, irrespective of the location of the owner. Accordingly, our estimates of capital, including land, comprise total real capital employed in farming. A breakdown of capital by ownership would tend to be arbitrary and possibly distort the productivity relationship. Actually, the trend of net output practically parallels that of the real national product originating, since real gross rents paid to nonfarm landlords increased proportionately with real farm product between 1910 and 1953.

Although the Commerce Department deflated intermediate products by detailed product classes, only the implicit deflators for the aggregate were published—on the 1939, 1947-49, and 1954 bases. The implicit

⁶ Raymond W. Goldsmith, *A Study of Saving in the United States*, Princeton University Press, 1956, Vol. III, Table W-27, p. 75.

⁷ Gross output is already net of intermediate products that were produced and utilized on the same farm or that did not pass through organized markets.

AGRICULTURE, FORESTRY, AND FISHERIES

TABLE B-1

Gross and Net Farm Output, Key Years, 1869-1957

	Gross Farm Output ^a (millions of 1929 dollars)	Intermediate Products Consumed ^b	Net Farm Output ^c	Ratio of Net to Gross (per cent)
1869	3,950	440	3,510	88.9
1879	6,180	730	5,450	88.2
1889	7,820	1,000	6,820	87.2
1899	9,920	1,360	8,560	86.3
(1909)	10,770	1,620	9,150 ^d	
1910	11,080	1,660	9,420	85.0
1919	11,930	2,250	9,680	81.1
1929	13,670	2,940	10,730	78.5
1937	13,990	3,060	10,930	78.1
1948	18,880	6,100	12,780	67.7
1953	20,100	7,040	13,060	65.0
1957 ^p	21,920	7,980	13,940	63.6

^p = preliminary (based on estimates in Dept. of Commerce, *Survey of Current Business*, October 1958).

NOTE ON WEIGHTING: For the four components of gross output and for intermediate products as a whole, Commerce deflators on a 1939 base, converted to a 1929 base, were used to 1940, linked to deflators on a 1947-49 base for the period 1940-53 and to deflators on a 1954 base for the subsequent years. Then the components were reweighted by average prices in the terminal years of each subperiod according to the Marshall-Edgeworth formula, and linked to the 1929 values before aggregation of the output components and subtraction of the intermediate-product total.

^a Equals "total value of farm output," as given in the *Survey of Current Business*, August 1954, Table 1, line 1, p. 22, deflated and extrapolated to 1869 as described in the text and in note above.

^b *Ibid.*, line 7 minus line 9 to 1910; 1869-1909 based on extrapolation of the ratios of intermediate products to gross farm output by ratios based on the constant-dollar estimates, 1860-1900, by Marvin T. Towne and Wayne D. Rasmussen (see Appendix B, note 8), interpolated linearly and extrapolated to 1909 by the 1890-1900 rate of change in the ratio.

^c This is equivalent to the Commerce Department's "farm gross national product" (*op. cit.*, line 10) inclusive of rents paid to nonfarm landlords (*op. cit.*, line 8), but with deflation procedures altered as described in note above.

^d Estimated by applying the 1910 ratio of net to gross to the 1909 estimate of real gross farm output.

deflators rise substantially more over the 1910-57 period when a relatively recent base is employed than when a 1939 base is used, and the physical volume of intermediate products rises correspondingly less. We have used 1939 weights for the years prior to 1940, 1947-49 weights for 1940-53, and 1954 weights since 1953. Ideally, we should like to have used averages of key-year weights throughout, but published detail did not permit this refinement.

APPENDIX B

The important feature of our real net output calculation is that a chain of estimates for the subperiods, using the Marshall-Edgeworth weighting system, was employed for gross output and aggregate intermediate products separately before the difference was calculated. As shown in Table B-1, the physical volume of intermediate products increased significantly more than gross output, and thus net output increased less. Since the ratio of prices received to prices paid by farmers was higher in 1947-49 and lower in 1939 than the average of the key-year ratios, the use of changing weights results in a smaller increase in net output over the whole period than is obtained by use of 1947-49 weights, and a larger increase than is obtained by use of 1939 weights. The difference between results based on changing weights and those based on 1954 weights is less marked.

The Department of Commerce farm real-product estimates are available back to 1910. Estimates for the censal years 1870-1900 have recently been prepared by Towne and Rasmussen as part of a larger study,⁸ and their estimates of the ratios of intermediate-product purchases to total output in 1910-14 dollars have been used to extrapolate the Commerce ratios. Although the Towne and Rasmussen estimates purport to be largely consistent with those of the Commerce Department, it was apparent that they did not include all intermediate-products purchases. Accordingly, we have extrapolated the ratio to 1910 by the 1890-1900 rate of increase and linked it to the ratio based on Commerce estimates.

Farm Labor Input

EMPLOYMENT

Full- and part-time employment of family and hired workers on farms has been estimated for the years since 1909 by the Agricultural Marketing Service (formerly the Bureau of Agricultural Economics) of the Department of Agriculture.⁹ Since 1925, the annual estimates have been averages of persons engaged in the last complete calendar week of each month based on responses by 15,000-20,000 farmers to mail questionnaires. The sample estimates have been tied into benchmarks provided by the *Census of Agriculture*, supplemented by the *Census of Population* occupational data. Prior to 1925, the annual estimates represented interpolations between census benchmarks on the basis of production and other indirect information; hence, they are not so accurate an indication of annual changes. Prior to 1910, estimates have been made by Agriculture for only the

⁸ Marvin W. Towne and Wayne D. Rasmussen, "Farm Gross Product and Gross Investment during the Nineteenth Century," *Trends in the American Economy in the Twentieth Century, Studies in Income and Wealth*, Volume 24, Princeton University Press (for NBER), 1960.

⁹ See the periodic *Farm Labor* report.

AGRICULTURE, FORESTRY, AND FISHERIES

decennial years in which census data are available.¹⁰ We have interpolated linearly between census years before 1910 in order to obtain farm employment estimates as a component of national totals. Although this procedure lends stability to the farm component of the annual employment estimates, it is well known that farm employment is not sensitive to general cyclical swings.

The Agriculture employment totals are broken down by class of worker beginning in 1910. Farm operators (owners or tenants) are counted as employed if they spend one hour or more on farm work during the survey week. Unpaid members of the operator's household are counted if they work fifteen hours or more. These two groups are classed together as "family workers." All persons, including members of the operator's family, doing one or more hours of farm work for pay during the survey week are counted as employees, or "hired workers."

For the purposes of this study, it was necessary to break down farm employment between family workers and hired workers prior to 1910. This was done on the basis of information provided by *Census of Population* occupational data as reworked by Alba M. Edwards.¹¹ It was noted that the ratios of each class of worker to total employment indicated by the Agriculture Department estimates for 1910 were the same as those indicated by the Census, if 797,000 workers were deducted from the latter because of an overcount of unpaid family workers, as suggested by Edwards. The 1910 proportions were also found to hold for 1900 if the 670,000 workers added by Edwards were put in the hired worker category. Earlier censuses do not provide a breakdown of laborers between hired and family workers, but the latter category was extrapolated by the estimates for owners and tenants, while the figures for hired workers were obtained by subtracting unpaid family workers so derived from total laborers. The 1890 ratios are close to those for 1900 and subsequent years; but the proportion of hired workers to the total fell significantly between 1870 and 1890, reflecting the increasing extent of farm ownership in those decades.

It should be noted that the Agriculture Department total farm employment estimates prior to 1910 are closely tied into the Edwards estimates of gainful workers in agriculture. These latter estimates show much the same decennial movements from 1880 to 1910 as the estimates subsequently prepared by Carson.¹² But the Carson estimate for 1870 is 6.5 per

¹⁰ *Changes in Farm Production and Efficiency, 1955 Summary*, Agricultural Research Service, June 1956, pp. 41-43.

¹¹ *Census of Population, 1940, Comparative Occupation Statistics for the United States, 1870 to 1940*, p. 104.

¹² See Daniel Carson, "Changes in the Industrial Composition of Manpower since the Civil War," *Studies in Income and Wealth, Volume 11*, New York (NBER), 1949, especially pp. 128-32.

cent under the Edwards estimate and, thus, indicative of a much larger employment increase between 1870 and 1880. Essentially, Edwards interpolated the number of farm workers between benchmarks by rural population. Carson, on the other hand, interpolated by the acreage of improved farm land. His method would seem to be subject to less margin of error, and his estimates definitely yield a more reasonable productivity movement than the estimates based on Edwards. We have, accordingly, adjusted the Agriculture estimate for 1870 down to 7.5 million.

An attempt was made to convert the employment estimates to a full-time equivalent basis. This conversion has no relevance to the farm productivity ratios, since the manhour estimates are independent of the employment series, and since the conversion factor applied to the Agriculture Department employment series is a constant. It was made for the purpose of comparing persons engaged in the various industrial segments of the economy (see Table A-VII). Because of the importance of proprietors and unpaid family workers in farming, we have converted total persons engaged to a full-time basis, in contrast to the Commerce Department's practice of converting only employees.

In order to arrive at a conversion factor, estimates of full-time equivalent persons engaged in farming were made from the Census Bureau Current Population Surveys (CPS) for 1940 and subsequent years. The *Monthly Report on the Labor Force* (MRLF) shows agricultural employment by broad average hours categories. We followed the Census Bureau in classing persons working less than 35 hours a week as part-time workers. To obtain full-time equivalents, the average number of persons working 1 to 14 hours a week was divided by 7, and the number working 15 to 34 hours, divided by 2, on grounds that the "standard" full-time workweek in agriculture is in the neighborhood of 50 hours. The sum of the converted figures and the average number working 35 hours a week and more represents full-time equivalents of persons covered by the CPS.

The Agriculture Department estimates cover more persons and jobs than the population survey estimates, however, and have run substantially higher than the latter estimates. The sources of difference between the two series in a recent year may be analyzed as follows, based on a special survey conducted by the Census Bureau in August 1951, surveys of multiple job-holding on other dates, and contemporary discussion in the *Farm Labor* report.

The total difference between the two series amounted to 2.1 million in 1951, after excluding zero-hour workers from the CPS estimates. Of this number, approximately half may be attributed to multiple job-holdings. Something more than 0.3 million represent secondary jobs held by persons engaged in farming. The total hours worked by such persons are already included in the Census Bureau figures, and no further adjustment

AGRICULTURE, FORESTRY, AND FISHERIES

is necessary. Around 0.7 million represent secondary jobs of persons primarily engaged in nonfarm industries. But such jobs are largely offset by nonfarm jobs held by persons who are classed in farming, and little adjustment to the Census totals would be required on this score. The remaining million or so workers included by Agriculture but not by Census consist of children between the ages of six and thirteen; unpaid family workers who work close to fifteen hours a week; and the excess of imported foreign workers and migratory workers, not living in private households, included by Agriculture but not by Census, over agricultural service workers, included by Census but not by Agriculture. Of the total difference, it is our judgment that 0.6 million represents the full-time equivalent number that should be added to the Census adjusted average for consistency with the Department of Agriculture series. This represents about 6.7 per cent of the Agriculture total.

For the other years from 1940 on, we have converted the Census estimates to a full-time equivalent basis as described and added 6.7 per cent of the Agriculture estimates in order to obtain full-time equivalents on the Agriculture basis. The series thus derived fluctuates in a fairly narrow range of 71 to 75 per cent of full- and part-time employment in the postwar period, 1946-55, although the ratio is higher during the war years. It is possible that the ratio was affected by the change in the design of the population survey in mid-1945. In any case, year-to-year changes would not be significant in view of the sampling errors that affect both the MRLF and Agriculture series. We have, therefore, computed the ratio of estimated full-time equivalent to full- and part-time employment, 1940-55 (77 per cent) and converted the latter by this constant. The resultant certainly furnishes a better basis for broad comparisons with the volume of labor input in other industries and with labor-force estimates.

MANHOURS AND AVERAGE HOURS

Estimates of farm manhours for years since 1910 have been made by the Production Economics Research Branch of the Agricultural Research Service, Department of Agriculture.¹³ The Agriculture estimates are in terms of "man-equivalent" hours. Since certain farm workers accomplish less than average adult males, total actual hours of farm work exceed total man-equivalent hours, and we have made a level adjustment for the sake of greater comparability with nonfarm manhours.

Agriculture estimates are based on studies, for selected years, of labor used per acre of crops and per head or unit of livestock production. Data for individual enterprises are averaged and applied to official estimates of acres and numbers made by the Crop Reporting Board. State estimates

¹³ See *Changes in Farm Production and Efficiency, 1955 Summary*.

APPENDIX B

are converted to a regional basis and then combined into national aggregates. Benchmarks for 1910, 1919, and 1929 were developed from data collected in extensive field surveys and published in the Works Progress Administration National Research Project reports. Surveys for 1939, 1944, and 1950 were based on secondary data reported in state experiment station bulletins and on special studies of farm practices.

Annual estimates, by type of production, were interpolated between benchmarks, on the basis of data relating to such factors as unit yields and quantity and quality of capital goods employed. Manhours spent in farm maintenance or general overhead work (including construction by farm workers) were calculated separately and added to the direct hours for crops and livestock.

We have used the Agriculture Department manhour estimates for 1910-50 but raised them by 10 per cent in order to come closer to an actual hours-worked concept. This factor was based on an informal opinion by some of the Department's technicians that actual hours would run 5 to 10 per cent above man-equivalent hours. We have taken the higher figure, since actual manhours computed from the Census Bureau Current Population Surveys for recent years (1950-55) averaged almost 10 per cent higher than the man-equivalent hours figures; and, as we noted above, the agricultural category of the MRLF does not include all persons engaged in farm work. The movement of the adjusted series is still that of the man-equivalent hours series; this is desirable for productivity purposes since no scheme is used to weight hours internally in accordance with the differential productivity of various categories of workers. Man-equivalence is a step in this direction.

It is obvious that the manhour estimates are only as good as the basic technical studies. It is also clear that the manhour and derived productivity estimates are better as indications of trend than of year-to-year movements. As of 1958, the last benchmark used by the Department of Agriculture for its manhour estimates was 1950. The series since 1950 has shown significantly less decline than the product of the Census Bureau estimates of employment and average hours worked in agriculture. We have linked in 1950 to the latter series, as it appears that the Department will revise its series downward on the basis of data from a 1954 benchmark study. The estimates based on the Census Bureau figures are those adjusted by the Bureau of Labor Statistics Division of Productivity to allow for the effect of the 1953 increase in the sample underlying the Current Population Surveys.

Because farm manhours and employment estimates differ in concept and sources, their quotient cannot be considered a precise measure of average hours worked on farms. It can, however, be used as a basis for assessing the reasonableness and consistency of the two sets of estimates in

AGRICULTURE, FORESTRY, AND FISHERIES

the light of some general information concerning average hours of work on farms. Disregarding annual fluctuations, which are generally not large, implicit average hours increase by around 3 per cent from the decade 1910-19 to 1920-29, then fall slightly in the 1930-39 period to the average for the first twenty years. After 1939, average hours rise 10 per cent to a peak in 1944, but by 1947-50 they are down to a lower level than that of the interwar period. The Census Bureau estimates of average hours worked in agriculture show a persistent decline in the period 1950-57.

Over the entire period, 1910-57, only a mild reduction in average hours worked was recorded, and this came after World War II. This may seem surprising in view of the undeniable downtrend in nonfarm average hours, which might be expected to affect the farm sector and particularly hired labor. But there are several reasons for believing that the implications of the farm manhours and employment estimates are broadly reasonable.

In the first place, average hours in the farm sector as a whole are affected by relative shifts in persons engaged among the several types of farming in which levels of average hours differ. Even though the nominal workweek in individual branches of agriculture may have fallen, downward pressure from this source has tended to be offset by relative shifts of workers to more demanding farm occupations. Specifically, there have been distinct relative increases of employment in the several types of livestock farming. Average hours worked per year are typically higher in livestock products than in the more seasonal staple crops.¹⁴

While mechanization has reduced unit labor requirements, it has not necessarily reduced average hours worked per year. Farmers' earnings are closely related to the amount of work done in critical seasons. Whereas the hours that can be worked per day with animals are limited, use of the tractor lifts these limitations. Hopkins has written: "In most areas, it is found that the farmers and their hired men put in 0.2 to 0.3 hours more per field day on farms with a tractor than on farms using only horses. . . . This effect is most pronounced in the small-grain area, in which the greatest pressure to seed or harvest crops within limited seasons is found."¹⁵

More generally, a farmer's income from both his labor and capital is closely related to the hours he and available members of his family work. This being so, there is a more direct incentive than in nonfarm work to maintain hours, especially since proprietors are a more important part of the work force in farming than elsewhere. Hired farm labor would be more influenced by the trend towards shorter hours elsewhere, but this tendency has probably been mitigated by the frequently close work association between operator and hired hand and by the absence of extensive

¹⁴ See John A. Hopkins, *Changing Technology and Employment in Farming*, Dept. of Agriculture, 1941, pp. 22-25.

¹⁵ *Ibid.*, p. 25.

APPENDIX B

unionization in agriculture. There is some evidence that average hours of farm labor have decreased;¹⁶ but since employees account for only one-fourth of the total, the effect on average hours of all persons engaged is lessened proportionately.

In sum, we do not have much direct information about average hours worked on farms, but the considerations listed suggest that the small changes indicated by the manhours and employment estimates are not unreasonable. It is Barger's conclusion that average hours in agriculture have been virtually constant over the whole period 1870-1950.¹⁷ In view of the lack of trend exhibited by our estimates for the period since 1910, we have extrapolated the manhours estimates by employment from 1870 to 1910, thus accepting Barger's judgment that average hours were relatively constant before as well as for several decades after 1910.

Farm Capital

With the exception of the farm machinery component, the estimates of farm capital are those prepared by Alvin Tostlebe for census years 1870-1950,¹⁸ interpolated annually by major category between 1900 and 1950 and extrapolated after 1950 by the estimates of Goldsmith.¹⁹ Goldsmith's estimates of the real stock of farm machinery were used for the period since 1900, in preference to the Tostlebe estimates, for reasons given below. The stock of land was estimated separately, and reproducible capital was subdivided into buildings, equipment, and inventories of crops and live-stock (including and excluding workstock).

FARM REAL ESTATE

Tostlebe estimated the real value of farm real estate in considerable detail. For the thirty-seven humid states, he calculated the base-period value per acre of "improved" and "unimproved" land in each state and applied these estimates to the number of acres of each type of land as reported by states in censuses. The constant-dollar depreciated value of farm buildings in these states was calculated from the Agriculture Department estimates

¹⁶ Willford I. King, *Employment, Hours, and Earnings in Prosperity and Depression, United States, 1920-1922*, New York (NBER), 1923, p. 82. King estimated that average weekly hours of farm employees from 1920 to 1922 were almost fifty-two. In 1953, the Current Population Survey implied they were about six hours lower. Much of this may have occurred in the postwar years.

¹⁷ Harold Barger, *Distribution's Place in the American Economy since 1869*, Princeton University Press (for NBER), 1955, pp. 10-12. See also Barger and Landsberg, *op. cit.*, pp. 268-72.

¹⁸ Tostlebe, *op. cit.* An earlier description of his sources and methods is contained in his *The Growth of Physical Capital in Agriculture, 1870-1950*, Occasional Paper 44, New York (NBER), 1954.

¹⁹ Goldsmith, *op. cit.* Revised and extended estimates for 1945-55 have been supplied by the author, and linked to his published estimates as of 1945.

AGRICULTURE, FORESTRY, AND FISHERIES

for the country as a whole. For the eleven western states, acreages of irrigated, dry farming, and grazing land, as reported in the censuses, were weighted by the estimated value per acre of each in the base period. Although Tostlebe estimated the real value of land and buildings together in the second instance, he made available a breakdown so that these items could be treated separately.

The procedure followed by Tostlebe has merit in that shifts in the quality composition of land are reflected in the real-stock estimates. Thus, since 1925 the total acreage of farm land has risen by 12 per cent more than the real-value estimates, reflecting the greater relative increase in unimproved land than in higher-value improved land. Goldsmith used a simpler estimating procedure. His real-value estimates closely parallel Tostlebe's but increase by 4 per cent more between 1900 and 1950. Goldsmith's annual figures, based on Agriculture Department information, were used for interpolation from 1910 on; prior to 1910, we followed Goldsmith's procedure of interpolating linearly between census dates.

Goldsmith's estimates of the real value of buildings were used to interpolate Tostlebe's census-year estimates back to 1900; before this date interpolations were linear. The stock-of-buildings figures of Goldsmith also show a somewhat greater increase than those of Tostlebe over the first half of the century.

MACHINERY AND EQUIPMENT

Goldsmith's estimates of the real net stock of farm equipment plus estimates of the real stock of passenger cars for farm business were used for this category. The Goldsmith estimates represent cumulated net expenditures for machinery and equipment (exclusive of passenger cars).²⁰ His gross expenditure figures are somewhat higher than those of the Agriculture Department, partly because he includes subsidiary durable items not counted by Agriculture, partly because he uses different depreciation periods. The Goldsmith real-stock figures are considerably higher than those of Tostlebe, and move differently. Tostlebe's basic procedure was to deflate the Census value data by a current price index. Yet there is much uncertainty about the method of valuation used by farmers in reporting and the consistency among farmers in the valuations over time. As Tostlebe warns, his method is in error to the extent that Census values deviate from depreciated values at current prices. Since Goldsmith's estimates are based on a clear and consistent method of derivation and valuation, they have been used. Also, Goldsmith's procedure of deflating by components is preferable to Tostlebe's procedure of deflating by one composite index based on fixed quantity weights.

²⁰ *Ibid.*, Vol. I, pp. 773-79, and Vol. II, pp. 443-68.

APPENDIX B

The real value of farm automobiles for business use was likewise estimated by cumulating real net additions. Current-dollar estimates of gross outlays and depreciation since 1910 were available from the Agriculture Department. The Department assumed that 40 per cent of the use of farm automobiles was for business purposes (50 per cent from 1942 to 1945). The corresponding percentage of a cumulation of Goldsmith's real net saving through farm passenger cars, 1900-10, was used for the first decade, and his deflator as extended was applied to Agriculture's current value net outlay figures. The Goldsmith price index from 1910 on is based on the Department of Agriculture estimates of prices paid by farmers for new automobiles, extrapolated to 1900 by wholesale prices of new cars.

The Goldsmith estimates, adjusted to include farm automobiles for business use, show a smaller increase than the Tostlebe estimates between 1910 and 1950. This is partly because Tostlebe included the deflated value of all farm automobiles and partly because of the different methods of establishing current values. Since Tostlebe's price deflator rises more than Goldsmith's over the period, the difference in deflation procedure would have worked in the opposite direction.

INVENTORIES

For livestock, Department of Agriculture estimates of number of head on January 1 of each year are available for the entire period, with the exception of chickens prior to 1925.²¹ Numbers, by type of state, were multiplied by average value per unit on or near January 1, 1929. Estimates by Agriculture of the physical volume of crops stored on farms are far less comprehensive, except for recent years. Coverage becomes progressively thinner in going back to 1910. The general procedure followed by Tostlebe was to average the ratio of inventories to production by state for the earliest five-year period for which both series were available and apply these ratios to state crop-production data as reported by censuses back to 1870.²² The continuous quantity estimates were then weighted by base-period average prices by states.

The Tostlebe constant-price inventory totals show almost exactly the same net change between 1910 and 1920 and over subsequent quinquennial periods as the "net change in all farm inventories" component of the Commerce gross farm output estimates converted to a 1929 price base. The totals also move quite similarly to Goldsmith's estimates of crop and livestock inventories in 1929 prices, and these latter estimates were used for annual interpolations back to 1900.²³ Prior to 1900, we estimated

²¹ Number of chickens 1870-1920 were estimated by Tostlebe as described in *The Growth of Physical Capital in Agriculture, 1870-1950*, Occasional Paper 44, Appendix D.

²² *Ibid.*, Appendix E.

²³ Goldsmith, *op. cit.*, Vol. I, Table A-31, p. 795.

AGRICULTURE, FORESTRY, AND FISHERIES

livestock inventories annually by the sources and methods described by Tostlebe, and adjusted to his benchmarks where necessary. Annual interpolations between his decennial crop inventory figures from 1900 back were made on the basis of the crop production estimates of Strauss and Bean.

Work stock was segregated from other inventories for analytical purposes. The numbers of horses and mules and their average values in the base period were taken from the same Agriculture Department data used by the other estimators.

Factor Weights in Farming

As a basis for obtaining weights to apply to indexes of farm labor and capital, estimates of national income originating in farming were compiled for key years. Department of Commerce estimates, based on Agriculture Department series, are available back to 1910.²⁴ These were extended to 1899, by estimates prepared by Raymond Goldsmith.²⁵ Since capital provided by nonfarm landlords was included in our farm capital estimates, net rents paid to nonfarm landlords were added to the farm national income estimates. Nonfarm rents were available from the Department of Agriculture back to 1910;²⁶ this series was extrapolated to 1899 by farm national income adjusted for the estimated change in the proportion of farms owned by nonfarm landlords.²⁷

The compensation of employees, including the value of pay in kind, is available from the Commerce Department from 1929 forward. This series was extended to 1910 by the Agriculture Department estimates for the same category.²⁸ Extrapolation to 1899 was by means of the product of our employee manhour estimates and an index of the composite wage rate in agriculture.²⁹ Average earnings of employees were imputed to proprietors and unpaid family workers by multiplying the employee compensation estimates by the ratio of total manhours worked to employee manhours. Capital compensation was derived as the difference between national income, as adjusted, and labor compensation.

Labor and capital compensation were divided by the indexes of real labor and capital input, respectively, in order to obtain unit compensation figures. These were totaled for successive key years to arrive at the percentage weights to apply to the input indexes for the years within each of the subperiods bounded by the key years. The procedure is shown in some

²⁴ *Survey of Current Business*, August 1954, pp. 22-23.

²⁵ *Op. cit.*, Vol. I, Table A-4, p. 757.

²⁶ *Farm Income Situation*, No. 159, 1956, Table 15, p. 32.

²⁷ Goldsmith, *op. cit.*, Vol. I, Table A-14, p. 770.

²⁸ *Farm Income Situation*, No. 159, Table 16, p. 33.

²⁹ *Historical Statistics of the United States, 1789-1945*, Dept. of Commerce, 1949, Series D 176.

APPENDIX B

detail in Table B-2, both for its intrinsic interest and to provide an illustration of the general weighting scheme (used in other industries but not usually shown in such detail). Also in line with our general procedure, the 1899-1909 weights were applied to the input indexes for earlier years.

TABLE B-2
Farm Segment: Derivation of Factor Weights, Annual Averages in Successive Pairs of Key Years, 1899-1953

Line No.	1899-1909	1909-19	1919-29	1929-37	1937-48	1948-53
1. Farm national income, ^a millions of \$	4,012	8,602	10,297	7,962	14,464	19,766
2. Employee compensation, millions of \$	614	1,121	1,398	1,142	2,016	2,922
3. Employee manhours as per cent of total manhours	23.47	23.07	23.81	23.85	21.39	21.00
4. Total labor compensation, millions of \$ (2) ÷ (3)	2,616	4,860	5,872	4,788	9,423	13,912
5. Index of manhours (1929 = 100)	94.41	100.25	101.10	97.85	77.99	69.46
6. Unit labor compensation millions of \$ (4) ÷ (5)	2,771	4,848	5,808	4,893	12,083	20,028
7. Capital compensation, millions of \$ (1) - (4)	1,396	3,742	4,425	3,174	5,041	5,854
8. Index of real capital (1929 = 100)	86.17	98.37	101.16	97.96	103.55	111.21
9. Unit capital compensation, millions of \$ (7) ÷ (8)	1,620	3,804	4,374	3,240	4,868	5,264
Relative weights (per cent)						
10. Labor (6) ÷ (6 + 9)	63.1	56.0	57.0	60.2	71.3	79.2
11. Capital (9) ÷ (6 + 9)	36.9	44.0	43.0	39.8	28.7	20.8

^a Adjusted to include net rents to nonfarm landlords.

Agricultural Services, Forestry, and Fisheries

These residual groups of the segment are small compared with farming, and we combined them into one major grouping. The groups are residual in the sense that adequate output measures were not available for

AGRICULTURE, FORESTRY, AND FISHERIES

them,³⁰ although rough estimates for fisheries could be put together as described in the following section.

Agricultural services (Standard Industrial Classification, Major Group 07) includes such diverse activities as cotton ginning, grist milling, corn shelling, hay baling, threshing services, animal husbandry services, horticultural services, etc., usually on a contract basis. Hunting, trapping, and game propagation are also included. Forestry (Major Group 08) includes the growing of trees, gathering of tree products, forestry services, but not logging. Fisheries (Major Group 09) involves the catching (or taking) of fish or other marine products and fishery services, such as the operation of fish hatcheries or fishing preserves.

EMPLOYMENT AND MANHOURS

From 1929 forward, the Commerce Department estimates of persons engaged were used. In the pre-Social Security period, *Census of Manufactures* estimates of employment in the gum turpentine and rosin industry were the chief source for the forestry group. Employment in fisheries was based on the 1930 and 1940 *Census of Population* occupational data, with selected intervening years based on Bureau of Fisheries estimates (which are more than twice as high as the Census figures, presumably because of part-time workers). For agricultural services, use was made of the 1935 and 1939 *Census of Service Establishments* and of the relation of employment in this group to that in agricultural production.

In going back of 1929 for forestry and fisheries, Carson's labor force estimates, adjusted to an employment basis (see Appendix A), were used for census years. The same method was used to obtain the information for fisheries alone, except that before 1910 it was necessary to use the Edwards estimates for fisheries, which are roughly comparable with the Carson totals. Annual interpolations were made for the two groups together from 1929 back to 1900 by the published estimates of the National Industrial Conference Board.³¹ The Board's estimates were based on data from the Bureau of Fisheries and the Forestry Service.

The pre-1929 estimates of persons engaged in agricultural services are the only component of the economy aggregate not tied into selected benchmarks. Instead, use was made of the relationship from 1929 to 1953 between numbers of persons engaged in farming and those in agricultural services. The ratio of agricultural service employment to farm employment rose steadily after 1929, reflecting the increasing use by

³⁰ Resources for the Future has made estimates of timber output, but these imply a decline in output per worker, and they have not been used here. See N. Potter and F. T. Christy, Jr., "Employment and Output in the Natural Resource Industries, 1870-1955," *Output, Input, and Productivity Measurement*, Studies in Income and Wealth, Volume 25, Princeton University Press (for NBER), 1961.

³¹ *Historical Statistics*, Series D 67.

APPENDIX B

farmers of certain intermediate services and the growing tendency to obtain certain services on a contract basis. It seemed reasonable to suppose that this was a secular tendency because we knew, for example, that the ratio of all intermediate products to farm output had exhibited a generally rising trend from 1910 on. Accordingly, we extrapolated the rate of change in the ratio since 1929 back to the beginning of the period and applied the extrapolated ratios to the estimates of farm employment in order to derive estimates of employment in agricultural services.

As for average hours worked, since agricultural services include certain processing activities, we have assumed that the workweek has behaved more like that in manufacturing than that in farming. Consequently, numbers of full-time equivalent employees were multiplied by average hours worked in all manufacturing. Numbers of proprietors and unpaid family workers were multiplied by the same series raised by 10 per cent to take account of the longer hours worked by this class of worker in the economy generally.

In the case of forestry and fisheries, however, we assumed that because of the necessity of accommodating work time to seasonal and weather conditions, average hours did not change significantly over the period under review. Accordingly, we held average hours per week for employees constant at the 46.8 figure indicated by the 1940 *Census of Population* and used 110 per cent of this figure for proprietors and unpaid family workers.

Our information regarding average hours worked in agricultural services, forestry, and fisheries is scantier than in any other grouping in the economy. However, this group is so small that possible errors here would have a negligible effect on total manhours in the private economy.

FISHERIES OUTPUT

Estimates of the United States catch of fish have been made by the Fish and Wild Life Service and its predecessor agency, the Bureau of Fisheries, over a relatively long period of time. Estimates of the number of pounds caught in the United States annually since 1929 can be derived from data shown in *Historical Statistics* (Series F 155, for the United States and Alaska, less Series F 189, for Alaska); and Arthur F. Burns³² provides estimates for 1880–1929 consistent with the later series. The estimates are based on “intermittent statistical canvasses,” with interpolations made by the official agencies, and are more accurate in indicating trends than annual movements. Furthermore, the series is an unweighted quantity aggregate; ideally, the catch of each type of fish should be weighted by base-period unit values; but this time-consuming refinement was not undertaken.

³² *Production Trends in the United States since 1870*, New York (NBER), 1934.

AGRICULTURE, FORESTRY, AND FISHERIES

Index numbers of the output of the fisheries, as measured by total poundage caught, are shown in Table B-3. The corresponding estimates of persons engaged are also shown for comparison. The relative movement of the two series does not seem unreasonable, in that output rose

TABLE B-3
Fisheries: Output and Persons Engaged, Key Years, 1889-1953
(1929 = 100)

	Output	Persons Engaged
1889	55	70
1899	60	80
1909	66	89
1919	77	79
1929	100	100
1937	121	92
1948	137	111
1953	143	118

more rapidly than employment between 1889 and 1953. In both world war periods, however, employment rose relative to output. The two series are too rough, however, to permit confident use of their ratio as a productivity indicator.

TABLE B-1
Farm Segment: Net Output, Inputs, and Productivity Ratios, 1869-1957
(1929 = 100)

	Net Output ^a	Persons Engaged ^b	Net Output per Person	Manhours ^b	Net Output per Manhour	Capital Input	Net Output per Unit of Capital Input	Total Factor Input	Total Factor Productivity
1869	32.7	58.2	56.2	53.6	61.0	37.7	86.7	47.5	68.8
1879	50.8	77.1	65.9	70.4	72.2	53.6	94.8	63.9	79.5
1889	63.6	90.4	70.4	82.6	77.0	65.3	97.4	75.8	83.9
1890	62.6	91.7	68.3	83.8	74.7	66.5	94.1	77.0	81.3
1891	65.1	92.5	70.4	84.5	77.0	67.8	96.0	77.9	83.6
1892	61.8	93.4	66.2	85.3	72.5	69.0	89.6	78.9	78.3
1893	60.2	94.3	63.8	86.1	69.9	69.8	86.2	79.7	75.5
1894	62.3	95.1	65.5	86.9	71.7	70.7	88.1	80.5	77.3
1895	66.3	96.0	69.1	87.7	75.6	71.9	92.2	81.5	81.4
1896	71.1	96.8	73.5	88.5	80.3	73.2	97.1	82.4	86.3
1897	76.4	97.7	78.2	89.3	85.6	74.8	102.1	83.5	91.5
1898	79.8	98.6	80.9	90.1	88.6	76.6	104.2	84.7	94.2
1899	79.8	99.4	80.3	90.8	87.9	78.1	102.2	85.7	93.1
1900	80.5	100.3	80.3	91.6	87.9	79.4	101.4	86.7	92.3
1901	80.0	100.9	79.3	92.2	86.8	80.2	99.8	87.3	91.0
1902	79.4	101.5	78.2	92.8	85.6	81.7	97.2	88.2	90.6
1903	81.8	102.1	80.1	93.4	87.6	83.4	98.1	89.3	91.6
1904	83.9	102.7	81.7	93.9	89.4	84.4	99.4	89.9	93.8
1905	84.9	103.2	82.3	94.5	89.8	85.7	99.1	90.8	93.5
1906	89.4	103.8	86.1	95.1	94.0	87.1	102.6	91.7	97.5
1907	85.4	104.4	81.8	95.6	89.3	88.0	97.0	92.3	92.5
1908	87.1	105.0	83.0	96.2	90.5	88.7	98.2	93.0	93.7
1909	85.3	105.6	80.8	96.8	88.1	90.0	94.8	93.8	90.9

(continued)

TABLE B-I (continued)

1910	87.7	106.2	82.6	97.4	90.0	91.5	95.8	94.8	92.5
1911	82.8	106.1	78.0	99.4	83.3	93.8	88.3	96.9	85.4
1912	97.9	106.2	92.2	100.7	97.2	94.7	103.4	98.1	99.8
1913	85.1	106.3	80.1	99.4	85.6	95.3	89.3	97.6	87.2
1914	95.0	106.4	89.3	102.5	92.7	96.1	98.9	99.7	95.3
1915	101.7	106.5	95.5	100.4	101.3	98.6	103.1	99.6	102.1
1916	89.4	106.8	83.7	99.8	89.6	98.8	90.5	99.4	89.9
1917	98.7	106.3	92.9	102.6	96.2	99.8	98.9	101.4	97.3
1918	89.6	104.9	85.4	103.9	86.2	101.0	88.7	102.6	87.3
1919	90.2	103.8	86.9	102.0	88.4	101.9	88.5	102.0	88.4
1920	88.9	105.2	84.5	103.6	85.8	101.8	87.3	102.8	86.5
1921	83.7	105.0	79.7	95.6	87.6	100.5	83.3	97.7	85.7
1922	89.4	104.5	85.6	98.9	90.4	99.4	89.9	99.1	90.2
1923	95.5	103.1	92.6	99.6	95.9	98.3	97.2	99.0	96.5
1924	90.6	102.1	88.7	100.7	90.0	97.5	92.9	99.3	91.2
1925	97.2	102.1	95.2	102.8	94.6	97.6	99.6	100.6	96.6
1926	96.3	101.7	94.7	103.1	93.4	98.4	97.9	101.1	95.3
1927	99.2	99.0	100.2	99.1	100.1	98.6	100.6	98.9	100.3
1928	97.0	99.4	97.6	100.9	96.1	99.5	97.5	100.3	96.7
1929	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1930	93.1	97.9	95.1	99.0	94.0	99.4	93.7	99.2	93.9
1931	104.2	99.9	104.3	101.2	103.0	100.1	104.1	100.8	103.4
1932	99.7	100.4	99.3	97.6	102.2	100.6	99.1	98.8	100.9
1933	102.5	99.8	102.7	97.4	105.2	99.2	103.3	98.1	104.5
1934	88.3	98.9	89.3	87.4	101.0	96.0	92.0	90.8	97.2
1935	97.3	99.8	97.5	90.9	107.0	95.6	101.8	92.8	104.8
1936	90.9	96.6	94.1	88.3	102.9	95.0	95.7	91.0	99.9
1937	101.9	93.8	108.6	95.4	106.8	95.8	106.4	95.6	106.6
1938	106.5	91.1	116.9	88.9	119.8	96.7	110.1	91.2	116.8
1939	106.7	88.8	120.2	89.3	119.5	97.0	110.0	91.6	116.5

(continued)

TABLE B-I (concluded)

Farm Segment: Net Output, Inputs, and Productivity Ratios, 1869-1957
(1929 = 100)

	Net Output ^a	Persons Engaged ^b	Net Output per Person	Manhours ^b	Net Output per Manhour	Capital Input	Net Output per Unit of Capital Input	Total Factor Input	Total Factor Productivity
1940	105.9	86.0	123.1	88.3	119.9	99.2	106.8	91.5	115.7
1941	114.8	83.6	137.3	86.6	132.6	101.8	112.8	91.0	126.2
1942	123.0	82.3	149.5	90.0	136.7	104.8	117.4	94.3	130.4
1943	117.4	81.8	143.5	89.3	131.5	106.1	110.7	94.2	124.6
1944	118.5	80.1	147.9	88.4	134.0	106.2	111.6	93.6	126.6
1945	113.3	78.3	144.7	82.5	137.3	105.4	107.5	89.1	127.2
1946	115.7	80.7	143.4	79.6	145.4	105.3	109.9	87.0	133.0
1947	111.0	81.3	136.5	76.0	146.1	104.9	105.8	84.3	131.7
1948	119.2	81.2	146.8	73.9	161.3	107.2	111.2	83.5	142.8
1949	118.6	78.1	151.9	71.5	165.9	111.1	106.8	82.4	143.9
1950	120.1	77.8	154.4	65.8	182.5	114.6	104.8	78.5	153.0
1951	113.2	74.8	151.3	62.8	180.3	117.2	96.6	76.6	147.8
1952	113.8	71.7	158.7	60.0	189.7	118.4	96.1	74.5	152.8
1953	121.7	69.5	175.1	55.9	217.7	118.0	103.1	71.1	171.2
1954	126.6	67.7	187.0	54.4	232.7	118.0	107.3	69.9	181.1
1955	133.1	65.5	203.2	55.4	240.3	118.9	111.9	70.9	187.7
1956	134.1	61.3	218.8	53.1	252.5	119.3	112.4	69.1	194.1
1957 ^p	129.9	59.4	218.7	48.9	265.6	119.3	108.9	65.6	198.0

^p = preliminary.^a Net of intermediate products but gross of capital consumption.^b Absolute numbers of persons engaged and manhours are given in Tables A-VI and A-X.

AGRICULTURE, FORESTRY, AND FISHERIES

TABLE B-II

Farm Segment: Gross Output and Productivity Ratios,^a 1869-1957
(1929 = 100)

	Gross Output	Gross Output per Person	Gross Output per Manhour	Gross Output per Unit of Capital Input	Total Factor Productivity
1869	28.9	49.7	53.9	76.7	60.8
1879	45.2	58.6	64.2	84.3	70.7
1889	57.2	63.3	69.2	87.6	75.5
1890	56.3	61.4	67.2	84.7	73.1
1891	58.7	63.5	69.5	86.6	75.4
1892	55.8	59.7	65.4	80.9	70.7
1893	54.4	57.7	63.2	77.9	68.3
1894	56.4	59.3	64.9	79.8	70.1
1895	60.0	62.5	68.4	83.4	73.6
1896	64.4	66.5	72.8	88.0	78.2
1897	69.3	70.9	77.6	92.6	83.0
1898	72.5	73.5	80.5	94.6	85.6
1899	72.5	72.9	79.8	92.8	84.6
1900	73.3	73.1	80.0	92.3	84.5
1901	73.0	72.3	79.2	91.0	83.6
1902	72.5	71.4	78.1	88.7	82.2
1903	74.8	73.3	80.1	89.7	83.8
1904	76.9	74.9	81.9	91.1	85.5
1905	77.9	75.5	82.4	90.9	85.8
1906	82.2	79.2	86.4	94.4	89.6
1907	78.6	75.3	82.2	89.3	85.2
1908	80.3	76.5	83.5	90.5	86.3
1909	78.8	74.6	81.4	87.6	84.0
1910	81.0	76.3	83.2	88.5	85.4
1911	77.1	72.7	77.6	82.2	79.6
1912	89.4	84.2	88.8	94.4	91.1
1913	79.7	75.0	80.2	83.6	81.7
1914	87.5	82.2	85.4	91.1	87.8
1915	92.0	86.4	91.6	93.3	92.4
1916	83.4	78.1	83.6	84.4	83.9
1917	91.1	85.7	88.8	91.3	89.8
1918	87.2	83.1	83.9	86.3	85.0
1919	87.3	84.1	85.6	85.7	85.6

(continued)

APPENDIX B

TABLE B-II (concluded)

Farm Segment: Gross Output and Productivity Ratios,^a 1869-1957
(1929 = 100)

	Gross Output	Gross Output per Person	Gross Output per Manhour	Gross Output per Unit of Capital Input	Total Factor Productivity
1920	87.0	82.7	84.0	85.5	84.6
1921	82.5	78.6	86.3	82.1	84.4
1922	87.6	83.8	88.6	88.1	88.4
1923	92.6	89.8	93.0	94.2	93.5
1924	91.0	89.1	90.4	93.3	91.6
1925	96.2	94.2	93.6	98.6	95.6
1926	96.2	94.6	93.3	97.8	95.2
1927	98.8	99.8	99.7	100.2	99.9
1928	98.1	98.7	97.2	98.6	97.8
1929	100.0	100.0	100.0	100.0	100.0
1930	94.5	96.5	95.5	95.1	95.3
1931	102.3	102.4	101.1	102.2	101.5
1932	98.1	97.7	100.5	97.5	99.3
1933	100.2	100.4	102.9	101.0	102.1
1934	88.1	89.1	100.8	91.8	97.0
1935	95.2	95.4	104.7	99.6	102.6
1936	92.6	95.9	104.9	97.5	101.8
1937	102.4	109.2	107.3	106.9	107.1
1938	106.7	117.1	120.0	110.3	117.0
1939	109.8	123.6	123.0	113.2	119.9
1940	112.2	130.5	127.1	113.1	122.6
1941	120.4	144.0	139.0	118.3	132.3
1942	131.8	160.1	146.4	125.8	139.8
1943	129.3	158.1	144.8	121.9	137.3
1944	131.1	163.7	148.3	123.4	140.1
1945	130.4	166.5	158.1	123.7	146.4
1946	134.0	166.0	168.3	127.3	154.0
1947	131.9	162.2	173.6	125.7	156.5
1948	138.1	170.1	186.9	128.8	165.4
1949	137.6	176.2	192.4	123.9	167.0
1950	141.9	182.4	215.7	123.8	180.8
1951	139.4	186.4	222.0	118.9	182.0
1952	143.2	199.7	238.7	120.9	192.2
1953	147.0	211.5	263.0	124.6	206.8
1954	152.3	225.0	280.0	129.1	217.9
1955	158.7	242.3	286.5	133.5	223.8
1956	162.1	264.4	305.3	135.9	234.6
1957 ^p	160.3	269.9	327.8	134.4	244.4

^p = preliminary.

^a Index numbers of the inputs are the same as those shown in Table B-I.

AGRICULTURE, FORESTRY, AND FISHERIES

TABLE B-III

Farm Segment: Real Capital Stock, by Type, Key Years, 1869-1953
(millions of 1929 dollars)

	<i>Total Farm Capital</i>	<i>Land</i>	<i>Structures</i>	<i>Machinery and Equipment</i>	<i>Work Stock</i>	<i>Inventories Livestock Excluding Work Animals</i>	<i>Crops</i>
1869	23,145	13,836	4,578	564	623	2,697	847
1879	32,941	19,643	6,367	828	906	3,643	1,554
1889	40,132	23,863	7,006	1,217	1,274	4,698	2,074
1899	48,004	29,107	8,057	1,900	1,504	4,770	2,666
1909	55,295	31,735	11,255	3,012	1,739	4,960	2,594
1919	62,600	34,254	13,671	3,984	1,906	5,745	3,040
1929	61,463	34,365	13,409	4,132	1,436	5,183	2,938
1937	58,877	34,686	11,663	3,651	1,147	5,300	2,430
1948	65,884	34,218	13,110	8,012	659	5,945	3,940
1953	72,521	36,032	14,781	10,753	379	6,768	3,808