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THE GROWING IMPORTANCE OF SERVICE EMPLOYMENT

In 1947 U.S. employment stood at 58 million. The comparable figure for 1965 was 71 million, an increase of 13 million over eighteen years. Nearly all of this net growth occurred in the Service sector; modest increases in manufacturing and construction have been almost completely offset by declines in agriculture and mining. Between 1929 and 1965 Service sector employment grew by 20 million. The Industry sector increased by only 10 million and Agricultural employment declined by 5 million. This chapter is primarily concerned with delineating the growth of service employment from several different points of view. Trends in recent decades are examined in detail, but longer-term trends are also considered. The growth of the Service sector's share of employment in individual states and in foreign countries is discussed. Greatest attention is given to the distribution of employment by industry and sector, but some occupational data are presented as well. The chapter begins with a discussion of the sector definitions. It concludes by examining some of the reasons for the shift to service employment.

Sector Definitions

More than a decade ago George J. Stigler wrote, "There exists no authoritative consensus on either the boundaries or the classification of the service industries." [1] A careful review of subsequent studies provides no basis for challenging this conclusion. Some studies include transportation, communications, and public utilities in the Service sector; others exclude these industries.[2] David Worton, in his study of the service industries in

[1] George J. Stigler, *Trends in Employment in the Service Industries,* Princeton University Press for National Bureau of Economic Research, 1956, p. 47.

[2] These industries were included in the Service sector by Gur Ofer in *The Service Industries in a Developing Economy,* New York, 1967. They were excluded by Maurice Lengellé in *The Growing Importance of the Service Sector in Member*

Canada, includes transportation and communications, but excludes public utilities. This definition is also used by Deakin and George in their study of the U.K., and by J. A. Dowie in his study of services in Australia.[3]

Even within the work of a single author, variations in definition are evident. Simon Kuznets included transportation, communications, and public utilities in the Service sector in much of his early work, but excluded them in his most recent study.[4] Gur Ofer also worked with the narrower definition in his recent study of Soviet services.[5]

The differences to be found among empirical studies reflects the absence of any clear theoretical basis for grouping industries. The two criteria most frequently mentioned are closeness to the consumer and the presence or absence of a tangible product. The notion of primary, secondary, and tertiary industries, for instance, as developed by Allan Fisher and Colin Clark,[6] is related to the degree to which the particular activity is distant from, or close to, the ultimate consumer. There are, however, several industries that service business firms—wholesale trade, commercial banking, advertising—but are nevertheless usually classified in the service or tertiary sector.

A strict application of the intangibility criterion also presents problems. A dentist who makes a false tooth and places it in the patient's mouth is certainly delivering a tangible product, but dentistry is invariably classified as a service. It is difficult to make a sharp distinction between the activities of an auto assembly plant and those of an automobile repair shop, but the former is invariably classified in Industry and the latter is usually regarded as a service. Alfred Marshall sharply pointed up this

Countries, Organization for Economic Co-operation and Development, Paris, 1966. Stigler, himself (*op. cit.*, p. 47), excluded these industries partly on the grounds that "they have been treated in earlier National Bureau studies." But he adds that "the characteristics of transportation and public utilities are sufficiently peculiar so that in any event they deserve separate analysis." (*Ibid.*, p. 47, fn. 1.)

[3] See David A. Worton, "The Service Industries in Canada, 1946–66," in *Production and Productivity in the Service Industries*, V. R. Fuchs, ed., New York, NBER, in press; B. M. Deakin and K. D. George, *Productivity Trends in the Service Industries, 1948–63*, Cambridge, England, 1965; and J. A. Dowie, "Productivity Growth in Goods and Services: Australia, U.S.A., U.K.," *The Economic Record*, December 1966.

[4] Compare, for instance, Simon Kuznets, "Quantitative Aspect of the Economic Growth of Nations; III, Industrial Distribution of Income and Labor Force by States, United States 1919–21 to 1955," *Economic Development and Cultural Change*, July 1958, with his *Modern Economic Growth*, New Haven and London, 1966.

[5] "The Service Sector in the Soviet Union." Unpublished Ph.D. dissertation, Harvard University, 1967.

[6] Allan G. B. Fisher, *The Clash of Progress and Security*, London, 1935, and Colin Clark, *The Conditions of Economic Progress*, London, 1940.

dilemma by noting that in one sense all industries provide services. "Man cannot create material things." [7]

A third basis for classification is revealed in the term "residual" sector, which is sometimes applied to a miscellaneous collection of industries that clearly are not in agriculture, mining, or manufacturing. Just why these industries should have become a residual is in itself an interesting question. The greater attention that has been given by economists to the primary and secondary industries might be explained by many factors: (1) Tertiary employment becomes of major importance only when high levels of income per capita are reached. (2) Some early economists, notably Adam Smith, believed that only the primary and secondary sectors were "productive" and that the other industries were in some sense "parasitic." (3) It is usually much more difficult to obtain data for the service industries, many of which are characterized by small-scale operations. This is also true of agriculture but, in that case, at least the output tends to be standardized and thus more easily measured. (4) Much tertiary production is nonprofit; economic analysis has concentrated on market activities.

In this book the Service sector has been defined to include wholesale and retail trade, finance, insurance, and real estate, general government (including the military in most instances), and the services traditionally so designated, including professional, personal, business, and repair services. The reasons for this definition are very similar to those mentioned by Stigler (see footnote 2). This is, in part, a residual sector; it is a collection of industries that have not received much attention in the past from economists concerned with productivity analysis. There is much heterogeneity to be found in this sector, and part of the book is devoted to an exploration of this heterogeneity. It can be said, however, that most of the industries in it are manned by white-collar workers, that most of the industries are labor intensive, that most deal with the consumer, and that nearly all of them produce an intangible product.

The most questionable decision was to place transportation, communications, and public utilities in the Industry sector because of their dependence upon heavy capital equipment and complex technology. Fortunately, investigation of the impact of this decision revealed that the major con-

[7] Alfred Marshall, *Principles of Economics,* 8th Ed., London, 1929, p. 63. For an interesting discussion of some of the conceptual problems and of the special difficulties involved in translating definitions from English to French, see Maurice Lengellé, "Growth of the Commerce and Service Sector in Western Europe," in *Manpower Problems in the Service Sector,* OECD, Manpower and Social Affairs Directorate, Social Affairs Division, Paris, 1966.

clusions would not be altered significantly if these industries had been classified in the Service sector.

In our preliminary reports, trends in the Service sector were contrasted with those in the so-called "goods" sector. In this book, the "goods" sector is usually divided into Agriculture and Industry. Comparisons between the Service and Industry sectors are of primary interest. They permit an analysis of the shift to services which is relatively independent of the change from agricultural to nonagricultural pursuits.

In addition to dividing the total economy into Agriculture, Industry, and Service, I usually include measures for a group of services designated "Service subsector." This subsector excludes government, households and institutions, and real estate. It corresponds roughly to the private enterprise portion of the Service sector.[8] The measures of real output for the Service subsector are generally regarded as more reliable than those for the excluded industries, and therefore more reliable than those for the total Service sector.

I do not believe that the major conclusions of this study would be significantly affected by any reasonable changes in sector definitions. It may be readily admitted, however, that the sector boundaries are very difficult to draw with precision, and that no division based on allocating major industry groups is likely to be completely satisfactory. It is possible that the best definition for one set of problems is not the best for another set. In recognition of this, and of the heterogeneous character of the sectors, the study presents industry detail where possible.

Sector Trends in U.S. Employment

Tables 1 and 2, and Charts 1 and 2 show the absolute and relative trends in the industrial distribution of employment in the United States since 1929.[9] The years selected for the tables were all marked by relatively high levels of business activity, although cyclical elements in the year-to-year changes are not completely absent. This is particularly true for 1937 when unemployment stood at 14.3 per cent. In all the other years unem-

[8] Real estate does contain some private enterprise, but the large owner-occupied component is more properly classified with households.

[9] Unless otherwise stated, the employment concept used is the Office of Business Economics measure "persons engaged." This consists of full-time wage and salary workers, plus workers converted to full-time equivalents, plus proprietors. The importance of part-time employment has been growing rapidly in the Service sector; therefore, the figures presented in this chapter understate the growth of service employment relative to those that would be obtained from a simple head count of persons employed full or part-time.

TABLE 1

Persons Engaged, by Sector and Major Industry Group, Selected Years, 1929–65
(thousands)

	1929	1937	1947	1956	1965
Agriculture	9,205	8,864	7,006	5,425	4,039
Industry	18,356	17,125	24,294	27,464	28,194
Service	18,655	21,167	26,400	32,515	39,011
Service subsector [a]	12,263	12,596	16,718	18,836	22,141
Industry					
Mining	1,017	993	973	884	670
Construction	2,306	1,738	3,007	3,700	3,971
Manufacturing	10,556	10,686	15,406	17,702	18,443
Transportation	3,034	2,333	3,045	2,803	2,486
Communications and public utilities	1,034	901	1,190	1,492	1,513
Government enterprise	409	474	673	883	1,111
Service					
Wholesale trade	1,744	1,857	2,625	2,953	3,362
Retail trade [b]	5,955	6,095	8,020	8,955	9,767
Finance and insurance	1,207	1,065	1,290	1,825	2,318
Real estate	368	455	576	733	766
Households and institutions	3,249	3,060	3,017	3,995	5,076
Professional, personal, business and repair services	3,357	3,579	4,783	5,103	6,694
General government (including armed forces)	2,775	5,056	6,089	8,951	11,028

Source: U.S. Office of Business Economics: *The National Income and Product Accounts of the United States, 1929–1965, Statistical Tables,* Table 6.6.

[a] Excludes real estate, households and institutions, and general government.

[b] Automobile services and repair are included in repair services, and are excluded from retail trade. Automobile services and repair estimated for years prior to 1948.

ployment was below 5 per cent. The war years are omitted from the tables and charts because the changes in employment patterns caused by the war are largely irrelevant for the study of long-term trends.

In 1929 the Service sector's share of total employment was slightly over 40 per cent. By 1965 this had increased to almost 55 per cent.[10]

[10] Preliminary data for 1967 indicate that the Service sector continued to increase its share of total employment and nonagricultural employment between 1965 and 1967.

TABLE 2

Shares of Total Persons Engaged, by Sector and Major Industry Group, Selected Years, 1929–65
(per cent)

	1929	1937	1947	1956	1965
Agriculture	19.9	18.8	12.1	8.3	5.7
Industry	39.7	36.3	42.1	42.0	39.6
Service	40.4	44.9	45.8	49.7	54.8
Service subsector	26.5	26.7	29.0	28.8	31.1
Industry					
Mining	2.2	2.1	1.7	1.4	0.9
Construction	5.0	3.7	5.2	5.7	5.6
Manufacturing	22.8	22.7	26.7	27.1	25.9
Transportation	6.6	4.9	5.3	4.3	3.5
Communications and public utilities	2.2	1.9	2.1	2.3	2.1
Government enterprise	0.9	1.0	1.2	1.4	1.6
Service					
Wholesale trade	3.8	3.9	4.5	4.5	4.7
Retail trade	12.9	12.9	13.9	13.7	13.7
Finance and insurance	2.6	2.3	2.2	2.8	3.3
Real estate	0.8	1.0	1.0	1.1	1.1
Households and institutions	7.0	6.5	5.2	6.1	7.1
Professional, personal, business and repair services	7.3	7.6	8.3	7.8	9.4
General government (including armed forces)	6.0	10.7	10.6	13.7	15.5

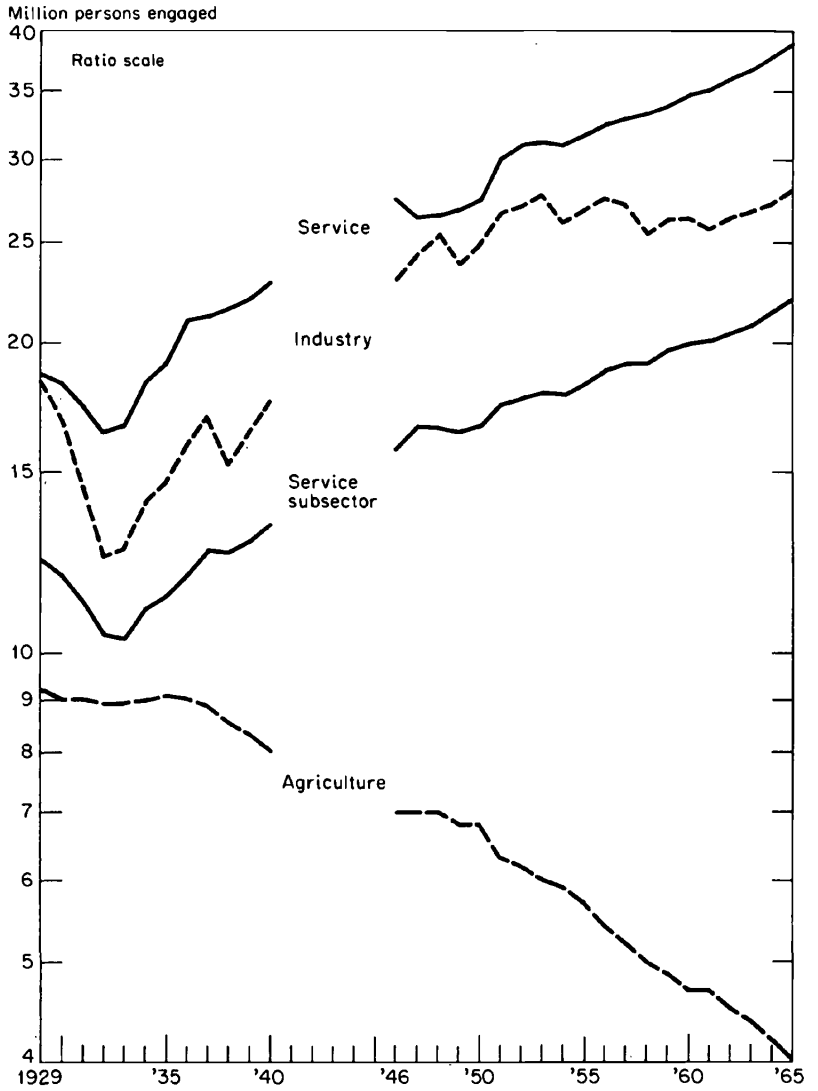
Source: See Table 1.
[a] See note a, Table 1. [b] See note b, Table 1.

Sometime during the past decade the United States thus became the first country in history to have more than half its employment in this sector. The tables and charts clearly delineate the broad trends underlying this dramatic shift: (1) the steady decline of agriculture throughout the period; (2) the rapid growth of employment in government; and (3) the relative stability of employment in manufacturing, especially since the mid-1950's.

Some other developments that worked in the same direction were the absolute declines in employment in mining and transportation and the sharp growth in importance of private nonprofit service institutions such as hospitals and universities. In 1929 the Industry and Service sectors

CHART 1

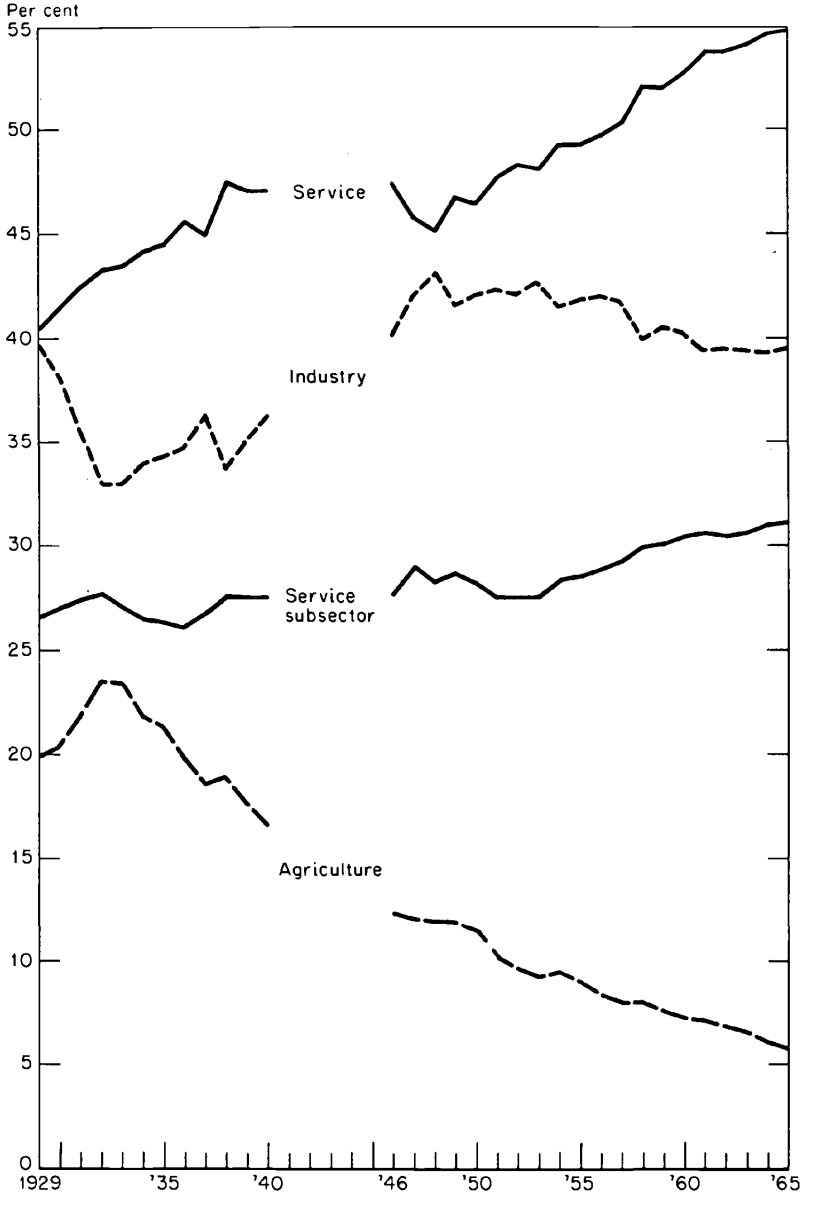
Persons Engaged, by Sector, 1929–40, 1946–65



Note: See Table 1 for sector definitions and source.

CHART 2

Sector Employment as a Percentage of Total Employment, 1929–40, 1946–65



Source: See Chart 1.

were approximately the same size. By 1965, the Service sector was 40 per cent larger than Industry.

Detailed Industries

Table 3 shows that the more rapid growth of service employment is also evident at the detailed industry level.[11] We see that a large percentage of the service industries had rapid rates of growth and only a very few had negative or slow rates. For the Industry sector the reverse is true. More than one-fourth of the industries in this sector showed an absolute decline in employment between 1929 and 1965, while fewer than one-sixth of them had rates of growth in excess of 3.0 per cent per annum.[12] Only two of the service industries showed declines in employment, and almost one-third of them grew at rates exceeding 3.0 per cent. The median rates of growth were 1.96 and 1.41 per cent per annum for the Service and Industry sectors, respectively.

Long-Term Trends

The shift of employment to services does not represent a sudden departure from previous long-term trends. For as long as we have records on the industrial distribution of the labor force, we find a secular tendency for the percentage accounted for by the Service sector to rise. Table 4 shows two sets of estimates of sector shares for census years from 1870 to 1930. Variant 1 estimates shares of "gainful workers"; variant 2 refers to employment.[13] Services grew more rapidly than the rest of the economy throughout the period; the average *differential* in rates of growth was approximately 1.4 per cent per annum. Since 1929 the differential between the Service sector and the rest of the economy has been slightly larger—1.6 per cent per annum.

Until 1920 the shift to services could be explained entirely by the movement from agricultural to nonagricultural pursuits; employment in Industry rose as rapidly as in Service. After 1920, however, the nonagricultural sectors' rates of growth diverged; Industry's share of total employment tended to decline, and the Service sector's share rose sharply.

[11] The most detailed source of employment data providing comparability between 1929 and 1965 is the U.S. Office of Business Economics. The level of detail here is between the SIC two-digit and three-digit classes.

[12] Of the eleven industries in the Industry sector with rates of growth above 2.0 per cent per annum, five are in the transportation, communications, public utilities and government enterprise group. As noted above, these industries have been classified in the Service sector by some investigators.

[13] The concept "gainful workers" includes all employed persons, paid or unpaid, and those unemployed who are not new entrants to the labor force.

TABLE 3

Frequency Distribution of Detailed Industries, by Rates of Growth of Employment, 1929–65

Average Annual Rates of Change	Number of Industries		Per Cent of Industries		Per Cent of 1929 Employment		Per Cent of 1965 Employment	
	Industry	Service	Industry	Service	Industry	Service	Industry	Service
3.0 and over	5	7	14.3	31.8	4.4	12.7	13.0	29.6
2.0 to 2.99	6	4	17.1	18.2	12.8	16.9	19.8	21.6
1.0 to 1.99	10	6	28.6	27.3	45.0	47.7	49.4	38.6
0 to .99	5	3	14.3	13.6	10.0	9.1	7.7	6.0
Negative	9	2	25.7	9.1	27.8	13.6	10.0	4.1

Note: Commercial and trade schools and employment agencies; instruments; miscellaneous manufacturing; and miscellaneous repair services and hand trades are excluded because of incomparability over time. Definitions of other industries were not always strictly comparable throughout the period.

Source: Appendix, Table C-6.

TABLE 4

Distribution of Employment, by Sector, 1870–1930
(per cent)

	1870	1880	1890	1900	1910	1920	1930
Variant 1, gainful workers							
Agriculture	50.8	50.6	43.1	38.1	32.1	27.6	22.7
Industry	30.0	30.1	34.8	37.8	40.9	44.8	42.1
Service	19.2	19.3	22.1	24.1	27.0	27.6	35.2
Variant 2, employment [a]							
Agriculture	47.3	47.1	39.7	34.7	28.4	23.8	21.9
Industry	27.1	27.1	31.2	33.7	37.8	41.4	35.8
Service	25.6	25.8	29.2	31.7	33.8	34.8	42.3

Source: Variant 1: Solomon Fabricant, "The Changing Industrial Distribution of Gainful Workers: Comments on the Decennial Statistics, 1820–1940" in *Studies in Income and Wealth*, Vol. II, National Bureau of Economic Research, New York, 1949, p. 42. Variant 2: 1900–30: Stanley Lebergott, *Manpower in Economic Growth*, New York, 1964. A Sector: Table A–6 includes unpaid family workers. I and S Sectors: Table A–5-Employees, Table A–4-Domestic service, and Table A–7-Self-employed The "other" category of Table A–7 was distributed among Mining, Finance and Transportation, and Communications using the 1929 percentage distribution of these three categories from Table A–9. Lebergott's levels for 1900 were used to extrapolate to 1870 by assuming that the percentage change in employment was the same as the actual percentage change in gainful workers (variant 1).

[a] Values for 1870–1900 are estimated by extrapolating changes from variant 1.

Sector Trends by State and in Foreign Countries

The pervasiveness of the growth of service industry employment is also evident if we look at changes in sector shares of labor force by state (see Table 5). Between 1930 and 1960, there was an increase in the relative importance of the Service sector in every state in the country. In 1930, the median percentage for the Service sector was 32.8; by 1960 it was 49.8. Between 1950 and 1960 there was an increase in the Service sector's share in every state except Alabama and California; the decline in each of these states was less than one percentage point.

Even when the comparison is limited to the nonagricultural labor force we find only seven states in which the Service sector's share failed to increase between 1950 and 1960, and only one state (Alabama) for the entire 1930–60 period.

The growth of services has not been exclusively a United States phenomenon although it has proceeded further in this country than anywhere

else. Inspection of trends in Western European countries for which comparable data can be obtained reveals that the Service sector's share of total civilian employment increased in all countries in the post-World War II period (see Table 6).[14] What is perhaps even more significant, the Service sector's share of nonagricultural employment increased in every country except Switzerland. In none of these countries, however, did the relative gain of the Service sector in total employment come close to matching the shift that took place in the United States between 1920 and 1930.

It is of some interest to ask whether the trends that have been observed in the United States during the past century can also be observed in cross section among countries at different stages of economic development. Table 7 shows sector shares of employment for twenty OECD countries ranked in descending order of per capita national income in 1960. The U.S. figures for Census years 1870–1960 are inserted at corresponding levels of real per capita income.[15]

We see that the percentage in Agriculture declines as real per capita income rises, and the percentage in Industry and Service tends to rise, but the pattern for the United States is somewhat different from that evidenced thus far by the twenty OECD countries. This divergence is easily seen in Chart 3 where curves have been fitted through the observations for the twenty OECD countries, and the observations for the U.S. Census years have also been plotted. For each sector a curve of the form $X = a + b\frac{1}{Y}$, (where X equals the sector share of employment and Y equals per capita income in 1960 dollars) has been fitted by least squares. These curves are mutually consistent in the sense that at any given level of income the sum of the three sector shares is equal to 100.[16] Each of the curves approaches an asymptote at high levels of income. The asymptote values are the constant terms (a) in each

[14] Simon Kuznets's broad study of economic growth reveals a few instances of declines in the Service sector's share of the labor force—in Belgium from 1880 to 1910 and in Sweden from 1870 to 1910—but the general trend is clearly upward in countries experiencing economic growth. See Simon Kuznets, *Modern Economic Growth*, New Haven and London, 1966, pp. 106, 107.

[15] Because official exchange rates were used, a downward bias may have been introduced into the income levels for the foreign countries. See Milton Gilbert and Associates, *Comparative National Products and Price Levels*, OEEC, Paris, 1958.

[16] Linear regressions of X or Y would also give shares that sum to 100, but would imply negative values for agriculture at high levels of income, and values of over 100 for the other sectors. Also, the function chosen was found to give better fits (higher R^2) than the linear function.

TABLE 5

Sector Shares of Labor Force, by State, 1930, 1950, 1960

State	Total Share of Total Labor Force									Service Share of Nonagricultural Labor Force		
	Agriculture			Industry [a]			Service [a]					
	1930	1950	1960	1930	1950	1960	1930	1950	1960	1930	1950	1960
Maine	21.0	10.6	6.0	46.1	48.9	46.0	32.9	40.5	48.0	41.6	45.3	51.1
New Hampshire	13.0	6.2	3.1	56.4	53.6	51.8	30.6	40.2	45.1	35.2	42.9	46.5
Vermont	28.3	17.9	11.8	40.8	39.4	39.1	30.9	42.7	49.1	43.1	52.0	55.7
Massachusetts	3.6	1.8	1.4	55.9	50.5	48.2	40.5	47.7	50.4	42.1	48.6	51.1
Rhode Island	3.4	1.4	1.3	62.7	54.0	49.0	33.9	44.6	49.7	35.1	45.2	50.4
Connecticut	5.7	2.7	1.9	58.2	54.5	52.8	36.1	42.8	45.3	38.3	44.0	46.2
New York	5.2	2.8	1.9	48.7	45.3	44.1	46.1	51.9	54.0	48.6	53.4	55.0
New Jersey	4.1	2.3	1.5	55.6	52.5	51.1	40.3	45.2	47.4	42.0	46.3	48.1
Pennsylvania	7.1	3.9	2.7	59.5	55.2	52.7	33.4	40.9	44.6	36.0	42.6	45.8
Ohio	12.3	6.7	3.8	53.1	51.4	51.5	34.6	41.9	44.7	39.5	44.9	46.5
Indiana	20.7	11.4	6.6	47.8	49.1	49.4	31.5	39.5	44.0	39.7	44.6	47.1
Illinois	11.6	6.8	4.6	49.1	47.9	47.8	39.3	45.3	47.6	44.4	48.6	49.9
Michigan	13.9	6.5	3.5	53.6	53.7	51.1	32.5	39.8	45.4	37.7	42.6	47.0
Wisconsin	27.0	18.5	11.5	42.5	42.8	45.4	30.5	38.7	43.1	41.8	47.5	48.7

Minnesota	32.0	22.4	14.5	31.8	32.5	35.7	36.2	45.1	49.8	53.2	58.1	58.2
Iowa	37.5	28.4	20.7	29.0	28.7	32.0	33.5	42.9	47.3	53.6	60.0	59.6
Missouri	26.5	17.5	9.7	37.7	37.7	40.4	35.8	44.8	49.9	48.7	54.3	55.3
North Dakota	57.2	44.2	32.0	15.4	16.4	17.9	27.4	39.4	50.1	64.0	70.6	73.7
South Dakota	54.1	40.1	30.1	17.4	18.1	20.4	28.5	41.8	49.5	62.1	69.8	70.8
Nebraska	40.1	29.5	20.9	25.1	25.5	27.6	34.8	45.0	51.5	58.1	63.8	65.1
Kansas	34.2	22.4	12.9	31.7	31.6	33.5	34.1	46.0	53.6	51.8	59.3	62.0
Delaware	18.6	8.6	5.2	48.6	49.4	47.0	32.8	42.0	47.8	40.3	46.0	50.4
Maryland	13.9	6.1	3.5	46.3	41.4	39.5	39.8	52.5	57.0	46.2	55.9	59.1
Virginia	32.8	13.6	7.3	35.6	35.6	35.8	31.6	50.8	56.9	47.0	58.8	61.4
West Virginia	22.2	9.6	4.5	52.8	54.9	51.6	25.0	35.5	43.9	32.1	39.3	46.0
North Carolina	45.3	24.0	12.7	30.6	38.4	42.5	24.1	37.6	44.8	44.1	49.5	51.3
South Carolina	51.2	25.5	11.5	26.0	37.6	41.3	22.8	36.9	47.2	46.7	49.5	53.3
Georgia	43.9	21.1	9.0	27.1	35.0	38.9	29.0	43.9	52.1	51.7	55.6	57.3
Florida	25.3	12.1	6.9	32.0	27.6	30.6	42.7	60.3	62.5	57.2	68.6	67.1
Kentucky	40.6	25.1	13.8	33.4	36.6	39.7	26.0	38.3	46.5	44.1	51.1	53.9
Tennessee	40.6	21.3	10.8	30.6	36.6	41.2	28.8	42.1	48.0	48.5	53.5	53.8
Alabama	49.2	23.9	9.7	27.4	36.3	51.2	23.4	39.8	39.1	46.1	52.3	43.3
Mississippi	67.6	40.8	21.2	14.1	22.9	32.1	18.3	36.3	46.7	56.5	61.3	59.3
Arkansas	59.6	34.9	17.9	18.9	27.2	34.7	21.5	37.9	47.4	53.2	58.2	57.7
Louisiana	38.9	17.4	8.0	29.3	34.8	37.2	31.8	47.8	54.8	52.0	57.9	59.6
Oklahoma	38.5	20.1	9.4	29.3	30.3	32.9	32.2	49.6	57.7	52.4	62.1	63.7
Texas	39.5	15.3	8.8	27.3	33.1	34.3	33.2	51.6	56.9	54.9	60.9	62.4

(continued)

TABLE 5 (concluded)

State	Total Share of Total Labor Force									Service Share of Nonagricultural Labor Force		
	Agriculture			Industry [a]			Service [a]					
	1930	1950	1960	1930	1950	1960	1930	1950	1960	1930	1950	1960
Montana	39.1	24.7	17.2	32.3	30.9	29.5	28.6	44.4	53.3	47.0	59.0	64.4
Idaho	45.5	26.6	18.7	26.6	29.8	31.0	27.9	43.6	50.3	51.2	59.4	61.9
Wyoming	35.2	19.2	13.4	34.7	34.3	35.3	30.1	46.5	51.3	46.5	57.5	59.2
Colorado	27.6	14.6	7.6	33.7	31.5	33.0	38.7	53.9	59.4	53.5	63.1	64.6
New Mexico	43.9	17.8	7.1	29.0	30.0	30.5	27.1	52.2	62.4	48.3	63.5	67.2
Arizona	24.7	14.5	8.3	38.7	30.5	32.8	36.6	55.0	58.9	48.6	64.3	64.2
Utah	25.4	12.2	6.1	39.1	35.1	36.2	35.5	52.7	57.7	47.6	60.0	61.4
Nevada	21.6	9.4	4.5	45.4	30.1	25.2	33.0	60.5	70.3	42.1	66.8	73.6
Washington	21.9	9.3	6.6	39.6	38.0	38.9	38.5	52.7	54.5	49.3	58.1	58.4
Oregon	26.0	12.2	8.1	36.9	40.2	39.3	37.1	47.6	52.6	50.1	54.2	57.2
California	14.4	7.0	4.7	38.0	35.6	38.1	47.6	57.4	57.2	55.6	61.7	60.0

Source: 1930 and 1950 figures, Simon Kuznets, "Quantitative Aspects of the Economic Growth of Nations, III, Industrial Distribution of Income and Labor Force by States, United States, 1919–1921 to 1955," *Economic Development and Cultural Change*, Vol. VI, No. 4, Part II, July 1958, Appendix Table 14. 1960 figures from U.S. Bureau of the Census, *Census of Population: 1960*, Vol. I, Parts 2–50, Table 126 (Experienced Labor Force).

Note: For New York and California the 1950 figures for Industry and Service have been adjusted for changes in the grouping of Radio broadcasting, and T.V. in the 1960 Census publications.

[a] Government enterprise is included in Service rather than Industry.

TABLE 6

Change in Service Sector's Share of Civilian Employment, Seven Western European Countries, 1950–62
(percentage points)

	Total Civilian Employment	Nonagricultural Civilian Employment
Belgium	+5.1	+3.7
Germany (F.R.)	+5.3	+1.8
Netherlands	+3.7	+1.9
Norway	+4.9	+2.0
Switzerland [a]	+0.4	−1.9
U.K.	+2.4	+1.8
France [b]	+3.4	+1.0

Source: Maurice Lengellé, *The Growing Importance of The Service Sector in Member Countries.* Organization for Economic Cooperation and Development, Paris, 1966, p. 43.
[a] 1950 to 1960. [b] 1955 to 1962.

regression. They are shown on the chart by straight dashed lines, and are equal to 3 per cent, 57 per cent, and 40 per cent for Agriculture, Industry, and Service, respectively.[17]

Inspection of the chart reveals that the Agriculture sector in the United States has followed a pattern over time very similar to that revealed by the twenty OECD countries in cross section. Agriculture's share was somewhat larger in the United States especially in the nineteenth and early twentieth centuries when U.S. agricultural exports were important. The share of the Industry sector in the United States

[17] The adjusted coefficients of multiple determination ($\bar{R}^2$) are: Agriculture = .86, Industry = .73, and Service = .65. The regression coefficients, which are all highly significant, can be used to solve for the percentage point change in sector shares associated with a change of $100 in real per capita income. Because the relationship is curvilinear, the percentage change is different at different levels of per capita income. The following changes per increase of $100 were calculated at the first, second, and third quartiles of income for the twenty OECD countries.

	Income Per Capita		
	$344	*$839*	*$1,048*
Agriculture	−10.5%	−1.8%	−1.1%
Industry	6.3	1.1	0.7
Service	4.3	0.7	0.5

TABLE 7

Sector Distribution of Employment: Twenty OECD Countries, 1960, and United States, 1870–1960

Per Capita National Income (1960 U.S. dollars)	Country (in descending order of income)	Sector Distribution of Employment (per cent)		
		Agriculture	Industry	Service
2,132	U.S. 1960	8	38	54
1,836	U.S. 1950	12	39	48
1,536	Canada	13	43	45
1,644	Sweden	14	53	33
1,364	U.S. 1940	19	35	46
1,361	Switzerland	11	56	33
1,242	Luxembourg	15	51	34
1,170	U.S. 1930	22	36	42
1,105	United Kingdom	4	56	40
1,050	U.S. 1920	24	41	35
1,048	Denmark	18	45	37
1,035	W. Germany	15	60	25
1,013	France	20	44	36
1,005	Belgium	6	52	42
977	Norway	20	49	32
927	U.S. 1910	28	38	34
839	Iceland	25	47	29
810	Netherlands	11	49	40
757	U.S. 1900	35	34	32
681	Austria	23	47	30
592	U.S. 1890	40	31	29
529	Ireland	36	30	34
504	Italy	27	46	28
499	U.S. 1880	47	27	26
344	Japan	33	35	32
340	U.S. 1870	47	27	26
324	Greece	56	24	20
290	Spain	42	37	21
238	Portugal	44	33	23
177	Turkey	79	12	9

has been below that observed in the OECD cross section and apparently reached a peak at a much lower level. This too can be explained, at least in part, by the role of exports; exports of manufactured goods in many OECD countries are relatively more important than in the United States. It should be noted that the observations for the United States in 1930 and 1940 tend to be relatively low in the Industry sector because the widespread unemployment of those years was highly concentrated in that sector.

The Service sector's share in the U.S. economy shows substantial divergence from the plotted curve in the four most recent decades. The most recent two, of course, involve levels of real per capita income not yet reached by any of the twenty OECD countries. In this panel of Chart 3 the U.S. observations for 1930 and 1940 tend to be raised because of the uneven incidence of unemployment. If they were adjusted to take account of this factor, we would see a pattern that followed the OECD curve for the first six or seven decades and then rose considerably above it in the most recent decades. There is no evident leveling off of the Service sector's share in the U.S. data, and Industry's share apparently reached a peak at a per capita income level of about $1,200 to $1,400 (in 1960 dollars).

Occupational Trends

The preceding discussion has been concerned with employment distribution by *industry*. Nearly all of the data come to us in that form and

Notes to Table 7

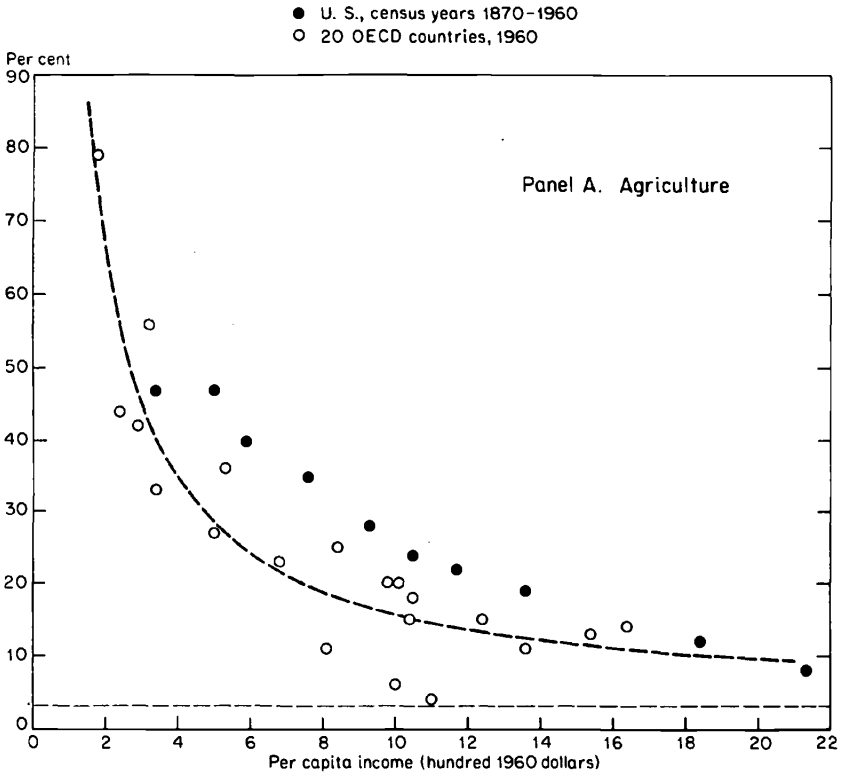
Note: The following countries include armed forces in the Service sector: Switzerland, Luxembourg (except males performing compulsory service), West Germany, France (plus alien armed forces not living in military camps and diplomatic personnel not living in embassies or consulates), Belgium, Norway, Netherlands, Ireland, Italy, Greece (excludes males performing compulsory service but includes alien forces stationed in area), Portugal, and Turkey. The following exclude all or some unemployed: Sweden, Switzerland, Luxembourg, United Kingdom, France, Iceland, Ireland and Japan.

Source: *Per capita income:* for United States, U.S. Bureau of the Census, *Historical Statistics of the United States,* Series F-4, 4a, 5, 5a; for OECD countries, United Nations, *Monthly Bulletin of Statistics,* November 1961 (for Greece, Ireland, and Luxembourg) and November 1965 (for all others). The data for the OECD countries were computed from Table 61 (national income), Table 64 (exchange rate), and Table 1 (population).

Industrial distribution of labor force: for United States, see Table 4, Variant 2; for OECD countries—Austria, Belgium and Italy—International Labor Office, *Yearbook of Labor Statistics,* 1964, Table 4A; Iceland and United Kingdom—OECD, *Manpower Statistics 1950–1962,* Table III; all others—United Nations, *Demographic Yearbook,* 1964, Table 9 (members of armed forces (Table 10) subtracted wherever possible).

CHART 3

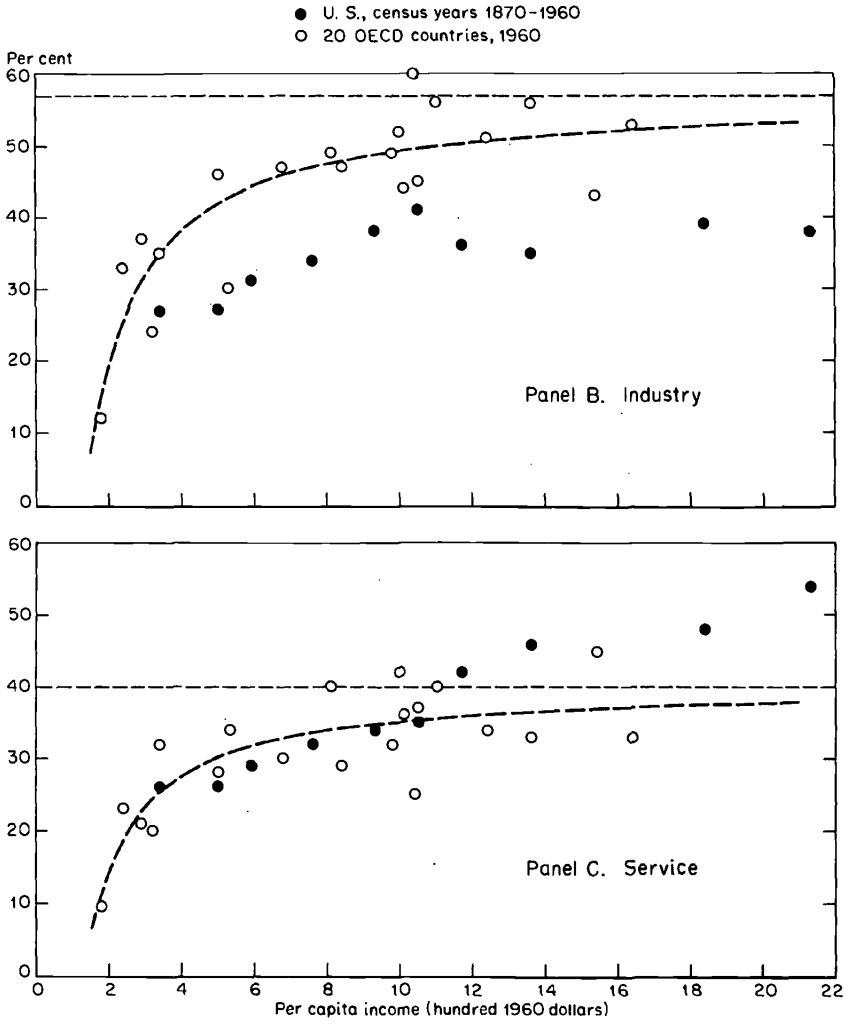
Relation Between Sector Shares of Employment and Real Per Capita Income: Twenty OECD Countries, 1960, and the United States, 1870–1960



many of the most important policy questions, both private and public, are formulated in terms of industries. It is, however, of some interest to determine whether a classification of employment by *occupation* instead of industry would confirm the existence of a trend toward services.

In Table 8, the eleven major occupational groups have been classified as "service-type" or "goods-type" according to general information about them, including their distribution by sector in 1960. The "service-type" category is defined to include white collar and service occupations. These are typically found in the Service sector. The "goods-type" category is defined to include blue collar occupations, except service; these occupations are typically found in Agriculture and Industry.

We see that the service-type group has grown rapidly (2.1 per cent



Note: The regression curves are fitted through the twenty OECD countries only.
Source: Table 7.

per annum between 1930 and 1960) while the "goods-type" occupations showed no net change over the period. Moderate gains in some goods-producing occupations were offset by absolute declines in others.

Table 9 supplies a more detailed look at occupational change within each of the major industry groups in the Agriculture and Industry sectors. It shows that between 1950 and 1960 there was an increase in the relative importance of the service-type occupations in each of the five groups.

TABLE 8

Occupational Distribution of Labor Force, 1930 and 1960

	Per Cent of Occupation Employed in Service Sector, 1960	Labor Force (millions)		Average Annual Rate of Change 1930–60 (per cent)
		1930	1960	
Service-type occupations				
Professional, technical, and kindred workers	74.5	3.3	7.3	2.7
Managers, officials, and proprietors excl. farm	69.0	3.6	5.9	1.4
Clerical and kindred workers	63.2	4.3	9.6	2.7
Sales workers	84.3	3.1	4.8	1.5
Private household workers	100.0	2.0	1.8	−0.3
Service workers excluding private household	91.8	2.8	5.8	2.5
Total service-type	76.0	19.1	35.2	2.1
Goods-type occupations				
Craftsmen, foremen, and kindred workers	24.3	6.2	9.2	1.3
Operatives and kindred workers	19.9	7.7	12.8	1.7
Laborers excluding farm and mine	27.4	5.3	3.5	−1.4
Farmers and farm managers	0.0	6.0	2.5	−2.9
Farm laborers and foremen	0.0	4.3	1.6	−3.5
Total goods-type	19.2	29.5	29.6	0.0
Total, all occupations	50.4	48.6	64.8	1.0

Source: 1930, U.S. Bureau of the Census, *Occupational Trends in the United States, 1900 to 1950,* Working Paper No. 5, 1958, Table 1; 1960, U.S. Bureau of the Census, 1960 Census of Population; Vol. I, *Characteristics of the Population,* Part 1, "U.S. Summary," Table 201, and "Occupation by Industry," Table 1.

As a share of each industry's total, the shifts were particularly large in mining and manufacturing.

Thus, the occupational data suggest that the industry shift in employment, far from exaggerating the growth of service employment, may actually understate it, because even within industries there has been a shift from the direct production of goods to service activities.

Trends in Output

The demand for labor is derived from the demand for output. One possible explanation, therefore, for the rapid growth of service employment would be a relatively rapid rate of growth of demand for service output. This demand is of two types: intermediate and final. Intermediate demand would grow if there were a shift in the production of intermediate services from manufacturing and other goods-producing industries to separately identifiable service industries. Relative growth of final demand might be the result of a high income elasticity of demand for services, a decline in the relative price of services, or a change in taste.[18]

The available evidence rejects the hypothesis that the shift to service employment can be attributed in any significant degree to a shift in the composition of output. To be sure, many questions arise concerning the measurement of real output in the Service sector (and in portions of the Industry sector also).[19] Table 10, therefore, presents sector distributions of output based on two alternative measures. The first takes the Office of Business Economics series gross product in constant (1958) dollars as the measure of real output. This is probably the best available measure but it has been criticized on the grounds that the implicit price deflators exaggerate the rise in the price of services. This bias is attributed in part to the fact that for government and certain other service industries prices are *assumed* to rise as rapidly as wages and no possibility of an increase in productivity is admitted. If this criticism is valid, then measures of real output based on gross product in constant dollars would tend to understate the growth of service output relative to that of the rest of the economy.

The second measure of real output presented is based on gross product in current dollars. This assumes that the prices of services changed at the same rate as did the over-all price deflator.[20] This measure probably overstates the growth of real output in services relative to the rest of the economy, since it seems unlikely that the over-all price index did in fact rise by as much or more than the price of services.

[18] Some empirical evidence concerning shifts in intermediate and final demand will be discussed later in the chapter.

[19] See especially discussions in Chapters 3, 4, and 5.

[20] Because industry differences in rates of change of gross product in current dollars provide a good measure of relative changes in factor inputs, this second version implies that real output per unit of total factor input changed at approximately the same rate in both sectors. See Edward F. Denison, *The Sources of Economic Growth in the United States and the Alternatives Before Us,* Supplementary Paper No. 13, Committee for Economic Development, New York, 1962, pp. 218, 219.

TABLE 9

Occupational Distribution of Labor Force, by Major Industry Group, 1950 and 1960
(per cent)

	Agriculture		Mining		Construction		Manufacturing		Transp., Comm. and Pub. Util.[a]		Total: Agriculture and Industry[a]	
	1950	1960	1950	1960	1950	1960	1950	1960	1950	1960	1950	1960
Service-type occupations												
Professional, technical & kindred workers	0.6	1.3	3.5	7.5	3.7	4.7	4.9	7.7	3.2	4.7	3.5	5.9
Managers, officials, propr's. excl. farm	0.3	0.6	4.0	5.9	8.4	9.9	4.8	5.2	7.2	7.8	4.5	5.5
Clerical & kindred workers	0.3	0.7	4.5	7.5	3.2	4.5	11.0	12.2	29.1	30.6	10.3	12.5
Sales workers	0.1	0.2	0.2	0.4	0.3	0.4	3.0	3.8	0.4	0.8	1.5	2.3
Service workers, excl. private h.'hold	0.1	0.3	0.7	1.0	0.5	0.5	1.9	1.7	3.3	2.8	1.5	1.5
Total service-type	1.4	3.0	13.0	22.4	16.1	20.0	25.6	30.5	43.2	46.7	21.3	27.7
Goods-type occupations												
Craftsmen, foremen & kindred workers	0.3	0.7	17.2	22.6	57.1	54.1	19.6	19.9	19.4	19.4	19.2	21.4
Operatives & kindred workers	0.8	2.4	69.7	55.1	7.6	8.9	46.0	43.5	25.4	25.3	28.8	30.8
Farm laborers & foremen	34.5	33.2	—	—	—	—	—	—	—	—	7.9	4.7
Laborers, except farm & mine	2.0	2.9	0.1	—	19.2	17.0	8.8	6.0	11.9	8.6	8.6	7.2
Farmers & farm managers	61.1	57.8	—	—	—	—	—	—	—	—	14.0	8.2
Total goods-type	98.6	97.0	87.0	77.6	83.9	80.0	74.4	69.5	56.7	53.3	78.5	72.3
Total (excluding occup. not reported)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number employed (thousands)												
Service-type occupations	98	132	121	145	544	757	3,678	5,255	2,069	2,309	6,510	8,598
Goods-type occupations	6,915	4,210	805	502	2,841	3,032	10,708	11,960	2,717	2,639	23,986	22,343
Annual rate of change, 1950–60 (per cent)												
Service-type occupations	+3.0		+1.8		+3.3		+3.6		+1.0		+2.8	
Goods-type occupations	−5.0		−4.7		+0.6		+1.1		−0.3		−0.8	

Note: Due to rounding, some columns do not total 100.0.
Source: U.S. Bureau of the Census "Occupation by Industry," 1950 and 1960, Table 1.
[a] These include postal workers.

TABLE 10

Sector Shares of Gross National Product in Constant and Current Dollars, Selected Years, 1929–65
(per cent)

	1929	1947	1956	1965
Constant (1958) dollars				
Agriculture	8.4	5.7	4.9	4.1
Industry	43.2	47.2	48.1	47.6
Service	48.4	47.0	47.0	48.3
Service subsector	29.6	27.4	26.3	27.1
Current dollars				
Agriculture	9.2	9.1	4.7	3.7
Industry	43.9	46.0	48.4	45.7
Service	46.9	45.0	46.9	50.5
Service subsector	26.6	27.8	26.4	27.3
Service as share of nonagricultural output				
Constant (1958) dollars	52.9	49.9	49.5	50.4
Current dollars	51.7	49.4	49.2	52.5

Source: Appendix Table C–3.

Because the probable bias runs in one direction for one measure and in the other direction for the other, the two measures of relative changes in output may be regarded as outer boundaries within which the true measure probably falls.

The most striking aspect of Table 10 is that, according to either measure, the Service sector's share of output has changed very little since 1929. The share in constant dollars was almost exactly the same in 1965 as in 1929, and the share in current dollars rose from 46.9 per cent to 50.5 per cent, with all the increase occurring after 1956. This stability is in sharp contrast to the share of employment shown in Table 2, which rose from 40 to 55 per cent over the same period. Agriculture's share has fallen to less than half of its 1929 levels and Industry has shown a moderate increase. If the Service sector is compared with Industry alone, its share fell slightly in constant dollars and rose slightly in current dollars.

In this book we are primarily concerned with comparing goods-producing and service-producing industries, but it is also possible to distinguish

TABLE 11

Sector Shares of Gross Product, by Type of Final Output in Constant and Current Dollars, 1929 and 1965
(per cent)

	1929	1965
Constant (1954) dollars		
Services	33.2	35.3
Goods and construction	66.8	64.7
Durables	16.9	21.8
Nondurables	35.6	32.6
Construction	14.4	10.2
Current dollars		
Services	35.4	38.5
Goods and construction	64.6	61.5
Durables	17.3	20.3
Nondurables	36.5	30.3
Construction	10.7	10.9

Source: 1929, Office of Business Economics, *U.S. Income and Output*, 1958, Tables 1–6 and 1–7; 1965, *Survey of Current Business*, April 1967, Table 2, p. 6, and July 1962, Table 65 (for implicit price deflators to convert from 1958 to 1954 dollars).

between goods and services on the basis of final expenditure. Table 11 shows the distribution of gross product by type of final output for 1929 and 1965. We see that the share of "services" increased only slightly during this period, whether measured in constant or current dollars. There are important differences between services defined as final output and the Service sector,[21] but the data in Table 11 confirm the conclusions based on the industrial distribution of gross product.

What might explain the Service sector's relatively stable share of final output? From casual observation one would expect the growth of urbanization and education, and the relative increase in the number and purchasing power of elderly people, to favor the demand for services. Also, many observers have argued that the income elasticity of demand for services is much higher than for goods.

I think the principal explanation is that, for the period studied, the income elasticity of demand for services has been only moderately above

[21] The classification by final output treats government as a consumer rather than a producer. Also, the value of wholesale and retail trade services and of many business service industries is assigned to goods rather than services.

that for the rest of the economy. Moreover, to the extent that the growth of income and urbanization would have produced a shift of output to services, the income effect has probably been offset by a substitution effect induced by a relative rise in the price of services. Before examining the evidence on income elasticities, however, let us look at the growth of services as an intermediate input to Agriculture and Industry.

Some Evidence on Intermediate Demand

Many service industries produce intermediate output (sold to other firms) as well as final output.[22] Most observers believe that a portion of the growth of services is attributable to an increase in specialization and division of labor, i.e., a relative increase in intermediate demand for services.[23] Precise data concerning this shift are not available, but it is possible to form a rough judgment about its relative importance from a comparison of the input-output tables of 1947 and 1958.

Table 12 shows, for each of the principal service industries involved, the percentage of total output that was distributed as intermediate input to Agriculture and Industry in 1947 and 1958. In every case this percentage rose; the change was in the predicted direction. Columns 3 and 4 of Table 12 show the employment in each industry in 1947 and 1958. Column 5 presents an estimate of the absolute growth of employment in each industry attributable to the growth of intermediate demand, under the assumption that employment requirements were proportional to output. Column 6 presents an estimate (using the same assumption) of the growth of employment attributable to the more rapid growth of intermediate than final demand for the output of these industries.

The employment increase is far from negligible for each measure, but, as Table 13 shows, the increase is small relative to the total gains of these five industries, and is considerably less than one-tenth of the absolute or relative gains of the total Service sector. Thus, the analysis confirms the hypothesis that some of the growth of service employment is attributable to the growth of intermediate demand for services by goods-producing industries, but this source accounts for only a small part of the total shift we are trying to explain.

[22] See Bert Hickman's discussion of the demand for intermediate services in *Growth and Stability of the Postwar Economy*, Washington, D.C., 1960, p. 203.

[23] See, for instance, George Stigler, *Trends in Employment in the Service Industries*, p. 139. It should be noted, however, that there has also been some shifting from Service back to goods-producing industries, e.g., much of drug making has been shifted from the drug store to manufacturing; the selection and packaging of fruits and vegetables has been shifted from retailing to agriculture or manufacturing.

TABLE 12

Employment and Intermediate Demand, Five Service Industries, 1947 and 1958

Service Industries	Per Cent of Total Output Distributed as Intermediate Input to Agriculture and Industry		Employment (thousands of persons engaged)		Employment Increase 1947–58 (thous. persons engaged) Attributable to:	
	1947 (1)	1958 (2)	1947 (3)	1958 (4)	Absolute Growth of Intermediate Demand (5)	Relative Growth of Intermediate Demand (6)
Finance and insurance	11.25	16.28	1,290	1,951	172	98
Real estate and rental	11.78	13.18	576	695	24	10
Business services	42.22	50.65	455	678	151	57
Auto repair services	19.74	23.78	338[a]	350	17	14
Medical, educational, and other nonprofit organizations	2.48	2.86	2,057	3,498	49	13

[a] Employment in auto repair services for 1947 was estimated from 1948 data on auto services as a per cent of retail trade.

Sources: U.S. Bureau of Labor Statistics, *Interindustry Relations Study, 1947;* U.S. Department of Commerce, Office of Business Economics, *Survey of Current Business,* September 1965, "Interindustry Transactions—1958," pp. 34–39, and *The National Income and Product Accounts of the United States, 1929–1965,* August 1966.

TABLE 13

Employment Growth, 1947–58, Five Service Industries and Service Sector
(thousands of persons engaged)

	Absolute Growth	Relative Growth
Intermediate demand of Agriculture and Industry, five service industries	413 [a]	192 [b]
Total, five service industries	2,456	1,963 [c]
Total, Service sector	6,784	4,023 [c]

Source: Tables 1 and 12.
[a] The sum of column 5, Table 12.
[b] The sum of column 6, Table 12.
[c] The difference between the absolute growth and the growth that should have resulted if the rate of growth had been equal to the national rate.

Some Evidence on Income Elasticity

It is difficult to measure the income elasticity of demand for service output relative to other output. To calculate elasticities we need measures of real output or consumption; for many service (and some other) industries, however, accurate measures of real output are not available. Moreover, demand depends upon many variables, including changes in relative prices, urbanization, and the distribution of income. Also, the adjustment of spending patterns to changes in income may require time; thus the pattern observed at any given moment may depend upon past levels of income as well as present levels. This might be particularly true of services financed by state and local government expenditures. Finally, elasticities change from time to time.

Despite these difficulties, it is possible to form some judgment concerning relative elasticities for goods and services. Two experiments were attempted. The first compares the relative elasticities for goods and services by regressing changes in receipts or expenditures per capita on changes in income per capita across the forty-eight states. The periods chosen were 1939–58 for retail sales and sales of personal services, and 1942–57 for selected expenditures of state and local governments. Comprehensive data were available by state for those years.

The form of the regression equation was

$$\log Q = a + b \log Y$$

where Q = expenditures or receipts per capita in the terminal year divided by expenditures or receipts per capita in the initial year, and Y =

income per capita in the terminal year divided by income per capita in the initial year.

Because the regressions were run in double log form, the regression coefficient b may be regarded as a measure of the elasticity between income and expenditures. Expenditures are measured in current dollars and are used as a proxy for real consumption. Price does not enter into the equation because it is assumed that the *change* in price was the same in all states. If this is true, then the change in expenditures in current dollars gives exactly the same regression coefficient as would the change in real consumption. To the extent that prices rose faster in some states than in others, the bias is likely to be in the direction of a positive correlation between changes in price and changes in income. The regression coefficients may be slightly biased upward for this reason.

The equations were fitted in both weighted (1958 state populations) and unweighted form. The results were similar. I regard the weighted form as the more appropriate because the underlying process (except in the case of government expenditures) has nothing to do with states as such. They are units used merely as a statistical convenience for grouping the behavior of individuals. Moreover, weighting reduces the chances that a random event or reporting error in a small state can significantly influence the coefficients.

The results of this preliminary inquiry into a very complex econometric problem are consistent with the conclusions based on sector trends in output. Income elasticities appear to be slightly higher for services than for goods, but the difference is not large. The estimated elasticity for total retail sales of goods is .97, for personal services 1.12, and for total state and local government expenditures, 1.07.[24]

Interpretation of the results is complicated by the fact that changes in income were so highly correlated with changes in urbanization (r = .90 weighted and .79 unweighted) that the latter may have affected expenditures for some goods and services independently of changes in income; because the correlation between the two variables was so high, it is difficult to distinguish one effect from the other. Each regression was also run in multiple variable form, with changes in both income per capita and per cent urbanization as the independent variables; in most cases there was no additional explanation of the dependent variable after allow-

[24] The standard errors of the regression coefficient are .06, .08, and .13, respectively. Solomon Fabricant reported an income elasticity for state and local government expenditures in 1942 of .90. See *The Trend of Government Activity in the United States Since 1900,* New York, National Bureau of Economic Research, 1952, p. 125.

ing for the loss of one more degree of freedom. In general, it may be said that part of what we here call income elasticity may reflect increased urbanization.

The second experiment consisted of regressing expenditures for services and expenditures for goods on total expenditures across 160 income-education-region groups (ten income classes, four education classes, and four regions). The data were obtained from the Bureau of Labor Statistics *Survey of Consumer Expenditures 1960–61*.[25]

The form of the regression equation was

$$\ln X = a + b_1 \ln C + b_2 \ln E + b_3 A + b_4 E + b_5 R$$

where X = expenditures for goods (or services)
C = total current consumption expenditures
E = education
A = age of head of family
F = family size
R = region, a dummy variable in which 1 = South and 0 = non-South.

The regressions were weighted by the number of observations in each cell.

The results show services with a total expenditure elasticity of 1.12, compared with .93 for goods.[26] When food and tobacco are excluded from goods, however, the elasticity rises to 1.05. The standard errors of the regression coefficients, as well as the results for all the variables, are shown in Table 14.

In addition to providing information about total expenditure elasticities, the regression results reveal that education, age of family head, family size, and region all show significant differences in their relation to goods and services. The demand for services is positively related to education. The regression coefficient tells us that an increase in education of 10 per cent (approximately one year of schooling) would be associated with an increase of about 1.9 per cent in expenditures on services. The demand for goods (and especially for food at home and tobacco) shows a significant negative elasticity for education. The demand for services is positively related to age and negatively related to family size.

[25] I am grateful to Robert Michael, of the National Bureau of Economic Research, for making available to me his unpublished material on consumer expenditures.

[26] Services include: food away from home, recreation, travel, education, household operations, personal care, medical care. Goods include: clothing, automobiles, reading matter, alcohol, house furnishings, food at home, tobacco, utilities, and shelter.

TABLE 14

Demand Elasticities for Goods and Services

	Total Consumption Expenditures (log C)	Education (log E)	Age of Head of Family (A)	Family Size (F)	Region: South = 1, Nonsouth = 0 (R)
Services	1.12	.19	.01	−.05	.10
	(.03)	(.03)	(.001)	(.02)	(.013)
Goods	.93	−.07	−.003	.03	−.05
	(.01)	(.017)	(.001)	(.01)	(.007)
Goods minus food at home and tobacco	1.05	.000	−.005	−.01	−.02
	(.02)	(.024)	(.001)	(.014)	(.01)
Food at home and tobacco	.65	−.22	−.001	.13	−.12
	(.04)	(.05)	(.002)	(.03)	(.02)

Note: Standard errors of the regression coefficients shown in parentheses.

Source: Basic data from U.S. Department of Labor, Bureau of Labor Statistics, *Survey of Consumer Expenditures, 1960–61,* BLS Report 237-93, Supplement 2, June 1966, Table 20: Education of head by income. Regression analysis by Robert Michael, NBER.

Also, the demand for services is stronger in the South than in the non-South. All of these results assume that other things are held constant and that expenditures are a good proxy for quantity, i.e., that prices do not vary systematically with any of the variables.

Again, it should be noted that the service–goods dichotomy for final consumption examined in these regressions bears only a rough correspondence to the industry classification used in the sector comparisons of output and employment. That agriculture faces a much lower income elasticity of demand than does the rest of the economy is scarcely in doubt. The Service–Industry differential is more difficult to ascertain, but it is probably small, perhaps about 5 to 10 per cent.

If we assume an income elasticity differential of 10 per cent, *ceteris paribus,* we would have expected the Service sector's share of nonagricultural output to rise by about 2 percentage points between 1929 and 1965, and Industry's share to fall by that amount. This is because the rise in real per capita income was about 80 per cent, and the 1929 shares of real output were approximately equally divided between the Service and Industry sectors. (See Table 10.) [27]

[27] With initial shares at 50 per cent for each, a *doubling* of real per capita income would produce sector shares of approximately 52.5 and 47.5 per cent if

When real output is measured in constant dollars, we find that the Service sector's share fell from 52.8 to 50.4 per cent instead of rising to 54.8 per cent. This might be explained by the increase of about 14 per cent in the price of Service sector output relative to Industry output.[28] Assuming that only the income and price effects were operative, this implies an elasticity of substitution between the Service and Industry sectors of approximately -1.15.[29] If we assume no sector difference in income elasticities, the implied elasticity of substitution is about $-.7$.

When the alternative measure of real output (gross product in current dollars) is used, there is, by assumption, no price effect to be considered. The income elasticity differential implied by the shift of the Service sector share from 51.7 to 52.5 per cent is on the order of 5 per cent. Thus, the results of the income elasticity experiments are consistent with the elasticity differential implied by the trends in sector output.

If the relative growth of service employment cannot be explained by a shift of output to services, it follows as a matter of definition that there must have been a dramatic difference in sector rates of change of output per man.[30]

the sector differential in income elasticity is 10 per cent. An increase of only 80 per cent in real per capita income, therefore, implies an increase of 2 percentage points for the Service sector and a decrease of 2 percentage points for the Industry sector.

[28] The implicit price deflator for the Service sector was 233.5 in 1965 (1929 = 100) compared with 204.4 for the Industry sector.

[29] If the relative change in price was 14 per cent, and the shift in sector shares was approximately 4 percentage points each way (54.8 minus 50.4), the relative change in quantity was about 16 per cent suggesting an elasticity of substitution of -1.15.

[30] See Appendix A for a theoretical discussion of sector differentials in employment. This discussion attempts to specify all the information needed to provide a nontautalogical explanation of sector shifts in employment.