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F / APPENDIX FOR CHAPTERS 6 AND 7

THE BEARING OF DEFECTS IN CENSUS LABOR FORCE DATA ON THE LONG-SWINGS PATTERN

The analyst of historical census labor force data is in the unusual position of having the benefit of a number of major studies that have looked intensively into the problem of historical comparability.¹ The nature of the problems has been extensively described in these studies and there is no need to recount them here.² For the present purpose, what is especially relevant is that most of these studies attempt not only to identify specific comparability problems but also to adjust the original data, at least for the most serious defects. The analysis of labor force in Chapters 6 and 7 and elsewhere in the volume has been conducted on the basis of such adjusted series, the choice of the particular series depending primarily on the aspect of labor force under study (industry, sex-age, and so on) and the length of the series. The issue of whether the comparability problems seriously impair use of the census data for study of long swings can be reduced to two questions. First, do long swings in aggregate labor force growth appear in the original *unadjusted* data? Second, do long swings appear in the *adjusted* labor force series, and, if so, in those of all the experts, or only in a few?

In Figure F-1, the decade growth rates of total labor force since 1870 implied by the original census returns have been plotted at the top of the upper panel. Since the Census Office itself published a revised 1890 estimate, two series are shown through 1900, one using growth rates based on the original 1890 returns, and the other, on the revised 1890 returns. In the case of the revised series, the sawtooth pattern of long swings appears throughout the entire period. The same is true of the original series except for the first swing. The initial conclusion is therefore that long swings do appear in the original data, though in the case of the first swing (but only the first swing) this conclusion presupposes use of the revision of the 1890 data published by the Census Office itself.

A second way of approaching this question is to confine attention to the data for the nonagricultural sector of labor force. This is suggested by two considerations—first, many of the alleged defects of the data arise in connection with enumeration of the agricultural labor force, particularly unpaid women and child workers, and, second, the analysis in Part I of this study indicates that U.S. long swings after 1870 were predominantly a non-agricultural phenomenon.

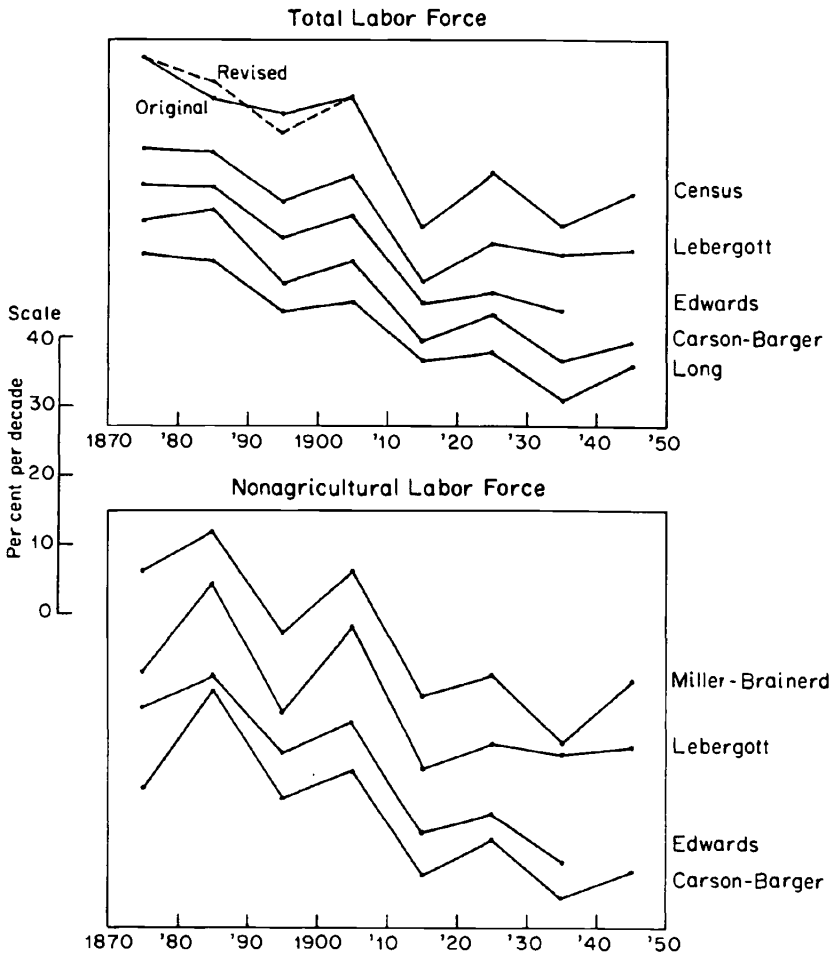
Unfortunately, a precise identification of the nonagricultural labor force in the original returns for the censuses from 1870 to 1900 is handicapped

¹ Cf. [31, 52, 110, 111, 116, 173].

² For a succinct and excellent recent survey, cf. the Miller-Brainerd discussion in [111, pp. 401-409].

FIGURE F-1

AVERAGE GROWTH RATE OF TOTAL AND NONAGRICULTURAL LABOR FORCE:
COMPARISON OF VARIOUS ESTIMATES, DECENNIALLY, 1870-1950



SOURCE: Tables F-1 and F-2.

by the existence of a sizable "laborers, not specified" category. The experts who have studied this problem agree that this category includes both agricultural and nonagricultural laborers and have attempted to estimate the distribution of these workers between the two sectors (cf. [111, p. 384] and the references cited therein). For the present purpose, use is made of the estimates of the nonagricultural labor force derived by Miller and

Brainerd. Preference is given to this series because together with the series for agriculture, it sums to the labor force totals in the original census returns for the entire 1870-1900 period. Thus the Miller-Brainerd series for *total* labor force in this period is identical with the original census series, and consequently fails to show the first swing.³ The Miller-Brainerd series for nonagricultural labor force growth is plotted at the top of the lower panel of Figure F-1. The sawtooth pattern appears clearly in nonagricultural labor-force growth throughout the entire period even though their series for total labor-force growth does not show the first swing. To test whether this conclusion depended on the specific Miller-Brainerd allocation of the "laborers, not specified" (LNS) category, we constructed two alternate series—one assuming all LNS were agricultural, the other, that they were all nonagricultural. The sawtooth pattern still appeared. It seems reasonable to conclude, therefore, that long swings exist in the original census data on nonagricultural labor force throughout the entire period.

To turn to the second question, whether long swings appear in the adjusted series, and, if so, in all or just a few of the adjusted series, this is readily handled by adding to Figure F-1 the growth rates derived from the adjusted labor force estimates made by the various experts. A glance at the chart is sufficient to reveal that the adjusted series uniformly show the long swings pattern, differing only with regard to amplitude. The first swing in the growth of total labor force is shown more clearly in the adjusted series than in the census series, original or revised. This is because not only do all experts accept the need for adjusting the 1890 data, but they agree too on a similar need with regard to the 1870 data. The Census Office itself provided the justification for this. It not only recognized that the 1870 returns involved a general underenumeration in parts of the South, but actually itself developed a corrected estimate for population. It did not, however, attempt to extend this to labor force or other census magnitudes, though the need for such was clearly indicated. As is clear from the lower panel of the figure, with regard to those series for which separation of the nonagricultural labor force is possible, the sawtooth pattern appears even more markedly.⁴

³ Miller and Brainerd recognize that there are defects in the total; they did not attempt to adjust for these because their primary interest was in state labor force estimates and an appropriate basis for differential adjustment of the state series was not available.

⁴ The Lebergott series for the 1930-50 period shows only a mild movement. This is because Lebergott assumes that the various comparability problems are such that the 1940 CPS estimate may be taken as directly comparable with the 1930 census estimate, whereas all other investigators have linked the 1940 census data to the 1930 census data (though in some cases adjusting one or the other). Since the 1940 CPS level is much higher than the 1940 census level, Lebergott obtained a noticeably higher growth rate than other analysts for 1930-40 and a correspondingly lower rate for 1940-50.

TABLE F-1. COMPARISON OF ESTIMATES OF AVERAGE GROWTH RATE OF TOTAL LABOR FORCE,^a 1870-1950
(per cent per decade)

| | Census (1) | Edwards (2) | Durand (3) | Carson- Barger (4) | Long (5) | Lebergott (6) |
|-----------|---------------|----------------|---------------|--------------------------|-------------|------------------|
| 1870-80 | 32.7 | 29.5 | — | 29.5 | 29.7 | 29.4 |
| 1880-90 | 26.6 (29.1) | 29.1 | — | 30.9 | 28.6 | 29.1 |
| 1890-1900 | 24.5 (22.0) | 22.0 | 24.4 | 20.2 | 21.7 | 22.0 |
| 1900-10 | 27.0 | 25.0 | — | 23.7 | 22.8 | 25.3 |
| 1910-20 | 8.6 | 12.7 | — | 12.1 | 14.2 | 10.4 |
| 1920-30 | 16.0 | 14.0 | 15.8 | 16.0 | 15.5 | 16.0 |
| 1930-40 | 8.3 | 11.7 | 11.7 | 9.2 | 8.3 | 14.2 |
| 1940-50 | 12.9 | — | — | 11.9 | 13.3 | 15.1 |

Col. 1. Census reports. Rates in parentheses are based on revised 1890 value published by the Bureau of the Census in [172, pp. lxxvi-lxxiii].

Col. 2. [173, p. 91, except 1930 and 1940, p. 12].

Col. 3. [52, pp. 208-209].

Col. 4. [31, p. 47], except 1950, [13, p. 4].

Col. 5. Unrounded data underlying published estimates in [116, Tables A-1, A-2].

Col. 6. [110, p. 510]. Data for all dates are for those aged 10 and over.

^a Aged 10 and over, 1870-1930; 14 and over, 1930-50.

TABLE F-2. COMPARISON OF ESTIMATES OF AVERAGE GROWTH RATE OF NONAGRICULTURAL LABOR FORCE,^a 1870-1950
(per cent per decade)

| | Miller- Brainerd (1) | Edwards (2) | Carson- Barger (3) | Lebergott (4) |
|-----------|----------------------------|----------------|--------------------------|------------------|
| 1870-80 | 36.8 | 36.7 | 30.0 | 31.9 |
| 1880-90 | 42.1 | 41.2 | 44.0 | 44.8 |
| 1890-1900 | 27.4 | 30.3 | 28.8 | 26.2 |
| 1900-10 | 36.7 | 34.7 | 32.7 | 38.6 |
| 1910-20 | 18.2 | 18.3 | 17.7 | 18.1 |
| 1920-30 | 21.4 | 21.3 | 22.8 | 21.6 |
| 1930-40 | 11.9 | 14.4 | 14.2 | 19.9 |
| 1940-50 | 20.8 | — | 18.0 | 20.9 |

Col. 1. [111, p. 609, except 1940, p. 389]. Data for all dates are for those aged 10 and over.

Col. 2. [173, p. 91, except 1930-40, p. 12].

Col. 3. See preceding table, source for col. 4.

Col. 4. [110, pp. 510-511]. Data for all dates are for those aged 10 and over.

^a Aged 10 and over, 1870-1930; 14 and over, 1930-50.

To sum up, in the case of nonagricultural labor force, long swings appear in the original census series and each adjusted series throughout the entire period. The same is true for total labor force, except that the original census returns fail to show the first swing. The census itself, however, revised the 1890 data and recognized the need for revision of the 1870 data, though confining its own efforts in the latter case to the population totals. In each case, the corrections lead to the long-swing pattern. It seems reasonable to conclude that the swings are not merely the product either of defects in the data or adjustments made to them. This conclusion is further strengthened by additional technical and analytical considerations mentioned in the text of Chapter 6.

