# Technical Note

## Labor Force, Employment, and Unemployment, 1929–39: Estimating Methods [1]

ESTIMATES OF THE total labor force, employment, and unemployment in 1929–39, which were prepared by the Bureau of Labor Statistics several years ago in order to fill a gap in the official statistics, have been revised recently. These were designed for comparability with the monthly series issued by the Bureau of the Census beginning in 1940, and together these series provide a continuous set of estimates from 1929 to date.

A wide variety of estimates of labor force and unemployment had previously been prepared by private agencies and individuals. These statistics were of considerable value in informing the public about the gravity of the unemployment situation in the 1930's.

In 1945, the BLS developed and made available preliminary estimates of labor force, employment, and unemployment for the 1929–39 period, comparable with those then published by the Bureau of the Census in its Monthly Report of the Labor Force (MRLF). Subsequently, the Census Bureau published revised estimates for 1940–45, incorporating adjustments resulting from an improvement in interviewing procedure, introduced in July 1945. Corresponding adjustments have now been made in the BLS estimates.

The methods used by the BLS in developing its estimates of labor force, employment, and unemployment are discussed in the present article, and a comparison is made with earlier series.

## Total Labor Force

To estimate the total labor force for the years between 1929 and 1940 it was necessary (a) to establish comparable Census bench-mark figures for 1930 and 1940, (b) to interpolate between these bench-mark figures and extend them back to 1929.

Estimates of the labor force in the Census week of 1940 (March 24–30) that are comparable with the current estimates of the MRLF, have recently been published by the Bureau of the Census.[2] Estimates for the comparable week of 1930, were computed after adjustment for the change in labor force definitions between the 1930 and 1940 Censuses [3] and for the effects of the improvement in interviewing procedure introduced into the MRLF in July 1945.[4] The worker rates (i. e., the percentage of the population in each age-sex group who were in the labor force) were then computed for the bench-mark periods in 1930 and 1940.[5]

The labor force estimates for 1929 and 1931–39, on an April seasonal level, were calculated by (1) interpolating linearly, between the worker rates for 1930 and 1940, and (2) applying the resultant rates to Census estimates of population by age and

[2] See: United States Bureau of the Census, Labor Force, Employment and Unemployment in the United States, 1940 to 1946, Series P-50, No. 2.

[3] The 1930 Census included as "gainful workers" seasonal workers who were not actually at work or looking for work during the Census week, as well as some retired persons and inmates of institutions, who could not have been included in the "labor force" as defined in the 1940 Census. On the other hand, the 1930 Census excluded young persons who were actually looking for work but had not yet established a gainful occupation. A revision of the 1930 estimates to allow for these and other differences appears in: United States Bureau of The Census, Estimates of Labor Force, Employment and Unemployment in the United States, 1940 and 1930 (1944).

[4] The adjustment for comparability with the revised 1940 Census estimates, as shown in Census release Series P-50, No. 2 (1946) was made by computing the ratios of the revised to unrevised 1940 Census estimates for each sex, age, and employment status group, and applying these ratios to the corresponding groups in 1930.

[5] Although in the present instance worker rates for age-sex groups were used, calculations might also have been made to allow for the effects of the changing racial composition of the population. Tests indicated, however, that such a refinement would produce no significant change in the final estimate.

sex for each year.[6] The labor force estimates for 1929–39 were then adjusted to an annual average basis by use of a seasonal adjustment factor derived from the month-to-month movement shown in the MRLF since 1940.[7]

In table 1, a sharp contrast is apparent between the gradual increase in the labor force shown for the years 1929–39 and the marked fluctuations reported since 1940 by the Bureau of the Census. This reflects in part the unprecedented expansion of the labor force under wartime pressures and the subsequent contraction. In part, however, it arises because the full extent of variations in the labor force cannot be determined precisely for those years prior to 1940 when no direct enumerations of the labor force were made.

TABLE 1.—*Total labor force, classified by employment status, 1929–1947* [1]

[Annual averages, in thousands]

| Year | Total labor force [2] | Armed forces [3] | Civilian labor force | | | | |
|---|---|---|---|---|---|---|---|
| | | | Total | Employed | | | Unem- ployed |
| | | | | Total | Agri- cul- tural | Non- agri- cul- tural | |
| 1929 | 49,440 | 260 | 49,180 | 47,630 | 10,450 | 37,180 | 1,550 |
| 1930 | 50,080 | 260 | 49,820 | 45,480 | 10,340 | 35,140 | 4,340 |
| 1931 | 50,680 | 260 | 50,420 | 42,400 | 10,290 | 32,110 | 8,020 |
| 1932 | 51,250 | 250 | 51,000 | 38,940 | 10,170 | 28,770 | 12,060 |
| 1933 | 51,840 | 250 | 51,590 | 38,760 | 10,090 | 28,670 | 12,830 |
| 1934 | 52,490 | 260 | 52,230 | 40,890 | 9,900 | 30,990 | 11,340 |
| 1935 | 53,140 | 270 | 52,870 | 42,260 | 10,110 | 32,150 | 10,610 |
| 1936 | 53,740 | 300 | 53,440 | 44,410 | 10,000 | 34,410 | 9,030 |
| 1937 | 54,320 | 320 | 54,000 | 46,300 | 9,820 | 36,480 | 7,700 |
| 1938 | 54,950 | 340 | 54,610 | 44,220 | 9,690 | 34,530 | 10,390 |
| 1939 | 55,600 | 370 | 55,230 | 45,750 | 9,610 | 36,140 | 9,480 |
| 1940 | 56,180 | 540 | 55,640 | 47,520 | 9,540 | 37,980 | 8,120 |
| 1941 | 57,530 | 1,620 | 55,910 | 50,350 | 9,100 | 41,250 | 5,560 |
| 1942 | 60,380 | 3,970 | 56,410 | 53,750 | 9,250 | 44,500 | 2,660 |
| 1943 | 64,560 | 9,020 | 55,540 | 54,470 | 9,080 | 45,390 | 1,070 |
| 1944 | 66,040 | 11,410 | 54,630 | 53,960 | 8,950 | 45,010 | 670 |
| 1945 | 65,290 | 11,430 | 53,860 | 52,820 | 8,580 | 44,240 | 1,040 |
| 1946 | 60,970 | 3,450 | 57,520 | 55,250 | 8,320 | 46,930 | 2,270 |
| 1947 | 61,760 | 1,590 | 60,170 | 58,030 | 8,260 | 49,770 | 2,140 |

[1] Estimates for the period 1929–39 were prepared by the Bureau of Labor Statistics. Estimates for the period 1940–47 were adapted from U. S. Bureau of the Census, Labor Force Bulletin, Series P–50, No. 2.

[2] Total labor force includes civilian labor force and the armed forces. The estimates of total labor force and of the armed forces were adjusted upward to include about 150,000 members of the armed forces stationed outside the continental United States in March 1940, and who were not enumerated in the Census of that date. The Census Bureau reduces its current estimates of the total labor force by this number in order to maintain comparability with the 1940 Census.

[3] Population estimates used were Census estimates of the population for July 1, of each year, as published in Census release Series P–45, No. 5.

[7] A final adjustment was made to include within the total labor force members of the armed forces stationed outside of the continental United States and who were, therefore, not in the Census base figures for either 1930 or 1940. There were about 150,000 members of the armed services stationed outside of the continental United States in March 1940 and about 130,000 in 1930.

## Armed Forces

Estimates of the net strength of the armed forces prior to 1940 were obtained by the BLS directly from the armed services. The estimates as shown (in table 1) differ slightly from those used in the MRLF beginning in 1940. The Census Bureau currently excludes from its estimate of the total labor force about 150,000 members of the armed forces who were stationed outside of the continental United States in March 1940 and who were therefore not enumerated in the Census of that date. This group is, however, included in the BLS estimates.

## Employment

The estimates of total employment represent the sum of: (1) nonagricultural employees (i. e., wage and salary workers), (2) nonagricultural self-employed, unpaid family workers, and domestic service workers, and (3) agricultural employment.

Estimates of nonagricultural employees were based on the movement of the recently revised BLS series of employees in nonagricultural establishments.[8] This series was adjusted to the bench-mark totals of nonagricultural employees in 1930 and 1940, as estimated from the Census data.[9]

The estimates of the nonagricultural self-employed were developed for the present series. The general procedure was to develop ratios of self-employed persons per employee separately for each industry group and each year. These were then applied to the corresponding estimates of employees. For those years between 1929 and 1939 when Censuses of Manufactures, Business, and Construction were available, the ratios were computed from the Census data. For inter-censal years, the ratios were computed on the basis of the relationship between (1) the ratios for Census years and (2) the number of employees

[8] This series was presented in the Monthly Labor Review for December 1947 (p. 647).

[9] Bench-mark estimates of nonagricultural employees for April 1930 that were comparable with the current MRLF estimates were prepared in cooperation with the Bureau of the Census. These were then adjusted to annual average levels on the basis of monthly employment data of the BLS. Estimates for 1940 were based on the revised Census data published in Census release P–50, No. 2, and on unpublished Census estimates.

in the appropriate industry group for the same year.[10]

Agricultural employment (including family and hired workers) was estimated on the basis of the movement of the series of the Bureau of Agricultural Economics, and adjusted to annual average employment in 1930 and 1940, by the use of Census data.[11]

## Unemployment

Unemployment estimates may be computed (1) by direct enumeration of the unemployed, or (2) by deducting the total of those actually employed from the total available for work (the labor force). The method of direct enumeration is currently utilized in the sample surveys of the MRLF. It was also employed in the Population Censuses of 1930 and 1940. But for those years in which no national enumerations were made, including 1929 and 1931–39, it was necessary to use the second method, and to estimate unemployment by subtracting total employment from the total labor force.[12]

As shown in table 2 the present unemployment series differs from previous estimates of unemployment for 1929–39, although the general pattern is not far different.[13] All of the series cited, for example, show the steep rise in unemployment

[10] This procedure is illustrated by the method of estimating the number of self-employed persons in retail trade. The number of employees per proprietor in retail trade was determined for Census years from the censuses of retail trade. These ratios ranged from a low of 2.367 in the depression year of 1933 to a high of 2.968 in 1929, with intermediate values for 1935 and 1939. The ratio changed with the general level of retail trade. It was thus possible to compute regression coefficients from which estimates of the ratios for the intervening years were derived. By dividing these ratios of employees per proprietor into the total number of employees, estimates were obtained of the movement of self-employed in retail trade over the period. This "movement series" was then adjusted to the bench-mark total of self-employed and own-account workers derived from the 1940 Census (after adjustment to the revised MRLF level) to yield the estimates of total self-employed in retail trade in 1929–39.

[11] For the Census week of 1930 a separate estimate of agricultural employment was prepared comparable in concept with that of the 1940 Census. This figure was then adjusted to an annual average level on the basis of the monthly data of the BAE, after allowing for differences in seasonal movement between the latter series and that of the MRLF for years since 1940.

[12] The results of the Census of Partial Employment, Unemployment, and Occupations in 1937 could not be used for the present estimates because the methods used in this Census were not comparable with those used in 1930 and 1940, and because the female worker rates shown in the 1937 Census appeared inconsistent with those shown in all other available data.

[13] Among the series on unemployment which were examined for this period were those of the Alexander Hamilton Institute, the American Federation of Labor, Daniel Carson, the Cleveland Trust Co., the Congress of Industrial Organizations, Corrington Gill, Theodore Kreps, the Labor Research Association, Robert Nathan, the National Industrial Conference Board, and the National Research League. Estimates for individual dates, including those in the Census of Unemployment for 1937, the National Health Survey for 1935–36, the New York Sun and the Dorothy Thompson-Arthur Krock estimates for 1940, were likewise reviewed.

from a prosperity low in 1929, to peak levels in 1932 or 1933. After 1933, the movements of the respective series were also generally similar. However, a more detailed examination reveals significant differences in level, as well as in year-to-year movement.

TABLE 2.—*Selected estimates of unemployment in the United States 1929–39*

[In thousands]

| Year | Bureau of Labor Statistics | Alexander Hamilton Institute | American Federation of Labor | Congress of Industrial Organizations | National Industrial Conference Board | Robert Nathan |
|---|---|---|---|---|---|---|
| 1929 | 1,550 | 3,456 | 1,864 | 1,831 | 429 | 1,752 |
| 1930 | 4,340 | 6,929 | 4,735 | 4,710 | 2,896 | 4,646 |
| 1931 | 8,020 | 10,939 | 8,568 | 8,322 | 7,037 | 8,118 |
| 1932 | 12,060 | 14,728 | 12,870 | 12,120 | 11,385 | 11,639 |
| 1933 | 12,830 | 14,394 | 13,271 | 12,643 | 11,842 | 11,942 |
| 1934 | 11,340 | 12,419 | 11,424 | 10,845 | 9,761 | 9,998 |
| 1935 | 10,610 | 11,629 | 10,652 | 10,050 | 9,092 | 9,102 |
| 1936 | 9,030 | 10,008 | 9,395 | 8,756 | 7,386 | 7,723 |
| 1937 | 7,700 | 8,366 | 8,282 | 8,109 | 6,403 | 6,856 |
| 1938 | 10,390 | 11,934 | 10,836 | 11,030 | 9,796 | 9,865 |
| 1939 | 9,480 | 10,696 | 9,979 | 10,813 | 8,786 | 9,835 |

Sources of the nongovernmental estimates: Alexander Hamilton Institute: correspondence with the institute. American Federation of Labor: American Federationist, August 1941 (p. 25). Congress of Industrial Organizations: unpublished figures of March 1941. Robert Nathan: Social Security Bulletin, January 1940 and subsequent dates. National Industrial Conference Board: Economic Almanac for 1948, (pp. 269, 270).

There are five major reasons for the differences shown between the BLS series and earlier estimates.

(1) The population data utilized in previous estimates were in general less accurate than the official Bureau of the Census estimates employed in the present computations. The latter were based on data not available until recent years.

(2) In previous unemployment series, the estimate of the labor force was made in terms of the 1930 Census concept of "gainful workers"—a concept which is not comparable to that used in the 1940 Census and in the MRLF. Furthermore, certain of the previous estimates made inadequate allowance for the fact that the number of workers relative to the population does not remain constant. Sufficient adjustment was not made for the effects of changes that occurred in the age composition of the population, in school attendance, and other factors, as revealed by a comparison of the 1940 worker rates with those for 1930 and earlier Census years.

(3) All the earlier unemployment series relied primarily on BLS data for estimating nonagricultural employment, but, necessarily, none of them could take account of the 1946 revisions in the BLS estimates.

(4) In many earlier series the number of self-employed in nonagricultural pursuits was estimated, by and large, on the assumption that the self-employed varied in direct proportion with the number of employees. Other estimators have treated the entire group or large segments of it as a constant. Industrial censuses show that neither procedure is satisfactory. When business conditions improve, additional employees tend to be hired at a faster rate than the rate of increase in the number of businesses; the pattern is reversed when conditions worsen. As a result, the ratio of employees to proprietors in all important industry groups changed continually during the 1930's.

(5) The basic unemployment bench mark for previous estimates was necessarily the unadjusted results of the 1930 Population Census. In making its present estimates, the BLS had the advantage of both revised 1930 data and materials from the 1940 Population Census.

## Evaluation of Series

The estimates of labor force, employment, and unemployment presented in this article are based on a detailed consideration of all available materials, including recent major revisions in Census and BLS data. However, any labor force and unemployment series which does not rest on a direct and continuous enumeration is subject to certain defects.

One such shortcoming—which attaches to any estimates for the years prior to the development of the MRLF—is the fact that even slight errors in the estimation of employment or labor force may produce relatively great errors in the estimates of unemployment. Another is the difficulty of mak-

ing satisfactory adjustment for changes in worker rates which arise from changing economic conditions. For example, the participation of women in the labor market during the depths of the depression may have been greater than is apparent from the 1930 and 1940 enumerations. When the head of the household was out of work during the 1930's, it was not infrequent that the housewife in the family would seek a job. On the other hand, some young persons remained in school longer than they would have in more prosperous years. The net effect of these omissions and additions cannot be measured but it is probably not enough to change materially either the level or trend of unemployment for the years 1929–39.[14]

The present unemployment series is primarily a measure of total unemployment of those persons who were customarily in the labor force in terms of the trends shown by the 1930 and 1940 population censuses. It does not measure the extent to which the Nation's manpower was not fully utilized during the depression. Many persons were employed at part-time jobs. Still others were subject to what has been called disguised unemployment, since they worked at jobs well below their capacities, and could not provide society with the optimum use of their services.

Moreover, the labor potential of the population is greater than that indicated by adding unemployment to employment. As the war well demonstrated, many persons not usually in the labor force take jobs in times of emergency. Such qualifications as these must be continually borne in mind in using the labor force and unemployment estimates.

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[14] This conclusion is based on a special study of changing worker rates during the 1930's.