

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

Volume Title: The Labor Force in Wartime America

Volume Author/Editor: Clarence D. Long

Volume Publisher: NBER

Volume ISBN: 0-87014-329-8

Volume URL: <http://www.nber.org/books/long44-1>

Publication Date: 1944

Chapter Title: The American Labor Force in World War I

Chapter Author: Clarence D. Long

Chapter URL: <http://www.nber.org/chapters/c6304>

Chapter pages in book: (p. 39 - 49)

such an excessive deduction. The explanation may well be that on the whole the underlying factors just mentioned are not *fundamentally* different for the urban societies of western countries. Indeed the lack of such fundamental differences may be more significant for numerical labor force propensities than any differences in political organization.³⁰

7 THE AMERICAN LABOR FORCE IN WORLD WAR I (With Some British and German Comparisons)

It has been rather generally accepted that during the first World War net additions to the total labor force in the United States had extensively replaced the military withdrawals from the civilian labor force. The National Industrial Conference Board puts the monthly average of negatively unemployed at two million for 1917, three million for 1918, and nearly one million for 1919, describing 'negatively unemployed' as wartime additions to the labor force in excess of the normal growth.³¹

My own estimates do not show any such additions, but my method of estimating the labor force does not guarantee to reflect the short-period dynamics of the female labor market (see the comparison in Chart 2 of my female labor force estimates with those of the 1940-43 monthly poll). Some such net additions may possibly have been made during the first World War, and I have reached no final conclusions on the question. Nevertheless, two tentative conclusions can be formed with some degree of confidence. First, negative unemployment, if it occurred, was probably not as large as the Conference Board estimates. Second, the Board's figures on employment and labor force cannot be used to support even the existence of negative unemployment in World War I, much less the amount it estimates. The Board was, to be sure, handicapped by lack of data. Some of the lacunae could have been filled only by most painstaking research; others could not have been filled at all. For some purposes, the measures the Board used to fill the lacunae may be moderately satisfactory. But for the purpose of isolating the net additions re-

³⁰ Labor force propensities in 1939 were not, as a matter of fact, appreciably higher for age groups 18 and older than were the propensities revealed by the German census of 1925. Propensities of girls 14-19, however, do rise greatly. Propensities of men and women 60 and older decline sharply.

³¹ *Economic Almanac for 1942-1943* (p. 154): "Negative unemployment arises during periods of high industrial activity when there are persons at work who are not ordinarily counted as members of the labor force."

ferred to, its estimates of labor force and employment have three elementary defects of method.

The first defect, namely, that the Board based its normal labor force estimates for 1910-19 on understated, and now officially superseded, population interpolations, is explained in Section 2. The second defect lies in excluding vacationing school children from the average annual labor force. The employment data must perforce have included them. In combination, the two defects explain why the Conference Board estimates of average annual labor force are below mine in 1917, 1918, and 1919 by 1,400,000 (Table 14). My

TABLE 14
Average Annual Labor Force, United States, 1914-1920

	MY ESTIMATES		CONFERENCE BOARD ESTIMATES*	EXCESS OVER BOARD'S ESTIMATES	
	With summer additions	Without summer additions		With summer additions	Without summer additions
1914	40,724	39,788	39,789	935	..
1915	41,124	40,174	40,083	1,041	91
1916	41,594	40,650	40,314	1,280	336
1917	42,171	41,277	40,752	1,419	525
1918	42,528	41,641	41,088	1,440	553
1919	42,530	41,615	41,159	1,371	456
1920	42,918	41,979	41,897	1,021	82

**Economic Almanac for 1941-1942*, p. 120.

higher estimates of the labor force, set against the Board's employment estimates, would yield negative unemployment of only 500,000 in 1917 and 1,700,000 in 1918; and positive unemployment of 500,000 in 1919.

But, in addition, the Board's employment estimates for 1910 must be cut by 1,400,000, our estimate of the 1910 census overcount of gainfully occupied women and children,³² and each subsequent year's employment must be adjusted for its share of this overcount. On the assumption that the Conference Board's employment estimates for 1911-19 are inflated by amounts that are approximately linear interpolations between the 1,400,000 in 1910 and 0 in 1920, the adjustment for the 1917 employment figure would be 400,000, that for the 1918 figure, 300,000, and that for the 1919 figure, 100,000, reducing negative unemployment to 100,000 in 1917,

³² For later publication I have written a long appendix on the nature of the 1910 overcount and its adjustment. The Census Bureau admits an overcount but not such a large one as has emerged from my estimates (*Thirteenth Census of the United States, 1910*, IV, 26-9).

1,400,000 in 1918, and raising positive unemployment in 1919 to 600,000. The estimates of the 1917-19 shares in the adjustment for the overcount in 1910 are admittedly rough. The adjustment was made merely to bring the Board's employment estimates, which included the overcount, into line with my labor force estimates, from which this overcount had been excluded.

The third defect in the Board's method of arriving at negative unemployment, together with other defects, is explained in some detail in Appendix E. It consists chiefly in basing the estimates of employment in industries *depressed* by the war on estimates of employment in industries *stimulated* by the war. According to the 1920 census, 20,000,000 employees were in industries whose wartime fluctuations the Board estimated by questionable or question-begging means. An employment level for these industries that was 5 per cent lower in 1917 and 10 per cent lower in 1918—simply to mention some numbers that sound reasonable—would not only erase the Board's negative unemployment. It would even allow, within the limits of the normal peacetime labor force, for some positive unemployment in wartime. It is by no means certain that employment in these groups did decline. If not, there is still a possibility that net additions to the labor force did occur in World War I, at least as measured by the Conference Board method.³³

Without coming to a final conclusion, I shall present other evidence that net additions in World War I to the normal labor force were indeed few or non-existent. The chief sources, naturally, would have had to be school-age boys and girls, women, and males over 64, normally retired.

The yearly number of persons in school was calculated from three sets of primary data, by sex and educational level: (1) alternate year enrollment data of the United States Office of Education; (2) yearly data of several state and city public school systems; (3) yearly data of several private and public colleges and universities. Within-the-year enrollment could be pieced together from monthly attendance in certain cities of various sizes, and from yearly enrollments, by classes, in colleges and universities.³⁴ As Table 15 and

³³ The whole question of the absolute level of the Conference Board employment estimate has been left in the air because it is impossible to tell from either its description or its figures whether its 1910 and 1920 employment 'benchmarks' are too high or too low.

³⁴ A good deal of reliance can be placed on the school enrollment estimates for October or November 1918, as annual statistics pertaining to the beginning of the school year covered all public school enrollment in 9 states as well as college enrollment in 22 institutions.

Charts 3 and 4 show, combined high school and college enrollment during World War I decreased insignificantly.³⁵ Indeed, if 97 per cent of males 14-24 is the most that could have been in school or in the labor force throughout 1918, October additions to the normal male labor force aged 14-24 could have been only 250,000, and the average yearly additions, including those during summer vacations, could have been only 400,000.³⁶

TABLE 15
School and Labor Force Status of Males 14-24, by Age Groups
United States, 1916-1918

	AGE GROUP 14-17				AGE GROUP 18-24			
	Popu- lation (000)	School (% of population)	Labor force* (% of population)	Total	Popu- lation (000)	School (% of population)	Labor force* (% of population)	Total
1916 Nov.	3,818	61.4	33.1	94.5	6,451	8.9	87.3	96.2
1917 Apr.	3,837	54.3	38.7	93.0	6,450	7.4	88.7	96.1
1918 Apr.	3,864	51.2	40.3	91.5	6,416	6.9	88.8	95.7
1918 Nov.	3,861	58.5	34.1	92.6	6,379	9.0	86.7	95.7

My interpolations. See Appendices A and B.

*Not attending school.

The possible net influx of men over 64 to the labor force could not have been substantial, for 28 per cent of all men over 64 were 75 or older. Only 1,000,000 men over 64 were outside the labor force in peacetime, many fewer, relatively and absolutely, than at the start of this war. Had it been possible to bring out of retirement or to rehabilitate 100 in every 1,000 outside the labor force,³⁷ the influx

³⁵ Contemporary comment on child labor conflicts with this. In October, publicity was given to the Department of Labor's "back to school" drive and to the fact that a large number of children "had left school because of the high wages" (*New York Times*, Oct. 27, 1918, p. 3:6). Just after the Armistice, reference was made to the enormous increase in child labor during the war (*ibid.*, Nov. 24, 1918, II, p. 8: 2-8).

³⁶ On the other hand, a Department of Agriculture survey (*New York Times*, April 11, 1917) estimated that 2,000,000 of the 5,000,000 boys 16-21 were continuously idle; and that during the summer months even more were unoccupied. However, my estimate of potential reserve is based on possible additions to a *normal* labor force, which includes both employed and unemployed. The Department of Agriculture figure doubtless included unemployed, an important factor in agriculture during that season. Nevertheless, the two estimates are too far apart to be reconciled.

It ought to be pointed out that my calculations of the maximum possible increase in the labor force propensity of school children in summer are based on my assumptions concerning the normal limiting propensity during vacation. If these limits were more nearly realized in war than in peace, as to some extent they may have been, then the maximum addition of males to the labor force in summer could have been somewhat larger. Averaged for the year, however, the number involved in this consideration is doubtless very small. Moreover, see Sec. 9 for the description of the smallness of such additions during World War II.

³⁷ This is about the proportion of males over 64 who returned to the labor force between December 1941 and December 1942, but the propensity before World War I

would have been only 100,000. It does not seem as if any great, unexploited, reserve lay in this group in 1916.

Altogether—given the normal labor force propensities, the school enrollment, and the age distribution of old persons—maximum net additions to the *male* labor force in 1917 and 1918 had to be fewer than 500,000 full-time during the school months and fewer than a million during the summer vacation months, about 600,000 in each year.³⁸ These figures, however, stand only for the possible additions; nothing guarantees that they were reached.

Since school children and elderly men could not have contributed significant net additions, and since the males 25-64 outside the labor force before the war were probably the hard core of unemployment, one must look next to women. Showing that the ratio of women to men employed in leading *war* industries had risen substantially, the Conference Board commented:

"When the effects of the draft began to be felt by industry, the first source to be drawn upon was the traditional women-employing factories: the food and clothing industries. Thousands of women left these plants to enter 'war agent and implement' industries. . . . As this supply of workers became depleted, it was necessary to call upon married women, some of whom had worked for wages before marriage. . . . In some instances the high level of female employment was carried over into peacetime operations. . . . The level of female employment, however, remained definitely higher [in war industries?] in the years that followed than it had been in 1914."³⁹

It is not clear whether the Board intended to imply that the ratio of women to men had risen in *all industries* or merely in war industries at the expense of others. Nevertheless, the implication that the rise occurred in all industries is basic to the Board's case for net additions to the labor force.

Was the ratio of women to men in the labor force abnormally high during 1918? Figures that could fully answer such a question were never gathered. But the net additions of females, if they occurred, were assumed by the Conference Board to have been most prevalent in manufacturing employment. For a tentative test of additions to general manufacturing employment, Ohio and Massachu-

(note 37 *concl.*)

was already so much higher than before World War II that the return of this proportion would, one might suppose, have been resisted more at that time.

³⁸ Assuming an irreducible minimum outside the labor force of 3 per cent for males 14-45, 6 per cent for males 45-64, and 38 per cent for males 65 and over. These percentages include inmates of institutions, persons permanently disabled or prematurely old, temperamental or social unemployables, and so on.

³⁹ Women as War Labor Reserves, *Economic Record*, Feb. 1942, p. 48, cf. pp. 47-50.

setts offer almost complete monthly coverage of women in all manufacturing 1917-20. The fact that Massachusetts was a light-industry and Ohio a heavy-industry state provides at least some industrial diversity.

Two pitfalls prevent the use of prewar starting points for wartime comparisons.⁴⁰ The first is the shift of females from non-factory industries. A wartime excess over the prewar ratio of females to males would be created in manufacturing merely by the *exodus of men* and by the *differential shift of females* from non-factory industries to replace them. The second pitfall is the rise in the employment of women in factories that had nothing to do with a change in the female labor force since it was due to the notable drying up of the unemployed.

To avoid these pitfalls, though at the expense of having to cope with others, the employment of women in 1918 is compared with that in January 1920 (Table 16). According to the occupational census, the labor force in general was rather fully employed in 1920; indeed, according to the Massachusetts trade union percentages, it was almost as fully employed as in 1918.⁴¹ In Ohio and Massachusetts factories the average monthly employment of female wage earners in 1918 was 2 per cent below the level of January 1920. The minimum estimate in this study of the normal female labor force for 1918, which omits vacationing school girls, was the same (only 2 per cent below the census count for January 1920). The failure of Ohio and Massachusetts data to suggest any 1918 peak in female employment or labor force status does not seem attributable to an extension in coverage from 1918 to 1920, for manufacturing employment is supposed to have been completely covered in both years.⁴²

⁴⁰ The Conference Board used the prewar starting point. The one postwar date it mentions is August 1919, a month of some unemployment in manufacturing.

⁴¹ The percentage of Massachusetts trade union members (manufacturing and building) unemployed in January 1920 (Dec. 31, 1919) was 3.8, compared with 2.6 average for March 31, June 30, September 30, and December 31, 1918.

⁴² "The list of [Ohio] establishments reporting fluctuation of employment and the list of establishments carrying workmen's compensation insurance are carefully checked against each other from year to year. Compensation insurance was compulsory during 1914 to 1923 for all employers employing five or more. . . ." U.S. Bureau of Labor Statistics, *Bulletin* 553, p. 2.

This assurance that the Ohio employment data covered all firms above the minimum must not be taken too literally. It was obvious that the coverage was differentially incomplete in 1914-16 compared to 1917-20, though not because of any significant change in the number of firms employing fewer than five employees. During 1917-20 the data

TABLE 16
Female Wage Earners in Manufacturing
Ohio and Massachusetts, 1918-1920

	OHIO (000)	MASS. (000)	TWO STATES COMBINED (000)	Index (Jan. 1920=100)
1918				
Jan.	89	222	311	91
Feb.	93	225	318	93
March	96	232	328	96
April	98	232	330	96
May	99	233	332	97
June	108	234	342	100
July	110	233	343	100
Aug.	112	231	343	100
Sept.	114	231	345	101
Oct.	115	224	339	99
Nov.	115	234	349	102
Dec.	109	229	338	99
Avg.	105	230	335	98
1919				
Avg.*	105	224	329	96
1920				
Jan.	108	234	342	100

SOURCES: U.S. Bureau of Labor Statistics, *Bulletin 553*, Fluctuation in Employment in Ohio, 1914-1929; Massachusetts Labor and Industry Department, *Statistics of Manufactures*.

*Because the Massachusetts Labor and Industry Department used the U.S. Census figures for the state instead of its own, employment for both states is from the *U.S. Census of Manufactures for 1919*. The closeness of the Ohio state figure (101,000) to the Ohio Census figure (105,000) suggests that no great error was introduced into the 1919 data by this substitution.

Moreover, for both Ohio and Massachusetts the United States census percentages of females 10 years and older in the labor force were the same in January 1920 as in April 1910. The lower employment totals in 1918 than in January 1920 could not, therefore, be due to an upward intercensal trend in female labor force participation in these states.

Of course, the female labor force in other industries and other states may have been more enlarged by the war than in Ohio and Massachusetts manufacturing. This does not seem at all likely, how-

(note 42 *concl.*)

on manufacturing wage earners in Ohio seem to have been complete enough; at least there was no further increase in the average annual employment per establishment.

In fact the average number of male and female wage earners per Ohio firm declined from 79 in 1918 to 74 in 1920. At the same time the number of firms rose from 8,900 to 9,700. Perhaps 800 formerly four-employee firms suddenly became five-employee firms. Such a shift, if it occurred, would have involved only 3,200 employees, a negligible number. Thus the employee coverage may have been virtually complete, though the firm coverage was less so.

ever, for manufacturing employment in highly industrial states might be expected to feel a greater impact from the war than non-manufacturing industries or industries in other states.

The possibility that additions to the female labor force came from other than manufacturing industries cannot, unfortunately for the argument, be disposed of entirely.⁴³ Data on female employment in other industries exist for Ohio but are not as complete as could be desired, especially those for service, trade, and agriculture, and some doubtless suffer from widening coverage. Nevertheless, even in the transportation (entirely intra-state) and public utilities groups, presumably fully covered, female employment in 1918 was 2 per cent lower than in January 1920.

A final and definite conclusion that no net additions were made to the normal female labor force during World War I is perhaps unwarranted. Scrutiny of all these data, however, has not turned up any statistical evidence that they were. Rather, the defects in the Conference Board estimate of negative unemployment, the sustained school enrollment, the small percentages of males normally outside the labor force, and the absence in 1918 (and 1917) of great expansion in the employment of women in factories build a presumption against any large net additions to the normal female labor force in the United States during World War I. Any that did occur were probably of minor proportions.

To reckon labor force replacements is hardly easier for Great Britain. The British evidence indicated an increase of 50 per cent (1,660,000) in the employment of women from 1914 to 1918. However, the returns represented only about 60 per cent of the female labor force in 1914.⁴⁴ Humbert Wolfe was convinced that "the reinforcements mainly consisted of women not engaged in industry before the War," and, partly on the basis of this assumption, calculated a loss of only 791,000 in the civilian labor force.⁴⁵ But his comparison is based on a 1914 standard of the civilian labor force rather than on what the civilian labor force would have been in 1918 had there been no war. The 1918 standard is used here *because a bigger population requires a larger labor force merely to satisfy in-*

⁴³ It does not fit into the popular impression of the time that the chief increases occurred in manufacturing.

⁴⁴ In 1911, 5,400,000 women were enumerated in gainful occupations in Great Britain. The so-called Z-8 estimates, which do not seem to have covered domestic service, listed only 3,300,000 in July 1914.

⁴⁵ *Labour Supply and Regulation* (1923), pp. 77, 96.

creased civilian needs. For if, despite the growth in population, the labor force is no larger than before the war, the propensity has actually declined.

On the basis of the figures Wolfe uses, 15,000,000 males would have been employed in 1918 (presumably in the United Kingdom). Of these, 4,200,000 men (net of the medically unfit returned to industry) had been taken into the services. Partial replacements came from three sources: (1) 300,000 young boys and old men who would not otherwise have been in the labor force (the 300,000 decrease in strikers and unemployed counted by Wolfe was really merely an increase in employment, and cannot be looked upon as an addition to the labor force); (2) fewer than 100,000 foreign and Dominion laborers especially imported; (3) some portion of the gross increase of 1,660,000 employed women mentioned above. Some of this gross increase would have come about merely as a result of the growth in population. Besides, the *Labour Gazette*, June 1918, estimated 400,000 women switched from domestic service and small dressmaking shops and workrooms. Consequently, the net addition of women due to a rise in labor force propensity may have been 1,100,000. Even allowing, therefore, for the addition of boys, old men, women, wounded soldiers, aliens, and prisoners of war, the civilian labor force in 1918 was 2,700,000, or roughly 12 per cent smaller than it might have been under peacetime conditions.

We may now turn to Germany. Leo Grebler opens his study of this question with these words:

"A foreign observer visiting Germany in 1916 or 1917 must have been impressed principally by the spectacle of a whole nation at work: women drivers and conductors of trams, women bank clerks, women workers in munition factories, women in the building trades and even in coal mines."⁴⁶

In 1907 gainfully occupied men 14-59 constituted 73.5 per cent of males 10 years and older. Had there been no war, a labor force in 1916 of 19,500,000 men 14-59 could be assumed.⁴⁷ But the 1916 census counted 14,300,000 males 14-60 in the civilian labor force, including about 1,700,000 prisoners and foreigners. Thus the net loss in the normal civilian male labor force was more than 5,200,000.⁴⁸ In 1907 gainfully occupied females 14-49 constituted 32.0

⁴⁶ Leo Grebler and Wilhelm Winkler, *Cost of the World War to Germany and to Austria-Hungary* (Yale University Press, 1940), p. 29.

⁴⁷ This figure is based on the estimate, extrapolated from 1900 to 1910, that the male population would have been 26,500,000.

⁴⁸ Our civilian labor force figure, taken from the German occupational census, included

per cent of the female population 10 years and older. By 1916 the normal labor force could be expected to have 8,800,000 women 14-49. But the census counted only 8,300,000 women 14-47. The difference, 500,000, may be considered to be due to the failure to count gainfully occupied women 48 and 49 years old. Therefore, the female labor force in Germany in 1916 seems to have been no larger than normal, which suggests that the net loss of males in the age groups 14-49 was not replaced.

The census comparisons are confirmed by returns of the sickness insurance system which show a rise by 1916 of only 3.6 per cent in female employment (decline in unemployment and growth in population allowed for), compared with a fall of 38 per cent in male employment.⁴⁹ By 1918 female employment had risen 17 per cent over 1914, against a fall of 40 per cent in male employment. Allowance for population growth and unemployment decrease would reduce the significance even of this small rise for females. Groups outside these age limits may possibly have furnished replacements not counted by the census: males under 14, and 60 and older, and females under 14, and 50 and older. It is very likely that, by devoting more time to field work, the farm housewives stepped up their labor force status, but not in a way that would be revealed in the statistics. It is also conceivable that the 1916 census did not count the gainfully occupied as fully as did the 1907 census. Nevertheless, the idea that there was any large scale replacement of men by women in the German civilian labor force in World War I seems illusory.

(note 48 concl.)

Class E which consisted of Military Service, Civil Service, and Professional Service. Class E was the only group in which males increased substantially (more than 2 million). It is, therefore, very likely that the military group in Class E contained not only professional soldiers but also a considerable part of the army stationed within the borders of the German Reich. However, as there was no reliable basis for separating the military and civilian subgroups, it was not attempted. Consequently, our estimate of the civilian labor force may be too high and the true net loss even larger.

⁴⁹ These figures were taken from the *Reichsarbeitsblatt*, Dec. 1916. Commenting on them, the *Reichsarbeitsblatt* remarked that the widespread belief in a large increase in the employment of women in wartime resulted from undue generalization from some conspicuous phenomena, such as the increase of women in war industries, especially the iron and machine industries and transportation. In support of this remark it pointed to a decrease in female employment in the textile industry and in domestic service, and a decrease, or at least no increase, in the handtrades and handicrafts (p. 989).

These statistics and the remarks of the *Reichsarbeitsblatt* were noted in the *Labour Gazette* which said: "The . . . figures [Sickness Insurance] . . . indicate that the growth of female employment in Germany since the outbreak of the war has not been so great as has hitherto been assumed from a consideration of certain trades to which they have been flocking in particularly noteworthy numbers." (Feb. 1917, p. 48; March 1919, p. 87.)

How is one to account for the illusion in Germany or elsewhere? Observers agree on the great flow of women into industry in all three countries. Yet analysis indicates that the increase in the female labor force propensity was invariably small or negligible, whether the comparison is with the number of women already in industry or with the number of men withdrawn from the civilian population. Here is a field, apparently, in which direct and unchecked observation can easily mislead. One part of the so-called rise in the labor force is merely the absorption of the female unemployed. Another part results from fixing attention on war industries, traditionally men's industries, where apparent inflow into the labor force may be really the transfer of women from agriculture, domestic service, and retail trade.⁵⁰ Even in these 'men's' industries, women stand out in wartime, not always because of the influx of females but because of the exodus of males.

Statistically, too, there has been much opportunity for illusion. Except for Germany, war and prewar comparisons have been made among employment (not labor force) figures of large firms in war industries. Increases are noted in female employment usually without noting also the growth in population, the fall in unemployment, or the transfer from industries not covered by statistics. The resulting errors are then inflated by applying the erroneous percentage increases to the 'uncovered' firms and industries. It must be concluded that, actually, none of the three countries discussed was able to add more than slightly to the normal male civilian labor force from this source. The greatest net loss from a civilian labor force, by 1916 anyway, was suffered by Germany (18-20 per cent). Great Britain, by 1918, had suffered a net loss of 10-13 per cent; and the United States one of 7-10 per cent. The order of these losses is roughly the order of the extent of mobilization, which had been, for Germany, one-third; for Great Britain, one-fourth; for the United States, one-tenth of the normal labor force. To the extent that these net losses were made up at all, it was by more intensive use of the diminished civilian labor force.

8 THE AMERICAN LABOR FORCE IN WORLD WAR II (With Some British and German Comparisons)

Though the statistics, when examined critically, do not show much of a rise in total labor force propensity during World War I, a good-

⁵⁰ In many cases the industries from which women transfer simply close down.