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APPENDIX A

Notes on the Annual and Monthly Estimates of Population and the Labor Force, 1940 Definition, by Sex and Military Status, 1914-1923

The 1940 census defines the labor force as the total of persons *employed, seeking work,* and on *public emergency work* during *any part* of the census week. As nearly as possible, the 1910-30 censuses of occupation were adjusted to this definition.

Included in labor force, 1940 definition

Some persons not actually working or seeking work: persons defined as employed by sheer virtue of owning a farm or business, having a professional office, or holding a job, though not working and not seeking work. They might be temporarily ill, on strike, on vacation, or simply not inclined to work.

Persons employed or seeking to work only a few hours a week: housewives and school children employed or seeking to work only a few hours a week count for as much as full-time male workers.

Employers and self-employed persons; soldiers, sailors, and marines, including those in the expeditionary forces during and immediately after wartime, but excluding those normally stationed outside the continental United States; civil government employees; persons seeking work who have never held a job; unpaid family workers on farms and in family enterprises, if at work or seeking gainful work, but not if idle and not seeking gainful work; and some persons of unknown occupation or labor force status.

Excluded from labor force, 1940 definition

Employable persons needing and desiring work but not seeking it because distant from any place of potential employment; e.g., agricultural workers in isolated sections of the rural South in winter. (On the other hand, workers in one-industry areas, such as mining regions, not seeking work because that industry is closed are theoretically included in the labor force.)

Members of the armed forces and government officials *normally* stationed outside the continental United States.

Inmates of institutions, even though working for pay; persons permanently disabled or retired; housewives and school children not also working or seeking work in a gainful occupation.

Persons in illegal or disreputable occupations (though most of these are probably returned as being in legal or reputable employments).

Males and females by age groups 10-13, 14-17, 18-24, 25-44, 45-64, 65 and older, were estimated annually by the method of cohorts. Estimates for 1914-19 are my own; those for 1920-23 were recently prepared by the Census

Bureau and courteously placed at my disposal. Monthly estimates are linear interpolations between annual estimates for July of each year, except for 1914 and 1918-19, years of reversal in migration and of influenza pandemic, respectively.

Intercensal estimates of the labor force are made by applying census labor force percentages of each age-sex population group, further sub-divided according to school enrollment and female marital status, to the estimates of the number of persons in each of these cells during each month of the intercensal period. Careful experiments showed that analysis of the population into color and nativity would not have yielded significantly different results, except perhaps for the school-age groups, for which variations in labor supply are probably better reflected by school enrollment—in the absence of data susceptible to both types of analysis. This method of structural interpolation does not allow for all variations in the labor force due to conditions of work-getting, income, employment, wage rates, and so on, except by the effect these conditions have on the structure of population, school enrollment, and marital status.

Because no benchmark exists for the summer labor status of vacationing students, estimates of the labor force from May to September are subject to a considerable margin of error. Moreover, it probably varies pretty much with the demand for labor. The minimum is based on the assumption that vacationing school children are in the labor force in the same percentages as children attending school during the academic term; the maximum on the assumption that they are in the labor force in the same percentages as children not attending school.

APPENDIX B

Population and the Labor Force by Sex and Military Status
United States, April 1940-November 1943 (absolute figures in millions)

	MALE						FEMALE			MALE AND FEMALE				
	Pop. 10 & older	Civilian labor force	% Col. (2) is of Col. (1)	Est. armed forces	Labor force incl. armed forces Col. (2) + Col. (4)	% Col. (5) is of Col. (1)	Pop. 10 & older	Labor force	% Col. (8) is of Col. (7)	Pop. 10 & older	Civilian labor force	% Col. (11) is of Col. (10)	Labor force incl. armed forces Col. (4) + Col. (11)	% Col. (13) is of Col. (10)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1940														
April	55.3	40.6	73.4	.3	40.9	74.0	55.2	13.3	24.1	110.4	53.9	48.8	54.2	49.1
May	55.3	41.3	74.7	.3	41.6	75.2	55.2	13.4	24.3	110.5	54.7	49.5	55.0	49.8
June	55.4	42.3	76.4	.3	42.6	76.9	55.3	13.9	25.2	110.6	56.2	50.8	56.5	51.1
July	55.4	43.1	77.8	.3	43.4	78.3	55.3	13.8	25.0	110.7	56.9	51.4	57.2	51.7
Aug.	55.4	42.9	77.4	.3	43.2	77.9	55.3	13.7	24.8	110.8	56.6	51.1	56.9	51.4
Sept.	55.5	41.5	74.8	.4	41.9	75.5	55.4	13.4	24.2	110.9	54.9	49.5	55.3	49.9
Oct.	55.5	41.3	74.4	.5	41.8	75.3	55.4	13.1	23.6	110.9	54.4	49.0	54.9	49.5
Nov.	55.5	41.1	74.0	.6	41.7	75.1	55.5	12.6	22.7	111.0	53.7	48.4	54.3	48.9
Dec.	55.6	40.9	73.6	.7	41.6	74.8	55.5	12.5	22.5	111.1	53.4	48.1	54.1	48.7
1941														
Jan.	55.6	40.7	73.2	.8	41.5	74.6	55.6	12.3	22.1	111.2	53.0	47.7	53.8	48.4
Feb.	55.7	40.6	73.0	.9	41.5	74.6	55.6	12.3	22.1	111.3	52.9	47.5	53.8	48.3
March	55.7	40.4	72.5	1.1	41.5	74.5	55.7	12.3	22.1	111.4	52.7	47.3	53.8	48.3
April	55.7	40.9	73.4	1.3	42.2	75.8	55.7	12.6	22.6	111.5	53.5	48.0	54.8	49.2
May	55.8	40.9	73.3	1.5	42.4	76.0	55.8	13.3	23.8	111.5	54.2	48.6	55.7	49.9
June	55.8	42.3	75.8	1.5	43.8	78.5	55.8	13.9	24.9	111.6	56.2	50.3	57.7	51.7
July	55.8	42.6	76.3	1.7	44.3	79.3	55.9	14.0	25.1	111.7	56.6	50.7	58.3	52.2
Aug.	55.9	42.4	75.9	1.7	44.1	78.9	55.9	14.0	25.0	111.8	56.4	50.5	58.1	52.0
Sept.	55.9	41.0	73.3	1.8	42.8	76.6	56.0	13.8	24.7	111.9	54.8	49.0	56.6	50.6
Oct.	55.9	40.4	72.2	1.8	42.2	75.4	56.0	13.7	24.5	112.0	54.1	48.3	55.9	49.9
Nov.	56.0	40.3	72.0	1.9	42.2	75.4	56.1	13.8	24.6	112.0	54.1	48.3	56.0	50.0
Dec.	56.0	40.2	71.8	2.0	42.2	75.3	56.1	13.8	24.6	112.1	54.0	48.2	56.0	49.9

1942														
Jan.	56.1	40.0	71.4	2.1	42.1	75.1	56.2	13.2	23.5	112.2	53.2	47.4	55.3	49.3
Feb.	56.1	40.0	71.3	2.3	42.3	75.4	56.2	13.4	23.8	112.3	53.4	47.6	55.7	49.6
March	56.1	40.0	71.3	2.6	42.6	75.9	56.3	14.5	25.8	112.4	54.5	48.5	57.1	50.8
April	56.2	39.8	70.9	3.0	42.8	76.2	56.3	13.9	24.7	112.5	53.7	47.7	56.7	50.4
May	56.2	40.0	71.2	3.2	43.2	76.9	56.4	14.2	25.2	112.5	54.2	48.2	57.4	51.0
June	56.2	41.1	73.1	3.7	44.8	79.7	56.4	15.0	26.6	112.6	56.1	49.8	59.8	53.1
July	56.3	41.6	73.9	3.9	45.5	80.9	56.4	15.2	26.9	112.7	56.8	50.4	60.7	53.9
Aug.	56.3	41.1	73.0	4.2	45.3	80.5	56.5	15.1	26.7	112.8	56.2	49.8	60.4	53.5
Sept.	56.3	39.2	69.6	4.6	43.8	77.7	56.5	14.9	26.4	112.9	54.1	47.9	58.7	52.0
Oct.	56.4	39.0	69.2	4.9	43.9	77.9	56.6	15.0	26.5	113.0	54.0	47.8	58.9	52.1
Nov.	56.4	38.5	68.2	5.6	44.1	78.2	56.6	16.0	28.3	113.1	54.5	48.2	60.1	53.2
Dec.	56.5	37.9	67.1	6.2	44.1	78.1	56.7	15.5	27.3	113.1	53.4	47.2	59.6	52.7
1943														
Jan.	56.5	37.1	65.7	6.8	43.9	77.7	56.7	15.3	27.0	113.2	52.4	46.3	59.2	52.3
Feb.	56.5	36.7	65.0	7.4	44.1	78.0	56.8	15.6	27.5	113.3	52.3	46.2	59.7	52.7
March	56.6	36.4	64.4	8.0	44.4	78.5	56.8	15.6	27.5	113.4	52.0	45.9	60.0	52.9
April	56.6	36.5	64.5	8.4	44.9	79.3	56.9	15.6	27.4	113.5	52.1	45.9	60.5	53.3
May	56.6	36.7	64.8	8.7	45.4	80.2	56.9	16.3	28.6	113.6	53.0	46.7	61.7	54.3
June	56.7	37.3	65.8	9.0	46.3	81.7	57.0	17.3	30.4	113.6	54.6	48.0	63.6	56.0
July	56.7	37.8	66.7	9.2	47.0	82.9	57.0	17.7	31.0	113.7	55.5	48.8	64.7	56.9
Aug.	56.7	37.5	66.1	9.4	46.9	82.7	57.1	17.4	30.5	113.8	54.9	48.2	64.3	56.5
Sept.	56.8	36.2	63.8	9.6	45.8	80.7	57.1	71.1	29.9	113.9	53.3	46.8	62.9	55.2
Oct.	56.8	35.9	63.2	9.8	45.7	80.4	57.2	16.7	29.2	114.0	52.6	46.1	62.4	54.7
Nov.	56.9	35.6	62.6	10.0	45.6	80.2	57.2	16.3	28.5	114.1	51.9	45.5	61.9	54.3

See the text for a description and critique of the method used in the monthly poll. The labor force percentages were computed from the original, not from the rounded population figures in this table.

Col. 1, 7, and 10: The monthly population estimates are linear interpolations between the April 1940 enumeration and Bureau of the Census estimates for January 1942 (Series P-3, No. 29, Sept. 28, 1942). The monthly data after January 1942 were derived by extrapolation, using a constant monthly increment. See note 1 to Table 1.

Col. 2, 8, and 11: Bureau of the Census, *Labor Force Bulletin,* March 1, April 28, and June 17, 1943; and *The Labor Force,* July-Sept. 1943.

Col. 4: Up to November 1941 based on data compiled by the Bureau of Labor Statistics. From December 1941 to May 1943 the number in the armed forces was estimated by computing the monthly difference between the estimated male population 14 and older and the number of males in the civilian labor force plus males outside the labor force (*Labor Force Bulletin,* March 1, April 28, and June 17, 1943) plus a constant number of persons in institutions as reported by the census for April 1940. For January 1943 the number of men in the armed forces was disclosed by the President's message of January 7 (*New York Times,* Jan. 8, 1943); for June by Paul McNutt (*ibid.,* June 15, 1943); for December Major Keesling gave the size of the armed forces as 10.4 million (*ibid.,* Jan. 15, 1944). Figures for intervening months were derived by straight line interpolation.

All these data have been reduced by 200,000, the estimated number stationed outside the continental United States in April 1940.

Appendix C

Preliminary Revisions* of the Census Monthly Estimates of the Civilian Labor Force (millions)

	MALE			FEMALE		
	Original (App. B)	Revised*	Difference	Original (App. B)	Revised*	Difference
1941						
Dec.	40.2	40.3	0.1	13.8	14.6	0.8
1942						
Jan.	40.0	40.1	0.1	13.2	14.1	0.9
Feb.	40.0	40.2	0.2	13.4	14.2	0.8
March	40.0	40.1	0.1	14.5	14.5	0.0
April	39.8	39.9	0.1	13.9	14.7	0.8
May	40.0	40.0	0.0	14.2	15.0	0.8
June	41.1	41.0	—0.1	15.0	15.7	0.7
July	41.6	41.5	—0.1	15.2	15.8	0.6
Aug.	41.1	41.0	—0.1	15.1	16.2	1.1
Sept.	39.2	39.2	0.0	14.9	16.4	1.5
Oct.	39.0	39.1	0.1	15.0	16.9	1.9
Nov.	38.5	38.5	0.0	16.0	16.8	0.8
Dec.	37.9	37.8	—0.1	15.5	16.9	1.4
1943						
Jan.	37.1	37.0	—0.1	15.3	16.4	1.1
Feb.	36.7	36.6	—0.1	15.6	16.6	1.0
March	36.4	36.2	—0.2	15.6	16.7	1.1
April	36.5	36.1	—0.4	15.6	16.8	1.2
May	36.7	36.4	—0.3	16.3	17.3	1.0
June	37.3	37.0	—0.3	17.3	18.2	0.9
July	37.8	37.5	—0.3	17.7	18.5	0.8
Aug.	37.5	37.1	—0.4	17.4	18.3	0.9
Sept.	36.2	35.7	—0.5	17.1	18.1	1.0
Oct.	35.9	35.3	—0.6	16.7	17.7	1.0
Nov.	35.6	35.1	—0.5	16.3	17.5	1.2
Dec.	not available	34.8	..	not available	17.1	..

*SOURCE: *The Labor Force,* Feb. 2, 1944:

"It has been recognized for some time that the original sample, inaugurated in April 1940 to furnish a simple and flexible measure of unemployment, had certain biases which became increasingly serious as a result of population shifts during the war. The chief weakness of the old sample was its tendency to overrepresent the rural population. Because the proportion of women in the labor force in urban areas is larger than in rural areas, the new series gives an estimate of the female labor force about one million above the former estimate. . . .

Data presented for October 1943 and earlier months represent the result of a preliminary adjustment of the old series designed to bring it as closely as possible into line with the new. This adjustment is based upon a retabulation of the original data which gives appropriate weight to the farm and the nonfarm population, and as a result brings the estimates very closely into line with the estimates from the new sample. Work now in process to extend the adjusted series back to April 1940 may result in some slight revision of these preliminary data. The method of adjusting the old series has been worked out in cooperation with an inter-agency committee under the sponsorship of the Division of Statistical Standards of the Budget Bureau. Detailed statements describing the new sample plan and the procedures followed in revising the original series will be available within a short time."

APPENDIX D

The Sample of Counties used by the WPA Poll in April 1940

A crude check on the WPA poll estimates may be had by examining the census enumerated population and labor force of each of the 46 counties sampled by the WPA in April 1940. The percentage of males 14 and older in the labor force ranged from 66.5 for Washington County, Tennessee, to 86.2 for Worth County, Georgia; the percentage of females from 13.4 for Garett County, Maryland, to 42.7 for New York County (Manhattan). The question of weighting may be important here.

It would have been illuminating to recompute the WPA estimate by applying its weights to the census enumerations. No doubt the interagency committee referred to based its report on the comparability of the two surveys on this recomputation. However, the WPA reports never contained enough detailed information to make such a recomputation possible by an outsider. In its absence we compare a simple average of the labor force percentages for the 46 counties with percentages computed from the United States aggregates. For males they were almost exactly the same; for females the simple average of the county labor force percentages was much below the United States percentage. Indeed a method of weighting that would have corrected the downward bias in the female propensity of the 46 counties might well have overcorrected the male propensity, which had no bias to start with.

	MALES	FEMALES
Percentages for the United States		
Census enumeration (unadjusted)	79.1	25.4
WPA-poll estimate	80.9	26.3
Average of the 46 county percentages	78.9	22.8
Percentages computed from the 46 county aggregates	80.6	31.0

It will be noted that propensities based on the poll estimates were higher, relatively to the propensities based on the census, for males than for females. Weighting the female labor force propensities of the individual 46 counties may have raised the sample propensity from 22.8 to 26.3 per cent, or .9 per cent above the census propensity. This can be assumed, of course, only if the sample of households would have yielded the same propensities as the complete county enumerations. Similarly, the system of weights applied for males may have raised the sample propensity 2 per cent above its original situation of virtual agreement with the census propensity.

However, J. C. Capt wrote: "the interagency committee came to the conclusion that the explanation of the differences in the two sets of data could not be found in the selection of sample counties included in the labor-force survey or in the technique by which the results were weighted to obtain United States totals. The group also concluded that there was no basis for believing that the sample of households within these counties was responsible for any important part of the difference between the two figures."

Appendix E

National Industrial Conference Board Estimates of Wartime Employment

The chief source of labor for war industries and the military are, one would think, wholesale and retail trade, and domestic, personal, and miscellaneous services and 'nonessential' manufacturing. Were there no net influx into the labor force, *increases* in essential manufacturing, transportation, and mining personnel, once the unemployed had fallen to a minimum, would come from *reductions* in nonessential manufacturing and in trade and service industries personnel. But the Conference Board, lacking data on employment in trade, assumed that it would fluctuate with employment in agriculture, mining, and manufacturing;[1] also that employment in domestic and personal service would fluctuate (increase) with employment in manufacturing, transportation, public utilities, and trade.[2] So far as manufacturing is concerned, it is to some extent fortunate for the Conference Board estimates that the Bureau of Labor Statistics index of manufacturing employment 1914-19 contained a relatively low representation of the war-dominated industries, thereby offsetting in part factors making for an upward bias in the Board's estimates.

Another important source of workers for war industries is construction, which declines when residential building stops and military cantonments and war plant conversion are completed. For example, employment in construction in Ohio and Pennsylvania fell 10-15 per cent from 1917 to 1918.[3] The Conference Board, however, based its estimates of employment in construction on the deflated value of construction itself, which rises continuously from 1915 through 1919. Use of construction cost data in such deflations is unsafe, of course, even for times of peace.[4] In times of war, when the marginal efficiency of labor drops rapidly, when types of material, methods of construction, and the nature of the final product change sharply, these deflated value series are all the more risky for estimating movements into and out of the labor force.

[1] Summary of Methods, *Economic Record,* March 20, 1940, p. 91. Agricultural employment might be expected to decline during wartime, but the method of estimating it is subject to question also so far as wartime fluctuations are concerned; see Sec. 7.

[2] *Ibid.,* p. 92. These fluctuations were, however, held down to the 1914-19 census trends of employment in power laundries and cleaning and dyeing establishments. Notice that trade, though calculated by dubious means, is used to estimate private domestic and personal service employment.

[3] Bureau of Labor Statistics, *Bulletin 553,* Fluctuation in Employment in Ohio 1914 to 1929, pp. 133, 162; Pennsylvania Bureau of Statistics, *Report on Productive Industries, Public Utilities and Miscellaneous Statistics, 1916-19,* pp. 92, 132.

As Geoffrey H. Moore observes, these data are not highly reliable from a national viewpoint. However, he feels that the argument is supported by the decline in "production of almost all construction materials for which physical data are available, from 1916 to 1917 and from 1917 to 1918."

[4] See my discussion in *Building Cycles and the Theory of Investment* (1940), pp. 108, 109.

Physical volume data are just as unsatisfactory as indicators of wartime employment in non-construction industries. Yet on such data the Conference Board based its 1910-20 figures for employment in oil and gas, metal mines and quarries, pipe lines, grain elevators and stockyards, and for hired and family labor on farms (exclusive of the farm owners themselves).[5]

Employment in other industries was interpolated for the war years without benefit of any type of activity index; included was employment in state and local government, interpolated linearly between the occupational censuses; employment on street railways before 1917, and in electric light and power and manufactured gas, interpolated linearly between the industry censuses; and the number of farmers 1910-20, assumed to have been the same as the annual number of farms, which was taken from logarithmic interpolations between census dates.[6] Reckonings of this kind could not possibly reflect a shift of farmers to industry, or even a loss to the army.

Finally, still other economic areas that might have lost workers to war industries or the military services during World War I were real estate, brokerage, non-banking finance companies, and advertising. But the Conference Board gave no information about the indexes of interpolation used to trace the ups and downs of employment in them.

[5] *Ibid.*, pp. 89-92. The WPA estimates of hired and family labor on farms (exclusive of farmers) used by the Conference Board were based on interpolated estimates of the farm population, interpolated estimates of the number of farms, and the "trend of agricultural production". E. E. Shaw and J. A. Hopkins, *Trends in Employment in Agriculture, 1900-1936* (WPA, National Research Project, Nov. 1938), App. A, p. 92.

[6] Shaw and Hopkins, *op. cit.*, App. B, p. 96. The census dates were 1900, 1910, 1920, 1925, 1930, 1935.

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