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GENE SMILEY

In the 1920s the U.S. government did not attempt to take comprehensive surveys of either the number unemployed or the size of the labor force. In the 1930s the government did make estimates of the number unemployed, but made no estimates of the size of the labor force so as to calculate unemployment rates. Some estimates of the rate of unemployment for the 1920s were constructed—see the unemployment rate estimates for Givens, Douglas, Carson, and Weintraub in Table 1—but these varied in their coverage and accuracy. In the 1950s Stanley Lebergott developed a consistent series of estimates of the labor force and its components, the number unemployed, and the rate of unemployment for the nineteenth and twentieth century. This culminated in his seminal book, *Manpower in Economic Growth*, and Lebergott's series have become the most widely accepted and used series for the interwar years.[1]

In the 1970s two major revisions of Lebergott's unemployment rate estimates appeared, Robert Coen's 1973 revisions and Michael Darby's 1976 revisions.[2] These estimates are presented in columns 6 and 7 in Table 1. It has been suggested that Coen's revised estimates diminish the ". . . sheen of the prosperity of the twenties . . ."[3] Darby's revised estimates are for the 1930s and present a significantly different picture of the level of and changes in unemployment during the recovery from the Great Depression. Because of the strikingly different and contradictory pictures of the interwar period that these revisions present, this note examines each of the revisions.

Coen's purpose was to provide estimates for the interwar period that allowed for cyclical variation in the labor force. The size of the labor force in the post-World War II United States tends to vary with business conditions because of the discouraged-worker phenomenon. The census provided the size and characteristics of the labor force at census dates for the interwar years. From this Lebergott was able to construct participation rates by age and sex, interpolate these participation rates between census dates, and with the population data construct estimates of the labor force for each year in the 1920s and 1930s. This allowed no cyclical variation in the labor force since it did not take into account annual variations in labor market conditions.[4]

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[1] Stanley Lebergott, *Manpower in Economic Growth* (New York, 1964). Lebergott's estimates are the bases for the unemployment statistics reported in *Historical Statistics of the United States: Colonial Times to 1970* (Washington, D.C., 1976).

[2] Robert M. Coen, "Labor Force and Unemployment in the 1920s and 1930s: A Re-examination Based on Postwar Experience," *Review of Economics and Statistics*, 55 (Feb. 1973), 46–55. Michael R. Darby, "Three-and-a-Half Million U.S. Employees Have Been Mislaid: Or, an Explanation of Unemployment, 1934–1941," *Journal of Political Economy*, 84 (Feb. 1976), 1–16.

[3] Charles F. Holt, "Who Benefited from the Prosperity of the Twenties?" *Explorations in Economic History*, 14 (July 1977), p. 277.

[4] Coen, "Labor Force," p. 46, noted that this feature had previously been pointed out by Martin Gainsburgh. See Martin Gainsburgh, "Annual Estimates of Unemployment in the United States, 1900–1950: Comment," in *The Measurement and Behavior of Unemployment*, NBER Special Conference Series no. 8 (Princeton, 1957), pp. 239–241.

TABLE 1
UNEMPLOYMENT RATE ESTIMATES, 1919–1941

Year	(1) Meredith Givens: Minimum Nonagricultural Labor	(2) Paul Douglas: Transportation, Coal Mining, Building, & Manufacturing	(3) Daniel Carson: Nonfarm Wage & Salary Workers	(4) David Weintraub	(5) As a Percent of the Civilian Labor Force: Leber-Gott-BLS	(6) Coen	(7) Darby	(8) As a Percent of the Nonfarm Employees: Leber-Gott-BLS	(9) Coen	(10) Darby
1919	—	6.9	—	—	1.4	—	—	2.4	—	—
1920	5.1	7.2	10.1	6.0	5.2	—	—	8.6	—	—
1921	15.3	23.1	22.3	25.0	11.7	—	—	19.5	—	—
1922	12.1	18.3	16.4	22.0	6.7	7.3	—	11.4	12.3	—
1923	5.2	7.9	9.9	11.0	2.4	4.5	—	4.1	7.4	—
1924	7.7	12.0	12.7	13.0	5.0	6.0	—	8.3	10.0	—
1925	5.7	8.9	9.4	13.0	3.2	4.9	—	5.4	8.9	—
1926	5.2	7.5	6.6	11.0	1.8	4.1	—	2.9	6.7	—
1927	6.3	—	7.5	12.0	3.3	5.0	—	5.4	8.2	—
1928	—	—	8.0	13.0	4.2	5.5	—	6.9	8.9	—
1929	—	—	5.7	10.0	3.2	5.5	3.2	5.3	8.8	5.3
1930	—	—	14.3	19.0	8.7	9.1	8.7	14.2	14.5	14.1
1931	—	—	—	—	15.9	13.0	15.3	25.2	20.7	24.3
1932	—	—	—	—	23.6	18.8	22.5	36.3	29.4	34.5
1933	—	—	—	—	24.9	19.8	20.6	37.6	30.6	31.1
1934	—	—	—	—	21.7	21.3	16.0	32.6	31.8	24.0
1935	—	—	—	—	20.1	19.5	14.2	30.2	29.1	21.4
1936	—	—	—	—	16.9	16.6	9.9	25.4	24.9	14.9
1937	—	—	—	—	14.3	14.1	9.1	21.3	21.0	13.7
1938	—	—	—	—	19.0	17.8	12.5	27.9	26.2	18.3
1939	—	—	—	—	17.2	16.0	11.3	25.2	23.7	16.5
1940	—	—	—	—	14.6	14.4	9.5	21.3	21.1	13.9
1941	—	—	—	—	9.9	—	6.0	14.4	—	8.7

Col. 1: Givens's estimates are from NBER, *Recent Economic Changes*, vol. II, p. 478.
Col. 2: Douglas, *Real Wages*, Table 172, p. 460.
Col. 3: The number of unemployed were reported in Lebergott and came from an unpublished 1939 WPA study by Daniel Carson. The number of nonfarm wage and salary workers came from Lebergott's data. Lebergott, *Manpower*, Table 9–2, p. 409.
Col. 4: The Weintraub unemployed rates were reported in Lebergott and came from David Weintraub, *Technological Trends and National Policy*, National Resources Committee (1937). Lebergott, *Manpower*, Table 9–2, p. 409.
Col. 5: From *Historical Statistics*, series D-9, p. 126.
Col. 6: From Coen, "Labor Force", Table 2, p. 52.
Col. 7: From Darby, "Three-and-a-Half Million," Table 3, p. 8.
Col. 8: From *Historical Statistics*, series D-10, p. 126.
Col. 9: From Coen "Labor Force," Table 2, p. 52 and from Lebergott, *Manpower*, Table A-3 and A-4, pp. 512–513. Lebergott's number unemployed was adjusted as Coen did and the difference between Lebergott's civilian labor force and nonfarm employee estimates was subtracted from Coen's civilian labor force estimates.
Col. 10: From Darby, "Three-and-a-Half Million," Table 2, p. 7 and from Lebergott, *Manpower*, Tables A-2 and A-3, pp. 512-513. Darby's estimates of the number of unemployed were divided by Lebergott's nonfarm employees.
Sources: National Bureau of Economic Research, *Recent Economic Changes in the United States* (New York, 1929). Paul Douglas, *Real Wages in the United States, 1890–1926* (Boston, 1930). *Historical Statistics of the United States: Colonial Times to 1970* (Washington, D.C., 1976). Stanley Lebergott, *Manpower in Economic Growth* (New York, 1964). Robert Coen, "Labor Force and Unemployment in the 1920s and 1930s; A Re-

Coen's solution was to construct a model of the determinants of labor force participation and, using United States data for the years 1949 through 1966, to estimate the parameters of the model. Then, using the parameters estimated from the postwar data and interwar values of the independent variables, he estimated the labor force for each year from 1922 through 1940. With the estimates of the number unemployed from Lebergott's work he constructed the new interwar unemployment rate estimates shown in column 6 of Table 1.

As a check on the accuracy of his estimates Coen compared his estimated size of the labor force in 1930 and 1940 with the census estimates (from Lebergott) and his 1922 estimate with Lebergott's 1922 estimate. He found his estimates to be far too low throughout the period, though when stated in terms of participation rates there was a roughly constant difference at the census dates of 1930 and 1940. To correct this he made a ". . . seemingly arbitrary adjustment of the constant term . . . ."[5] Coen's justification for this was that several demographic characteristics were significantly different in the pre- and post-World War II periods and these explained his inaccurate interwar estimates.[6]

There are three problems with the Coen estimates that, in my opinion, make them unacceptable for use in examining unemployment in the interwar period. The first problem is not very serious. It can be seen in Table 1 that Coen's unemployment rate peaks at 1934 rather than in 1933. This occurs because of a sharp decline in average hours worked and a sharp rise in the wage rate in 1934. These lead to an enlargement of the labor force and a rise in the unemployment rate. Though Coen mentions that this was a result of the hours and wage legislation of the NIRA that went into effect in 1934, he seems not to question the data.[7] Darby contends, however, that the NIRA-instituted controls did not really change behavior and that the fall in hours and rise in wages are largely spurious. He suggests (and uses) average earnings per full-time-equivalent employee and questions Coen's estimates because Coen makes no adjustment for these questionable hours and wage data.[8]

The second problem with Coen's estimates is much more serious. Clearly, the discouraged-worker phenomenon is relevant to the nonfarm labor force but not to the farm labor force.[9] The model Coen developed should have been applied to the nonfarm labor force and the postwar parameter estimates should have been used to estimate cyclical variation in the interwar nonfarm labor force. These yearly nonfarm labor estimates could be added to the farm labor force to construct the total labor force estimates in the interwar years.

This is not what Coen did. He estimated the model using the total labor force in the postwar years and applied the parameter estimates to the total labor force in the interwar years. With large changes in the division of the labor force between the

[5] Coen, "Labor Force," p. 51.

[6] Coen, "Labor Force," pp. 51–52.

[7] Coen, "Labor Force," pp. 53–54.

[8] Darby, "Three-and-a-Half Million," pp. 8 and 10.

[9] This must especially have been the case during the 1920s and 1930s. Consider the quite common observation that in the 1930s on the farm there was no unemployment but dramatic declines in real and nominal incomes, while in nonfarm occupations, there was massive unemployment but relatively little real income decline for those who were able to keep their full-time jobs. Because of this the share of the *employed* labor force working on farms rose sharply during the Great Depression.

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examination Based on Postwar Experience," *Review of Economics and Statistics*, 55 (Feb. 1973), 46–55. Michael Darby, "Three-and-a-Half Million U.S. Employees Have Been Mislaid: Or, an Explanation of Unemployment, 1934–1941." *Journal of Political Economy*, 84 (Feb. 1976), 1–16.

TABLE 2
THE AGRICULTURAL LABOR FORCE AS A PERCENT OF THE TOTAL LABOR FORCE

Year	*Percentage*	*Year*	*Percentage*
1919	28.6	1949	12.6
1920	25.3	1950	11.6
1921	24.9	1951	10.7
1922	24.9	1952	10.2
1923	24.4	1953	9.7
1924	24.0	1954	9.6
1925	23.6	1955	9.8
1926	23.4	1956	9.3
1927	22.7	1957	8.8
1928	22.3	1958	8.2
1929	22.1	1959	8.1
1930	21.3	1960	7.8
1931	20.8	1961	7.4
1932	20.2	1962	6.9
1933	19.8	1963	6.5
1934	19.3	1964	6.2
1935	19.3	1965	5.9
1936	19.0	1966	5.2
1937	18.6		
1938	18.0		
1939	17.6		
1940	17.1		
1941	16.3		

Sources: The agricultural labor force as a percentage of the total labor force in the 1919 through 1941 is calculated from *Historical Statistics of the United States: Colonial Times to 1970* (Washington, D.C., 1976), series D-4 and D-6, p. 126. The civilian labor force was used since this is the series that Coen reported that he used. For 1949 through 1966 the agricultural labor force's percentage share is calculated from *Economic Report of the President, 1967* (Washington, D.C., 1967), Table B-20, p. 236.

nonfarm and farm sectors, his interwar estimates would be biased, and this is what occurred. Table 2 presents the agricultural labor force as a share of the total labor force in the 1919–1941 and 1949–1966 periods. First, for 1949 through 1966 this share declined from 12.6 to 5.2 percent, so parameter estimates based on the total, not nonfarm, labor force in the 1949–1966 period yield inaccurate estimates of the discouraged worker effect on the labor force during that period. Second, the farm labor force's share is much larger in the interwar period, 24.9 percent in 1922 falling to 17.1 percent in 1940. Postwar parameter estimates for the nonfarm labor force applied to the interwar nonfarm labor force *might* yield unbiased estimates of cyclical variation in the nonfarm labor force. It is clear, however, that when parameter estimates from the entire postwar labor force are applied to the entire interwar labor force, the resulting estimates will show significantly greater cyclical variation in the total labor force than actually occurred.

The third problem is even more formidable. Suppose that the model was applied to the nonfarm labor force in both the postwar and prewar periods. The behavior of the nonfarm labor force in the 1922–1940 period would be estimated using the parameter estimates derived from the postwar behavior of the nonfarm labor force. This is legitimate if the nonfarm labor force behaved the same way in both periods. Specifically the discouraged-worker phenomenon, as the cause of cyclical variation in the size of the labor force, must be such that individuals enter and leave the nonfarm labor force at the same rate for the same labor market conditions, hours, and wages, in both the 1949–1966

and 1922–1940 periods. If this is not the case then parameter estimates based on the postwar behavior of the nonfarm labor force will not describe the prewar behavior of the nonfarm labor force.

Since Coen uses this procedure he must assume identical behavior in the prewar and postwar periods. But he provides no real justification for this assumption. What he does say is that ". . . the most stringent test of the method is its ability to predict accurately the size of the labor force in the two census years included, 1930 and 1940." He also says that this estimate should be close to Lebergott's for 1922.[10] The parameter estimates of this model did not accurately predict the size of the labor force in 1930 and 1940 but significantly underpredicted the sizes, and, after his correction, there is a suggestion that during the period his model systematically goes from overestimating the labor force to underestimating the labor force.[11]

Should the discouraged-worker behavior of the nonfarm labor force have been the same in the prewar and postwar years? First one would expect this phenomenon to be more common in households with two members in the labor force such as a husband and wife. It is then easier for one household member to withdraw temporarily from the labor force when that person becomes discouraged from unsuccessful job search. In 1920, 1930, and 1940 the female labor force participation rates were 22.7, 23.6, and 27.9 percent. In the postwar period the female participation rate rose steadily from 33.9 percent in 1950 to 39.3 percent in 1965. This would suggest that the discouraged-worker effect would be stronger in the postwar than in the prewar years.

One would also expect the discouraged-worker effect to be stronger the more extensive the entitlement or welfare programs that were available and the larger the family wealth that could be drawn down while the discouraged family worker was not in the labor force. In the 1920s, welfare programs were substantially less in size and scope than in the New Deal and afterwards. Even if household wealth were relatively the same in the 1920s and the postwar years, one would surely expect the greatly enlarged welfare programs after the Great Depression and World War II to have made the discouraged-worker phenomenon much stronger in the 1949–1966 years than the 1920s.

With the massive unemployment and underemployment of the 1930s, government relief programs expanded dramatically. It is not clear that they were really larger in per capita terms for individuals utilizing the programs than in the 1949–1966 years. But it is clear that the long and extraordinarily severe depression would have sharply drawn down family wealth and have made it much more difficult for families to draw upon the family wealth for continued consumption while the discouraged worker was temporarily out of the labor force. This suggests that the discouraged-worker effect would have been stronger in the postwar years of 1949–1966 than during the 1930s.

Because of the problems described above with Coen's new estimates of the labor force in the 1922 through 1940 years, I believe his estimates of the unemployment rate for those years are not acceptable.

Michael Darby's new unemployment rate estimates are presented in column 7 of Table 1. Darby was puzzled by the inability of Robert Lucas and Leonard Rapping's

[10] Coen, "Labor Force," p. 51. Coen also suggests a vague criterion of the ". . . reasonableness of the behavior of our labor force estimates in the remaining intercensoral years, considering other information available" (p. 51). Since the behavior under consideration is cyclical variation in the labor force resulting from the discouraged-worker effect, and for the interwar years there is no information available on this, it is not clear what constitutes "reasonable behavior."

[11] His model originally underpredicted by 2.709 million (or 5.58 percent) in 1930 and 3.290 million (or 5.91 percent) in 1940. After Coen's "seemingly arbitrary adjustment" of the constant term, his model estimated a 0.633 percent *larger* labor force than actual labor force in 1922, a 0.205 percent *larger* than actual labor force in 1930, and a 0.205 percent *smaller* than actual labor force in 1940. The percentages are calculated from Coen, "Labor Force," Table 2, p. 51. Because of the cyclical variation his model introduces, these comparisons cannot be made for other years.

1972 application of an anticipations-search model to the 1930s to explain the continued high unemployment rates from 1934 through 1941.[12] As Darby noted, their model failed ". . . to explain high levels of unemployment from 1934 to 1941 because rapid increases in nominal wages imply that the unemployment rate should fall to near the natural rate in 1934 or at the very latest by 1937."[13]

Darby examined the unemployment rate estimates for the possible effects of generous unemployment insurance since the model would not fit if ". . . millions of people were gainfully employed as 'unemployed.' "[14] He found that he was literally correct since the government had counted as unemployed all persons employed on government work-relief programs such as the WPA, CCC, and so forth. Apparently the purpose of the estimates of the number of unemployed was to estimate how many private-sector jobs would have to be created to reemploy all those who were unemployed as well as those who were employed on federal government work-relief programs. These data were used by Lebergott in constructing his unemployment rate estimates for the 1930s. Since World War II the BLS does not count as unemployed those employed in any type of government relief programs, so the Lebergott rates are not consistent with those reported since the 1930s. To correct this Darby subtracted the number employed at federal work-relief programs each year from the number of the unemployed as reported in Lebergott. Using these estimates of the number unemployed he constructed unemployment rate estimates for the 1930s that are consistent with the unemployment rates reported by the BLS since World War II.

Several criticisms of Darby's study have recently appeared, particularly the studies of Robert J. Gordon in 1976, J. R. Kesselman and N. E. Savin in 1978, and Robert J. Gordon and James A. Wilcox in 1981.[15] These studies, however, largely criticize the appropriateness of the anticipations-search model for the 1930s and argue about the appropriate base of the unemployment rate used in such a model.

For example, in his 1976 study Gordon argues that the appropriate unemployment rate for such a model would be unemployment as a percent of the nonfarm employees (not the nonfarm labor force). Lebergott estimated such an unemployment rate and that rate, from the *Historical Statistics*, is presented in column 8 of Table 1. Similarly, using Coen's revisions of the labor force and the number unemployed, and Darby's revisions of the number of unemployed, revised estimates of the unemployed as a percent of the nonfarm employees are presented in columns 9 and 10 in Table 1. As can be seen, in the 1920s these unemployment rate estimates by Lebergott and Coen are closer to the estimates of Givens, Douglas, Carson and Weintraub in columns 1 through 4 of Table 1.

The arguments about which unemployment rate is appropriate for the anticipations-search model, particularly in the 1930s, are separate from the question of which unemployment rate is consistent with the BLS's definition and measurement of the rate of unemployment. Darby's new estimates provide a series that is consistent with the BLS's post-World War II estimates of the unemployment rate.

This examination suggests that Robert Coen's revised estimates of unemployment rates in the 1920s and 1930s are unacceptable. Though allowance for the discouraged-

[12] Robert E. Lucas, Jr. and Leonard A. Rapping, "Unemployment in the Great Depression: Is There a Full Explanation?" *Journal of Political Economy*, 80 (Jan./Feb. 1972), 186-191.

[13] Darby, "Three-and-a-Half Million," p. 9.

[14] Darby, "Three-and-a-Half Million," p. 1.

[15] Robert J. Gordon, "Recent Developments in the Theory of Inflation and Unemployment," *Journal of Monetary Economics*, 2 (April 1976), 185–219; J. R. Kesselman and N. E. Savin, "Three-and-a-Half Million Workers Never Were Lost," *Economic Inquiry*, 16 (April 1978), 205–225; Robert J. Gordon and James A. Wilcox, "Monetarist Interpretations of the Great Depression: An Evaluation and Critique," chapter 2, pp. 49–107 in Karl Brunner, ed., *The Great Depresssion Revisited* (Boston, 1981).

worker phenomenon in these decades would be desirable, Coen's estimates clearly overstate the magnitude of this effect in the interwar period.

Michael Darby's revised estimates of unemployment rates in the 1930s are preferable to the Lebergott-BLS estimates if one wishes to use estimates of the unemployment rate that are consistent with unemployment rate estimates in the post-World War II period. For some purposes they appear to be more correct estimates of labor market conditions. For other purposes, such as estimating the number of jobs that the private sector had to create to eliminate the extraordinary work-relief jobs of the 1930s, the standard Lebergott-BLS unemployment rate estimates would seem to be preferable. Both series have their uses.