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Unemployment Rates in Postbellum America: 1869–1899

An annual series for U.S. unemployment rates for the period 1869–99 is estimated. The series reflects the cyclical economic fluctuations of the period clearly, including the protracted depressions of the 1870s and 1890s. It indicates that these depressions were much less severe than the Great Depression of the 1930s, but somewhat more severe than the depressed periods of the post-World War II years. Annual series for labor force, employment, and unemployment also are presented.

1. Introduction

This paper provides annual U.S. unemployment rate estimates for the years 1869–99, extending existing estimates backward in time from 1890 to 1869, and providing new estimates for 1891–99. It proceeds by first establishing benchmarks for unemployment rates at full employment years designated within 1869–99,[1] and then interpolating between the benchmarks with a relationship between unemployment rates and real GNP estimated from post–1899 data. The Balke and Gordon (1989) real GNP series is employed as the GNP indicator series.

Section 2, which follows immediately, reviews the currently available unemployment rate estimates which enter into the data base for constructing the estimates provided in this paper. Section 3 describes the construction of the new estimates. Section 4 discusses the new estimates in relation to postbellum economic fluctuations and makes the contrast with Great Depression and post–World War II years. Section 5 obtains an employment series for 1869–99 with a technique similar to that used for the unemployment rate series and builds from the two series to present a full set of labor-related data. Section 6 concludes the paper.

2. The Unemployment Rate Data Base

The U.S. Bureau of Labor Statistics has estimated U.S. unemployment rates on a monthly basis since March 1940, and provides an annual series as

[1]The benchmark values are by definition estimates of the natural rate of unemployment, since full employment years (that is, potential output years) are defined as years in which the economy approximated the natural rate of unemployment. The natural rate of unemployment is the rate which prevails when the labor market is in equilibrium.

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an average of the monthly figures. The annual series has been extended backward in time to 1890. While the Bureau itself has provided annual figures through 1929, the bellwether series for the pre-1940 period has been the series provided by Lebergott (1964, 512, 522).

Lebergott builds his estimates from unemployment rate benchmarks created from U.S. census survey data for 1890, 1900, 1910, and 1930 and labor force benchmarks for those dates plus 1920. He constructs annual figures for labor force and employment between these dates and 1940 and obtains an annual unemployment series as labor force less employment.

Lebergott constructs his labor force series essentially by interpolating labor force participation rates between decennial U.S. census dates (ignoring cyclical influences) and multiplying the results by annual population estimates. He constructs his employment series from numerous sectoral employment figures. The Lebergott estimates have been reproduced in various U.S. Department of Commerce (1960, 1973) publications.

Coen (1973) and Romer (1986) have criticized Lebergott's series for neglecting a procyclical movement in labor force. They provide alternative estimates for unemployment rates by backcasting post–World War II relationships onto earlier data. Coen presents estimates for 1922–40. He backcasts a cyclical movement in labor force participation rate estimated from postwar data onto prewar data and recomputes prewar unemployment as the residual between adjusted labor force figures and Lebergott's employment data. Romer's estimates are for 1890–1930. She obtains them by constructing postwar unemployment rates with Lebergott's prewar technique and backcasting the relationship between the constructed data and actual postwar unemployment rates to Lebergott's 1890–1930 estimates. The result for both Coen and Romer is to reduce somewhat the cyclical variation in unemployment rates as compared to the Lebergott data, since, in effect, with the adjustments, both labor force and employment move procyclically.

3. Methodology

Providing an unemployment rate series for the period prior to 1890 has been difficult because for these earlier years there have not been reliable annual indicator series for interpolating between benchmarks. Recently, Balke and Gordon (1989) and Romer (1989) have provided quality real GNP series back through 1869 which solve this problem.

As noted earlier, this paper builds from the Balke-Gordon estimates.[2]

[2]From a performance standpoint, the chief difference between the Balke-Gordon and Romer real GNP series is that the Balke-Gordon series is somewhat more cyclically volatile. Both series incorporate the Kuznets commodity output series, as does Kuznets's own unpublished but

The first step was to select full employment year benchmarks for the full range of real GNP data, a problem complicated for this paper as compared to Romer and Balke-Gordon by the necessity of reconciling the selections with unemployment rate data, including the lag structure which attends the relationship of unemployment rates to real GNP. The paper retains the full employment year designations 1869, 1873, 1884, and 1947 from the lists Romer (1989, 19) and Balke-Gordon (1989, 56) employed,[3] but makes modifications for four other years. Their years 1891, 1900, 1910, and 1924 do not serve well for the purposes of this paper. For example, whereas the unemployment rate should be at its natural level in full employment years, Lebergott's census based unemployment rate for 1910 is 5.86% while Gordon's independent estimate of the 1910 natural unemployment rate is just 4.2%.[4] This paper substitutes 1909 for 1910. The year 1900 involves this same problem. Lebergott's census-based unemployment rate for 1900 is 5.0%, while the estimate Gordon projects (from 1902) for the 1900 natural unemployment rate is 4.1%. Since the years proximate to 1900 do not serve well either, 1900 is simply dropped. The years 1891 and 1924 are mainly depressed years according to NBER reference dates (see U.S., Department of Commerce, 1990, 104), business troughs occurring in May and July, respectively. This paper substitutes 1890 for 1891 and 1925 for 1924. These modifications yield a list (1869, 1873, 1884, 1890, 1909, 1925, and 1947) which is consistent with NBER peaks and troughs and information such as the recent Miron and Romer (1990) industrial production series, and, most important, a list which reconciles well with both Lebergott's census based

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privately circulated real GNP series for 1869–1938. The Balke-Gordon series also incorporates three series which are not used by Romer and were not used by Kuznets. It employs as GNP components the Gottlieb (1965) series on construction output and a transportation and communications series based on indexes presented by Frickey (1947, 417) and Kendrick (1961, 541–43, 585–87). Also, it incorporates a consumer price index based on works by Hoover (1960, 141–43) and Rees (1961, 74). The Kuznets commodity output series extends a series developed by Shaw (1947) to 1869. Shaw provides census benchmark figures for 1869 and 1879, but his annual series begins with 1889.

[3]Romer (1989, 18) picked years corresponding to midexpansion in the business cycle insofar as possible, looking also at unemployment rates. Balke and Gordon adopted the Romer list to "avoid debate," departing only by adding 1869 (to avoid the "major deviations from trend" which occur when the Romer alternative of extending the 1873–84 trend backward through 1869 is applied). Gordon (1984, 545) (1993, A13) has elsewhere used alternatives to some of the other dates.

[4]Gordon (1993, A1, A2, A13) arrives at his estimates by taking the unemployment rate in late 1954, when he perceives the economy to have been operating at the natural rate of unemployment, and adjusting that figure backward in time for changes in the self employed percentage of the labor force.

decennial unemployment rates and Gordon's independent estimates of the natural rate of unemployment.

With the full employment year designations in place, the next step was to create unemployment rate benchmarks for the 1869–89 period by backcasting the natural rate of unemployment from the designated full employment year 1890 to the designated full employment years 1869, 1873, and 1884, adjusting the 1890 rate for the estimated influence of changes in the occupational structure of the labor force.[5] Since 1890 is a census benchmark year for the unemployment rate as well as a designated full employment year, Lebergott's (1964, 522) census based unemployment rate figure for the civilian labor force of 3.97% for 1890 was taken as the 1890 natural rate of unemployment. Notice that this estimate is quite consistent with Gordon's independent estimate of a secularly rising natural rate of unemployment which had achieved 4.1% by 1902 and 4.2 percent by 1910.[6]

The backcast values for 1869, 1873, and 1884 are 3.97%, 3.99%, and 4.01%, respectively. They were obtained by computing sectoral natural rates of employment estimates for 1890 from the 1890 census survey and weighting them to aggregate 1869, 1873, and 1884 values with weights trended from decennial U.S. census figures for the sectoral distribution of gainful workers.[7] It may seem surprising that the estimate for 1869 is no lower than that for 1890, despite the trend between these years away from agricultural employ-

[5]The natural rate of unemployment can change over time, and for other reasons as well. However, change ordinarily is small and gradual, and 1869–90 is only 21 years.

There is the example of the increase of a percentage point or more during 1954–75, a period of the same length. But the chief factors in that increase—demographic factors and expansions in income maintenance programs—were not of similar significance during 1869–90 and other possibilities do not seem capable of appreciable effects. Emancipation at the close of the Civil War is a possibility. But the transition from plantations to tenancy was largely completed by 1870, apparently without leaving a lingering temporary increase in natural unemployment in the South, and there was no huge exodus of African-Americans from the South in these years to create a significant temporary increase elsewhere. The postbellum immigration boom is another possibility. But annual immigration from abroad was small in relation to the total population, and arose more from "pull" than "push" factors, suggesting that there was no significant fluctuation in natural unemployment over the period arising in fluctuations in immigration.

For estimates of the increase in the natural rate of unemployment during 1954–75, see Gordon (1984, 563) and Hall (1979, 5–8). On the effects of emancipation, see Ransom and Sutch (1977, 62, 64, 68) and Wright (1987, 174). For the predominancy of pull factors in immigration, see Kuznets (1958).

[6]Gordon's technique of estimating natural rates of unemployment backward in time by adjusting for the self-employed percentage of the labor force cannot be used effectively for 1869, 1873, 1884, and 1890 because quality data on the number of self-employed begin with 1900.

[7]The weights used gainful worker figures rather than the improved labor force estimates now available in order to retain consistency by category with the census sectoral unemployment rates. For the raw census figures, see U.S. House of Representatives, Tenth Census (1883, 703) and Eleventh Census (1897, CXXXVIII).

ments. The explanation is that a significant portion of the shift was to transportation and trade employments, where unemployment rates were even lower than in agriculture. The census based sectoral natural rates of unemployment for 1890, adjusted to be consistent with Lebergott's 3.97% for the aggregate labor force,[8] were 3.23% for agricultural, 5.36% for manufacturing-mining-construction, 5.07% for services (professional, domestic, and personal), and 2.10% for transportation and trade.

With the unemployment rate benchmarks for 1869, 1873, and 1884 established, plus Lebergott's census based unemployment rate for 1890, it was possible to generate the annual unemployment rate series for 1869–99 by interpolating between the full employment years with values obtained by backcasting the relationship between real GNP and a spliced Coen-Romer unemployment rate series for 1900–40 to the pre-1900 Balke-Gordon real GNP data. The spliced series included Romer's figures for 1900–30 and Coen's figures for 1931–40.

The initial step in the interpolation process was to fit constant rate of growth trends—log linear trends—to the designated full employment years from 1869 through 1947 for both real GNP and unemployment rate. Next, the regression equation summarized in Column 1 of Table 1 was fitted to annual data for 1900–40 for the potential real GNP and natural unemployment rate trends (Y'' and U'', respectively), a spliced Balke-Gordon (1900–29) and Department of Commerce (1930–40) real GNP series (represented by Y), and the Coen-Romer unemployment rates (represented by U).

In effect, deviations of the unemployment rate from the natural rate of unemployment were estimated as a function of percentage deviations of real GNP from potential output, as in Okun's Law. First lags of both variables were included as explanatory variables to handle the dynamic misspecification problem.[9] The figures in parentheses are t-values and the asterisk and

[8]The adjustment includes an adjustment made by both Lebergott (1964, 360) and Douglas (1930, 409–10) which is based on information from a 1901 study by the U.S. Bureau of Labor. The study distributes unemployment by time unemployed over shorter periods than do the census data. The raw census figures are in the 1890 census document. See U.S. House of Representatives, Eleventh Census (1897, CXXXVIII).

[9]For the dynamic misspecification test, see Hendry and Mizon (1978) and Maddala (1988, 210–12). For a regression with no lagged variables and one with just the output gap lagged, the likelihood ratio statistics rejected the hypothesis that the low Durbin-Watson statistics of the ordinary least squares versions reflected first-order autocorrelation.

Okun (1970, 136–37) fitted a version which had no constant and no lag terms to quarterly data for varying periods drawn from 1953–60 and settled on a "subjectively weighted average" for the output gap coefficient of −31.25, from a range of about −28 to −38. Clark (1983) and Gordon (1984), also using quarterly data, added lag variables, Clark just lags of the output gap variable and Gordon lags of the dependent variable as well. Clark's long-term output gap

double asterisk indicate significance at 0.05 and at 0.01 or better, respectively. The Durbin h statistic indicates no first-order autocorrelation when evaluated as a standard normal deviate. A White (1980) test indicates that heteroskedasticity is not a problem.[10]

The Table 1, Column 1, regression was chosen from a number of regressions on the basis of statistical properties, regressions for varying periods and lag structures, and including logarithmic as well as Okun type dependent variables. Regressions involving post–World War II observations were excluded because the postwar labor-related data pertain to a labor force 16 years of age and over instead of the 14 years of age and over of the prewar data. Observations for World War II years were excluded because the manpower needs and direct controls of the war years disrupted the Okun relationship. World War I was much shorter and less disruptive, and did not constitute a similar problem.

Equipped with the Table 1, Column 1 regression, and possessing the values for lnY, lnY″, and U'' for 1869–99, the U values reported for these years in Column 1 of Table 2 and plotted in Figure 1 for these years were computed by solving the equation for U. The series retains the benchmark U values for the full employment years 1869, 1873, 1884, and 1890, in each case using the benchmark figure as the lagged value for computing the next year. The values predicted by the regression for the benchmark years were 3.97 for 1869, 4.19 for 1873, 4.12 for 1884, and 4.45 for 1890, yielding differences from benchmark values of 0.0, 0.20, 0.11, and 0.48 percentage points, respectively—differences of 0.0%, 5.0%, 2.7%, and 12.1%, respectively, when expressed as percentages of benchmark values. These differences are no larger than might be expected in the sense that the standard error of the estimate for percentage deviations of predicted from actual U values for the 1900–40 regression sample period is 16.6%.

The broken straight lines imposed on the two upper plottings of Figure 1 reflect the potential output and natural rate of unemployment trends for 1869–99, that is, the Y'' and U'' values, with the slopes indicating growth rates. For potential output, the growth rates are 5.34% for 1869–73, 4.61% for 1873–84, 2.55% for 1884–90, and 3.92% for 1890–1909. This pattern of rapid growth following the Civil War, with growth slowing successively during 1873–84 and 1884–90, and then rising again for 1890–1909, is a feature of

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coefficient is similar to Okun's, while Gordon's (1984, 549–50) long-term coefficient is almost identical to the −49.3 of the similarly specified Table 1, Column 1, regression.

[10]The LM statistic of $nR^2 = 7.934$ fails to reject the hypothesis of homoskedasticity at 0.05 when evaluated as a Chi-square with 4 degrees of freedom. For the White test, see also Kmenta (1986, 295–96).

TABLE 1. *Regression Statistics, 1900–40*

Variable or Statistic	(1) Dependent Variable $(U—U'')_t$	(2)[a] Dependent Variable $(\ln N—\ln N'')_t$
Intercept	0.140	−0.011
	(0.809)	(−1.751)
$(\ln Y—\ln Y'')_t$	−27.553	0.474
	(−11.713)**	(11.177)**
$(\ln Y—\ln Y'')_{t-1}$	12.254	0.721
	(2.842)**	(1.703)
$(U—U'')_{t-1}$	0.689	
	(7.740)**	
R^2	0.976	0.956
Root Mean Square Error	0.933	0.016
Durbin-Watson statistic		1.974*
Durbin h statistic	0.578*	

NOTES: Numbers in parentheses are *t*-statistics.
Y = real GNP; Y'' = potential real GNP; U = unemployment rate;
U = natural unemployment rate; N = employment; N'' = potential employment.
*Significant at 0.05.
**Significant at 0.01.
[a]Adjusted for first-order autocorrelation. The autocorrelation coefficient and its *t*-statistic are −0.536 and −3.811, respectively.

the Balke-Gordon real GNP data and fits that data well. Engerman (1971), who relied chiefly on a commodity output series for data, concludes that growth stagnated during the War, and then surged afterward as the industrial revolution regained its momentum. Hansen (1941, 39–41) attributes the reacceleration beginning in the 1890s to the electrification and motorization of the U.S. economy. Considerable variation in the trend of real GNP between successive periods is not unusual. For the business peak to business peak periods 1960–73 and 1973–81, each encompassing two regular business cycles, the annualized real GNP average growth rates are 3.96% and 2.04%, respectively. The two periods are separated by the energy crisis–associated 1973 business peak.

4. The New Estimates: Major Features

A striking feature of the new unemployment rate estimates is that they indicate depressions for the 1870s and 1890s which are appreciably less severe than the depressions perceived for these periods by economists such as Schumpeter and Lebergott. Schumpeter (1939, 337) regarded the 1870s

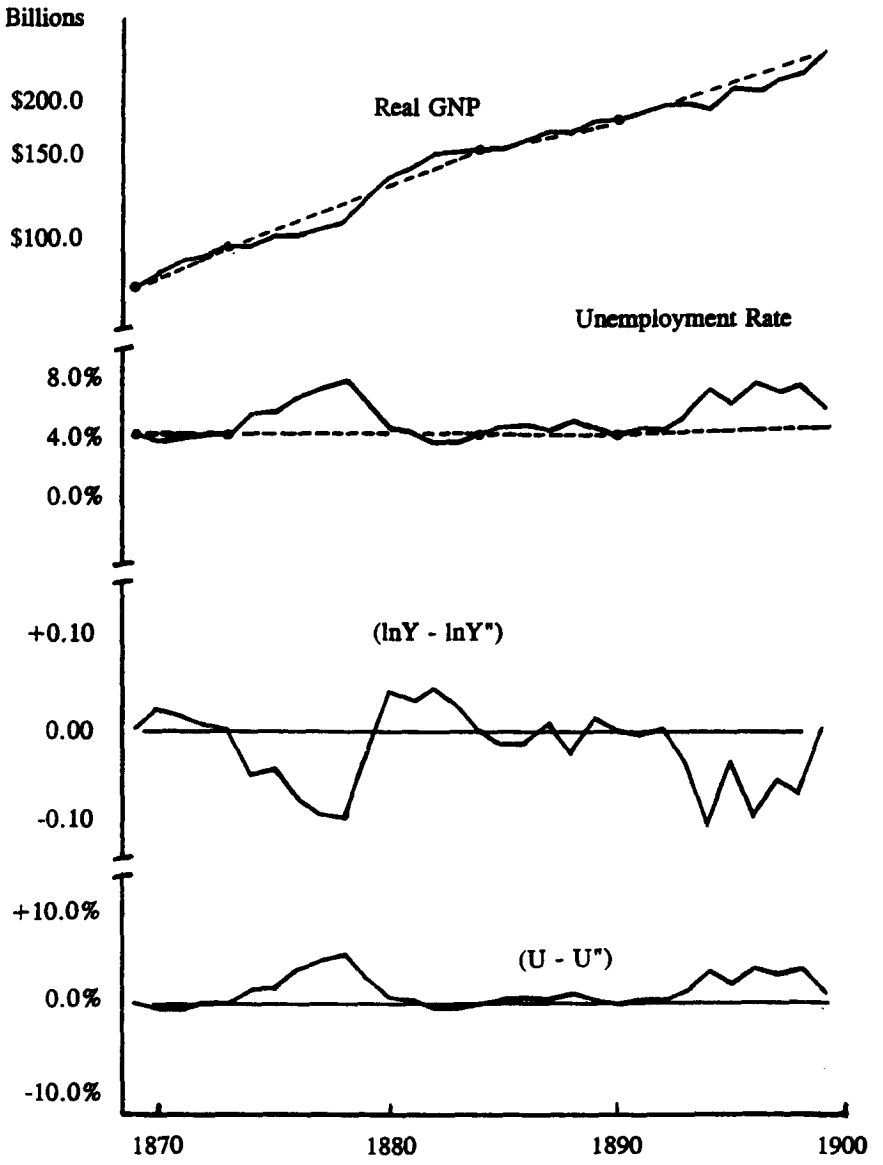
Billions
$200.0
$150.0
$100.0
Real GNP
Unemployment Rate
8.0%
4.0%
0.0%
+0.10
0.00
-0.10
(lnY - lnY")
+10.0%
0.0%
-10.0%
(U - U")
1870
1880
1890
1900

Figure 1.

depression as comparable in magnitude to the 1930s depression, buttressing his view by relating as "mentioned by some authors" a figure of 3 million unemployed in the winter of 1873–74. This figure would translate to an unemployment rate of approximately 21%, a rate comparable to the peak unemployment rates of the 1930s. More recent treatments of the postbellum period, in particular those by Fels (1949, 71–73) and Friedman and Schwartz (1963, 42–44), suggest that this Schumpeter view greatly exaggerates the real income and employment effects of the 1870s depression. The Figure 1 and Table 2 unemployment rate estimates support the Fels and Friedman-Schwartz view over the Schumpeter view.

Lebergott (1964, 187–89, 522) does not see the 1870s and 1890s depressions as comparable in magnitude to the 1930s depression, but he does present unemployment rate figures for the two nineteenth century depressions which are significantly higher than the Table 2 figures. He presents what he terms "speculative" averages for the decades of the 1870s and 1880s of 10% and 4%, respectively, and his annual series for the 1890s average 10.4%.[11] In addition, he presents crisis year unemployment rate estimates of 12–14% for 1876, 6–8% for 1885, and 18.4% for 1894. These Lebergott decade average figures are far above the Table 2 decade averages of 5.61% for the 1870s and 6.23% for the 1890s. The Table 2 crisis year figures are 7.00% for 1876, 4.62% for 1885, and 7.73% for 1894, all well beneath the Lebergott figures.

The interpretation of the Lebergott and Table 2 differences offered here is that the Lebergott estimates are too high. His figures for the 1870s and 1880s are, as he says, speculative. They were made without the benefit of real GNP data of the quality of the Balke-Gordon and Romer data. The Lebergott figures for 1893–99 also are too high, and the reasons have been recognized elsewhere. First, there is the Coen-Romer criticism that Lebergott's entire 1890–1939 series exaggerates the cyclical movement in unemployment rate by neglecting a procyclical movement in labor force. Romer's adjusted unemployment rate series for the 1890s averages 8.87%, compared to Lebergott's 10.4%.

But there is a more serious problem with the 1890s Lebergott estimates, a problem noted by Weir (1992, 308).[12] Whereas Lebergott's underlying employment series for the 1900–39 estimates is interpolated with a host of sectoral employment indexes, his 1890s employment series is interpolated with a single employment index, the Frickey (1947, 212) series covering factory employment in Ohio and several northeastern states. Factory employment is much more volatile cyclically than total employment, with the

[11]Lebergott's (1964, 512) decade average unemployment rate for the 1930s is 18.44%.

[12]Weir's (1992, 341) decade average for the 1890s is 6.87%. For Lebergott's discussion of his procedure for the 1890s, see Lebergott (1964, 182).

TABLE 2. *Selected Data: 1869–1899*

Civilian Labor Force*

Year	*Unemployment Rate*	*Employment*	*Unemployment (thousands)*	*Labor Force*
1869	3.97	11,626	481	12,107
1870	3.52	11,965	437	12,402
1871	3.66	12,268	466	12,734
1872	4.00	12,576	524	13,100
1873	3.99	13,098	544	13,642
1874	5.53	13,031	763	13,794
1875	5.83	13,516	837	14,353
1876	7.00	13,713	1,032	14,745
1877	7.77	14,081	1,186	15,267
1878	8.25	14,501	1,304	15,805
1879	6.59	15,463	1,091	16,554
1880	4.48	16,366	768	17,134
1881	4.12	16,709	718	17,427
1882	3.29	17,373	591	17,964
1883	3.48	17,714	639	18,353
1884	4.01	18,051	754	18,805
1885	4.62	18,293	886	19,179
1886	4.72	19,160	949	20,109
1887	4.30	19,945	896	20,841
1888	5.08	20,261	1,084	21,345
1889	4.27	21,306	950	22,256
1890	3.97	21,814	902	22,716
1891	4.34	22,081	958	23,039
1892	4.33	22,860	1,035	23,895
1893	5.51	22,941	1,338	24,279
1894	7.73	22,784	1,909	24,693
1895	6.46	24,235	1,674	25,909
1896	8.19	23,948	2,136	26,084
1897	7.54	25,074	2,045	27,119
1898	8.01	25,393	2,211	27,604
1899	6.20	26,897	1,778	28,675

*14 years of age and older

result that Lebergott's derived unemployment rate series overstates the cyclical peaks in 1890s unemployment rate appreciably over and above the contribution coming from neglect of procyclical movement in labor force.

The Table 2 unemployment rate peaks of the 1870s and 1890s (8.25% for 1878 and 8.19% for 1896) reflect depressions somewhat more severe than those of the post–World War II years when allowance is made that the natural unemployment rates of 1975–83 were two to three percentage points higher than those of the postbellum years. Gordon (1984, 563; 1993, A2, A3) offers natural unemployment rate estimates of 6.0% for 1975, 1977, and 1981–83. Other economists, including Hall (1979, 5–8), and Stein (1977, 22), argue that the natural rate may have reached 7% by the middle 1970s. The peak postwar annual unemployment rates were 8.5% for 1975, 9.7% for 1982, and 9.6% for 1983.

In sum, the Table 2 estimates present depressions for the 1870s and 1890s which were severe by post–World War II standards, but not nearly so severe as the Great Depression of the 1930s. Indeed, the period 1869–99 as a whole emerges in the data with a level of capacity utilization which was significantly lower than that for 1947–90, but much higher than that for 1900–40. The mean of the 31 unemployment rate gaps for 1869–99, that is, the mean of the (U-U'') of Figure 1, is 1.25 percentage points. That is to say, the postbellum unemployment rates, on average, were 1.25 percentage points above the natural rate. The mean unemployment rate gap for 1947–90 is just 0.05 percentage points. The mean gap for 1900–40 is a much higher 3.36 percentage points.

These figures for the unemployment rate gaps mirror the output gaps to which they relate. The mean of the 31 output gaps of Figure 1, that is, the mean of the ($\ln Y$-$\ln Y''$) for 1869–99, in effect, the mean capacity utilization rate, is −0.02065. The mean output gaps for 1947–90 and 1900–40 are 0.00242 and −0.06766, respectively. This reflection of higher capacity utilization for 1947–90 as compared to the earlier periods is consistent with the greater emphasis on the full employment goal of the postwar period and the higher postwar inflation rates.[13]

5. Employment, Unemployment, and the Labor Force

In order to expand the postbellum coverage to a full set of labor-related data, an annual aggregate employment series for 1869–99 was constructed with a technique similar to that used for the unemployment rate series, and

[13]The designated full employment years for generating the U'' and $\ln Y''$ values for computing the mean unemployment rate and output gaps for 1947–90 were 1947, 1955, 1962, 1972, 1981, and 1987. This departs from the Romer and Balke-Gordon lists for these years only by adding 1987, which is beyond the range of their data.

the two series were combined to produce series for unemployment and labor force as well.[14] These three additional series appear in Columns 2, 3, and 4 of Table 2.

Benchmark values for employment were established for the same full employment years used for unemployment rate by building from decennial census year labor force figures constructed by Weiss (1985). Annual employment figures were interpolated between the benchmark values with a regression equation estimated from Lebergott's (1964, 512) employment series for 1900–40 and the spliced Balke-Gordon and Department of Commerce real GNP series used earlier. The regression equation, which includes a lagged output gap as an explanatory variable, appears in Column 2 of Table 1. A dynamic misspecification test failed to reject the hypothesis that the low Durbin-Watson statistic of the ordinary least squares version reflected first-order autocorrelation, so the adjusted for autocorrelation version was used.[15] A White (1980) test indicated that heteroskedasticity was not a problem.[16]

As with the unemployment rate data, the bench mark values were retained as the values for the full employment years, and used as the lagged values for computing the next year. The differences between the predicted and bench mark values for N, expressed as percentages of the bench mark values, are zero for 1869, −1.2% for 1873, 1.2% for 1884, and 0.8% for 1890. These are well within the standard error of the estimate for percentage deviations of predicted from actual N values for the 1900–40 sample period, which is 9.3%.

6. Conclusion

The labor-related series presented here are estimates. Their accuracy depends on a number of things, including especially the accuracy of the real GNP, employment and unemployment rate estimates used in their construction, the bench mark year selections, and the predictive power for 1869–99 of the regressions estimated from 1900–40 data. Given these constraints, no claim is made that they match in quality corresponding postwar series based on monthly household surveys. However, care has been taken to present the best estimates possible.

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[14]Where U, N, UN, and LF are the unemployment rate, employment, unemployment, and the labor force, respectively, $UN = (U \cdot N)/(1—U)$, and $LF = N + UN$.

[15]For the dynamic misspecification test see Maddala (1988, 210–12). The likelihood ratio figure for the test is $-2\log_e\lambda = 2.805$, which is not significant at 0.05 when evaluated as a Chi-square with one degree of freedom.

[16]The LM value of 1.604 for the test failed to reject the hypothesis of homoskedasticity at 0.05 when evaluated as a Chi-square with 3 degrees of freedom.

References

Balke, Nathan S., and Robert J. Gordon. "The Estimation of Prewar Gross National Product: Methodology and New Evidence." *Journal of Political Economy* 97 (February 1989): 38–92.

Clark, Peter K. "Okun's Law and Potential GNP." Working Paper, Board of Governors of the Federal Reserve System, June 1983.

Coen, Robert M. "Labor Force and Unemployment in the 1920's and 1930's: A Re-Examination Based on Postwar Experience." *Review of Economics and Statistics* 55 (February 1973): 46–55.

Douglas, Paul H. *Real Wages in the United States, 1890–1926.* Boston: Houghton Mifflin, 1930.

Engerman, Stanley. "The Economic Impact of the Civil War." In *The Reinterpretation of American Economic History,* edited by Robert Fogel and Stanley Engerman. New York: Harper, 1971.

Fels, Rendigs. "The Long-Wave Depression, 1873–97." *Review of Economics and Statistics* 31 (February 1949): 69–70.

Frickey, Edwin. *Production in the United States, 1860–1914.* Cambridge, Mass.: Harvard University Press, 1947.

Friedman, Milton, and Anna J. Schwartz. *A Monetary History of the United States, 1867–1960.* Princeton, N.J.: Princeton University Press, NBER, 1963.

Gordon, Robert J. "Unemployment and Potential Output in the 1980s." *Brookings Papers on Economic Activity,* no. 2 (1984): 537–64.

———. *Macroeconomics,* 6th ed. Glenview: Harper Collins, 1993.

Gottlieb, Manuel. "New Measures of Value of Nonfarm Building for the United States, Annually 1850–1939." *Review of Economics and Statistics* 47 (November 1965): 412–19.

Hall, Robert E. "Labor Markets in Recession and Recovery." In *NBER 1979 Research Conference: A Summary.* Washington: NBER, 1979, 5–8.

Hansen, Alvin H. *Fiscal Policy and Business Cycles.* New York: Norton, 1941.

Hendry, D.F., and G.E. Mizon. "Serial Correlation as a Convenient Simplification, Not a Nuisance: A Comment on a Study of the Demand for Money by the Bank of England." *Economic Journal* 88 (September 1978): 549–63.

Hoover, Ethel D. "Retail Prices after 1850." In *Trends in the American Economy in the Nineteenth Century.* Studies in Income and Wealth, vol. 24, Conference on Research in Income and Wealth. Princeton, N.J.: Princeton University Press, NBER, 1960.

Kendrick, John W. *Productivity Trends in the United States.* General Series, no. 71. Princeton, N.J.: Princeton University Press, NBER, 1961.

Kmenta, Jan. *Elements of Econometrics.* New York: Macmillan, 1986.

Kuznets, Simon. "Long Swings in the Growth of Population and Related Economic Variables." *Proceedings of the American Philosophical Society* 102 (February 1958): 25–52.

Lebergott, Stanley. *Manpower in Economic Growth: The American Record Since 1800.* New York: McGraw-Hill, 1964.

Maddala, G. S. *An Introduction to Econometrics.* New York: Macmillan, 1988.

Miron, Jeffrey A., and Christina D. Romer. "A New Monthly Index of Industrial Production, 1884–1940." *Journal of Economic History.* 50 (June 1990): 321–35.

Okun, Arthur M. *The Political Economy of Prosperity.* New York: Norton, 1970.

Ransom, Roger, and Richard Sutch. *One Kind of Freedom: The Economic Consequences of Emancipation.* New York: Cambridge University Press, 1977.

Rees, Albert. *Real Wages in Manufacturing, 1890–1914.* Princeton, N.J.: Princeton University Press, NBER, 1961.

Romer, Christina D. "Spurious Volatility in Historical Unemployment Data." *Journal of Political Economy* 94 (February 1986): 1–37.

———. "The Prewar Business Cycle: New Estimates of Gross National Product, 1869–1908." *Journal of Political Economy* 97 (February 1989): 1–37.

Schumpeter, Joseph A. *Business Cycles,* vol. 1. New York: McGraw-Hill, 1939.

Shaw, William H. *The Value of Commodity Output since 1869.* New York: NBER, 1947.

Stein, Herbert. "Full Employment at Last?" *Wall Street Journal* (September 14, 1977): 22.

U.S. Department of Commerce. *Historical Statistics of the United States.* Washington, 1960.

———. *Long Term Economic Growth, 1860–1965.* Washington, 1973.

———. *Business Conditions Digest.* January 1990.

U.S. House of Representatives. *Tenth Census of the United States, 1880, Population.* Washington, 1883.

———. *Eleventh Census: 1890, Part II.* Washington, 1897.

Weir, David. "Unemployment Volatility, 1890–1984: A Sensitivity Analysis." *Research in Economic History* 14 (1992): 301–46.

Weiss, Thomas. "Adjustments to the Census Counts of Population and Labor Force: 1870, 1890, 1910." University of Kansas, Lawrence, 1985.

White, H. "A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity." *Econometrica* 48 (May 1980): 817–38.

Wright, Gavin. "The Economic Revolution in the American South." *Economic Perspectives* 1 (Summer 1987): 161–78.