Inequality in American Manufacturing Wages, 1920-1998: A Revised Estimate

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UTIP Working Paper Number 8

ABSTRACT

In recent work one of us has presented measurements of the evolution of inequality in the U.S. manufacturing sector, from 1920 to 1992. This paper updates and revises those estimates, using a monthly data set for wages and employment of production workers in 18 sectors, for which continuous data are available back to January, 1947. The main findings of the previous study are confirmed: there is a close connection between the dispersion of hourly wage rates and unemployment. But the previous series erred in bridging a gap in the data between 1947 and 1958 by assuming that inequality in manufacturing in that period tracked the movement of a Gini coefficient for household incomes, which was fairly stable during this time. In fact, in the 1950s manufacturing wage rate inequality rose sharply, reaching the extreme levels of the 1930s. An implication is that inequality in manufacturing hourly wage rates in the late 1970s and 1980s, previously thought to be lower than during the Great Depression, was in fact much higher. The new series also shows that wage rate inequality began declining again in 1994, and has now fallen to just below the peaks of the inter-war period. The data are current to the end of 1998.

First Draft: February 17, 1999

This paper is a product of the University of Texas Inequality Project, and we thank our fellow members of the project for encouragement. This paper is © 1999 by James K. Galbraith and Vidal Garza-Cantú. UTIP's work can be viewed at http://utip.gov.utexas.edu .

1. Introduction.

In a recent paper and book one of us (Galbraith, 1998a and b) has presented estimates of the evolution of inequality in hourly wage rates in American manufacturing for two periods, 1920 to 1947 and 1958 to 1992. Both measures are based on the between-group component of Theil's T statistic, calculated across industrial categories, a method thoroughly explored in Conceição and Galbraith (1998). The earlier series is based on historical data assembled from many sources by Ferguson and Galbraith (forthcoming), while the latter is computed from the Annual Survey of Manufactures, as reported in the Economic Census. They are linked to together by an interpolation based on the observed correlation between TN and a Gini coefficient based on household income data during the years where both are available, 1958 to 1992, applied to the years 1947-1958 for which the latter was available but not the former.

Now, calculations by Garza-Cantú permit us to offer continuous *monthly* series for inequality in U.S. manufacturing wage rates, beginning in January 1947 and up-to-date as of December, 1998. This series tracks Galbraith's 1958 - 1992 measures closely. It strongly supports the argument that there exists a close association between the dispersion of hourly pay rates and unemployment – in effect that wage rate inequality is a macroeconomic variable. The new measures also show a sharp decline in wage-rate inequality beginning in 1994, just as the unemployment rate begins to decline from recession levels.

The new series also shows a sharp rise in wage rate inequality between 1947 and 1958 – the years for which a Theil measure was not available in the earlier study. The assumption that wage rate inequality in manufacturing tracked the much broader and stable measure of household income inequality in this period was thus incorrect. It appears instead that wage rate inequality returned to levels characteristic of the Great Depression by the late 1950s. It declined in the 1960s, particularly toward the end of the decade, but to levels that remained substantially higher than had been the case in the 1920s or at the end of the second World War. And then, in the 1970s and 1980s, manufacturing wage rate inequality rose to levels far higher than during the Great Depression of the 1930s. The decline of the second half of the 1990s has only now brought this measure of inequality back below the peak levels of the Great Depression.

2. A Monthly Measure of Wage Rate Inequality in U.S. Manufacturing, 1947-1998.

The new measure is calculated across 18 highly aggregated manufacturing sectors for which data are continuously reported from January, 1947, to the present.. Figure 1 presents this measure, alongside the monthly rate of unemployment. Table 1 lists the sectors covered.

Figure 1 about here.

This is perhaps a crude measure. But when presented as an annual series, it tracks very closely Galbraith's measure of the same phenomenon, which is based, albeit indirectly, on three-digit SIC categories. Figure 2 provides a picture of both series.

Figure 2 about here.

As noted above, the new series declines sharply beginning in 1994. While there is general agreement that some improvement in wage inequality has occurred in recent years, actual measures are few and far between. Our measure is consistent with other findings, though it would probably date the beginning of improvement earlier than most other studies.

Wage rate inequality also rises sharply in this series in the decade immediately following World War Two. This is surprising, as the 1950s are widely regarded as a time of stability in the wage structure. Our evidence strongly contradicts this image, and suggests that the observed stability of the household income distribution in this period must be due to factors outside the manufacturing wage structure: to the growth of services, retail, government employment and the Social Security System, for example. On the other hand, the finding that wage rate inequality did rise in the 1950s resolves an anomaly of the earlier assumption, for in this period there were two recessions with sharply rising unemployment, and we now see that there did exist, in fact, a relationship between these spikes in the unemployment rate and rising wage rate inequality.

3. Computing an Unbroken Inequality Series back to 1920

This new series also has strong implications for efforts to extend the measurement of inequality in wage structures back to the interwar period. Put simply, if wage rate inequality rose sharply in the 1950s, it must have been lower in the 1940s and in earlier years.

Figure 3 presents a measure of inequality that is unbroken from 1920 to 1998. It is computed by the simple device of adjusting the levels of the new series so that they correspond to those of the Ferguson-Galbraith series for the earlier period in the one year of overlap, 1947. Thus the new series assumes that proportionate changes in the inequality measure for the earlier period are comparable to equivalent proportionate changes in the measure for the later period.

Figure 3 about here.

If this assumption is correct, then previous understandings of the long evolution of manufacturing wage rate inequality must be revised. While the earlier series offered by Galbraith shows inequality at all time highs in the 1930s, the new series shows that Great Depression levels were regained within a decade of the end of World War Two. The Kennedy-Johnson years showed improvements, but even at their best, in 1967-1969, wage rate inequality remained far higher than in the late 1940s. And from that high base inequality soared in the 1970s and 1980s, reaching levels far higher than during the Depression. The recovery after 1994 brings inequality down again, but only to just below the worst years of the 1930s.

How good is the equi-proportionality assumption on which these observations rest? The question can be tested directly, in two ways. The first is to examine industrial categories that are substantially the same in the earlier and the later data sets. Figure 4 presents the ratio of average hourly wages in four high-wage industries as compared to four lower-wage industries for which one can construct time-series that are continuous across the entire time frame. The results

broadly confirm the assumption: direct measures of inter-industrial pay gaps also return to the their 1930s levels in the 1950s, and then rise beyond those levels in the 1970s and 1980s.

Figure 4 about here.

There is a second way to confirm the continuity of the time-series, and that is to extend the Theil measure of inequality back in time, albeit for higher levels of aggregation. Garza-Cantú has calculated a 12-sector measure of TN that extends back to January, 1939, again on a monthly basis. This measure, annualized, is presented alongside the composite Ferguson-Galbraith-Garza measure in Figure 5. Once again the correspondence is very close for all years of overlap, which indicates that the across-industries Theil method is quite robust to differing classification schemes and levels of aggregation in the data set from which it is constructed.

4. Inequality and Unemployment: The Ethical Rate Revisited

Figures 6 and 7 present the relationship of inequality to unemployment in the new monthly series, first as a simple scatterplot and then as a quantile-quantile plot. The latter is particularly telling: inequality maintains a linear relationship with unemployment, but only over a middle range of values of the unemployment rate. At very high rates of unemployment, say ten percent and above, there is little additional effect on the wage structure. And at low rates of unemployment improvement speeds up. This suggests that Galbraith's notion of an ethical rate of unemployment may be redefined, as that value of the unemployment rate below which

acceleration of improvement in wage inequality begins to occur. From the figure, that critical value appears to be about 4 per cent, or just below present-day unemployment rates at time of writing. It should, however, be stressed that this is no more than an historical regularity.

Figures 6 and 7 here.

Figures 8 and 9 present similar plots on annual data over the entire time frame under study. The data show a similar pattern: sharp differences in the response of inequality to high and low unemployment, and a rough linearity in the inequality-unemployment relationship between unemployment rates of 4 and 10 percent.

Figures 8 and 9 here.

5. Conclusions

New monthly measures of inequality in the structure of manufacturing wages back to 1947 and even to 1939 permit us to refine and extend past measures of wage rate inequality back to 1920. They also permit us to calculate the evolution of wage rate inequality to very recent dates. We believe that these new measures support a Keynesian and macro-theoretic view of changing wage distributions, according to which the unemployment rate stands out as a principal determinant of the wage rate distribution.

Additional work remains to be done, to develop the relationship between wage rate inequality in manufacturing and that in the rest of the economy, and particularly to account for the stability of household income inequality in the United States in the 1950s while manufacturing wage rate inequality was rising rapidly. What we have seen so far supports the commonsense notion of the time: the growth of government and the welfare state, and not equality of private wage rates, produced a stable income distribution during those years. At the same time, the increases in inequality in the 1970 and 1980s now appear much more dramatic than they did in earlier estimates. This tends to lend weight to the argument advanced in Galbraith (1998b) linking extreme inequality of the wage structure to the breakdown of support for redistributive policies and for public sector employment.

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Figure 1.

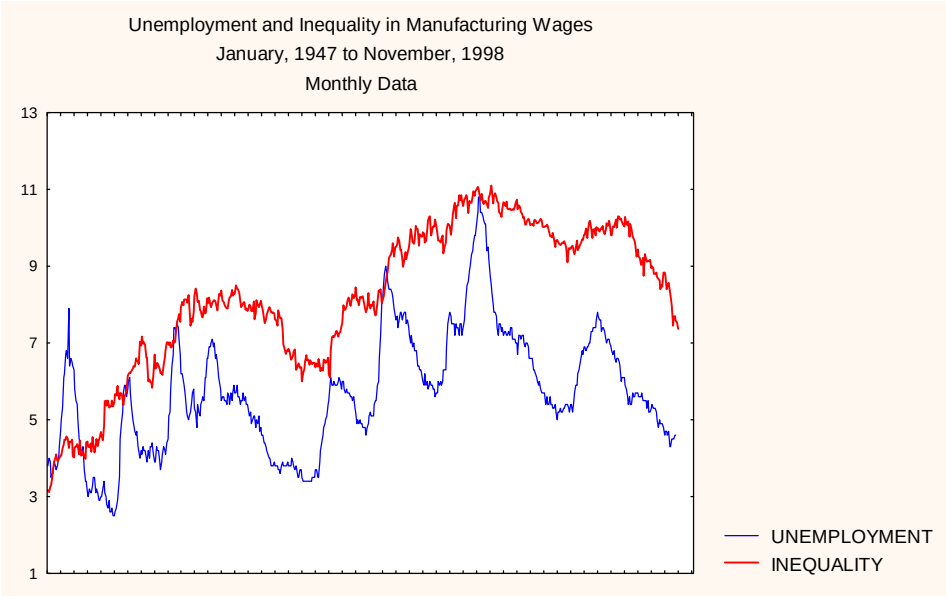
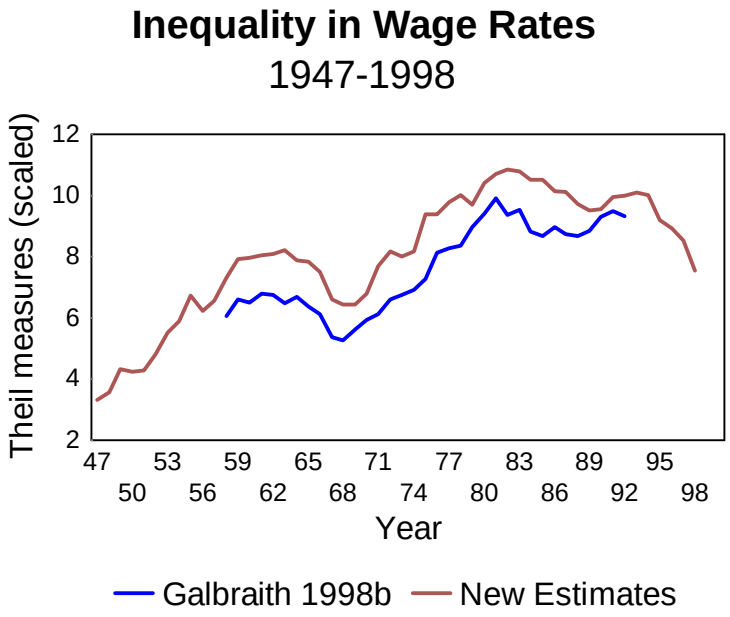


Figure 2.



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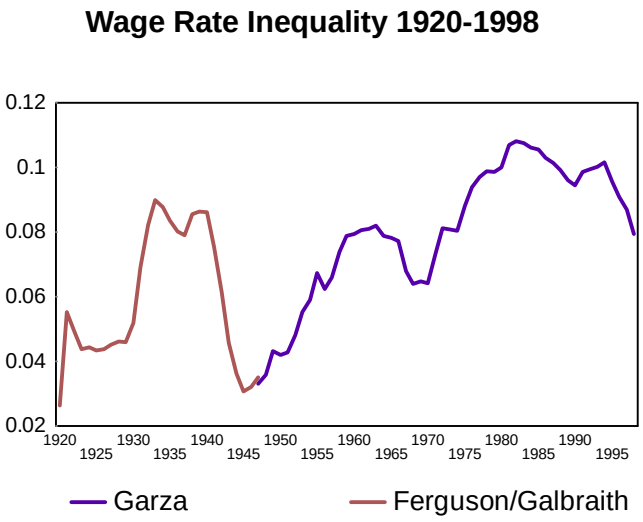

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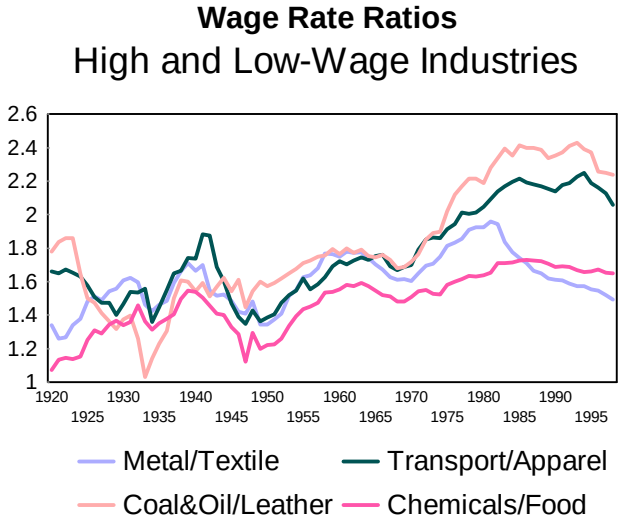

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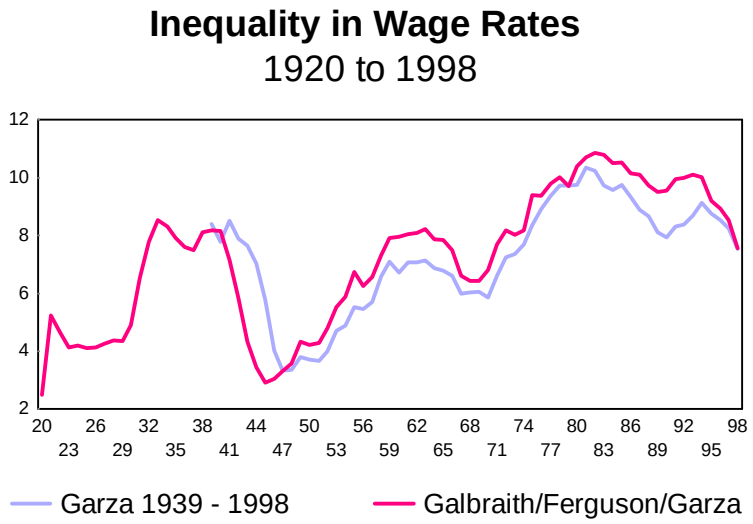

Figure 6.

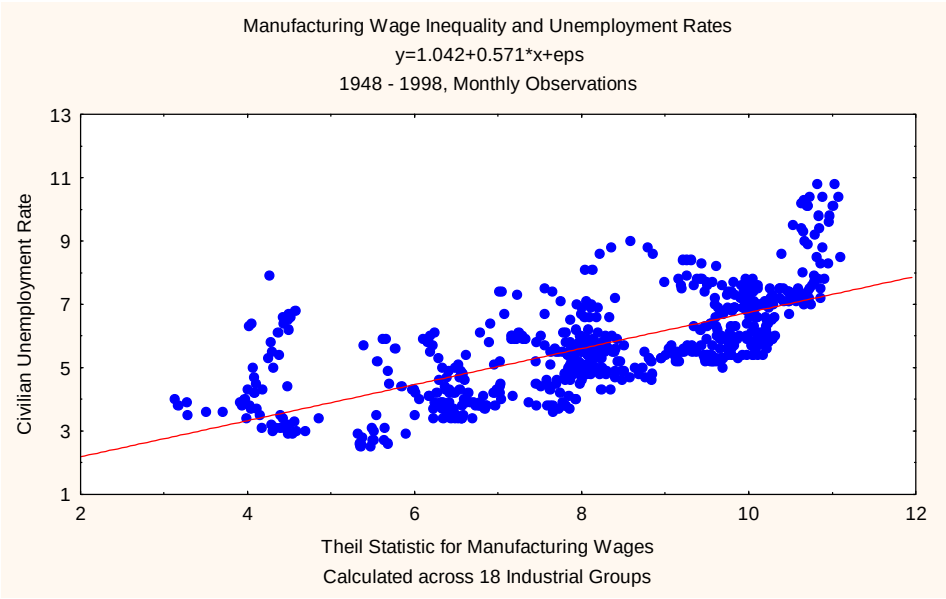

Figure 7.

Figure 8.

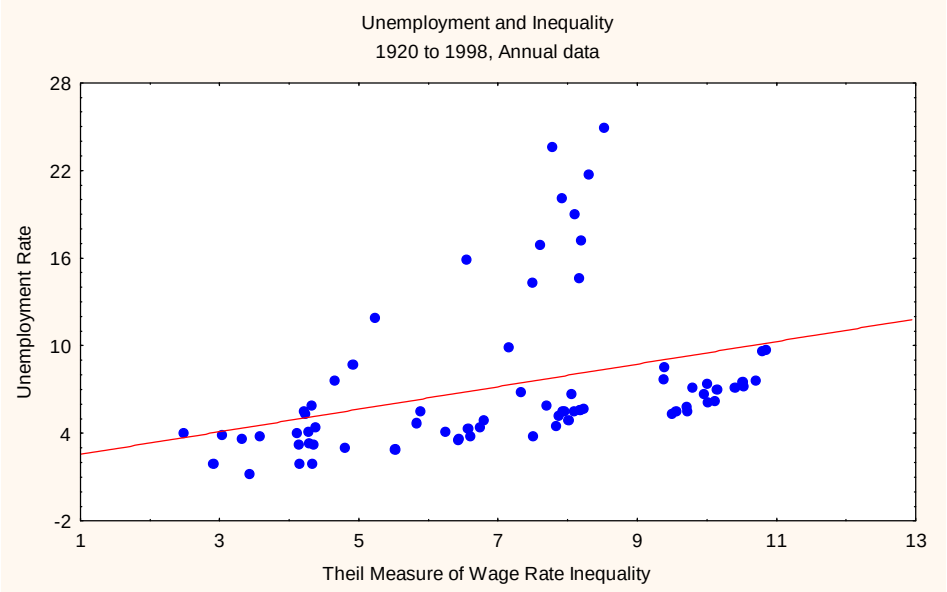

Figure 9.

Unemployment and Inequality
1920 - 1998, Annual Data
Quantile-Quantile Scatterplot
Theil Measure of Wage Rate Inequality, Manufacturing
13
11
9
7
5
3
1
-2
4
10
16
22
28
Unemployment Rate

Table 1.

18 Manufacturing Sectors
for which continuous wage and employment
data are available, 1947 to 1998

Lumber and wood products

Furniture and fixtures

Stone, clay, and glass products

Primary metal industries

Fabricated metal products

Industrial machinery and equipment

Transportation equipment

Miscellaneous manufacturing industries

Food and kindred products

Tobacco products

Textile mill products

Apparel and other textile products

Paper and allied products

Printing and publishing

Chemicals and allied products

Petroleum and coal products

Rubber and miscellaneous plastics products

Leather and leather products