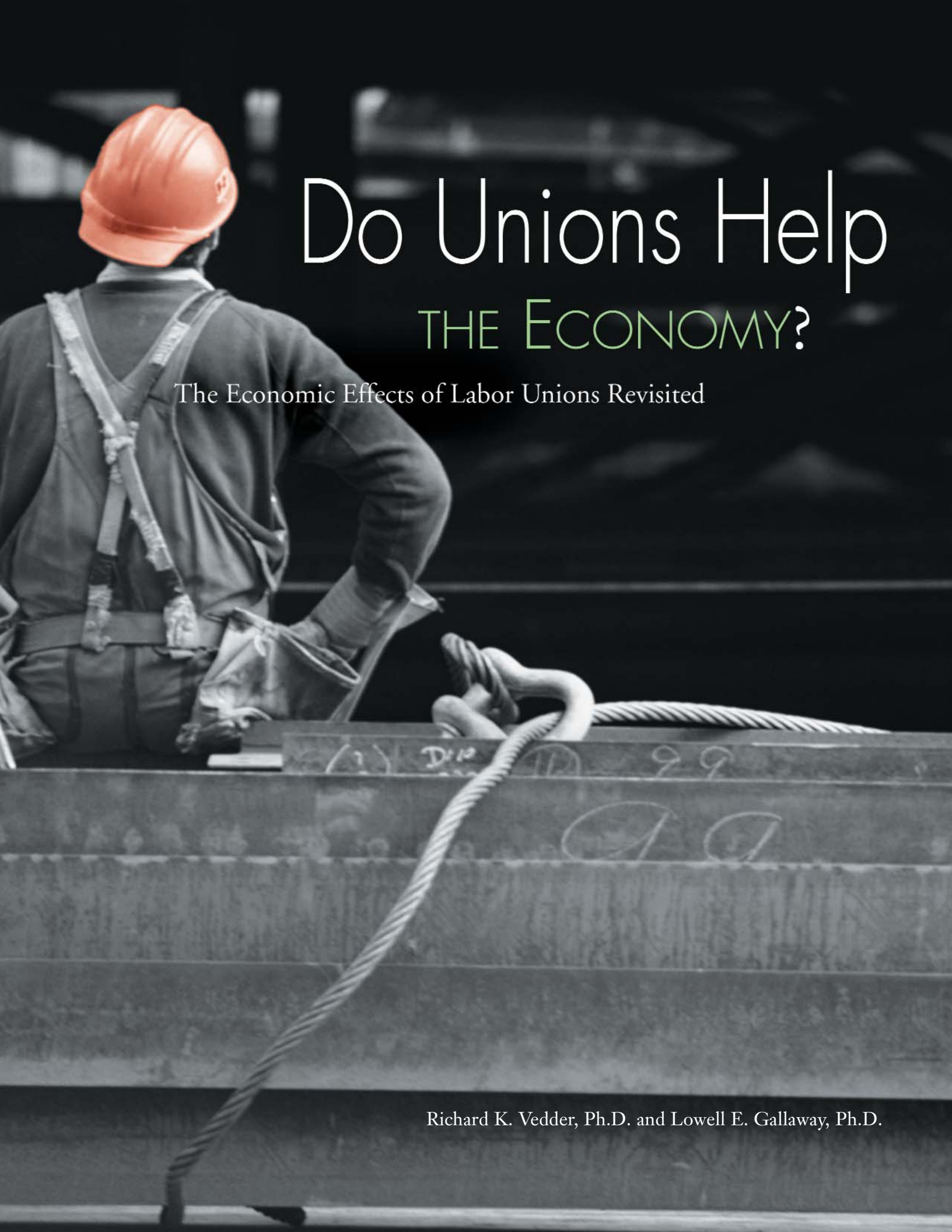

Do Unions Help the Economy?

The Economic Effects of Labor Unions Revisited

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Using a variety of statistical techniques, we conclude that labor unions have reduced U.S. output by significant amounts — trillions of dollars over time. Additionally, the employment-population ratio and the unemployment rate have been adversely affected by the presence of unions. From the very beginning, unionization materially lowered employment in the auto and steel industries, and union militancy in coal mining has contributed importantly to largely eliminating employment in this once large industry. While some individual workers have profited from unions, the aggregate economic impact is strongly negative.

I. Labor Unions and Their Effects

Workers who join labor unions expect an improvement in their utility, typically manifested in the form of higher wages and benefits. Indeed, there is a substantial literature that suggests that, other things equal, unionized workers do receive higher rates of compensation than their nonunion counterparts (Lewis, 1963, 1985). At the same time, however, it is possible that unions have longer-term detrimental effects on the economy as a whole and, arguably, therefore, unionized workers. Labor unions may promote practices that reduce hours worked or productivity growth (from union rules, reduced capital formation, barriers to resource mobility, etc). A number of studies observe a negative relationship between the incidence of union membership and economic performance (Vedder and Gallaway, 1986; Pantuosco et al., 2001). On the other hand, proponents of the concept of efficiency wages and others might argue that the positive effect of unionization on worker morale might raise productivity and possibly economic growth (Krueger and Summers, 1988; Katz, 1986; Altenburg and Straub, 1998).

Of course, the impact of unions on the aggregate performance of the economy would depend in part on their relative importance in labor markets and that has changed dramatically over time. To roughly summarize the 20th century experience, during the first one-third of the century, union membership tended to be small (usually 10 percent or less of employment), in the middle third of the century it tended to be much larger (reaching one-third or so of the labor force), and in the last third of the century the "market share" of labor unions in the private sector was falling rather steadily, by century's end approaching the levels of the earlier part of the century. Thus if unions on balance had adverse effects on the rate of economic growth as some have suggested, those impacts would have been growing in mid-century (when unions were at their peak), but diminishing in the latter part of the century.

II. The Labor Market in Perspective

In the broadest sense, labor markets tend to conform to the economist's perception of institutions that tend to move toward equilibrium outcomes. In an unconstrained labor market, the price of labor (the wage rate) will move toward a level at which the number of workers interested in working at that wage will match the number of workers that employers are interested in hiring. In the aggregate, this is not likely to occur in all markets, but, when it is the typical case, what is often called a "full-employment" situation exists.

This does not mean that there is an absence of statistically-measured unemployment. The measured unemployment under these circumstances can be explained through a choice-theoretic, reservation-wage, job-search model. Job-seeking workers approach the labor market with a reservation wage in mind. If an initial search reveals no job opportunities that satisfy their reservation-wage aspirations, they continue to search. As they do this, they will be regarded by the statistical authorities as involuntarily unemployed, that is, actively seeking work but without a job. As the search process continues and time passes, two things will happen: Superior job alternatives will be revealed, and workers will revise their reservation wage expectations downward in response to the previous search disappointments. Eventually, a correspondence between an actual job (and wage) opportunity and the job-seeker's reservation wage will be attained and the market will clear, as shown graphically in Figure 1.

When all job opportunities have been filled, historical experience tells us that there will still be active job seekers in the market. Consequently, statistically measured unemployment will still be observed.[1] Expressed as an unemployment rate, this is the "equilibrium" or "natural" rate of unemployment. It differs from the "effective" rate of unemployment, which reflects any mismatch between the quantity demanded of labor and the quantity supplied. At full employment, the effective unemployment rate is

Figure 1

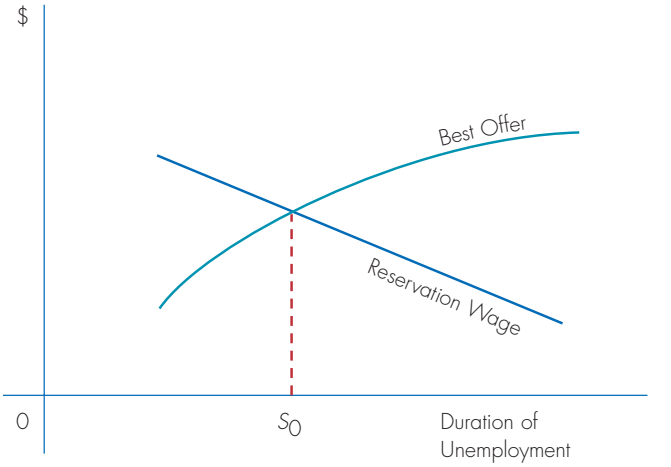
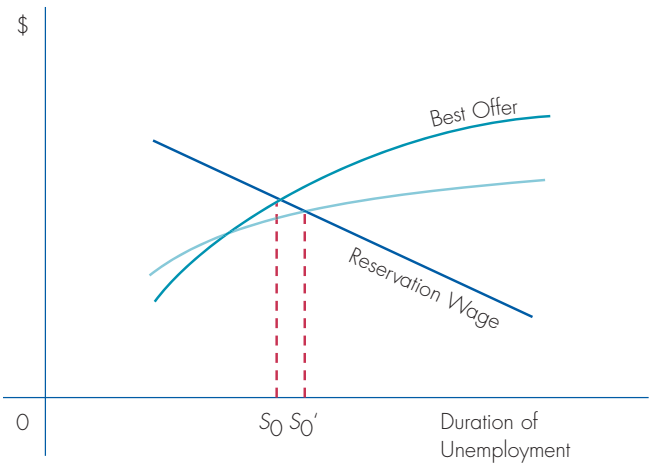


Figure 2



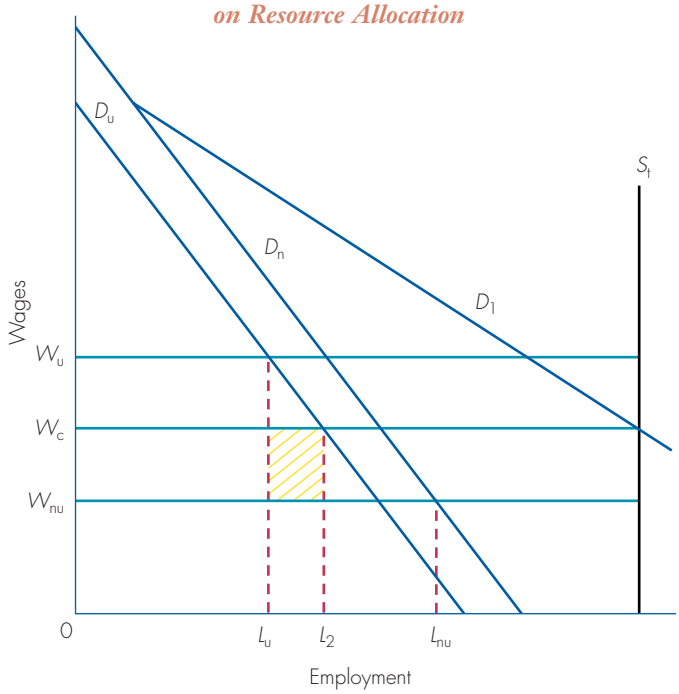
zero.[2] In the truest sense of the word, any measured unemployment at this point should be viewed as voluntary.

Various factors determine the magnitude of the measured rate of unemployment. Things such as public policies and market imperfections may generate shifts in either the reservation-wage or best-offer loci shown in Figure 1. For example, governmental programs that subsidize job search, such as unemployment compensation and general income-maintenance arrangements, move the reservation-wage locus upward and rightward, increasing the natural rate of unemployment. On the other hand, of particular interest in this essay, is the effect on job search outcomes of the presence of labor unions. At first glance, it might be thought that unions, by raising the wages of their members, would shift the best-offer locus upward. However, in a world in which unions are pervasive, this would not be the case. As unions increase wage rates through the use of their monopoly power, job opportunities in the unionized industries and occupations decrease, increasing the supply of labor in the nonunion sector. This drives wages down in those areas and increases the relative number of lower-wage jobs available to workers engaged in the job-search process. The effect of this is to rotate the best-offer locus to a less steeply sloped position (Figure 2), which, typically, increases the search time necessary to clear the market, thereby increasing the natural rate of unemployment and imposing a deadweight loss of economic output on the economy.

The presence of deadweight losses arising out of labor union activity can be shown in an alternative fashion. Here we borrow from Rees (1953, 1963), who has demonstrated the consequences of union wage-raising initiatives on levels of employment in both the union and nonunion sectors of the labor force. His formulation begins with a negative-sloping aggregate demand curve for labor and a fixed supply of labor,[3] as shown in Figure 3 in

Figure 3

The Effects of Union Wage Differentials on Resource Allocation



the respective loci D_t and S_t (where the subscript t denotes total). In an unhampered competitive labor market, the equilibrium wage rate would be W_c. Consider an initial state in which the labor market is divided into two sectors, both of which are nonunion. In both of them, the competitive wage, W_c, will be the norm. Now, let one of the sectors become unionized, say, the smaller one. Denote its demand for labor by D_u and the other's by D_n. Presumably, the union presence in its sector will lead to wages among union members rising above the competitive

standard. This will reduce employment in the union sector from L_2 to L_u.

Those workers who become unemployed in the union sector will tend to gravitate to the nonunion sector, driving down wage rates for those jobs available. Assuming the same slopes for the demand schedules in both the union and nonunion sectors of the labor market, the deadweight welfare loss to the overall economy is shown by the shaded rectangle in Figure 3 and is equal to ½ $(W_{nu} - W_u)(L_2 - L_u)$.

The Rees formulation can be made operational if union density and wage premiums are known, as well as the general elasticity of demand for labor. The union density establishes the value of L_u, while the wage premium information permits the calculation of W_{nu} and W_u. The latter is done by setting the wage that would exist in a competitive market equal to 1.0 and writing $W_c = L_{nu} W_{nu} + L_u W_{nu}$, where L_{nu} and L_u are expressed as decimal fractions of total employment. Knowing the wage premium, this expression can be expanded to $W_c = L_{nu} W_{nu} + L_u (1 + a)$ Wnu, where a is a decimal fraction representing the union wage premium. With W_c set to 1.0, we can solve for W_{nu}, viz., $Wn_u = 1/[(1 + a)]W_u$.

This leaves only the calculation of L_2 to make Rees's model operational. At this point, an estimate of the aggregate elasticity of demand for labor is needed to estimate the employment effects of the wage premium in the union sector using the expression $L_2 = L_u/[(W_u - W_c) E_{DL}]$, where E_{DL} represents the aggregate elasticity of demand for labor.

The only remaining question is, "What value should be used for E_{DL}?" Drawing on a framework suggested in some of our other work, we have selected a value of –0.76 for this statistic.[4] Using it and other estimates of the necessary data, we have calculated the Rees effect deadweight losses associated with the presence of labor unions in the American economy for selected years between 1947 and 2000. The results, expressed as a percentage of workers' wages, are shown in the second column in Table 1. Consistently, they show a deadweight loss of slightly more than a third of one percent of workers' wage income. Adjusting to take into account the fact that wages are only a fraction of Gross Domestic Product (GDP), albeit a large one, the net loss of GDP is about a quarter of a percent a year. See column two of Table 1.

There is a shortcoming to the Rees methodology. He assumes a perfectly inelastic aggregate supply of labor. Consequently, any labor supply effects associated with the beating down of wage rates in the nonunion sector of the labor force are ignored. If the aggregate quantity supplied of labor responds positively to changes in wages, there will be an additional amount of output lost as the result of union activity equal to $L_{nu}(W_c - W_{nu})E_{SL}$, where E_{SL} denotes the aggregate supply of labor.[5] Estimates of this loss are shown in column three of Table 1. The values

Table 1

Estimated Deadweight Loss of U.S. National Income Resulting from the Presence of Trade Unions, Various Years, 1947–2000

(Percent)

Years	Rees Effect	Factor Adjusted	Labor Supply Effect	Total Effect
1947	0.60	0.40	0.01	0.41
1953	0.09	0.06	0.29	0.35
1960	0.34	0.23	0.54	0.77
1967	0.34	0.23	0.54	0.77
1973	0.39	0.26	0.61	0.87
1980	0.41	0.28	0.63	0.91
1986	0.33	0.22	0.56	0.78
1993	0.26	0.17	0.40	0.57
2000	0.11	0.08	0.26	0.34

shown there range between one-half and three-quarters of one percent. Thus, the combination of Rees deadweight losses and labor supply effects can impose as much as a one percent annual drag on the American economy's output. The mean value of the three sets of estimates shown in Table 1 is 0.823 percentage points. In a $10-trillion economy (roughly the current level in the U.S.), that amounts to $82.3 billion or over $300 per person.

III. Is There Employment Shifting?

At the heart of the Rees formulation is the proposition that the adverse employment effects associated with labor unions are reflected by higher levels of employment and lower levels of wage rates in the nonunion sector of the labor market. How valid is this proposition? To answer that question, we explore the historical data concerning employment and wage levels in different parts of the labor force. We begin with the period 1919–1933, a time when labor unions were a relatively small factor in the American economy. This is an interval in which the average compensation per full-time-equivalent employee in the industrial callings that would later become central to the growth in unionism in America is only slightly greater than compensation in industries that would later be regarded as relatively nonunion. Details are shown in Table 2. For fourteen years of data, the average union-nonunion differential amounts to a mere 3.2 percent.[6] And, in four years, it is actually negative. In fact, a simple *t*-test of the null hypothesis that the true differential is equal to zero leads to its acceptance.[7] Thus, there is a period which, in a statistical sense, possesses characteristics not unlike those of a competitive labor market.

From an historical standpoint, the terminal year in this interval is an important demarcation in the history of American labor unions. In 1933 the National Industrial Recovery Act (NIRA) was passed, which contains a section

Table 2

Compensation Per Full-Time-Equivalent Employee* (Column A) and Difference in Compensation Per Full-Time-Equivalent Employee between Union and Nonunion Sectors (Column B), 1919–1960

(1957–1959 Prices)

Year	Column A	Column B
1919	$2,037	$147
1921	2,098	121
1922	2,306	–44
1923	2,319	131
1924	2,316	150
1925	2,319	92
1926	2,383	76
1927	2,386	158
1928	2,446	175
1929	2,624	147
1930	2,479	96
1931	2,586	–6
1932	2,560	–151
1933	2,466	–18
1934	2,455	26
1935	2,467	90
1936	2,499	201
1937	2,520	264
1938	2,556	149
1939	2,607	269
1940	2,611	369
1941	2,641	612
1946	3,274	484
1947	3,341	625
1948	3,192	704
1949	3,314	711
1950	3,431	839
1951	3,348	993
1952	3431	1,068
1953	3,570	1,122
1954	3,700	1,107
1955	3,856	1,225
1956	3,992	1,323
1957	4,009	1,369
1958	4,038	1,388
1959	4,216	1,478
1960	4,348	1,437

Note: *In order to take account of changes in industrial mix through time, 1954 weights were used throughout to standardize the estimates of compensation per full-time-equivalent employee. Thus, these estimates abstract from shifts in industrial structure.

Source: U.S. Department of Commerce, Bureau of the Census, *Historical Statistics of the United States, Colonial Times to 1957*, Series D-685-D-719; and U.S. Department of Commerce, *Survey of Current Business*, July 1961.

7(a) that is the precursor of the National Labor Relations Act of 1935 (the Wagner Act). Between 1933 and 1935, there was a transformation of American public policy towards positive federal government encouragement of and support for unions. At the beginning of this period (in 1933), the union-nonunion industry wage differential was *negative* and less than one percent of the average level of compensation. Under the stimulus of the NIRA, by 1935, this differential had turned positive and risen to 3-4 percent of the average compensation level. After 1935, the union-nonunion wage differential surges, exceeding twenty percent by 1941. The general pattern shown by these data is simple: From 1919 through 1933, there is little, if any, wage differential and no time trend in it.[8] After 1933, there is a pronounced upward time trend in this differential through 1941. There is a brief hiatus in the increase in the wage differential during World War II. However, subsequent to the war, the differential resumes its pre-war pattern of growth, reaching about one-third of average compensation per full-time-equivalent employee in 1960. Clearly, the behavior of wage differentials immediately subsequent to the adoption of a public policy that encourages labor unions is quite consistent with the Rees framework.

What about employment patterns, though? Here, we pick up the story in the post-World War II period. In a world where unions have the impacts already suggested, we would expect a systematic shifting of the overall structure of employment away from the union and toward the nonunion sectors of the labor force. Thus, over time, there would be a relative decline in employment in the union sectors and a relative rise in employment among nonunion workers.

As a first step in analyzing the nature of changes in the structure of employment, we have estimated the following regression equation for each of nine broad private nonagricultural industries of employment: $EMP_i = a + b\ TOTEMP + c\ TIME$, where EMP_i denotes employment in the ith industrial sector; *TOTEMP* represents total employment in the economy (included to control for intertemporal growth in employment); and *TIME* is a variable to capture the passage of time. Since our data set covers the fifty-year time period 1950–1999, the *TIME* variable takes the value one in 1950, two in 1951, etc., through 50 in 1999. The results of these estimations are shown in Table 3. In seven

Table 3

Regression Analysis of Time Drift in Employment, by Sector, 1950–1999

Industry	Time-Drift Coefficient	t-Statistic	Probability
Mining	–21.75	2.02	0.0496*
Construction	–58.31	4.66	0.0000*
Durable Goods Manufacturing	–908.93	4.33	0.0001*
Nondurable Goods Manufacturing	–423.46	1.10	0.2773
Transportation and Public Utilities	–65.96	6.31	0.0000*
Finance, Insurance, and Real Estate	88.44	6.56	0.0000*
Wholesale Trade	5.83	0.47	0.6403
Retail Trade	113.83	2.36	0.0000*
Service	590.51	3.66	0.0000*

Note: *Statistically significant at the five percent level or higher.

of the nine cases, the coefficient of the time-drift variable is statistically significant at the five percent level. Four of the significant coefficients are negative and three are positive. Most interesting, the four significant negative time-drift industries (mining, construction, durable goods manufacturing, and transportation and public utilities) have the highest union densities in 1973, 1980, and 1986.[9] On the other hand, the three positive time-drift coefficients are in retail trade, finance, insurance and real estate, and service employment, all very low union-density sectors. As to the two nonsignificant coefficients, wholesale trade, a low union-density sector, has a positive sign, and nondurable manufacturing, on the high side in terms of union density, has a negative sign.

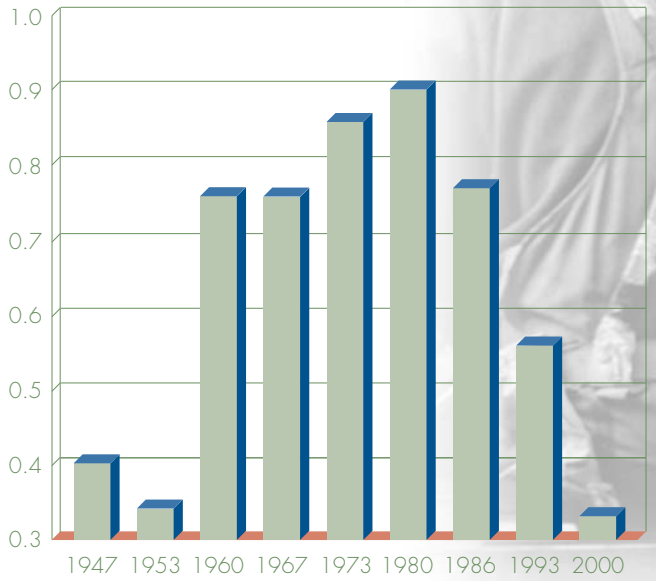
The pattern of statistical significance shown in the time-drift coefficients is extremely consistent with the Rees model. High union-density areas experience a significant negative time drift in their employment relative to overall employment. And, low union-density industries show significant positive time drifts. What is suggested is the shifting of displaced union workers to nonunion employments. If the time-drift coefficients are expressed as percentages of average sectoral employment over the interval 1950–1999, the respective rank-order correlation coefficients between the time-drift measure and union density for 1973, 1980, and 1986 are –0.74, –0,62, and –0.61, respectively.

IV. More Extended Estimates

Clearly, the stylized facts of the post National Industrial Recovery Act and National Labor Relations Act of 1935 era are broadly consistent with the argument propounded by Rees. Thus, it seems appropriate to extend the earlier estimation of the deadweight economic losses associated with the existence of labor unions to encompass a more extended time period. This requires the developing of deadweight loss estimates for additional years. Subsequent to 1986, we have made the necessary calculations for 1993 and 2000, while, prior to 1973, we have added estimates for 1947, 1953, 1960, and 1967.[10] The results of these calculations, in combination with our earlier estimates, are displayed in Figure 4. The pattern shown by this graphic is intriguing. In the early years following World War II, the deadweight losses associated with union activity are relatively small, although not trivial, amounting to slightly more than one-third of one percent of annual output. However, after 1953, as unions become more solidly entrenched in the economy, the deadweight losses mount, peaking in the 1970s. This is followed by a decline in union impact as both union membership (density) and the union wage premium fall. By the end of the century, the deadweight loss estimates have returned to their early post-World War II levels.

Figure 4

Union-Produced Deadweight Loss as Percent of Gross Domestic Product



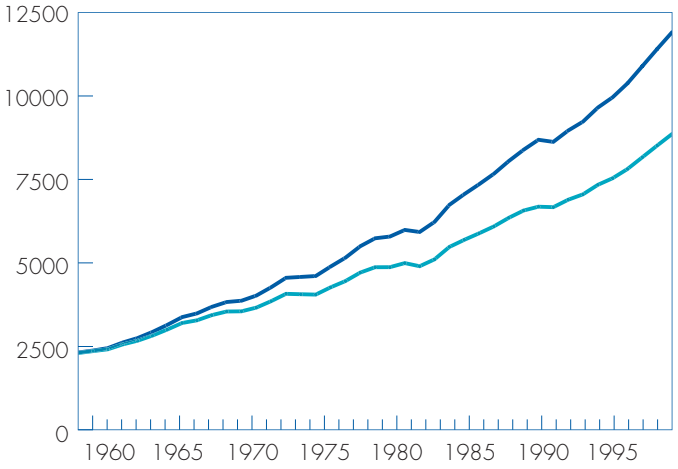
The variability in the economic cost of labor unions over the last half century or so makes it more difficult to arrive at generalizations about their total cumulative cost. To deal with this problem, we have calculated simulated (or counterfactual) levels of GDP for 1947 through 2000 that assume a zero deadweight cost of unions. The year-to-year values of the deadweight losses that are assumed in these calculations are estimated by extrapolating in a linear fashion between the individual years for which actual estimates are provided. The results of this simulation are shown in Figure 5 and provided in Table 4. They are striking. By 2000, our simulations show a shortfall in current real GDP (1992–1994 dollars) of about $3.5 trillion dollars — about forty percent of current GDP.

This may seem to be an astoundingly large number. However, it must be remembered that the deadweight economic losses that are being measured are not mere one-shot impacts on the economy. They recur, every year, relentlessly, cumulating in their impact. What our simulations reveal is the powerful effect of the compounding over more than a half-century of what appears at first glance to be small annual effects. An even more dramatic statement of the economic cost of unions is provided by cumulating the lost income and output over the entire 54-year period under consideration. The result exceeds *$50 trillion* (1992–1994 prices), a breath-taking total.

An alternative way of expressing the economic impact of unions is to assess the effect on the growth rate in real GDP. We do this by comparing the mean actual growth rate with the mean of the year-to-year percentage changes in our simulated GDP series. The difference is approxi-

Figure 5

Real Gross Domestic Product
(1992 Prices)



mately three-quarters of a percentage point a year. Among students of Edward Denison-style national income growth accounting, that is a huge impact, quite consistent with the counterfactual output differences already reported.

One interesting implication of this finding is that it implies that *even union members* are potentially worse off from the effects of unionization. If unionization has an accumulated long-term impact of lowering GDP by, say, 30-40 percent, and union members earn a 15-20 percent wage differential from unionization, the gains to union members from the wage differential are more than offset by the losses associated with lower wage levels in general arising from a smaller national output.

To summarize the findings of this section of our appraisal of the economic cost of government-sponsored union activity in the U.S., it can be said that it is perhaps a classic case of a doctrine laid down by Frederic Bastiat (1950) a century-and-a-half ago, when he opined, "it almost always happens that when the immediate consequence [of an economic policy] is favorable, the later consequences are disastrous." In this instance, those "later consequences" amount to what can be thought of as a "*$50-trillion* misunderstanding."

V. A Cross-Sectional Approach

An alternative approach is to examine how labor unions affect economic performance cross-sectionally (Vedder and Gallaway, 1986; Pantuosco et al., 2001). Unlike previous studies, we decided to examine variations in economic performance over a long time horizon, the 35-year period 1964 to 1999. Our sample is the 50 U.S. states plus the District of Columbia.

Table 4

Comparison of Actual Real U.S. Per-Capita Gross Domestic Product with Simulated Gross Domestic Product Assuming an Absence of Deadweight Losses Attributable to Labor Unions, 1959–1999

Year	Actual Per-Capita Gross Domestic Product	Simulated Gross Domestic Product
1959	$2,300.0	$2,316.4
1960	2,357.2	2,374.4
1961	2,412.1	2,447.8
1962	2,557.6	2,614.8
1963	2,668.2	2,748.4
1964	2,822.2	2,930.4
1965	3,002.8	3,142.1
1966	3,199.5	3,375.5
1967	3,279.5	3,486.7
1968	3,435.6	3,682.8
1969	3,543.2	3,827.6
1970	3,549.4	3,867.0
1971	3,660.2	4,020.6
1972	3,854.2	4,270.5
1973	4,073.1	4,553.5
1974	4,061.2	4,579.7
1975	4,050.3	4,606.5
1976	4,267.6	4,889.0
1977	4,455.7	5,154.9
1978	4,709.9	5,498.2
1979	4,870.1	5,736.8
1980	4,872.3	5,789.5
1981	4,993.9	5,987.5
1982	4,900.3	5,925.3
1983	5,105.6	6,227.1
1984	5,477.4	6,737.6
1985	5,689.8	7,056.8
1986	5,885.7	7,354.1
1987	6,092.6	7,669.0
1988	6,349.1	8,049.1
1989	6,568.7	8,388.7
1990	6,683.5	8,587.9
1991	6,669.2	8,625.1
1992	6,891.1	8,963.5
1993	7,054.1	9,231.3
1994	7,337.8	9,651.7
1995	7,537.1	9,962.1
1996	7,813.2	10,349.4
1997	8,165.1	10,894.5
1998	8,516.3	11,409.7
1999	8,861.0	11,910.2

Real per capita income growth (hereinafter, *GROWTH*) from 1964 to 1999 varied substantially among the states, from lows of under 80 percent in California and Alaska to over 150 percent in Georgia, Mississippi, North Carolina, South Carolina, and Tennessee. The incidence of unionization (*UNION*) likewise varied widely. Since union membership as a percent of the labor force declined over time, we took an average of membership as a percent of the labor force at the beginning and end of the period.

That average varied from 5.3 percent in North Carolina to 37.1 percent in Michigan.

We introduced five additional independent variables into our analysis: *MANUF* (the percent of employment in manufacturing early in the period); *INCOMETAX*, the number of times at four different dates in the period that a state levied an individual income tax on employment-based income; *INC64*, real per capita income in 1964; *POLITICS*, the percent of the population voting for Ronald Reagan in the 1984 presidential election; and *COLLEGE*, the percent of the population over 25 years with a college education or the equivalent as of the 1980 Census. Finally, we introduced *64INCOME* as a variable, the level of personal income per capita in 1964, at the beginning of the period examined. If neoclassical income convergence is happening, we would hypothesize a negative relationship between *64INCOME* and *GROWTH*.

Table 5 includes the results using OLS regression analysis. There is a statistically significant (at the one percent level) negative relationship between *UNION* and *GROWTH*. For each increase of one percent of the labor force belonging to labor unions, it is estimated that real income growth per capita is lowered by over 1.24 percentage points. The elasticity of per capita income growth with respect to unionization is about –0.16.[11] Of secondary interest, there is a significant positive relationship between *COLLEGE* and *GROWTH* and between *MANUF* and *GROWTH*. *GROWTH* is related in a statistically significant negative fashion with the other three independent variables.

From the results in Table 5, it is possible to estimate the impact that unionization has had, not only on the U.S., but on individual states. Turning first to the nation as a whole, the average state had union membership equal to 18.88 percent of its labor force. This compares with 5.3 percent in the state with the least unionization, North Carolina. If all states had the level of unionization of North Carolina, the model predicts that the rate of growth of real per capita income would have been increased by 16.89 percentage points. The mean rate of growth was 112.43 percent, so with North Carolina levels of unionization, growth would have been 129.32 percent.

Table 5

Explaining Interstate Economic Growth, 1964-1999: OLS Regression Results

Variable or Statistic	Estimated Value	*t*-Statistic
Constant	217.86	8.885
UNION	–1.24	3.349
MANUF	0.9	6.101
INCOMETAX	–5.73	3.336
64INCOME	–0.01	3.885
POLITICS	–0.8	3.308
COLLEGE	1.95	2.152
R^2	.716	

This suggests that the real annual compounded rate of per capita income growth would have increased from the actual 2.18 percent to 2.40 percent, or by 22 basis points. Using a counterfactual assumption of no unions whatsoever, the mean growth rate over the 35 years is an estimated 135.85 percent, or an annual growth rate of 2.48 percent a year, some 30 basis points more than the actual growth. The estimated 1999 personal income per capita under the assumption of zero unionization is more than 10 percent higher than actually recorded, implying a gross domestic product loss associated with unionization in the year 1999 of about $1 trillion. The present value of the accumulated loss over the 35 years is, of course, measured in many trillions, reasonably consistent with the rather extraordinary estimates using a quite different methodology cited above.

In Table 6, we report the actual personal income per capita by state in the year 1999, as well as a counterfactual estimate of what that income would have been if all states had the level of unionization of the state of North Carolina. High levels of unionization are estimated to have severe adverse effects in Northern industrial states such as Michigan, New York, and Illinois, but the low relative levels of unionization in most southern states suggest that unionization had little impact. In reality, income per capita in Georgia in 1999 was less than four percent higher than in Michigan, but the model estimates that if both states had North Carolina's low level of unionization, Michigan's income per capita would have exceeded Georgia's by over 21 percent. Thus the differential patterns of unionization have had an important role in explaining interstate income differentials and changes in those differentials over time.

There is evidence that the presence of significant unionization has been a major factor in the convergence of incomes over time. In 1964, the coefficient of variation on per capita income variations between the states (including the District of Columbia) was .1894. By 1999, that figure had declined to .1593, or about 16 percent. This is a sign of greater geographic income equality, as the poor states gained noticeably on the rich ones. Yet, if the regression coefficient in Table 5 is approximately correct, much of the convergence occurred because of union-related sluggish economic growth in relatively high-income Northern states. The flight of capital to the South to avoid the high wages associated with unions, and of workers to the North to obtain those higher wages, was no doubt critical to convergence.

We calculated the coefficient of variation in 1999 on the counterfactual income per capita numbers in Table 6 to be .1799. Of the 301 basis point decline in the coefficient of variation on per capita income between 1964 and 1999, some 206 points, or over 68 percent, can be attributed to the presence of unionization beyond that found in the state with the least unionization, North Carolina.

Table 6

Actual and Counterfactual Personal Income Per Capita by State, 1999

State	Actual 1999 Income	Counterfactual Income	% Income Lost
Alabama	$22,987	$24,135	4.99%
Alaska	28,577	32,773	14.68
Arizona	25,189	26,295	4.39
Arkansas	22,244	23,073	3.73
California	29,910	33,995	13.66
Colorado	31,546	33,330	5.65
Connecticut	39,300	43,020	9.47
Delaware	30,778	33,633	9.27
District of Columbia	39,858	42,781	7.33
Florida	27,780	28,553	2.67
Georgia	27,340	28,065	2.65
Hawaii	27,544	30,946	12.35
Idaho	22,835	24,096	5.52
Illinois	31,145	35,800	14.95
Indiana	26,143	29,752	13.81
Iowa	25,615	27,700	8.14
Kansas	26,824	28,318	5.57
Kentucky	23,237	25,029	7.71
Louisiana	22,847	23,925	4.67
Maine	24,603	26,403	7.32
Maryland	32,465	35,012	7.84
Michigan	28,113	34,084	21.24
Minnesota	30,793	34,243	11.20
Mississippi	20,688	21,152	2.24
Missouri	26,376	29,835	13.12
Montana	22,019	25,025	13.65
Nebraska	27,049	28,415	5.05
Nevada	31,022	35,448	14.27
New Hampshire	31,114	32,735	5.21
New Jersey	35,551	39,906	12.25
New Mexico	21,853	22,822	4.44
New York	33,890	39,547	16.69
North Carolina	26,003	26,003	0.00
North Dakota	23,313	24,208	3.84
Ohio	27,152	31,071	14.43
Oklahoma	22,953	23,903	4.14
Oregon	27,023	30,382	12.43
Pennsylvania	28,605	32,556	13.81
Rhode Island	29,377	32,511	10.67
South Carolina	23,545	23,562	0.07
South Dakota	25,045	25,385	1.36
Tennessee	25,574	26,592	3.98
Texas	26,858	27,572	2.66
Utah	23,288	24,335	4.49
Vermont	25,889	27,165	4.93
Virginia	29,789	30,685	3.01
Washington	30,392	35,310	16.18
West Virginia	20,966	24,166	15.27
Wisconsin	27,390	30,819	12.51
Wyoming	26,396	27,852	5.52

Some might read these results as favorable to unionization. After all, the presence of extensive unionization has hastened income convergence, meaning that the poor states of the South are not as poor any more in some relative sense. Yet that ignores the fact that unionization is estimated to have *lowered incomes for all*, albeit more in the relatively higher income states that on average have higher levels of unionization. If unionization has led to a more even distribution of the income pie, it also has led to a significantly smaller pie, one in which everyone gets smaller slices. Any increase in spatial income equality has come at a very high price.

The findings above are obviously sensitive to the statistical estimates generated. We re-estimated the model represented in Table 5 using alternative variables for control purposes. In every case, we obtained a statistically significant negative relationship between *UNION* and *GROWTH*. Moreover, the regression estimate for *UNION* presented in Table 5 was below the mid-range of estimates generated by sensitivity analysis, increasing our confidence in the proposition that unionization can and does have significant adverse effects on the growth in aggregate economic activity.

VI. Unions and Employment Opportunities Revisited

As indicated above, if the goal of unions is to raise wages for their members, then, in the absence of productivity gains, one would expect employment opportunities to fall as a consequence of unionization, since, *ceteris paribus*, the quantity of labor demanded would fall with higher wages. The job creation effects are the result not only of reductions in the quantity demanded of labor in the union sector of the labor market, but also the labor supply impacts of lower wage rates in the nonunion sector.

A cursory glance at data on union density and involvement in the labor force shows that over time the proportion of the working-age population that was employed has steadily increased, while union density has decreased. For example, at mid-century, the percent of nonagricultural workers belonging to unions exceeded 30, while only about 56 percent of civilians over the age of 16 were working. By the end of the century, union density among nonagricultural workers had fallen by over one-half, but the civilian employment-population ratio had risen to above 64 percent (U.S. Bureau of the Census, 1975, p. 178; *Economic Report*, 2001, p. 316).

Compare the periods 1953–1973 with 1973–1999. The first period is one of relatively high union density, whereas the second one is clearly an era of steady decline in the incidence of unionization. Let us compare what one might call the "marginal employment-population ratio" in both periods. Specifically, let us look at the growth in total civilian employment as a percent of the total growth in the noninstitutional population aged 16 and over.

During the first of these two periods, employment rose by 23,885,000, and the relevant population by

40,040,000, giving a marginal employment-population rate of 59.7 percent. Both 1953 and 1973 are business cycle peaks, so the results are not significantly skewed by cyclical considerations. During the more recent period of lower and declining union density (also involving data for two prosperous years, largely eliminating cyclical factors), employment rose by 48,424,000, while the appropriate population rose by 60,657,000. The marginal employment-population ratio rises by almost precisely one-third, to 79.7 percent. This 20 percentage point increase in this ratio is the equivalent of saying that for each 10 new potential workers, two more were employed in the period of low unionization compared with the era of enhanced union density. If the higher marginal-population ratio had prevailed during the era of high labor union influence, some eight million more jobs would have been created.

This is a rather startling result, but might be criticized because it assumes that the pronounced rise in employment relative to the potential labor force entirely reflected change in unionization. Accordingly, using an alternative data source and methodolgy, we did two more estimations, reported in Table 7. We first examined variations in interstate rates of unemployment (*UNEMP*). Because unemployment rates vary over time and business cycle effects often are uneven spatially, we used as our measure the median of the unemployment rate for nine years dispersed widely over the period 1964 to 1999.[12] As we have indicated elsewhere (Vedder and and Gallaway, 1996), interstate variations in unemployment are quite substantial. We observe a range from 2.9 percent in Nebraska to 9.2 percent in Alaska (the high for the contiguous U.S. was 6.8 percent in West Virginia).

In the second regression, we examined variations in the employment-population ratio, *EMPOP*. As with unemployment rates, the employment-population ratio varies substantially. In Table 7, we used a mid-range year, 1981, for our estimate of it.[13] In each of the OLS regressions, we incorporated a number of other variables into the analysis for control purposes and to reduce the probability of significant omitted-variable bias. Among those variables not used in the earlier regression analysis are *FARM*, the percent of personal income in a state derived by farming at the beginning of the period (1965), *COLD*, the number of heating degree days annually, *SUNSHINE*, the average percentage of days annually the sun shines, and *OVER65*, the percent of the state's population over the age of 65 in 1981.

The results show strong and statistically significant (at the one percent level) negative relationships between our *UNION* variable and each of the dependent variables. The unemployment results suggest that a state with a 10 percent unionized work force could expect, other things equal, a 0.7 percentage point increase in its unemployment rate. The employment-population ratio results are even more robust. They suggest, other things equal, that

Table 7

Impact of Unions on Unemployment and the Employment-Population Ratio: OLS Regression Results

Variable or Statistic	Dependent Variable: UNEMP	Dependent Variable: EMPOP
Constant	11.494	47.768
	(7.089)	(9.338)
UNION	0.074	–0.255
	(3.114)	(3.141)
MANUF	–0.034	
	(2.595)	
FARM	–6.643	12.716
	(1.854)	(1.157)
COLD	–0.000	0.001
	(2.700)	(4.148)
SUNSHINE	–0.049	0.113
	(2.767)	(1.921)
64INCOME	–0.000	0.001
	(1.750)	(3.511)
OVER65	–0.072	–0.607
	(1.109)	(2.986)
R2	0.517	0.590

for each four additional workers who become unionized, one less person works. Put differently, had union density at the end of the twentieth century remained about what it was near the middle of the century, union membership today would be well over 10 million higher, meaning that the loss of jobs would be measured in the millions. Unions have a profound effect on total employment.

Looking at the two regressions together, the adverse employment effects of unionization largely (about 80 percent) may come from an increase in the proportion of the work age population *not* in the labor force, and about 20 percent from higher unemployment. The higher wages associated with unionization may cause people to withdraw from the labor force because they are discouraged or because they opt for greater leisure (e.g., union workers may retire at younger ages).

These results do suggest that the rise in the employment-population ratio in modern times reflects more than changing attitudes of women towards work. The decline in the proportion of workers in unions seems to be an important factor in explaining the rising proportion of people working over time. It is true that the rise in the employment-population ratio is entirely the result of rising female employment participation. But it is at least plausible, and perhaps even probable, that the decline in unionization has enhanced the involvement of women in the world of work, just as the reverse may also be some extent true.

The findings above are reinforced using other data and methodologies. We examined the growth in employ-

ment over time by occupation and industry. The approach to the calculation of union density by the U.S. Bureau of Labor Statistics changed in 1983, so for consistency we examined occupational and industry employment for 1983 and 2000. Tables 8 and 9 show the raw data. Starting with occupations (Table 8), there were six categories that were relatively union-intensive, in that the proportion of workers belonging to labor unions exceeded the average for the entire economy in both 1983 and 2000: professional workers, protective service, precision production workers, machine operators, transportation workers, and handlers. Employment in those six classifications grew by 33.3 percent from 1983 to 2000. By contrast, the relatively low union density classifications (executives, technicians, sales, administrative support, services other than protective service, and farming), witnessed employment growth of 39.8 percent, or nearly 20 percent higher. Job growth was meaningfully greater in the relatively nonunion occupations.

That approach, however, probably understates the adverse effects of unionization on employment growth. Two of the occupational classifications, professional and protective service, include disproportionately large numbers of government workers (e.g., teachers and police officers). Theory expects the wage-enhancing goals of unions will reduce employment in the private market economy where firms try to maximize profits by producing where marginal costs equal marginal revenues. That is not necessarily the case in the governmental sector. Excluding the two government-intensive occupational sectors, employment grew only 16.8 percent in the remaining four union-intensive categories, substantially less than one-half the growth rate for the relatively nonunion sectors. If those four occupational categories had grown at the average of the six relatively nonunion-intensive occupational classifications, job growth would have been about six million greater.

The results are perhaps even starker when one turns to the industrial classifications of employment data (Table 9). There are six categories of employment where union density exceeded the average for the entire labor force in both 1983 and 2000: construction, durable goods manufacture, nondurable goods manufacture, transportation, communications and public utilities, and government. There were five categories that had below-average union density in both years: agriculture, wholesale and retail trade, finance, and services. The 12th category, mining, is ambiguous, with above average union density in 1983 and below average in 2000.

Employment growth in the six union-intensive categories was 24.4 percent from 1983–2000, compared with 55.2 percent in the five classifications with relatively low union density. If the percentage employment growth in the relatively high density industries had equaled that in the relatively low density industries, about 10 million more jobs would have been created. Had employment

Table 8

Growth of Employment by Occupation and Union Density, 1983–2000

Occupational Category	Union Density: 1983	Union Density: 2000	Number of Workers: 1983[a]	Number of Workers: 2000[a]	% Growth in Employment
Executive, Administrative	8.1%	5.3%	8,546	16,434	92.3%
Professional	24.0	19.3	11,111	18,444	70.5
Technicians	12.1	10.1	3,001	4,279	42.6
Sales	6.7	3.5	9,234	13,677	48.1
Admin. Support	15.0	12.1	15,789	18,167	15.1
Protective Serv.	39.0	39.4	1,674	2,384	42.4
Other Services	11.8	8.1	11,202	14,569	30.1
Machine Operators, etc.	36.9	19.4	7,537	7,043	–6.6
Precision Production, etc.	32.9	21.9	10,546	12,716	20.6
Transportation	38.5	23.1	3,822	5,182	35.6
Handlers, etc.	29.5	17.3	4,058	5,417	33.5
Farming, etc.	5.5	4.5	1,775	1,974	11.2
ALL JOBS	20.1	13.5	88,290	120,786	36.8

Note: [a]Numbers in Thousands.

Source: U.S. Bureau of Labor Statistics and authors' calculations.

Table 9

Employment Growth, 1983–2000, by Industrial Classification

Industrial Classification	Union Density: 1983	Union Density: 2000	Workers: 1983[a]	Workers: 2000[a]	% Change, 1983-2000
Agriculture	3.4%	2.5%	1,446	1,821	25.9%
Mining	20.7	10.6	869	499	–42.6
Construction	27.5	19.1	4,109	6,666	62.2
Durable Goods Manufacturing	29.2	16.4	11,162	11,688	4.7
Nondurable Goods Manuf.	25.9	14.4	7,904	7,480	–5.4
Transportation	42.5	25.5	2,712	4,573	68.6
Commun., Public Utilities	42.4	25.4	2,430	2,935	20.8
Wholes. Trade	9.3	5.4	3,653	4,766	30.5
Retail Trade	8.5	5.1	14,427	20,366	41.2
Finance, etc.	2.9	2.1	5,559	7,488	34.7
Services	7.7	5.5	18,400	33,528	82.2
Government	36.7	37.3	15,618	18,976	24.5
TOTAL	20.1	13.5	88,290	120,786	36.8

Note: [a]Numbers in thousands.

Source: U.S. Bureau of Labor Statistics and authors' calculations.

growth equaled that of the economy as a whole (36.8 percent), there would have been four million more jobs created. Thus the job deficiency associated with high union density may well be somewhere between four and ten million jobs, consistent with earlier estimates.[14]

The industry data stress the growing relative importance of public employment in American unionization. Looking at the total labor force, union density declined from 20.1 percent in 1983 to 13.5 percent in 2000, a decline in the proportion of the labor force in unions of slightly less than 33 percent. Looking at the private sector alone, however, density fell from 16.5 to 9.0 percent, a decline of over 45 percent. The decline in unionization in the market economy is in marked contrast to that in the public sector, where membership has grown significantly in an absolute sense, and even slightly as a percent of the work force. The discipline that the market imposes has made unionization less attractive. Governmental activity largely lacks that market discipline and is characterized by considerable rent-seeking — an environment in which unions flourish.

VII. Unions and the Death of Jobs: Two Case Studies

The Birth of Unions and Job Destruction: The Case of Steel. In 1935, the National Labor Relations Act (Wagner Act) was enacted. By greatly expanding the move towards a pro-union/high-wage political environment that had begun four years earlier with the Davis-Bacon Act, the Wagner Act within a few years led to massive increases in union density in the U.S. In 1934, the year before the passage of the Wagner Act, union density among nonagricultural workers was less than 12 percent, while a decade after the legislation's enactment the density had tripled to over 35 percent (U.S. Bureau of the Census, 1975, p. 178). In the two years 1936 to 1938, union membership doubled. It was precisely in that period that recovery from the Great Depression stalled. Unemployment rates fell from over 21 percent as late as October 1935 to under 13 percent by May 1937 (Vedder and Gallaway, 1997, p. 77). The Wagner Act only began to be effective in the Spring of 1937, in large part because employers largely ignored it, believing, wrongly, that it would be found unconstitutional. In the spring of 1937 the great union organizing drives successfully occurred in several major industries, leading to huge wage increases in late 1937 that reversed the promising 1935–1937 recovery and led to rising unemployment: the unemployment rate surpassed 20 percent again by the spring of 1938.

Nowhere was the fight to unionize more contentious yet ultimately successful than the steel industry. While the U.S. Steel Corporation negotiated a collective bargaining agreement at the end of March 1938, and the Jones and Laughlin Company after a short strike in May, a bitter and bloody battle erupted with the "Little Steel" companies. When it all subsided by September, 18 had been killed and 168 injured (Taft, 1964, pp. 515-22).

The upshot of the unionization was a dramatic increase in the wages of workers and an equally dramatic decline in employment. From the last quarter of 1936 (the last quarter before U.S. Steel signed a collective bargain agreement) to the second quarter of 1938 (about eight months after the end of the Little Steel strikes), money wages per hour rose more than 21 percent (amidst double-digit national unemployment!), and manhours worked in steel mills fell by more than 51 percent, reversing employment gains that had occurred during 1936 when money wages were relatively stable and real unit labor costs were actually falling because of rising productivity (Vedder and Gallaway, 1997, p. 136).

After the initial trauma of unionization, markets did adjust to the new environment. From the second quarter of 1938 to the fourth quarter of 1940, money wages rose very little, but robust productivity gains, no doubt in part induced by labor-saving technological change resulting from the new high wages, led to a significant decline in the real wage adjusted for productivity change. As a consequence, employment again rose sharply. Nonetheless, even in the fourth quarter of 1940, when the nation was moving rapidly to war mobilization, employees in the steel industry worked fewer hours than four years earlier, before unionization had begun.

Long-Term Unionization and Job Destruction: Coal Mining. The quintessential militant labor union leader during the golden age of American labor unions was John L. Lewis (1880–1969), head of the United Mine Workers. Not only was he an extremely aggressive and powerful leader of his union, he was by most accounts the founder of twentieth century industrial unionization as practiced by the CIO (Congress of Industrial Organizations). Yet a strong union tradition in mining predates Lewis, who became UMW president in 1920. From the late nineteenth-century on, America's miners had showed a significant interest in unionization, and "in 1897, the United Mining Workers of America became the largest union in the United States, a position it retained for almost three decades" (Taft, 1964, p. 166). Nonetheless, many miners remained nonunion until membership grew sharply after the improvement in the political-legal environment for collective bargaining beginning in the early 1930s.

From 1909 through 1927, the number of production workers in bituminous coal mining in the United States oscillated around 500,000 or 600,000 (U.S. Department of Labor, 1968, pp. 19-20). While employment declined in the Great Depression, it never recovered. During World War II, Lewis incurred the wrath of the War Labor Board and the American public by repeatedly violating labor's no-strike pledge, followed by long and bitter strikes in the

immediate post-war era. This strategy did lead to higher wages, with weekly wages well over tripling from 1933 to 1944 (U.S. Department of Labor, 1968, p. 20). Employment, which had been 471,000 in depression year 1937, had fallen to 351,000 by relatively prosperous 1950. When Lewis gave up the UMW presidency in 1960, employment had fallen below 150,000, a decline of about 400,000 during the four decades of his leadership.

Output had fallen by more than one-fourth, as consumers switched to other fuels. Railroads started using oil-consuming diesel locomotives; homes switched to gas, oil, and even electric heat. At the retail level, coal prices more than doubled from 1935 to 1950, while natural gas retail prices rose at best 10 percent (U.S. Bureau of the Census, 1975, p. 214). Aside from being dirty and relatively labor intensive, home heating with coal was losing its price advantage over alternative fuels, in part because of the high cost of mining it.

While coal mining had a brief revival in the 1970s and 1980s propelled by the explosion in oil prices, booming electricity demand, and other factors, by 1999, only 70,000 production workers were left in coal mining in the U.S., barely one-tenth the number when Lewis assumed the UMW presidency 80 years earlier. Coal miners remained among the best paid industrial workers, earning nearly 50 percent more than the average for private sector workers (U.S. Bureau of the Census, 2000, p. 428). While environmental, occupational safety, and other factors no doubt played a role, several decades of union militancy exacted a heavy toll on employment in the coal mining industry. Ironically, the United Mine Workers by 2000 were a shadow of their former self, as high wages reduced industry employment and led also to a growth in nonunion mining activity.

VIII. Unions and the Quality of Life

Because utility is essentially unmeasurable with precision, we cannot state precisely what the impact of unions is on happiness or, broadly speaking, "the quality of life." There is one act of revealed preference, however, that is probably a reasonable proxy measure for the general level of satisfaction with a geographic locale, namely the amount of net spatial migration. If people, net, are moving into an area, that suggests that the area is perceived as being relatively attractive, for a variety of economic and noneconomic reasons. Likewise, net out-migration would be a sign that an area is relatively unattractive, leading people to vote with their feet by moving elsewhere.

The U.S. Bureau of the Census (2000) has estimated net domestic migration for the 50 states and the District of Columbia for 1990 to 1999. The sum of migration is zero — each interstate act of migration is recorded as a negative (out-migration) for the state of origin, and as a positive (in-migration) for the state of destination. We took the 10 states with the highest rates of in-migration in the 1990s and observed their end-period union density.[15] We compared that figure with the union density in the 10 states with the greatest out-migration.[16] Note that in the states with the highest out-migration (a total of 6,468,945), the median union density in 1999 was 17.7 percent, well above the national average of 13.5 percent, and more than twice the median density in the 10 states with the greatest in-migration (that received a total of 5,200,608 migrants).

While that evidence is rather strong, we decided to classify the data an alternative way, namely by union density. We took the 11 states with the highest density and compared them with the 11 states with the lowest density.[17] The results show that the lowest density states had net in-migration of 3,530,108 which is more than one thousand persons a day, every day, for nine years. Ten of the 11 states had net in-migration, the single exception, South Dakota, having a very small (less than 3,000) out-migration. By contrast, the 11 states with the highest union densities had a net out-migration of 2,984,007 persons, with eight of 11 reporting net out-movement of people. While no doubt other factors are also relevant in explaining these population movements, the evidence suggests unions are not perceived positively by individuals making migration decisions.

IX. Conclusions

While there are no doubt many individual members of labor unions who feel that they have benefitted from collective bargaining, the overall evidence is overwhelming that labor unions in contemporary America have had harmful aggregate effects on the economy. Unions are associated with lower rates of growth in income and jobs. On balance, people move away from union-intensive areas to areas with relatively low rates of union density. Occupations and industries with high rates of union density have had less vibrant job growth in recent decades. Widespread unionization of an industry is often associated with initial sharp declines in employment, as the steel industry demonstrates. The more strident and intense union involvement in industry, the bigger that industry's decline, as the experience of coal mining shows. Also, high levels of unionization are associated with out-migration of native born Americans, while low levels are associated with in-migration. The decline in union density in the private sector in the past generation has been sharp, and that decline has added to the vitality of the economy at the beginning of the new century. The increasing weakness of unions in the market economy has contributed to economic growth and a rising proportion of the working age population that actually works.

NOTES

[1]The classic case of this occurred during World War II. In the face of an overwhelming demand for workers, the lowest level reached by the official statistically-measured unemployment rate was 1.2 percent in 1944.

[2]See Hutt (1977) for a fuller discussion of this issue.

[3]We relax this assumption later in this essay.

[4]This is derived from regression coefficients in Vedder and Gallaway (1997), Appendix B.

[5]In an earlier paper (Gallaway et al., 1991), we estimate an aggregate labor supply elasticity of 0.14. This is broadly consistent with the general literature on overall labor supply.

[6]See U.S. Bureau of the Census (1975), Series D-685- D-719. In order to take account of changes in industrial mix through time, 1954 weights were use throughout to standardize the estimates of compensation per full-time-equivalent employee.

[7]The t-statistic for the test is 0.61.

[8]The time trend in the wage differential between 1919 and 1933 is actually weakly negative.

[9]See Linneman et al. (1990) for details.

[10]See Lewis (1963) and Parsley (1980).

[11]A loglinear version of the model provides very similar results.

[12]The years were 1966, 1970, 1974, 1979, 1983, 1988, 1991, 1994, and 1999.

[13]Data are not available for this measure on a strictly comparable basis for all years in the period.

[14]Of course, the differential employment growth may be at least partially explainable by nonunion factors.

[15]The states are Arizona, Connecticut, Florida, Georgia, Nevada, North Carolina, Oregon, Tennessee, Texas, and Washington.

[16]The states are California, Illinois, Louisiana, Massachusetts, Michigan, New Jersey, New York, Ohio, Pennsylvania, and the District of Columbia.

[17]The reason 11 states were used instead of ten was because the 10th highest ranking was a tie between two states. The eleven high-density states are: Connecticut, Illinois, Michigan, Minnesota, New Jersey, New York, Ohio, Washington, Wisconsin, Alaska, and Hawaii. The 11 lowest density states are: Arizona, Arkansas, Georgia, Mississippi, North Carolina, South Carolina, South Dakota, Tennessee, Texas, Utah, and Virginia.

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