

DATA WATCH

State-Level Estimates of Union Density, 1964 to Present

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June 2000

Abstract

This note describes the construction of time-consistent national and state-level estimates of union density for the years 1964 through 1999. Two sources of data are combined to produce these estimates, the Current Population Survey (CPS), a monthly survey of U.S. households, and the discontinued BLS publication *Directory of National Unions and Employee Associations*, based on data reported by labor unions to the federal government. The union density measure represents the *percentage of nonagricultural wage and salary employees who are union members*, including employees in the public sector. A more limited database, available for years since 1977 and based exclusively on the CPS, provides a measure of union *coverage* density, representing the percentage of nonagricultural wage and salary workers covered by a collective bargaining agreement. The databases will be updated annually and distributed freely via the Internet.

State-Level Estimates of Union Density, 1964 to Present

Empirical studies in the social sciences frequently include or desire to include state-level measures of unionization. There also exists demand for information on state union density among public agencies, labor unions, private analysts, and the news media. This note describes the derivation of time-consistent state-level estimates of union density for the years 1964 through 1999. The database will be updated annually and distributed freely via the Internet. The union density measure provided for all years since 1964 represents the *percentage of nonagricultural wage and salary employees who are union members*, including employees in the public sector. A more limited data set provides a measure of union *coverage* density for years since 1977, defined as the percentage of nonagricultural wage and salary workers covered by a collective bargaining agreement.

Two sources of data are combined to produce these estimates, the Current Population Survey (CPS), a monthly survey of U.S. households, and the now discontinued BLS publication *Directory of National Unions and Employee Associations*, a summary of information reported by labor unions to the federal government. For estimates beginning in 1977, all figures are calculated directly from the May 1977 through May 1981 CPS or the CPS Outgoing Rotation Group (CPS-ORG) monthly earnings files beginning January 1983 and continuing through December 1999. Figures prior to 1977 are calculated based on a combination of information from the May CPS and the BLS *Directories*, as described below.

Methodology

Estimation of state-level union density using the CPS follows the methodology used by the BLS to calculate published estimates of *national* union membership and coverage, the only difference being that agricultural workers are excluded here in order to provide consistency with estimates for earlier years derived from the BLS *Directories*.¹ Union membership and coverage are defined as follows. Beginning in 1977, the CPS included two questions related to union status. There have been no changes in these questions since 1977. Workers are counted as union *members* if they respond yes to the following

¹ The BLS publishes national estimates from the CPS in the January issue of *Employment and Earnings*. Hirsch and Macpherson (annual) publish a *Data Book* through the Bureau of National Affairs that includes national numbers from the CPS identical to published BLS figures, plus disaggregated union and earnings figures for states, metropolitan areas, detailed industries, and detailed occupations.

question, asked to employed wage and salary workers: *On this job, is ___ a member of a labor union or of an employee association similar to a union?* Workers who answer *no* to the union membership question above are then asked, *On this job, is ___ covered by a union or employee association contract?* Workers are counted as *covered* if they are union members or if they are not members but say they are covered by a union contract.

Union membership density in state j is calculated as follows:

$$\%Mem_j = 100(\sum w_{ij}M_{ij}/\sum w_{ij}) = 100(Membership/Employment)$$

where i indexes individual CPS respondents and j indexes the state (or metropolitan area, industry, occupation, etc.) over which density is being calculated. Employment is measured by $\sum w_{ij}$, the sum of the sample weights across the i individuals in state j . Included are all employed wage and salary workers, with the exception of workers whose industry of employment is agriculture, fishing, or forestry.² Letting $M_{ij} = 1$ if individual i in state j is a union member, total union membership is measured by $\sum w_{ij}M_{ij}$ and union density by $100(\sum w_{ij}M_{ij}/\sum w_{ij})$.

$\%Cov_j$ is calculated identically, except that one substitutes for M_{ij} the dummy variable C_{ij} measuring coverage by a collective bargaining agreement.

$$\%Cov_j = 100(\sum w_{ij}C_{ij}/\sum w_{ij}) = 100(Covered/Employment)$$

There are several differences in the union status information available prior to 1977 in the May 1973-1976 CPS. First the membership question did not include the phrase "*or employee association similar to a union.*" Second, there was no union *coverage* question. And third, not all states were uniquely identified, so many workers have their residence assigned to state *groups* rather than to a unique state. The addition in 1977 of the phrase "employee association" is estimated to have increased overall union density by about 2 percentage points, with relative small effects in the private sector and large effects in the public sector. We subsequently address the change in the CPS membership question and the use of state groups prior to 1977.

CPS Union Density Estimates, 1973-Present

Estimates for the years 1973 forward are based on CPS data. For the years 1983 to present, we use

the CPS-ORG earnings files, which for each year include all 12 months of the CPS, with each month including the quarter sample of the CPS (the outgoing rotation groups) administered the earnings supplement containing the union status questions. Each observation during a year is unique, although there is overlap in the samples across pairs of years. Sample sizes averaged about 177,000 during the 1983-95 period and 156,000 since 1996, with a high of 185,030 observations in 1990 and a low of 152,188 in 1996. In 1983 the average sample weight was 508. By 1999, the average weight had risen in value to 746 (i.e., each observation represents 746 in the population).

Union density estimates for 1977-81 are calculated from the May 1977 through May 1981 CPS. The May surveys prior to 1981 (beginning in 1973) administered the union status questions to all rotation groups, making sample sizes roughly one-third as large as the full-year quarter samples beginning in 1983. The May 1981 CPS administered the union questions to just a quarter sample. The CPS did not include any union status questions in 1982. Our figures for 1982 represent the average of CPS estimates for 1981 and 1983.

For the years 1973-76, two problems had to be addressed in order to achieve time-consistency. First, the union membership question prior to 1977 does not include the phrase “or employee association similar to a union.” Absent any adjustment, union membership density in the CPS is measured as increasing from 22.4% in 1976 to 24.1% in 1977, despite the fact that membership was falling in years prior to and subsequent to 1977. BLS *annual* figures based on union financial reports, however, show a 0.4% point decline in union membership density between 1976 and 1977, from 24.5% to (coincidentally) the same 24.1% found in the CPS (BLS, 1979, Bulletin 2079, Table 6).³ Assuming that a time-consistent CPS series would have fallen by 0.4% points, a multiple of 1.094 is required to adjust upward pre-1977 figures to the post-1977 CPS definition including employee association members (i.e., $1.094 \times 22.4\% = 24.5\%$). The 1.094 national adjustment rate is applied to 1973-76 CPS figures for all states.

Second, CPS state identifiers prior to 1977 exist for twelve large states plus the District of

² This follows the BLS definition of “nonagricultural” employment.

³ Unlike the *Directory* figures used to form our database, this series excludes members of “single-firm” unions and local unaffiliated unions and is thus not directly comparable to the broader-based biennial figures provided nationally and for states. Both *Directory* series exclude Canadian membership.

Columbia, with the remaining 38 states combined into ten multi-state groupings. State estimates for these 38 states during 1973-76 are derived as follows. We first use the May 1977-1981 CPS and calculate the ratio's of each state's union density to its state-group union density. We then produce state unionization estimates for 1973-76 by multiplying each year's state-group union density by the state-to-group ratios calculated for the overall 1977-81 period.

Linking BLS *Directory* Estimates to the CPS, 1964-72

Prior to 1973, union status questions were not regularly collected in the CPS.⁴ Our approach for the years 1964 to 1972 utilizes information from the former BLS publication *Directory of National Unions and Employee Associations*. The *Directories* provide state-level union density estimates for the even numbered years between 1964 and 1978.⁵ Data on union membership were obtained from a mail questionnaire sent to national unions, employee associations, and AFL-CIO state organizations. State estimates were requested in these surveys. BLS then aggregated the responses to yield overall state estimates of union membership. These were combined with independent estimates of nonagricultural employment to obtain state-level density estimates.

The *Directory* and CPS data sources overlap for three years -- 1974, 1976 and 1978. Generally, the *Directory* estimates are slightly higher than the CPS estimates. When state-specific ratios of CPS-to-*Directory* density are averaged over the three years (1974, 1976, and 1978), the range is from a low of 0.72 (Missouri) to a high of 1.41 (South Dakota). The median ratio was 1.02, with 22 of 51 being smaller than 1.0. Only four ratios fell below 0.90 and eight exceeded 1.20. Cross section regressions for the three

⁴ A union status question was asked of private sector workers in the March 1966 CPS and of private and public sector workers in the March 1970 CPS.

⁵ The *Directory* published each year's figure in the calendar year following the survey, and then "revised" figures two years later in the next *Directory*. We use the revised state figures for 1964-76, and the original figures for 1978, published in the final *Directory*. Bulletin numbers, year of data, and source tables are as follows: *Directory of National Unions and Employee Associations 1979*, #2079 (data for 1978, 1976 revised, Table 18); 1977, #2044 (1974 revised, Table 18); 1975, #1937 (1972 revised, Table 18); 1973, #Un33/9/973 (1970 revised, Table 18); 1971, #1750 (1968 revised, Table 18); the *Directory of National and International Labor Unions in the United States, 1969*, #1665 (1966 revised, Table 10); and 1967, #1596 (1964 revised, Table 9). The BLS *Directories* include series for membership and ones for membership and employee associations. The former series is roughly comparable to CPS figures that include the phrase "employee association" in the membership question, whereas the latter series is about 3% points higher. The *Directory* appears to overstate member and association membership, whereas respondents in the CPS may understate their affiliation with employee associations. Since we are attempting to construct a series time-consistent with figures based on the post-1977 CPS question, we utilize the BLS *Directory* numbers based on membership.

years, with the CPS unionization rate estimates regressed on the *Directory* estimates, yielded adjusted R²s of 0.865 in 1974, 0.859 in 1976 and 0.839 in 1978 and standard errors of 5.0 to 5.1 percentage points.

Thus while the *sources* of state level estimates for the three years of overlap are radically different, the two estimates generally are quite similar.

In order to rescale the *Directory* figures to a level consistent with the CPS, the state-specific three year CPS-to-*Directory* average ratios are applied to the *Directory* estimates for 1964, 1966, 1968, 1970 and 1972. Estimates for odd numbered intervening years are computed as simple averages of the adjacent even year estimates. Thus, a state-specific union density series for the years 1964-72 is obtained based on *Directory* figures rescaled to correspond with CPS levels, while estimates for 1973-1999 are based directly on the CPS. The overall series thus extends 36 years for all states plus the District of Columbia.⁶

In Figure 1, we show the *national* series of union membership density for 1964-99 and coverage density for 1977-99. Density figures by year are provided in the note accompanying Figure 1. Union membership density in nonagricultural wage and salary employment declines throughout the period, from 29.3% in 1964 to 14.0% in 1999.

Because of space constraints we do not show state union membership figures for all 36 years, but these estimates will be made readily available. In Table 1, we show density figures for three selected years -- 1964, 1984, and 1999. Corresponding to the national trend, most states show sizable declines in state unionization. In 1999, the most highly unionized states are New York (25.5 percent) and Hawaii (23.1 percent), while the least unionized states are North Carolina (3.3 percent) and South Carolina (3.6 percent).

Comparison with Previous State-Level Union Estimates

This section provides a brief comparison of the database described in this note with previous state-level union density estimates. The original sources should be consulted for details. Estimates of state union density prior to the CPS rely on the financial reports made by labor unions to the Department of Labor, along with supplemental information obtained from unions and employee associations not

⁶ In the BLS *Directories* the District of Columbia and Maryland are lumped together, while in the pre-1977 CPS, Maryland is included as a part of a state group. In order to obtain separate rates for DC and MD for the years 1964-72, we did the following. We calculated the CPS union density rate during the entire 1977-81 period for DC, MD, and DC-MD combined, and then adjusted the *Directory* figures for DC-MD by the ratio for DC/DC-MD

reporting. In addition to the published BLS *Directories*, Leo Troy has provided state estimates of full-time equivalent dues-paying membership from the union reports. His estimates tend to be smaller than those in the *Directories*, owing to BLS using a less stringent definition of membership. In *Distribution of Union Membership Among the States, 1939-1953*, Troy (1965) presents state estimates for 1939 and 1953. In the *Union Sourcebook*, Troy and Sheflin (1985, Table 7.1) revise figures for 1939 and 1953 and present state estimates as well for 1960, 1975, 1980, and 1982.

Compilations by researchers of union micro data from the CPS have provided the primary source for recent estimates of union density for states, as well as for metropolitan areas, detailed industry, and detailed occupation. Freeman and Medoff (1979) provide union membership density figures for all *private* sector wage and salary workers based on the combined 1973-75 May CPS. Kokkelenberg and Sockell (1985) calculate annual state membership density among all wage and salary workers ages 14 and over using the May 1973 through May 1981 CPS. Curme, Hirsch and Macpherson (1990) and Hirsch and Macpherson (1993) provide state estimates using the BLS definition of all wage and salary workers ages 16 and over based on the monthly CPS Outgoing Rotation Group earnings files (CPS-ORG) beginning in 1983. The latter paper provides state unionization rates for 1983 through 1991. Hirsch and Macpherson (annual) have provided CPS state union density estimates for all wage and salary workers for each of the years for 1983 forward, along with separate state estimates for private, public, and private manufacturing sector workers. Their state density figures for all workers and private manufacturing are subsequently reproduced in the annual *Statistical Abstract of the United States*, beginning with the 1995 volume (the state table includes 1983 and the most current year, beginning with 1994). None of the above includes CPS state union density for *nonagricultural* wage and salary workers, as measured here and in the earlier BLS *Directories*.

The immediate precursor for the database described in this note is a study by Vroman (1999) of interstate differences in unemployment insurance reciprocity rates. Vroman constructed a 1966-98 series of state union density rates based on published figures in the BLS *Directories*, CPS state density rates for 1973-81 from Kokkelenberg and Sockell (1985), and CPS state density rates for 1983 forward from Hirsch (0.8675) and for MD/DC-MD (1.0199). We then proceeded as described in the text.

and Macpherson (annual). We follow the approach used by Vroman to integrate the BLS *Directory* and CPS figures, but have extended the database in time and refined the methodology to enhance time consistency. In particular, we have estimated CPS figures for all years since 1973 with agricultural workers excluded and have adjusted CPS figures for 1973-76 to account for the change in the union membership question in 1977. This note has provided a description of the new state union database, which will be available to researchers on an on-going basis.

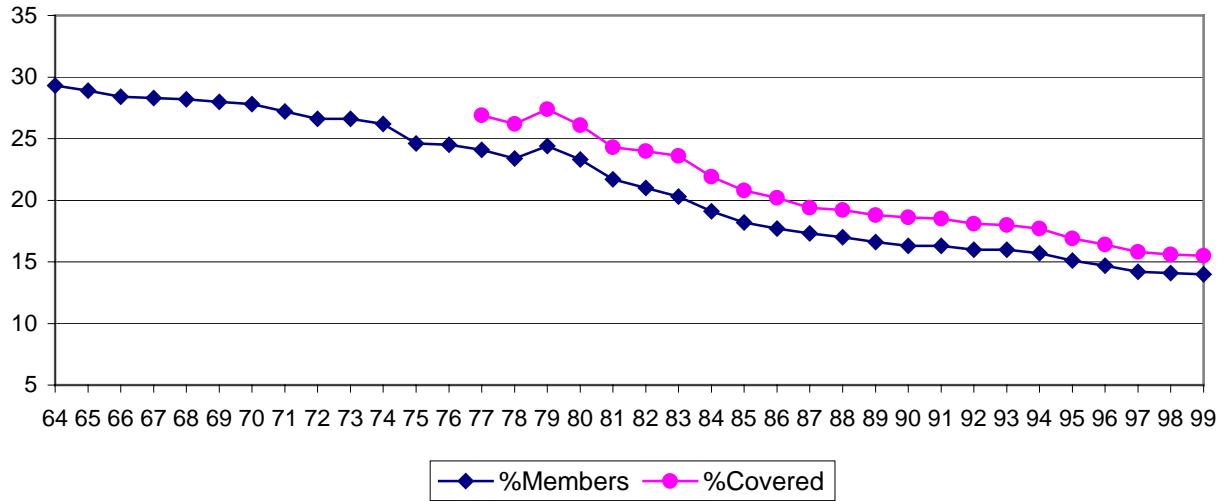
Availability of State-Level Union Density Estimates

The state-level union density databases described in this note will be available on the Internet through the authors' home pages. The data are contained in two spreadsheets, with each row corresponding to a state and the union density figures by year in columns (beginning with the most recent year). The membership density database contains figures from 1964 forward. The coverage density database contains figures for 1977 forward. Following release of the CPS each year, state union density estimates for the previous calendar year will be compiled and added to the membership and coverage databases.

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Figure 1: U.S. Membership & Coverage Density, 1964-1999



Union density is measured by the percentage of each state's nonagricultural wage and salary employees who are union members or covered by a collective bargaining agreement. Estimates are based on the 1983-99 Current Population Survey (CPS) Outgoing Rotation Group (ORG) earnings files, the 1973-81 May CPS earnings files, and the BLS publication, *Directory of National Unions and Employee Associations* for various years. Details on data and methodology are provided in the text. Union membership density figures by year are: 64:29.3 65:28.9 66:28.4 67:28.3 68:28.2 69:28.0 70:27.8 71:27.2 72:26.6 73:26.6 74:26.2 75:24.6 76:24.5 77:24.1 78:23.4 79:24.4 80:23.3 81:21.7 82:21.0 83:20.3 84:19.1 85:18.2 86:17.7 87:17.3 88:17.0 89:16.6 90:16.3 91:16.3 92:16.0 93:16.0 94:15.7 95:15.1 96:14.7 97:14.2 98:14.1 99:14.0. Union coverage density figures by year are: 77:26.9 78:26.2 79:27.4 80:26.1 81:24.3 82:24.0 83:23.6 84:21.9 85:20.8 86:20.2 87:19.4 88:19.2 89:18.8 90:18.6 91:18.5 92:18.1 93:18.0 94:17.7 95:16.9 96:16.4 97:15.8 98:15.6 99:15.5.

Table 1: State Union Membership as a Percentage of Nonagricultural Employment, Selected Years

State	1964	1984	1999	State	1964	1984	1999
All States	29.3	19.1	14.0	Missouri	27.1	20.0	14.5
Alabama	21.1	15.2	11.0	Montana	37.4	18.6	15.9
Alaska	39.7	24.2	20.4	Nebraska	23.0	14.0	8.9
Arizona	17.6	9.2	6.9	Nevada	33.3	23.9	19.7
Arkansas	15.0	10.0	7.6	New Hampshire	24.3	10.4	10.8
California	33.0	21.6	16.9	New Jersey	39.4	25.0	20.7
Colorado	21.2	13.1	9.5	New Mexico	14.1	9.8	10.1
Connecticut	28.8	20.5	18.3	New York	35.5	32.3	25.5
Delaware	29.2	17.9	14.0	North Carolina	8.4	7.5	3.3
D.C.	18.4	17.5	13.1	North Dakota	17.3	12.7	9.5
Florida	14.0	9.6	6.6	Ohio	37.6	23.9	18.1
Georgia	11.9	10.3	7.3	Oklahoma	15.8	10.4	8.9
Hawaii	21.7	29.2	23.1	Oregon	38.9	25.1	15.5
Idaho	24.8	9.5	9.6	Pennsylvania	37.7	25.0	17.4
Illinois	35.6	22.6	18.1	Rhode Island	26.0	22.5	17.9
Indiana	40.9	25.4	15.8	South Carolina	7.0	4.2	3.6
Iowa	27.7	17.4	14.2	South Dakota	14.1	11.0	6.2
Kansas	21.3	11.9	9.9	Tennessee	22.1	13.5	7.6
Kentucky	25.0	17.3	11.7	Texas	13.5	8.0	6.1
Louisiana	18.1	11.1	8.2	Utah	23.8	13.4	6.5
Maine	23.8	19.2	15.7	Vermont	18.5	11.5	9.7
Maryland	24.7	18.4	15.1	Virginia	15.8	10.8	6.6
Massachusetts	27.7	21.4	16.4	Washington	44.5	26.3	21.1
Michigan	44.8	29.4	21.6	West Virginia	36.5	24.1	15.3
Minnesota	37.0	23.1	19.5	Wisconsin	34.0	25.0	18.2
Mississippi	15.4	9.7	6.3	Wyoming	21.0	15.7	9.4

Figures represent the percentage of each state's nonagricultural wage and salary employees who are union members. Estimates for the 1964-99 period are based on a combination of the 1983-99 Current Population Survey (CPS) Outgoing Rotation Group (ORG) earnings files, the 1973-81 May CPS earnings files, and the BLS publication, *Directory of National Unions and Employee Associations* for various years. Details on data and methodology are provided in the text.