LABOR UNIONS AND AMERICAN POVERTY*

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Abstract

American poverty research largely neglects labor unions. We use individual-level panel data, incorporate both household union membership and state-level union density, and analyze both working and working-aged poverty. We estimate three-way fixed-effects (person, year, and state) and fixed-effects individual slopes models on the Panel Study of Income Dynamics (PSID) 1976-2015. We exploit the Cross-National Equivalent File's – an extension of the PSID – higher quality income data to measure relative and anchored poverty. Both union membership and state union density have statistically and substantively significant negative relationships with relative and anchored working and working-aged poverty. Household union membership and state union density significantly negatively interact, augmenting the poverty-reducing effects of each. Higher state union density spills over to reduce poverty among non-union households, and there is no evidence that higher state union density worsens poverty for non-union households or undermines employment.

By and large, American poverty research neglects labor unions. Prominent public intellectual books on poverty fail to discuss unions (e.g. Wilson 1996). High profile edited volumes on poverty (e.g. Danziger and Haveman 2001) and O'Connor's (2001) influential history of American poverty scholarship do not mention unions. Other prominent volumes contain only token mentions. For instance, Blank and colleagues (2006) only mention unions in regards to unemployment insurance (p.374). To the best of our knowledge, there have been no studies of how unions influence American poverty in *Journal of Labor Economics*, *Journal of Human Resources*, *Industrial and Labor Relations Review*, *Industrial Relations*, or the "top five" Economics journals. Most *Annual Review* essays on American poverty in anthropology (Morgen and Maskovsky 2003) and sociology (Desmond and Western 2018; Small and Newman 2007) have zero mentions of unions.[1]

The neglect of labor unions in American poverty research is surprising because extensive literatures demonstrate the critical role they play for outcomes closely related to poverty like wages, working conditions and equality. Scholars have long studied how labor unions are a key "power resource" that provides workers influence in the workplace, mobilizes voters, and allies with Leftist political parties to institutionalize egalitarianism (Brady 2019; Huber and Stephens 2001; Korpi 1983; VanHeuvelen 2020). Indeed, a few recent studies provide evidence that unionization is associated with lower poverty (Brady et al. 2013; Crettaz 2013; Lohmannn 2009; Lohmann and Marx 2018; Plasman and Rycx 2001; Rosenfeld and Laird 2016; Zuberi 2006).

[1] There has not been an *Annual Review of Economics* essay on poverty in the US, and we are not aware of any piece in the *Journal of Economic Literature* on unions and poverty. On balance, Lichter (1997), Newman and Massengill (2006) and O'Connor (2000) have a few brief mentions of unionization. But, none of these devote substantial attention to unionization as a principal cause of poverty. Brady's (2019) annual review essay and Brady and Burton's (2016) volume are exceptions, devoting real attention to unions.

Still, there remains a striking disconnect between the American poverty literature and research investigating union effects (Brady and Burton 2016).

The present study explicitly builds on the few recent and relevant studies while addressing their limitations. To the best of our knowledge, this is the first study on unions and poverty to use individual-level panel data. Unlike prior research, we examine both household union membership and state-level union density (henceforth "state union density"), and both working and working-aged poverty. With the Panel Study of Income Dynamics (PSID) for 1976-2015, we estimate three-way fixed-effects (person, year and state) and fixed-effects individual slopes models (Wooldridge 2010). We exploit the Cross-National Equivalent File's – an extension of the PSID – higher quality income data to measure relative and anchored working and working-aged poverty. We investigate three primary research questions: (1) Does household union membership influence working and working-aged poverty? (2) Net of household union membership, does state union density influence working and working-aged poverty? (3) By testing the interaction between union membership and state union density, do the effects augment each other and do the benefits of state union density spillover to nonunion households?

THE CASE FOR LABOR UNIONS

At the household and state levels as well as through their interactions, it is plausible that unions reduce poverty. Extensive literatures link union membership to higher wages and greater equality (Card 1996; Freeman and Medoff 1984; Kalleberg et al. 1981; Kristal and Cohen 2017; Rosenfeld 2014; Rosenfeld et al. 2016; Rosenfeld and Kleykamp 2012). Many demonstrate that union members receive a wage premium compared to nearly identical non-members. Union wage premia even exist for less-skilled workers (Eren 2009), those without a high school

education (Maxwell 2007), and those in precarious employment (Gomez and Lamb 2019). Union membership benefits also exist for a wide variety of low-wage workers (Applebaum et al. 2003; Batt et al. 2003; Erickcek et al. 2003; Waddoups 2001). Because wages are the dominant source of income for most working-aged households, union wage premia suggest household union membership will reduce poverty.[2]

Regarding state union density, evidence suggests a contextual effect of firm- and industry-level unionization on poverty. Many have shown that highly unionized contexts benefit both union members and non-members (Kahn and Curme 1987; Leicht et al. 1993; Neumark and Wachter 1995; VanHeuvelen 2018). Such contextual effects are due to a combination of threat and moral economy processes, resulting in spillover effects onto nonunion workers within a firm and industry and into nearby nonunion firms and industries.

Beyond the firm and industry, country-level union density similarly reduces poverty. Power resources theory describes unions as key class-based collective political actors shaping the distribution of economic resources (Brady 2019; Huber and Stephens 2001; Korpi 1983; VanHeuvelen 2020). Unions bond the working-class and poor together, politically mobilize in elections, exert pressure in workplaces and on governments, and ultimately result in a more egalitarian income distribution. Accordingly, studies demonstrate that countries with higher unionization have significantly lower working poverty (Crettaz 2013; Lohmannn 2009; Lohmann and Marx 2018; Rosenfeld and Laird 2016; Zuberi 2006). Although largely neglected by American poverty research, this comparative literature shows that labor unions are a key collective political actor driving lower poverty across rich democracies (Plasman and Rycx 2001).

[2] In our PSID sample, 89% of pre-fisc total household income comes from labor income.

Similar to comparative analyses of rich democracies, US states can be compared as polities where struggles and settlements occur over redistribution and inequality (Bucci 2018; Jacobs and Dirlam 2016). Indeed, in an era of decentralized federalism, state polities could be increasingly important in shaping poverty (DiGrazia and Dixon 2019; Hertel-Fernandez 2019). Consistent with this, Rosenfeld and Laird (2016) provide descriptive correlations showing that states with higher density have lower working and overall poverty. Brady and colleagues (2013) examine the relationship between state union density and working poverty from 1991 to 2010. Using multilevel models of individuals nested in states in 2010 and two-way fixed-effects models of individuals nested in state-years (1991-2010), they find that state union density reduces working poverty. They also find that state union density has larger effects than states' economic performance and social policies, with effects comparable to standard individual-level predictors of working poverty like education and single motherhood.

Beyond the distinct effects of household union membership and state union density, these two aspects should interact to augment the poverty reducing effects of each. Unions are a key component of a broader and integrated complex of labor market institutions that govern and equalize wages, constrain employers from paying very low wages, and protect workers' job security and physical safety (Blau and Kahn 2002; Bucci 2018; Doellgast et al. 2009; Gautie and Schmidt 2009; Giesselmann 2014; Koeniger et al. 2007). In the US, which lacks centralized wage bargaining and corporatist governance, unions are one of the few and most crucial labor market institutions (Bucci 2018; Jacobs and Dirlam 2016; Rosenfeld 2014; VanHeuvelen 2020). To the extent that unions are an essential part of a broader institutional complex shaping equality, the presence of both household union membership and state union density should provide a particularly favorable situation for working families. Moreover, as state union density reflects

and amplifies an egalitarian institutional context, it should spill over to reduce the poverty of nonunion and non-working households.

THE CASE FOR SKEPTICISM

Despite the arguments above, there are at least four reasons why unions might fail to reduce poverty. First, union density is so low that unions may have become ineffective, even irrelevant (DiGrazia and Dixon 2019; Hertel-Fernandez 2019). As Rosenfeld (2014: 30) explains, "the private sector in this country is now nearly union-free, to a degree not seen in a century." The US – and especially some states – exhibits cross-nationally and historically exceptionally low union density (Rosenfeld 2014). Union density has declined more rapidly among the less skilled, who are most vulnerable to poverty (Blank 2009). For such reasons, Autor (2011: 14) argues: "it appears unlikely their [unions'] role is paramount. . .[unions'] impact is largely confined to manufacturing and public sector employment, neither of which comprises a sufficiently large share of the aggregate economy." Low union density also results in less variation across states than exists across rich democracies (Hirsch and McPherson 2003; Visser 2011). In turn, there could be insufficient interstate heterogeneity in union density to explain variation in poverty. Moreover, low and relatively invariant state union density suggests that, although unions could theoretically affect US poverty, other factors, such as economic performance and individual characteristics, are likely to have far greater influence (Autor 2011; Blank et al. 2006). In total, analyses of recent data might reveal little to no relationship between labor unions poverty.

Second, there are large underlying differences between those selecting into unions versus not. Selection likely reflects unobserved advantageous characteristics of union members, such as

ambition and social skills (Borjas 2015; Card et al. 2004; VanHeuvelen 2018). Such unobserved characteristics are likely associated with poverty for reasons independent of union membership. This unobserved heterogeneity and related selection bias are plausibly even more notable among the less skilled and those below/near the poverty line. Previous studies on unions and poverty have relied on cross-sectional data (e.g. Brady et al. 2013; Lohmann 2009), however. Therefore, panel data with techniques to net out unobserved individual characteristics might reveal no robust union effect.

Third, even if unions benefit union households, there might be no beneficial spillover effects for nonunion households. Many argue that unions only benefit workers in select industries/sectors where unions are strong (Autor 2011). Those at the bottom of the income distribution are unlikely to be unionized and may not benefit from state spillover effects. While Brady and colleagues (2013) show state union density reduces household-level working poverty, they mostly cannot control for household union membership and therefore cannot establish such spillover effects for nonunion households.[3] Rather than a contextual spillover effect, it is unclear if poverty-reducing effects of state union density are simply due to compositional differences across states. Further, Brady and colleagues (2013) find that the effects of state union density are much stronger for working households closer to the median and insignificant for those in deep poverty. Therefore, any benefits of unions may be narrowly restricted to employed and less poor union households. To accurately assess potential spillover effects for nonunion households, panel

[3] They use LIS data from the March Current Population Survey (CPS), but the LIS removes union membership data. While Brady and colleagues conduct sensitivity analyses with the underlying CPS data from the smaller outgoing rotation group including union information, they can only approximate the higher-quality LIS income measures.

data with both household and state union information, for working and nonworking households, is needed.

Fourth, unions could even have adverse spillover effects, worsening poverty of non-members and disadvantaged groups. Directly, unions and the policies they advocate for might only create rents for protected insiders, and may even worsen the labor market for the truly disadvantaged (for a discussion, see Rosenfeld and Kleykamp 2012). Some theorize that unions have a "crowding effect," in which union wage gains lead to cuts in the quantity of union jobs (Kahn 1978; Neumark and Wachter 1995). Crowding then increases the supply of non-member workers, depressing wages of non-members. While Brady and colleagues (2013) only analyze working households, a comprehensive test for direct adverse spillover effects must include non-working households.

Indirectly, by raising wages among the employed, unions could increase labor costs, cause labor market rigidity, and discourage hiring (Blau and Kahn 2002; Magnani and Prentice 2010). Similar to well-known arguments about adverse effects of minimum wages, higher wages and labor costs could force firms to reduce employment (Walsworth 2010). This would worsen poverty because employment is the most salient individual-level predictor of poverty (Brady 2019; Brady et al. 2017; Rainwater and Smeeding 2004). Therefore, it is essential to include non-working households in the sample and test for state union density effects on employment as well.

To recapitulate, previous research on unions suggests that the beneficial impacts on workers in the middle and bottom of the distribution should be detectable among poverty. Direct mechanisms of union household residence and contextual effects of state union density might each have distinct negative associations with poverty, and these effects might even interact. However, there are several reasons to remain skeptical. Any poverty differences may be due to

variation in observed or unobserved characteristics across individuals or across states. Meanwhile, restricting focus only to employed workers might miss negative spillover effects in which individuals are crowded out of gainful employment.

DATA AND METHODS

We use individual-level data from the Panel Study of Income Dynamics (PSID) and the Cross-National Equivalent File (CNEF), which we merge with state-level data (described below). This dataset has critical advantages over the LIS-CPS data used by Brady and colleagues (2013). Primarily, the CPS is cross-sectional,[4] meaning they cannot control for the unobserved characteristics that select individuals into unions. Secondly, they only examine from 1990 to 2010. By contrast, our study using the PSID spans a longer and more varying time period.

The CNEF, which is a supplement to the PSID, provides higher quality standardized measures of income incorporating taxes, tax credits, and transfers (Frick et al. 2007). The PSID is the longest running panel survey in the US, with the initial survey wave administered in 1968. With weights, the economic characteristics of the PSID, including wages and inequality, and all but the most extreme high and low family incomes, are similar to the data used to construct official poverty statistics, the Current Population Survey (CPS) (Gouskova and Schoeni 2007, VanHeuvelen 2018).

We use the PSID-CNEF waves 1976, and 1979-2015 because 1976 and 1979 were the first PSID waves with information on spouse's union membership. 2015 is the final year of available CNEF data, which we need for the income measures. We drop the 1990-1995 Latino

[4] While the CPS outgoing rotation group can be treated as longitudinal, respondents are in the panel for only one year, an insufficient timespan for our purposes.

sample and include the Survey Research Center, Survey of Economic Opportunity, and 1997 onward Immigrant samples.

Individuals, the unit of analysis, are nested in households, which are nested in states and years. We construct two samples corresponding to working households and working-aged households: (a) individuals in households with at least one employed working-aged adult (18-64 years) and (b) individuals in households with a working-aged adult household head. We include the 50 US states and the District of Columbia, which is treated as a state.

Dependent Variable

Following the overwhelming majority of international poverty research (Brady et al. 2013; Brady and Burton 2016; Brady et al. 2017; Rainwater and Smeeding 2004; Smeeding 2016), we operationalize *poverty* as those residing in households less than 50 percent of the median equivalized disposable household income (reference=not poor). Thus, poverty is a household-level variable. A household pools its expenses and resources, so if the household is poor, all members are poor. We measure household income with the CNEF household "post-fisc" income variable. Unlike the official US poverty measure (OPM), our measure of income comprehensively incorporates taxes and tax credits (e.g. the Earned Income Tax Credit) and cash and near cash (e.g. the Supplemental Nutritional Assistance Program) transfers.[5] Thus, we intentionally avoid the OPM because of its well documented and serious validity and reliability problems (Brady et al. 2013; Rainwater and Smeeding 2004; Smeeding 2016). Following prevailing international standards on income measurement (Brady et al. 2013; Brady et al. 2017; Duncan and Petersen 2001; Rainwater and Smeeding 2004), we equivalize income for household size by dividing by the square root of household members. The poverty threshold is calculated

[5] The CNEF employs the National Bureau of Economic Research's TAXSIM model.

yearly using all individuals regardless of the head's age or employment status of any household member. The sample is reduced to employed or working-aged households only after calculating the threshold.

Using the current year's median, we analyze this standard *relative poverty* measure described above. This is the most widely accepted definition in the international poverty literature. We supplement that measure with *anchored poverty*. Anchored poverty sets the threshold for poverty in the first year of analysis (1976) and uses that threshold across years, adjusting only for inflation (Brady et al. 2013; Smeeding 2016). Anchored poverty is a well-established approximation of "absolute" poverty as it applies the same threshold over time, even when medians rise and fall. While relative poverty is less responsive to the business cycle and economic development, anchored poverty should mechanically decline as the typical household experiences rising affluence since 1976.

Household and State Union Measures

We measure labor unions at the household and state levels. First, *union household membership* is a binary measure of living in a union household or not, where either or both the household head and spouse are union members.[6] Second, we measure *state-level union density* among non-agricultural workers aged 16 and older, collected from the Current Population Survey by Hirsch and McPherson (2003).[7] Union membership for household heads is available from 1970 onward. However, spouses were asked about union membership only in 1976 and

[6] Union information for other household members is not available. Heads and spouses make up over 90% of employed individuals in our sample. While our measure probably slightly underestimates union households, we are skeptical that main results are significantly biased by this limitation.

[7] An alternative measure, state union coverage, produces similar results. This is expected because of the similar levels and trends of membership and coverage over this period.

from 1979 onward. Fortunately, union membership in the PSID tracks closely to union membership in the CPS (VanHeuvelen 2018). Appendix I displays the variation in state union density over time.

Other Independent Variables

We adjust for a standard set of variables that may confound the association between unions and poverty (Blank et al. 2006; Brady et al. 2013; Brady and Burton 2016; Brady et al. 2017; Lohmann 2009; Rainwater and Smeeding 2004). We include two sets of controls, based on our samples of working households and working-aged households. For working households, we identify the household lead earner, defined as the highest earner, with ties broken by age (i.e. not necessarily the head). Household age distribution includes lead's *age* (under 25, 25-34, 35-54, and 55 or older), the *number of household members under 18*, the *number of household members over 64*, and a binary measure of whether the household contains a *child under age 5*. With couple as the reference, we include binary measures for *single mother*, *single father*, *female-head no child*, and *male-head no child* households. With White as the reference, we include indicators for *Black* and *Other* lead earners.[8] With less than high school degree as the reference, we include binary measures for whether the lead earner has a *high school degree*, *some college*, *college degree*, and *graduate education*. Following VanHeuvelen's (2018) harmonization of Census industry codes in the PSID, we include dummies for 18 industries of the lead earner. Further, we include indicators for 13 occupations of the lead earner.

[8] While race and education are usually time-invariant among employed adults, lead earners can vary across surveys, and individuals can transition across households. Thus, race and education as household properties have some time variation for individuals. For the working-aged sample, heads also vary over time.

For working-aged households, we assign household characteristics based on the head rather than the lead earner because approximately 8% of sample households have no one employed. This applies to age, race, and education. We omit the industry and occupation indicators and instead include indicators of whether *no one is employed* in the household and *multiple earners* in the household (reference=one earner) (Brady et al. 2017). The working-aged poverty models retain the controls for age distribution and family structure.

For both samples, we adjust for several state characteristics (Brady et al. 2013; VanHeuvelen and Copas. 2019): (i) *GDP per capita, in thousands of real 2000 dollars*, (ii) *employment rate of the population,* (iii) *GDP growth,* and (iv) the *natural log of population.* Data are collected form the US Bureau of Economic Analysis. Descriptive statistics are included in the Appendices II-III.

Estimation Techniques

We begin by estimating three-way fixed-effects linear probability regression models:

$$y_{ist} = UnionHH'_{ist}\beta + UnionSt'_{st}\beta + \boldsymbol{x'_{ist}\beta} + \boldsymbol{year'_i\gamma} + \boldsymbol{state'_{st}\pi} + \alpha_{1i} + \epsilon_{ist} \quad (1)$$

Individuals, *i,* are nested in states, s, which are nested in years, *t.* y indicates whether or not an individual is poor in survey wave t.[9] Individual fixed-effects, α_{1i}, remove time-invariant unobserved person-level heterogeneity, while year contrasts, $\boldsymbol{\gamma}$, remove shared period-specific shocks, and state fixed-effects, $\boldsymbol{\pi}$, remove time-invariant state-level characteristics and transform state-level variables to within-state deviations. **x** is the set of observed household and state-level

[9] Because we are primarily interested in average marginal effects, we use linear probability models, which provide similar results to average marginal effects from logistic regression models. We also estimated conditional logistic regression models and found similar results.

characteristics, included beyond household union membership ($\text{UnionHH}'_{ist}\beta$) and state union density ($\text{UnionSt}'_{st}\beta$).[10]

Compared to previous research, these models provide a more rigorous test of the association between unions and poverty. Most critically, individual fixed-effects remove time-invariant individual unobserved heterogeneity, which addresses concerns of selection into unions discussed above. Thus, main results indicate the association between change in union membership, at both the household and state levels, and an individuals' poverty change.

State fixed-effects allow us to better identify the influence of state union density on poverty by measuring within-state deviations. There are many reasons why states with high union density, such as California, differ from states with low union density, such as Mississippi (VanHeuvelen and Copas. 2019). We can more directly test the influence of union density by measuring its change within states after netting out stable unobserved between-state characteristics. Moreover, including both household and state union measures more rigorously assesses whether previous findings relied on compositional differences in states' union membership.

We next estimate linear probability regression models interacting household union membership and state union density, which allows us to formally assess whether state union density effects are concentrated among union households, whether state union density effects spillover to nonunion households, and whether household union membership and state union density augment each other's effects.

While three-way fixed-effects models improve upon previous research and address many of the reasons for skepticism discussed above, they nevertheless have limitations. Such models

[10] We use robust standard errors clustered at the individual.

rely on certain strong assumptions that might be unreasonable when applied to the study of unions and poverty. Thus, to scrutinize the robustness of our main results, we consider an extension of fixed-effects method that allows for the relaxation of these assumptions.

We estimate fixed-effects individual slopes (FEIS) linear probability regression models. These models, popularized and detailed by Wooldridge (2010, pp. 377-81), can be written as:

$$y_{it} = \alpha_{2i} year_{it} + \boldsymbol{x}_{\boldsymbol{it}}'\boldsymbol{\beta} + \boldsymbol{state}_{\boldsymbol{st}}'\boldsymbol{\pi} + \boldsymbol{period}_{\boldsymbol{t}}'\boldsymbol{\varphi} + \alpha_{1i} + \epsilon_{it} \quad (2)$$

The difference between equations (1) and (2) is the treatment of time. Year contrasts are replaced with an individual-specific linear year coefficient.[11] FEIS models adjust not only for time-invariant individual-level heterogeneity in the probability of working poverty, but also individual-specific time trajectories in the probability of working poverty (Ludwig and Brüderl 2018). To partially account for broadly shared poverty trends, we include a categorical variable, $\boldsymbol{period}_t$, which measures period contrasts in the business cycle.[12] Additional details of the FEIS are included in the online appendix.

RESULTS

Descriptive Patterns

Descriptive statistics of key variables are included in Table 1. Across the entire sample, about 10.1% of person-years fall into anchored poverty, and 16.1% fall into relative working poverty. As expected, we observe substantively and statistically significant differences in poverty rates across union and nonunion households, as well as between states with high and low

[11] For coefficients of interest, FEIS is equivalent to including time-by-individual interactions in the regression model.
[12] Due to fewer observations in earlier years, we combine 1976-1992 (1) 1993-1999 (2) 2000-2007 (3) and 2008-2015 (4).

union density rates, defined as those in the top or bottom third of the entire sample's state union density rates. Across working and working-aged relative and anchored poverty, we observe that union households have poverty rates between 9 (anchored-working aged) and 15 (relative-working aged) percentage points lower than nonunion households, with unionized households consistently having poverty rates of only 3-4 percent. Similarly, highly unionized state-years have poverty rates between 3 (anchored-all) and 7 (relative-all) percentage points lower than state-years with lower union density.

Figure 1 shows trends in poverty. Figure 2 shows trends separately by household union membership and state union density. Figure 3 visualizes the differences across groups from Figure 2. While many patterns in these figures are notable, we highlight three.

Table 1. Descriptive Statistics

		Household			State union density		
	Mean	Nonunion	Union	Dif	Low	High	Dif
Relative Poverty, all	0.164	0.189	0.051	-0.138 *	0.200	0.129	-0.071 *
Relative Poverty, working	0.130	0.149	0.049	-0.100 *	0.158	0.099	-0.059 *
Anchored Poverty, all	0.131	0.152	0.036	-0.116 *	0.155	0.111	-0.043 *
Anchored Poverty, working	0.098	0.113	0.034	-0.079 *	0.114	0.082	-0.031 *
Union membership	0.160						
State union density	16.00						

Source: PSID, 1976-2015. "Low" and "High" state union density are defined as state-years in the bottom and top third of the distribution of state union density among the whole sample.

* $p<0.001$, two-tailed test

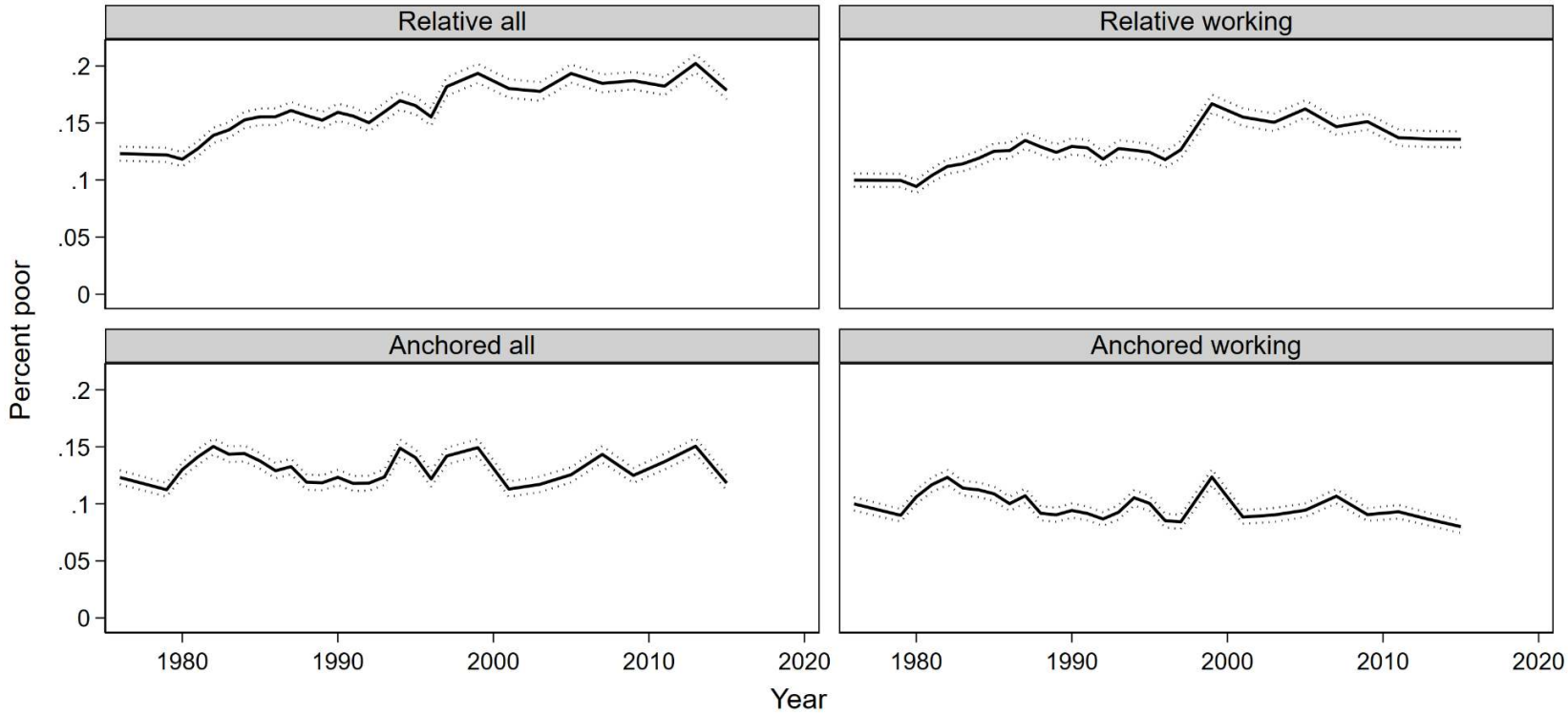

Figure 1. Poverty over time
Data source: PSID 1976-2015. Dotted lines are 95% confidence intervals.

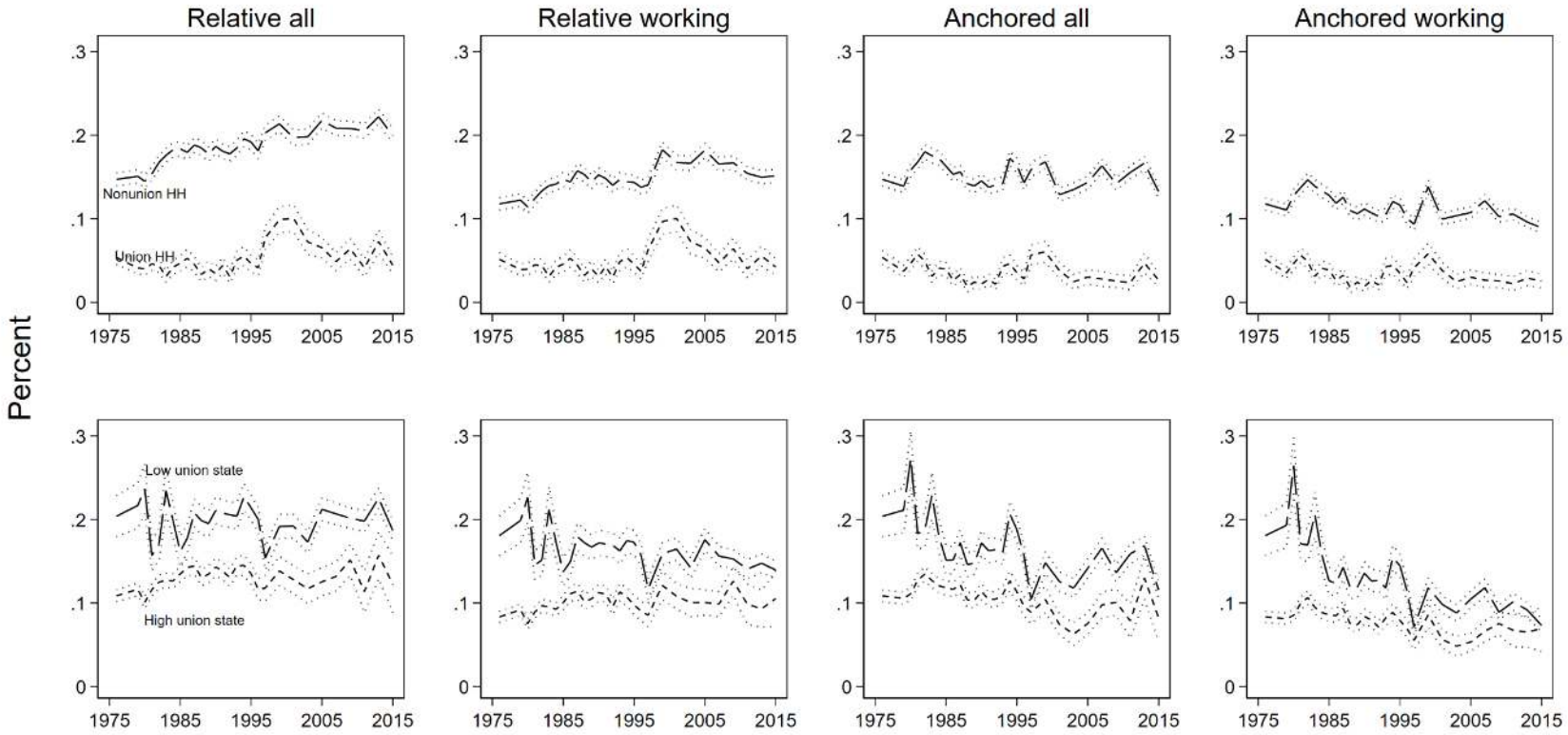

Figure 2. Poverty over time, by household and state union density
Data source: PSID 1976-2015. Dotted lines are 95% confidence intervals. "Low" and "High" state union density are defined as state-years in the bottom and top third of the distribution of state union density among the whole sample.

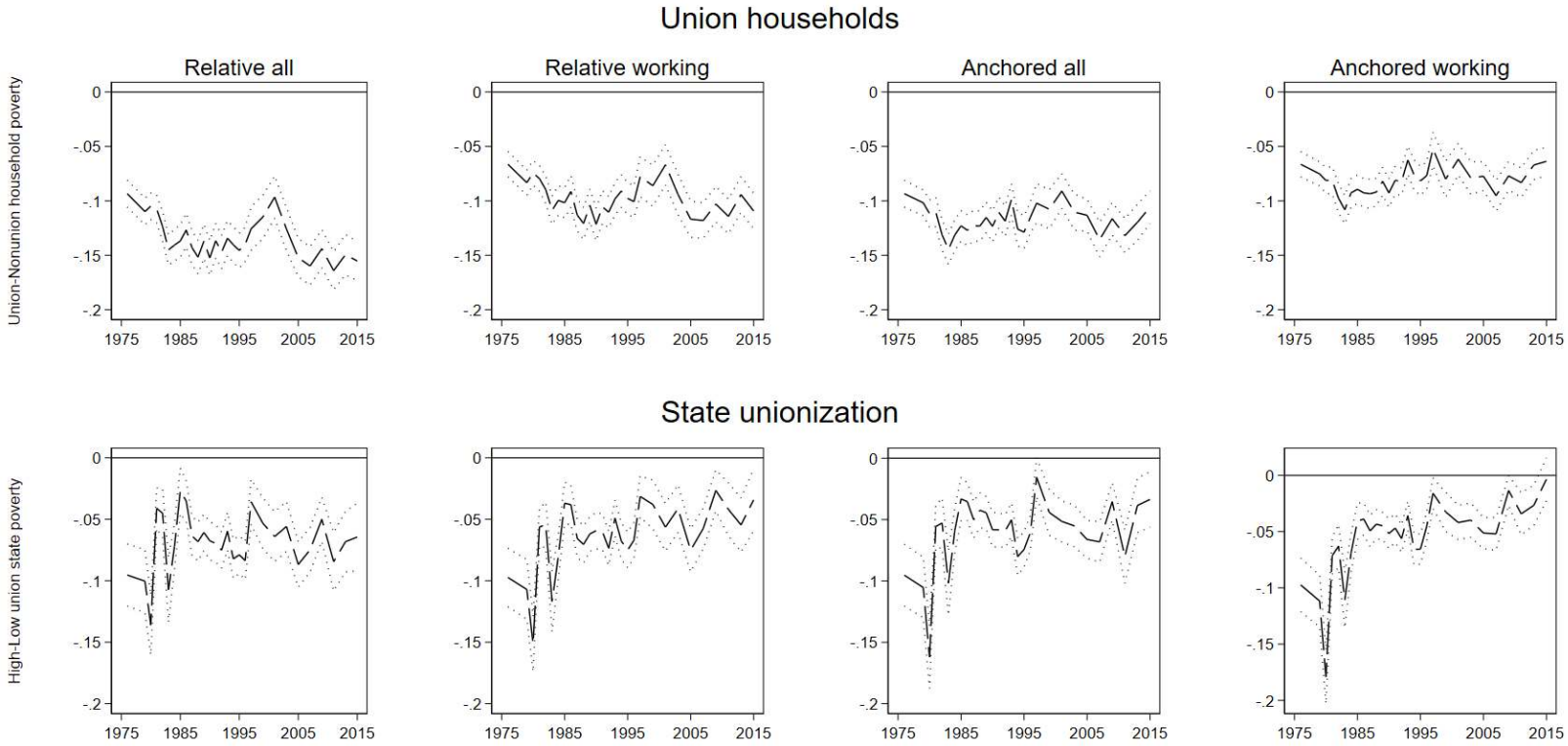

Figure 3. Difference in poverty across household and state union density
See notes in Figure 2.

First, we observe consistent differences in poverty rates between union and nonunion households over time between 5 and 10 percentage points. Poverty rates among union households remain at low values across time, meaning that nonunion households largely drive changes in poverty over time.

Second, we observe consistently lower working-aged poverty rates among states with high union density. Anchored and relative working-aged poverty are consistently about five percentage points lower in highly unionized states.

Third, we observe convergence across states of working relative and anchored poverty rates in recent years, driven primarily by working poverty rates in low union density states converging with the low poverty rates in high union density states. This partly reflects convergence in union density across states between 1976 and 2015 and the modest decline in working poverty in the US since the 1990s (Brady et al. 2013). For relative working poverty, the difference between states shrinks from about 15 percentage points in 1980 to about three in the most recent waves. For anchored working poverty, we see no significant difference in the last year of data, 2015. However, this last point is an exception to the otherwise consistent set of findings. At least descriptively, unionized households and states have lower rates of each dimension of poverty.

Of course, differences in poverty could result from compositional differences of states and households, as well as unobserved characteristics of individuals resulting in unequal sorting across union dimensions. We therefore turn to fixed-effects regression models to assess the robustness of the association between labor unions and poverty.

Regression Analyses

Table 2 presents results from three-way fixed-effects regression models. For both relative and anchored poverty and both working and working-aged households, we present three models. The first include only our two union measures and individual, state, and year fixed-effects. The second add individual-, household-, and state-controls. The third include an interaction between household and state union density.

Across Table 2, several conclusions can be drawn. First, residence in a union household clearly and significantly reduces all poverty outcomes. These coefficients are robust across all eight of the first two models. While adding controls in the second models unsurprisingly lowers the magnitude of coefficients, we find that union household membership reduces the probability of poverty by between .04 and .06 compared to nonunion households ($p<0.001$ in all models with controls, two-tailed tests). Critically, all models include individual fixed-effects. Results thus do not reflect differences in the probability of poverty across union and nonunion households, but rather change in the probability of poverty for an individual when a household changes its union membership. Associations are thus net of time-invariant characteristics differing between those in union and nonunion households.

Table 2. Fixed effects linear probability models, poverty on unions and controls

	Relative poverty			Anchored poverty		
	Working-aged households[1]					
	(1)	(2)	(3)	(4)	(5)	(6)
Union household	-0.100***	-0.059***	-0.051***	-0.087***	-0.049***	-0.024***
	(0.003)	(0.003)	(0.007)	(0.003)	(0.003)	(0.006)
State union density	-0.001	-0.002***	-0.002***	-0.001	-0.002**	-0.001*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Household * State union density			-0.001			-0.001***
			(0.001)			(0.001)
	Working poverty households[2]					
	(7)	(8)	(9)	(10)	(11)	(12)
Union household	-0.066***	-0.041***	-0.028***	-0.052***	-0.031***	-0.009
	(0.003)	(0.003)	(0.007)	(0.003)	(0.002)	(0.006)
State union density	-0.002**	-0.002***	-0.002***	-0.001+	-0.002***	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Household * State union density			-0.001*			-0.001***
			(0.001)			(0.001)
Controls?	No	Yes	Yes	No	Yes	Yes

Robust clustered standard errors in parentheses

All models include individual, year, and state fixed effects. Standard errors clustered at individual level. Working aged sample controls include: household head age, number of household members under 18, number of household members over 64, whether the household contains a child under 5, household composition, household head race, household head education, whether none, one, or two or more household members are employed. Working poverty sample controls include: lead earner age, number of household members under 18, number of household members over 64, whether the household contains a child under 5, household composition, lead earner race, lead earner education, lead earner industry, lead earner occupation. All include state controls: GDP per capita, employment rate per population, GDP growth, and natural log of population.

+ p<0.10, *p<0.05, **p<0.01, ***p<0.001, two-tailed test

1 Samples: 381,112

2 Samples: 324,391

Second, we find significant and negative associations between state union density and all four poverty outcomes. For three of four outcomes, state union density becomes statistically significant only when control variables are included. Nevertheless, declines in state union density, or the inverse of presented coefficients, corresponds with an increase in the probability of all four poverty outcomes ($p<0.01$). Because the models include state fixed-effects, coefficients represent the association between working poverty and change in state union density within states over time. Notably, results are net of household union membership. Thus, these state-level results do not simply reflect individual compositional differences in the PSID across times and places. Rather, this is a state-level effect of union density net of household membership.

Third, the interaction effects between household and state union density are statistically significant for three of four outcomes (relative working-aged is the exception). Results mostly suggest that state union density and household membership augment the effects of each other. Moreover, the main effect of state union density is significantly negative in all four models. Overall, results suggest that state union density reduces poverty for nonunion households. There is also no evidence that state union density has adverse spillover effects as negative associations are found for both working and working-aged poverty.

While the models in Table 2 improve on previous studies of unionization and poverty, they nevertheless rely on potentially strict assumptions for fixed effects. We relax these assumptions by fitting FEIS models, presented in Table 3. Model sequencing remains the same as in Table 2.

Table 3. Fixed effects individual slopes linear probability models, poverty on unions and controls

	Relative poverty			Anchored poverty		
	Working aged[1]					
	(1)	(2)	(3)	(4)	(5)	(6)
Union household	-0.093***	-0.056***	-0.035***	-0.080***	-0.045***	-0.014*
	(0.004)	(0.003)	(0.008)	(0.003)	(0.003)	(0.007)
State union density	-0.002**	-0.002***	-0.002**	-0.001+	-0.002***	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Household * State union density			-0.001*			-0.001***
			(0.001)			(0.001)
	Working poverty[2]					
	(7)	(8)	(9)	(10)	(11)	(12)
Union household	-0.063***	-0.037***	-0.024***	-0.048***	-0.027***	-0.011+
	(0.003)	(0.003)	(0.007)	(0.003)	(0.003)	(0.006)
State union density	-0.001**	-0.002**	-0.002*	-0.001	-0.001*	-0.001*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
Household * State union density			-0.001*			-0.001**
			(0.001)			(0.000)
Controls?	No	Yes	Yes	No	Yes	Yes

Robust clustered standard errors in parentheses

See Table 2 for discussion of controls.

+ p<0.10, *p<0.05, **p<0.01, ***p<0.001, two-tailed test

1 Samples: 379,076

2 Samples: 321,654

Our first two conclusions, that household membership and state union density independently reduce poverty, are clearly replicated in FEIS models. Losing household union membership increases the probability of poverty for all four outcomes, and the decline of state union density increases the risk of all as well. Thus, both state and household union effects are detectable not only net of stable individual characteristics, but also idiosyncratic individual poverty trajectories over time.

When we include individual slopes, we even more clearly detect consistent, significant interactions between household and state union density. Across all poverty outcomes, state union density has a significant and negative association for nonunion households with a steeper impact for union households. As shown in Figures 2-3, union and nonunion households have substantially different trajectories in poverty over time, as have states with different union densities. It is uncertain whether assuming uniform time trajectories is appropriate. Partly for this reason, we can more clearly detect variation of union effects across states and household membership when we relax this assumption.

Figure 4 plots the predicted probabilities of our four poverty dimensions across union and nonunion households, and across state union density (based on Table 3). The dashed line for union households clearly shows that living in a union household has its most protective benefits when one also lives in a highly union density state, with the probability of poverty ranging between 0.03 and 0.07 among highly union density state-years. Similarly, nonunion households benefit from higher state union density. We observe lower predicted probabilities of poverty among nonunion households among higher union density states across all poverty outcomes.[13]

[13] Household marginal effects are visualized in the online appendix.

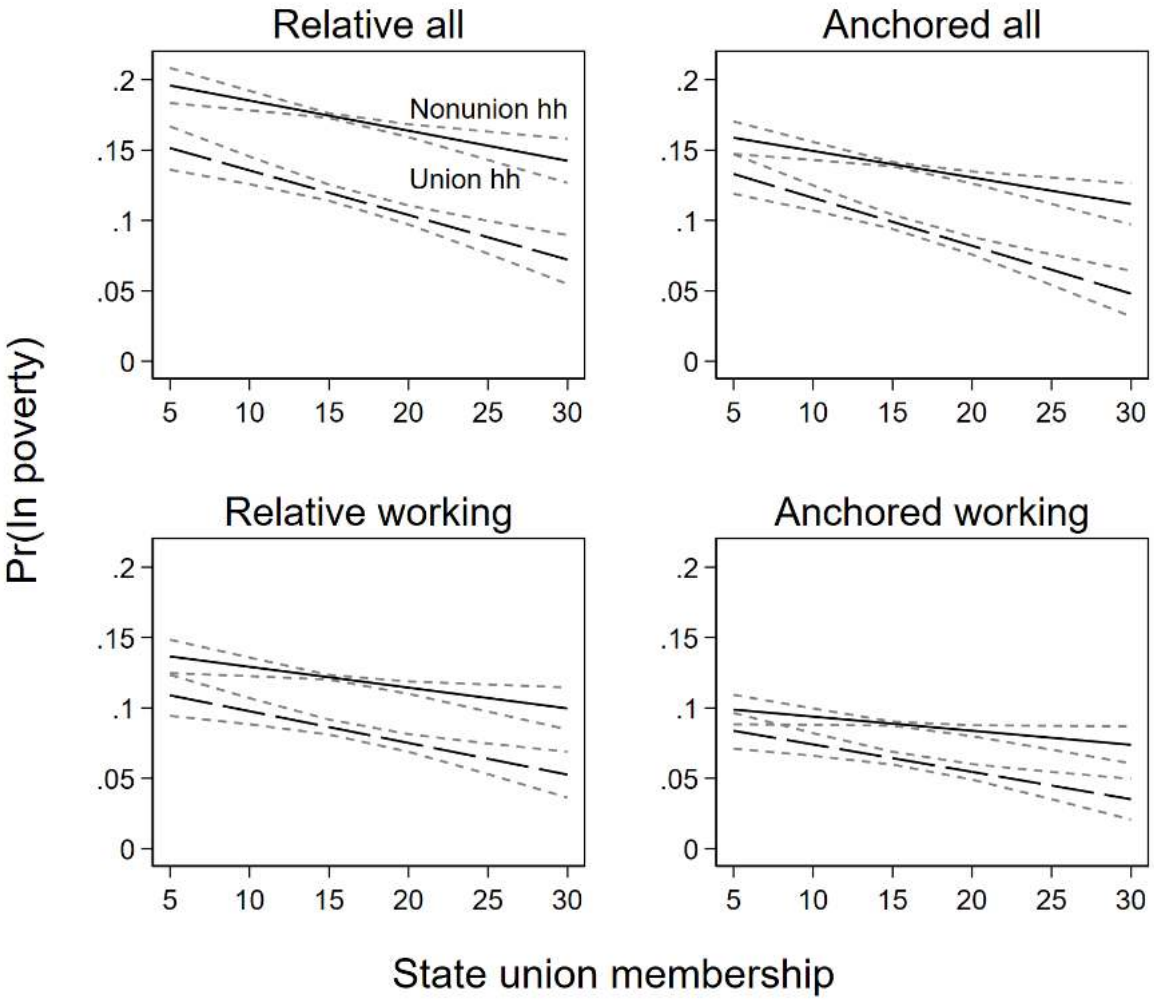

Figure 4. Predicted poverty levels by state and household union density
Data source: PSID 1976-2015
Predictions from models 3, 6, 9, and 12 in Table 3

Figure 5 displays the marginal effects of household union membership across levels of state unionization. The marginal effects of poverty decline between two and five percentage points from low to high state unionization. For example, union households have about 0.02 lower probabilities of being in anchored poverty compared to non-union household among low unionized states, and have about 0.06 lower probabilities among the highest unionized states. The interaction illustrates that there is more similarity in the risk of poverty between union and non-union households among less unionized states. However, this between group equality comes at the cost of an overall higher risk of poverty. Although there is a greater between-group difference between union and non-union households in highly unionized contexts, this inequality occurs within a context of an overall lower risk of experiencing poverty in the first place.

Before proceeding, it is important to clarify how the magnitude of state union density and household union membership compares to our other predictors of poverty. Figure 5 presents x-standardized coefficients of all state level variables in our second models of Table 3: union density, GDP per capita, employment, GDP growth, and logged population.[14] It also compares household union membership against the individual-level coefficients for the "big four" risk factors of poverty (Brady et al. 2017): single motherhood, low education (i.e. less than high school), unemployment, and young household head/lead earner (aged 25 or younger).

[14] A table of standardized coefficients is included in the online appendix.

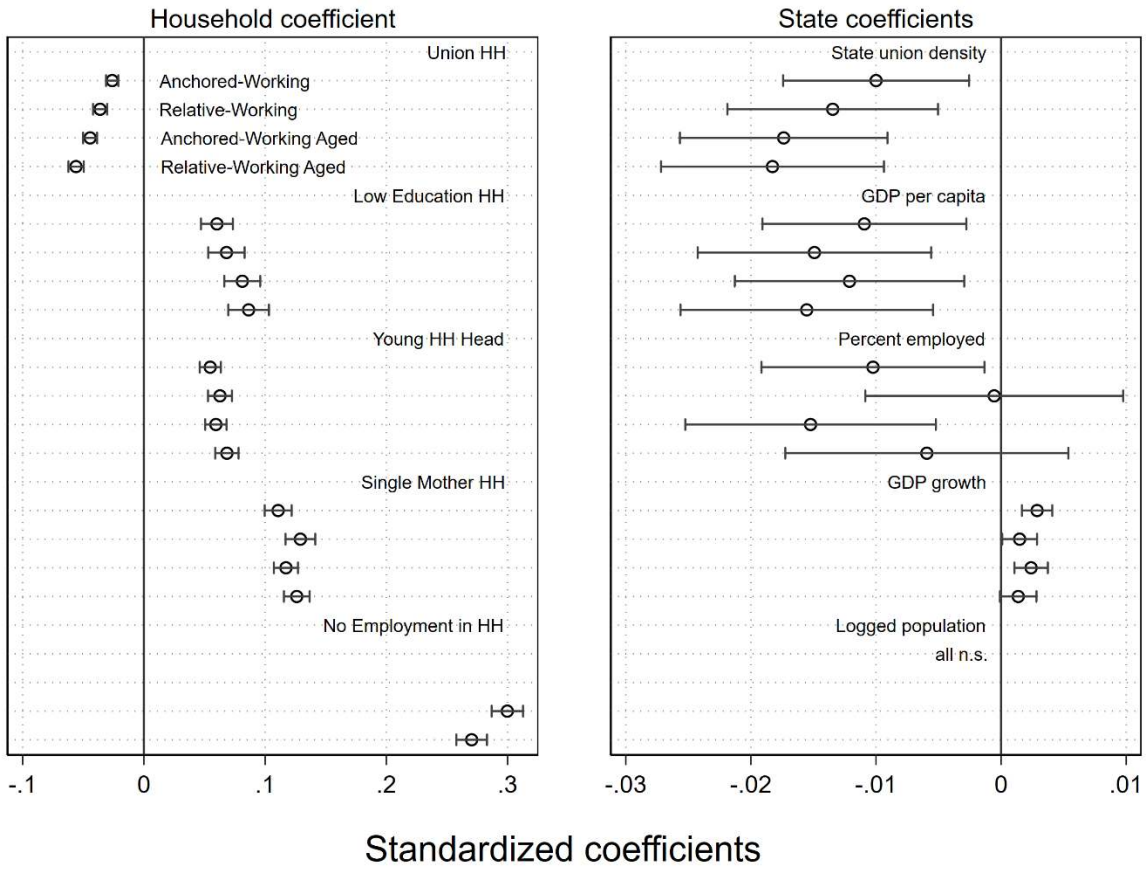

Figure 5: Household and standardized state-level associations with poverty, fixed-effects individual slopes models

Note: bars indicate 95% confidence intervals. Coefficients based on second models in Table 3.

Focusing first on state-level effects, Figure 5 shows that state union density has a comparable magnitude to GDP per capita. GDP per capita tracks rising economic development and affluence, and hence gauges long-term economic growth. Both state level characteristics have significant and negative effects: the decline of union membership associates with higher poverty, while rising GDP per capita associates with lower poverty. The absolute magnitudes of the two variables are similar. A standard deviation increase in state union density decreases poverty by between 0.01 and 0.018, while a standard deviation increase in GDP per capita decreases poverty by between 0.011 and 0.016. Put differently, state union density has about the same influence on poverty change as long-term state economic growth. Further, state union density has larger and more robust standardized coefficients than employment rates, GDP growth (i.e. short term economic growth), and logged population.

Next, focusing on household-level effects, union membership consistently has effects smaller than the big four risks. For working poverty, household union membership effects are between 25% and 50% the magnitude of other household variables, while for working aged poverty, union effects are between 15% and 75% the magnitude of other key household explanations. It is reasonable that household changes in employment or single motherhood status should have substantively larger effects on poverty than household union membership. However, what is notable is that the magnitudes of household union membership effects are almost as large as the contrast of lacking a high school degree, compared to having a college degree, or having a young household lead/head. Altogether, the results in Figure 5 suggest that while unions alone are insufficient to explain poverty trajectories, the decline of unions is a substantively significant contributor to American poverty trajectories.

Supplementary Analyses

Thus far, we have presented evidence that both household union membership and state union density reduce poverty. However, it is important to recall that employment is consistently found to be the most important predictor of working (Brady et al 2013) and working-aged poverty (Brady et al. 2017; Rainwater and Smeeding 2004). Being an employed household or having multiple earners (e.g. note effects of unemployment in Figure 5) have much larger effects on poverty than unions, raising concerns that unions might have adverse spillover effects for those outside, or marginally attached to, the labor market. As we explained, there has long been concern that higher state union density leads to fewer employment opportunities or lower wages for non-members. It is therefore valuable to assess whether state union density undermines employment.

First, if state union density did more harm than good at the bottom of the labor market, we would find a positive effect on the poverty of non-members among higher union density states. However, Figure 4 shows state union density reduces all four poverty outcomes among nonunion households. Thus, there is no evidence of adverse spillover effects from state union density for the poverty of nonunion households. Second, perhaps controlling for employment attenuates (or is a posttreatment control for) the coefficient of state union density and conceals the adverse spillover effects. However, models 1, 4, 7 and 10 of Tables 2-3 show the effects of state union density before controlling for employment. Although the coefficients for state union density are less robustly significant before controls are added, no "reduced form" model shows a positive coefficient for poverty. Third, that the coefficients for state union density are consistently negative among both working and working-aged households undermine claims of

adverse spillover effects. Even if state union density worsens the employment of some households, the net effect across the sample is to reduce poverty.

Going further, we test if state union density undermines being employed among working-aged households or having multiple earners among employed households. These models mimic the fixed-effects models in Table 2. Results (included in the online appendix) show that across model specifications, state union density is not significantly associated with whether a household is employed among the sample of working-aged households. In fact, state union density's coefficient is positively signed when controls are included. Similarly, state union density is not significantly associated with whether a household has multiple earners among the sample of working households. In total, we find no evidence of adverse spillover effects on nonunion households or those marginally attached to the labor market.

Beyond spillover effects, we considered several potential concerns with different modeling decisions. First, we consider how our results were sensitive to different clustering strategies. Clustering standard errors at the incorrect level risks producing too small standard errors for our main effects. Unfortunately, no simple answer exists. While some suggest clustering at the highest level possible, others argue that clustering makes better sense at the level of data collection or treatment (Abadie et al. 2017). We replicated main results clustering at the household and state levels. State-level clustering reveals slightly weaker and modestly less robust coefficients for state union density in the fixed-effects models. However, even when clustering at the state level, state union density FEIS coefficients remain largely unchanged. Thus, overall, our decision to cluster at the individual level does not appear to change our conclusions.

Second, cross-level interactions with state-level within-unit deviations might be biased without special consideration. Giesselmann and Schmidt-Catran (2019) show that such interactions in standard fixed effects models can be problematic, as they still retain a partial mix of between-unit and within-unit effects. Thus, our interaction results may not appropriately identify the more robust results stemming from within-state union density changes. Following their advice, we interacted household union membership with state and year fixed-effects. We also replicated our interaction models including an additional interaction between household union membership and individual fixed-effects. These did not alter main results, which we interpret as evidence that results are not unduly rooted in misspecification of within-unit deviations.

CONCLUSION

This study investigates the relationship between labor unions and poverty. We measure unions as household union membership, state union density, and their interaction. Distinctively, we assess the spillover effects of state union density on nonunion households. We analyze individual-level panel data from the PSID between 1976 and 2015 using three-way fixed-effects and FEIS models. To the best of our knowledge, this is the first study of the consequences for labor unions on poverty using individual-level panel data. Because we use the CNEF's post-fisc income measures, this study also has more valid and reliable measures of poverty than studies based on the OPM. Relatedly, we verify our results across both working and working aged poverty, and both relative and anchored measures.

We ask three research questions. First, does household union membership influence working and working-aged poverty? The descriptive evidence shows that all four dimensions of

poverty are significantly lower in union versus nonunion households. These results are not wholly based in characteristics varying between union and nonunion households. We find robust evidence that entering a union household has a consistent negative effect on the probability of all forms of poverty. Although the magnitudes are smaller than those of the big four risk factors of poverty (Brady et al. 2017), household union membership has substantively meaningful effects.

Second, net of household characteristics, does state union density influence working and working-aged poverty? We show poverty is significantly lower in states with high union density. Although not quite as robust as household union membership, we find significant associations in 21 of 24 reported models. Furthermore, state union density has a significant negative coefficient in all eight fixed-effects and FEIS models for the four dimensions of poverty when including individual- and state-level controls. These results demonstrate that state union density has a poverty-reducing contextual effect net of the compositional effects of states' union membership. The coefficients for state union density are also substantively meaningful compared to standard predictors of poverty. State union density has coefficients comparable to those of GDP per capita (i.e. affluence and long-term economic development), and only state union density and GDP per capita have consistent associations across poverty dimensions.

Perhaps more salient is that state union density reduces poverty for *both* union and nonunion households. Hence, state union density has a poverty-reducing contextual spillover effect for nonunion households specifically. Higher state union density even reduces poverty for those who are not members and for the working-aged population as a whole. Because we analyze the working-aged and not just working households, these results are particularly relevant for the argument that state union density has a contextual spillover anti-poverty effect.

Third, do any poverty-reducing effects of household union membership and state union density significantly interact to offset or augment one another? The interactions discussed above not only show that state union density has effects for both union and nonunion households, but also that household union membership is particularly beneficial in a context of high state union density. There are distinct, nonredundant effects to both household union memberships and state union density. Although high state union density benefits nonunion households, union households are particularly unlikely to be poor where state union density is high.

This study also provides evidence that undermines each major reason for skepticism about labor unions. Even though unions are exceptionally weak in the contemporary US, we continue to find significant effects. This is the case even though our analyses includes three recent time points (2011, 2013, 2015) of very low union density – all after the last time point (i.e. 2010) observed by Brady and colleagues (2013). Further, this study exploits panel data to remove the stable unobserved characteristics that select people into union membership. Along with a rich set of time-varying controls, the use of fixed-effects and FEIS models should reduce concerns about unobserved heterogeneity and selection. Further, we find beneficial spillover effects for nonunion households and the broader working-aged population. Finally, analyses yield no evidence of adverse spillover effects for the bottom of the income distribution, especially those marginally attached to the labor market. Higher state union densities do not appear to marginalize people into unemployment, fewer workers per household, or poverty. Beyond these points, we underline that the present study addresses concerns that past research examined only state union density and working poverty. By examining both household union membership and working-aged poverty, this study substantially deepens and expands the evidentiary base for arguing that unions reduce poverty.

It may seem initially counterintuitive that household and state union measures have such robust associations with poverty, given the relative stability of poverty rates during the period of our study compared to steep union decline. This seeming contradiction is best understood through a cross-national comparison, where the United States has an unusually high poverty rate compared to other high income countries (Brady et al. 2017). The decline of labor unions and their protective social, political, and economic consequences has allowed for US poverty rates to remain stable at a high level despite four decades of economic growth, rising educational attainment, female labor force participation and multi-earner households, declining young headship, and several other poverty-reducing trends (Brady et al. 2017). A counterfactual world in which United States labor union membership caught up to Western Europe, rather than the experienced inverse, would potentially have pushed American relative poverty much nearer to Western European levels.

Our study has limitations that can hopefully motivate future research. Although we demonstrate that state union density has broad effects on poverty reduction, there may be meaningful heterogeneity across subgroups. First, given that labor union membership tends to stabilize marital patterns (Schneider and Reich 2014), does union density have similar effects across single- and two-parent households? Second, our focus on individual trajectories may not fully account for the substantial geographical reorganization of industrial location over the time period of study. Manufacturing employment shifted from the northeast to the south over the period of our study. To what extent do the poverty-reducing effects of union density track with state-level shifts in industrial composition (i.e. net of household level industry and occupation of employment, which we control for)? Third, how does union density affect poverty among senior and child populations specifically, two groups at especially high risks of poverty? While all these

questions are beyond the scope of the current paper, they would help further establish when, and how, union density reduces poverty.

Fourth, future research should interrogate the causal ordering. For example, we cannot fully disentangle whether labor unions themselves reduce poverty or whether labor unions are associated with good jobs available to those in the middle and bottom of the income distribution. Similarly, unions may reduce employment churn and downward pressures on wages in years spent unemployed, or else union membership may follow after attainment of high wage employment when one can pay union dues. Labor unions could be closely associated with establishing the social conditions necessary for quality employment in spaces other than the top of the labor market, but more research should test if unions have the direct effect on poverty than our results suggest. Although these mechanisms are critical for developing a precise theoretical understanding of how labor unions alleviate poverty, our study still demonstrates that declining labor unions in the US have clear practical implications for poverty.

While Brady and colleagues (2013) provide evidence that part of union density's effect on poverty works through the mechanism of social policy, we are forced to leave that question to future research. In contrast to Brady and colleagues' time period of 1991-2010, it is more difficult to compare social policy generosity across state-years in our longer and more recent time period (1976-2015). While their analysis of AFDC/TANF+SNAP and UI maximum benefit levels is informative, a more comprehensive analysis would require greater consideration of coverage, eligibility and access. Future research could ideally examine the decline of welfare programs that were previously more prominent like General Assistance as well as the emergence of higher state minimum wages, earned income tax credits and the expansion of Medicaid via the Affordable Care Act (as well the shift from programs like TANF to SNAP and SSI).

We conclude by encouraging American poverty research to incorporate labor unions into the study of poverty. As shown in the introduction, there is a pervasive neglect of labor unions in American poverty research. This is unfortunate because the omission of unions from analyses of poverty could arguably be a substantial omitted variable bias. Even if the focus of an analysis is far from unions, we conjecture that unions should still be accounted for in models of poverty. To the extent studies are interested in causes of poverty that are in any way related to labor unions (e.g. employment), it is essential for American poverty research to incorporate labor unions into their analyses. This is even more unfortunate given growing interest in political theories of poverty generally (Brady 2019), and given the extensive related literatures on unions and wages, jobs, and social equality. Scholars are increasingly recognizing that poverty is the result of politics, and that power resources and institutions exert tremendous influence on poverty. Unions are one of the most important power resources and institutions and are pivotal to the politics of social policies. Moreover, it is well understood that declining unionization is substantially shaped by politics at the federal, state and local level (DiGrazia and Dixon 2019; Hertel-Fernandez 2019; Rosenfeld 2014; VanHeuvelen 2020). Therefore, to understand poverty, we must understand unionization as a key aspect of the politics of poverty and as a key of aspect of the broader political processes that ultimately shape the distribution of economic resources in society.

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