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Working 9 to 5?
Unionization and Work Variability,
2004-2013

Ryan Finnigan l rfinnigan@ucdavis.edu
Jo Mhairi Hale l hale@demogr.mpg.de

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Ryan Finnigan*

University of California, Davis

Jo Mhairi Hale

Max Planck Institute for Demographic Research

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Abstract

Millions of workers in the United States experience irregular and unpredictable weekly working hours, particularly following the Great Recession. This work variability brings greater economic insecurity and work-life conflict, particularly for low-wage workers. In the absence of strong and widespread policies regulating 'precarious work,' labor unions may significantly limit work variability. However, any benefits with union membership could depend crucially on union density, which varies widely between states. This paper analyzes the relationship between unionization and two measures of work variability among hourly workers using data from the 2004 and 2008 panels of the Survey of Income and Program Participation. The results show union members were significantly less likely to report a varying number of hours from week to week, but only in states with relatively high unionization rates. In contrast, union members were more likely to report irregular schedules, but not in states with the highest unionization rates. Finally, we find the monthly earnings penalty for work variability is significantly weaker among union members than non-members. Altogether, the paper's results demonstrate some of the continued benefits of unionization for workers, and some of its limitations.

Keywords: unionization, precarious employment, work scheduling, earnings

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Unpredictable work schedules and unstable hours create significant costs in time and money for millions of workers and their families. Workers with variable hours or non-standard schedules are more likely to have "bad jobs" characterized by low pay and no benefits (Golden 2015; Kalleberg, Reskin, and Hudson 2000). Particularly for hourly workers, variable weekly hours lead to reduced and volatile incomes, complicating long-term budgeting and even meeting basic expenses (Golden 2015; Lambert 2008; Western et al. 2012). Conversely, working more hours than expected makes planning for non-work obligations, or even rest and relaxation, more difficult. Irregular work schedules also severely complicate caregiving responsibilities for families with young children or other dependents (Enchautegui, Johnson, and Gelatt 2015; Henly and Lambert 2014; Presser 2005).

Various forms of work variability have increased steadily in recent decades, reflecting fundamental changes in employment relationships (Hacker 2006; Kalleberg 2011; Presser 2005). A growing number of temporary and contract workers experience profound insecurity and irregularity (Bernhardt 2014; Katz and Krueger 2016; Smith and Neuwirth 2008). Even among more traditionally employed service workers, management practices to reduce labor costs leave workers' hours highly variable and uncertain (Alexander and Haley-Lock 2015; Halpin 2015; Lambert 2008). Though businesses tout flexibility as a boon for work-life balance, work variability among low-wage service workers in particular is most often employer driven (Golden 2015; Henly, Shaefer, and Waxman 2006).

If the growth of precarious employment reflects a further shift of power from workers to employers (Hacker 2006; Kalleberg 2009), it is also starkly evident in the profound decline of labor unions. Ample evidence demonstrates the resulting economic damage of deunionization for workers, including higher working poverty and wage inequality (Brady, Baker, and Finnigan 2013; Rosenfeld 2014; Western and Rosenfeld 2011). However, the potential benefits of unionization for less work volatility specifically, particularly in the Great Recession, remains an open question.

This study examines differences in work variability between union members and non-members, and how this difference may be contingent on state-level unionization rates. We

analyze self-reported varying hours from week-to-week and irregular schedules (i.e., rotating, split, or irregular shifts) using individual-level data on prime-age hourly workers from the 2004 and 2008 panels of the Survey of Income and Program Participation (SIPP). The analyses also incorporate state-level data from various sources, including economic conditions and "Right to Work" laws.

Our results indicate mixed effectiveness of unionization for limiting work variability. Union members are significantly less likely than non-members to report varying hours from week to week, but only in highly unionized states. In contrast, union members are significantly more likely than non-members to report irregular schedules, but not in states with the highest unionization. Despite mixed associations with work variability, we find the negative consequences of work variability for monthly earnings are significantly smaller among union members than non-members. We conclude by briefly discussing policy avenues for limiting work variability in ways that unions traditionally have.

Theoretical Background

Work Variability

The increase of precarious employment has been a major focus of the sociology of work in recent years, and studies of inequality more generally. Kalleberg (2009:2) broadly defines precarious work as "uncertain, unpredictable, and risky from the point of view of the worker." This growing literature often focuses on the risk of unemployment, potential declines in job tenure (Hollister 2011; Hollister and Smith 2014), growth in contingent or temporary work (Bernhardt 2014; Smith and Neuwirth 2008), or perceived job insecurity (Fullerton and Wallace 2007; Pedulla 2013). Similarly, research on deteriorating job quality for precarious workers often focuses on pay, the provision of benefits, or job autonomy (Kalleberg 2011; Kalleberg et al. 2000).

Though less prominent, research has also focused on growing instability and unpredictability of working hours within traditional employment relations, i.e., neither temporary employment nor independent contracting. Attention to such unpredictability has also become prominent in public discourse. For example, a widely read *New York Times* article (Kantor

2014b) focused on unpredictable schedules for Starbucks employees, followed shortly by significant changes in Starbucks' scheduling practices (Kantor 2014a). Starbucks' scheduling continued to draw media attention more than a year later (Scheiber 2015).

Depending on the operationalization, anywhere from 10 to 40 percent of workers experience some form of work variability (Golden 2015; Lambert, Fugiel, and Henly 2014; Presser 2005).[1] Work variability in this study stands in contrast to work flexibility, which implies workers can fit their work around their personal schedules rather than the reverse (Henly et al. 2006; Lambert et al. 2014). Substantial fractions of workers with variable, part-time, and non-standard schedules report preference for greater regularity and more hours each week (Alexander and Haley-Lock 2015). Moreover, work variability is experienced disproportionately by already disadvantaged groups in the labor market. Women, particularly mothers, low-wage workers, and those in service occupations are more likely to work irregular or non-standard hours (Clawson and Gerstel 2014; Enchautegui 2013; Golden 2015; Presser 2005).

Variable working hours from week-to-week reduce total earnings and income, especially among hourly workers. Even with relatively high wage rates, workers with few hours struggle to make ends meet. Studies have often documented that many low-wage workers are more concerned about their numbers of hours than their hourly wage rates (Golden 2015; Halpin 2015). Unpredictable and limited numbers of hours from week to week translate to unpredictable and limited earnings. Increases in variable hours over time then contribute to increasing income volatility over time above and beyond employment disruptions like job loss (Western et al. 2012).

Work variability creates many more burdens for workers and their families than reduced and unstable earnings. Henly and Lambert (2014) found significantly greater work-life conflict among retail workers experiencing work variability. Workers who received little advanced notice about their upcoming schedule or experienced last-minute schedule changes reported greater interference from work in personal or family obligations like attending children's school events, scheduling doctors' appointments, etc. Even with regular numbers of hours each week, non-standard work schedules disrupt personal and family rhythms. Retail food workers with

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[1] We use "work variability" to refer to hours that change in either amount or scheduling from week to week.

non-standard schedules experience significant sleep disruption, particularly among women (Maume, Sebastian, and Bardo 2009). Non-standard schedules have also been described as "non-social work" (Alexander and Haley-Lock 2015). Workers with night, evening, and weekend shifts also have lower community involvement than those with standard weekday day shifts (Cornwell and Warburton 2014). Irregular and variable hours force parents to construct an ever-changing patchwork of formal and informal childcare arrangements (Enchautegui et al. 2015; Presser 2005).

A variety of institutional forces have contributed to greater work variability over time, including management practices to reduce firms' labor costs. Centralized management exerts significant pressure on front-line managers in service industries like foodservice, retail, and hospitality to minimize employee's work hours (Bernhardt, Dresser, and Hatton 2003; Lambert 2008). Computerized systems for "just-in-time" scheduling predict the numbers of workers needed down to the hour, or less, based on previous patterns of sales or customer traffic. Meanwhile, managers attempt to cut short or completely cut employees' shifts on the spot when demand is lower than expected (Alexander and Haley-Lock 2015). In many cases, managers even deliberately manipulate workers' supply and regularity of working hours as a system of punishment or reward (Halpin 2015).

Firms' attempts to reduce labor costs through variable scheduling are part of a much broader shift of risk from employers to employees (Hacker 2006; Kalleberg 2011; Lambert 2008). The mediation of employment relations by government policies or other labor market institutions has in many ways been replaced by the market (Kalleberg 2009, 2011). A range of scholarship focuses on the growth of corporate power and incentives to reduce labor costs, enabled by political deregulation (Appelbaum, Bernhardt, and Murnane 2003; Hacker 2006; Kalleberg 2011). This article focuses on labor unions as a key institution pushing back against this broader shift, with potential implications for work variability. Next we describe reasons why unionization at both the individual and state levels may be associated with significantly less work variability, as well as strong reasons for skepticism.

Why Unionization May Reduce Work Variability

Particularly since the New Deal in the 1930s, labor unions have historically been one of the key labor market institutions providing safety and stability for workers in the United States, and the most prominent manifestation of labor power (Freeman and Medoff 1984; Milkman 1997; Rosenfeld 2014). Among unions' many functions, a primary strategy for benefiting workers is collective bargaining with employers at various levels of centralization. Unions bargain for a variety conditions, including higher wage rates and work safety. Unions also provide an institutional recourse for workers in disputes with management.

Through these functions, labor union members may experience significantly less work variability than comparable non-members. Work-hour protections are common components of unions collective bargaining with employers, and prevent employers from sending workers home early or otherwise establish minimum guaranteed work hours (Alexander and Haley-Lock 2015; Ben-Ishai, Hammad, and Warden 2014). Unions often push employers to convert part-time positions to full-time when demand increases, rather than hiring new part-time workers (Bernhardt et al. 2003; Rosenfeld and Kleykamp 2009). As one example, UNITE HERE, a collection of local unions representing various hospitality and other service workers across the country, lists among their priorities: "consistent scheduling," "minimum shift lengths and hours per week," and "advance notice of shift changes" (UNITE HERE 2016a).

Though the majority of empirical research focuses on unions' benefits for wage rates (Hirsch 2004; Rosenfeld 2014; Western and Rosenfeld 2011), some work also documents unions' benefits for employment security, particularly in the face of economic or structural change. Factory workers' unions actively worked against widespread job loss during deindustrialization and the adoption of greater automation (Fernandez 2001; Milkman 1997). Even during and after the Great Recession, union members were less likely than non-members to become unemployed (Catron 2013).

Unions' abilities to collectively bargain with employers also depend crucially upon their size. As a result, local union density may be significantly associated with lower work variability above and beyond individual-level union membership. Studies repeatedly find local unionization rates have statistically significant positive associations with wages in addition to the positive

association with individual union membership. These wage benefits also extend to non-union members (Brady et al. 2013; Western and Rosenfeld 2011). First, highly centralized bargaining between unions and employers covering large firms or whole industries covers both members and non-members. Second, non-members can benefit from what is classically referred to as the "union threat effect." Employers of non-union workers must offer comparable pay in order to keep them from forming a union themselves, or leaving for unionized jobs (Freeman and Medoff 1984; Hirsch 2004). Third, Western and Rosenfeld (2011) argue high union density traditionally maintained wage equality through spreading egalitarian cultural norms, political mobilization for redistributive policy, and through institutionally protecting workers in the labor market.

This study focuses on union density at the state level, following (c.f., Brady et al. 2013). Particularly in recent decades, states have become increasingly relevant for social and economic policy relative to the federal government (Cancian and Danziger 2009). As a result, states have become key battlegrounds for struggles between business and labor for shaping labor market regulation (Brady et al. 2013; Tope and Jacobs 2009).

Based on the literature described above, we argue unionization at both the individual and state levels is associated with significantly less work variability. These relationships likely also interact. Union members may experience less variability than non-members, and the difference may be larger in states with greater union density. The union wage premium has declined in magnitude over time alongside national unionization rates, suggesting unions were more able to secure higher wage rates when they were larger and more powerful (Rosenfeld 2014). Similarly, Hipp and Givan (2015) find the association between union membership and job satisfaction varies cross-nationally with characteristics like union density, coverage, and level of bargaining. Perhaps most directly relevant, Bernhardt et al. (2003) found that hospitality workers' unions were able to secure more regular hours most effectively in cities with high union densities. The authors quote a pithy hotel executive to that effect, "In a union town, you pay if you're non-union. In a non-union town, you pay if you're union" (Bernhardt et al. 2003:57).

Why Unionization May Fail to Reduce Work Variability

Though extensive literature documents the benefits of labor unions for workers, a significant relationship between unionization and work variability in recent years is by no means

certain. There are several compelling reasons to be skeptical that unions successfully prevent work variability. First, regularity in hours and shifts may simply be outside the scope of many labor union negotiations. Many jobs include variable hours and schedules as a fundamental requirement, particularly hourly jobs. Though strong unions can bargain for higher wage rates or more hospitable work conditions, work regularity may be non-negotiable. Higher wages have traditionally been unions' primary goal, in part because wage rates are one of the specific outcomes benefiting all members (Bernhardt et al. 2003). Even unionized factory workers commonly work nonstandard hours, and have accepted indefinite layoffs in the hope of avoiding permanent job loss during deindustrialization (Milkman 1997).

In a recent example, members of the United Auto Workers (UAW) voted to reject a proposed deal with Fiat Chrysler Automobiles (FCA) over so-called "alternative scheduling" (Gardner 2015). FCA schedules many of its manufacturing workers four 10-hour days per week, and rotating day/night shifts. The "alternative schedules" are similar to those used by other major auto manufacturers in the US, and allow the factory to extend production hours from 16 to 20 per day. The UAW's proposed contract would have secured higher pay rates for Saturday shifts (Williams and Jewell 2015), but would not have limited alternative scheduling. UAW members reportedly rejected this proposal largely because they preferred to return to more traditional weekly schedules (Gardner 2015).

Second, unionization is relatively uncommon in service industries where work variability is very common (Alexander and Haley-Lock 2015). Temporary workers and independent contractors, often considered the most precarious (Bernhardt 2014), are generally excluded from union membership (Kalleberg et al. 2000). Private sector unions have traditionally represented workers in industries like manufacturing. Though UNITE HERE may explicitly work for greater hours stability, it represents only about 100,000 (UNITE HERE 2016b) of an estimated 4.7 million food service workers in the U.S. (Bureau of Labor Statistics 2015).

Third, unionization rates have declined profoundly over recent decades, particularly for private sector workers (Hirsch 2008; Rosenfeld 2014). Only around one-quarter of workers is part of a labor union in even in the most heavily unionized states in recent years. Meanwhile, unions are almost non-existent in the least unionized states (Brady et al. 2013). As a result,

unions may not be sufficiently powerful to substantially regulate work variability, especially given the substantial surge of unemployment and involuntary part-time work in the Great Recession (Golden 2015).

Many explain the decline of labor unions as the result of deindustrialization (Rosenfeld 2014). The majority of private-sector union members historically worked in manufacturing, and the contraction of these industries diminished labor unions' ranks. However, changes in the sizes of industries/occupations explains only a small fraction of the decline in total union rates. The majority of the decline occurred within industries/occupations, including but not limited to manufacturing (Hirsch 2008). Rosenfeld (2014), among others, argues the decline of labor unions is largely attributable to coordinated efforts by corporate employers and conservative lawmakers. Efforts to reinforce unregulated markets, undermined labor movements and gave employers sufficient power to reshape employment relations to their benefit. Unionization may then do little to prevent work variability because the same forces undermining unions also drive greater work variability.

Hypotheses

Below we explicitly state our hypotheses based on the literature described above. The first set of hypotheses tests the relationships between work variability and unionization. The second set ests the relationships between earnings, work variability, and unionization. We include these additional hypotheses and corresponding analyses in correspondence with the substantial literature on the union wage premium (Hirsch 2004; Rosenfeld 2014; Western and Rosenfeld 2011). Unionization may be associated with less work variability, and attenuate its negative consequences for wages.

The first hypothesis tests for a significant negative relationship between work variability and individual-level union membership. The second tests for a negative relationship between work variability and state-level unionization, conditional on individual-level union membership. The third tests for potential moderation of the individual-level union member difference in work variability by the level of state-level unionization.

Hypothesis 1: Union members experience less work variability than non-members.

Hypothesis 2: Workers in states with higher levels of unionization experience less work variability than those in states with lower unionization.

Hypothesis 3: The negative association between union membership and work variability is stronger in states with higher unionization rates.

As described above, the corresponding null hypotheses, no significant association between unionization and work variability, are by no means trivial. The lack of significant negative relationships between work variability and unionization would support the argument that unions have become too limited to regulate a crucial element of work life.

The fourth and fifth hypotheses test for relationships to total monthly earnings. The fourth tests the already well-supported hypothesis that work variability is associated with significantly lower earnings (Golden 2015; Kalleberg et al. 2000). The fourth hypothesis is a prerequisite for the fifth and final hypothesis, that union membership significantly moderates the negative relationship between earnings and work variability.

Hypothesis 4: Workers experiencing work variability have lower earnings than those who do not.

Hypothesis 5: The negative association between work variability and earnings is weaker for union members than non-members.

Data & Methods

We analyze individual-level data from the 2004 and 2008 panels of the SIPP, downloaded from the National Bureau for Economic Research (NBER).[2] Each SIPP panel interviewed members of approximately 50,000 households every four months over four to five years. Each interview wave included questions about each of the last four months specifically. We analyze observations of prime-age (25-55) workers who report a primary job with non-zero earnings, and report being paid by the hour.[3] We also removed a small number of individuals

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[2] The data are available from: http://www.nber.org/data/survey-of-income-and-program-participation-sipp-data.html

[3] Hourly employees are generally subject to greater employment variability than salaried workers, have less control over their schedules, and suffer from reduced total earnings due to shortfalls in the availability of work hours (Golden 2015).

who were likely misidentified between waves, as described in the appendix. Sample sizes vary between dependent variables, as described below.

Work Variability

The paper analyzes two measures of work variability in respondents' primary jobs: self-reported varying weekly hours, and self-reported irregular weekly schedules. These measures are similar to the forms of "work-hour insecurity" identified by Alexander and Haley-Lock (2015:699): "work-hour inadequacy, variability, and unpredictability."

First, the SIPP asks employed respondents how many hours they usually work per week during the four months since their last interview. Rather than reporting a number of hours, respondents in the could also report "hours vary" starting in the 2004 panel. We code this option as a dichotomous variable equal to one, *Hours Vary*. The hours question refers to the entire four-month survey wave, so the unit of analysis for this variable is the person-wave.

Second, a special topical module asks employed respondents about their usual work shift. The module was fielded once during the 2004 panel (wave 4 in January through April 2005) and twice during the 2008 panel (wave 5 in December 2009 through March 2010, and wave 8 in December 2010 through March 2011). The dichotomous variable *Irregular Schedule* equals one for those reporting irregular, split, or rotating shifts, and zero for those reporting regular day, evening, or night shifts, and "other." The unit of analysis for this variable is the person in 2004 panel, and person-wave in the 2008 panel (with up to two observations per person).

Table 1 presents means and standard deviations, when applicable, for the main variables of interest other selected characteristics. The proportions of observations reporting *Hours Vary* and *Irregular Schedule* are in the top two rows. About 7.6 percent of person-waves in the 2004 panel reported varying hours from week to week, which increased to 11.0 percent in the 2008 panel.[4] This increase is statistically significant (p<0.001) in a bivariate logit model, clustering standard errors within persons.

[Table 1 here]

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[4] These levels are higher than those from a similar measure in the Current Population Survey (CPS), which Alexander and Haley-Lock (2015) estimate at a steady 4-5 percent from 1994 to 2013. We argue the SIPP measure has greater reliability than the CPS measure. The reference period for the CPS is undefined, while the SIPP asks about the previous four months specifically. Respondents may be more likely to "smooth" their hours for undefined reference periods than for a specific and recent period.

The proportion of workers with irregular schedules is greater than the proportion with varying hours, 13.7 percent in the 2004 panel and 16.0 percent in the 2008 panel. The increase between panels is statistically significant ($p<0.001$) in a bivariate logit model. These estimates are of similar magnitude to those from other surveys like the General Social Survey (Golden 2015).

Overlap between *Hours Vary* and *Irregular Schedule* is moderate, consistent with arguments that they represent distinct forms of "work-hour insecurity" (Alexander and Haley-Lock 2015). Among all observations with both measures, about 30 percent of workers with varying hours also report irregular schedules. About 19 percent of observations with irregular schedules report varying hours. Less than three percent report both.

The panel nature of the SIPP also allows estimation of cumulative experiences of hours variability. In the four years (12 waves) of the 2004 panel, 25 percent of respondents ever report varying hours. This percentage increases to 32 percent in the first 12 waves of the 2008 panel. About 21 percent of workers reported irregular schedules in either of the two measures in the 2008 panel, but less than five percent report varying hours in both. A cumulative measure for irregular schedules is unavailable in the 2004 panel because it was measured only once.

Earnings

The dependent variable for testing hypotheses 4 and 5 is respondents' reported gross monthly earnings from their primary jobs. Earnings are converted to 2013 dollars using the Consumer Price Index (CPI), then logged to adjust for the skewed distribution. The means and standard deviations for monthly earnings and their logged values are presented in Table 1.

Unionization

Individual-level unionization, *Union Member*, is a binary variable equal to one for those reporting union membership in their primary job. State-level unionization, *State Unionization*, is the percentage of all workers in each state-year who are union members. The state-level measure comes from Hirsch and Macpherson's (2003) estimates based on the Current Population Survey (CPS).[5]

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[5]Hirsch and Macpherson's (2003) database is available at
http://unionstats.gsu.edu/MonthlyLaborReviewArticle.htm

In Table 1, the percentage of unionized observations declined from 14.5 percent in the 2004 panel to 12.7 percent in the 2008 panel. Union membership is also quite stable within persons. About 79 percent of observations reporting union membership are among respondents who are union members in all waves. Average state-level unionization also declined between panels, though the decrease was less pronounced.

Analytic Strategy

The paper's analysis proceeds in multiple stages. The first two stages test hypotheses 1 through 3. First, a series of regression models predicts each measure of work variability with union membership and state-level unionization, and next with their interaction. We fit these models both with and without state- and individual-level control variables, described below. The models can be expressed as,

$$Y_{ijt} = \beta_0 + \beta_1 Union\ Member_{ijt} + \beta_2 State\ Unionization_{jt} + \beta_3 Union\ Mem_{ijt} \times State\ Union_{jt}$$
$$+ \beta_X X_{ijt} + \beta_W W_{jt} + \beta_t Year_t$$

where Y_{ijt} is either *Hours Vary* or *Irregular Schedule* for person i in state j and year t. The vectors X_{ijt} and W_{jt} are individual- and state-level control variables, respectively, and $Year_t$ represents year fixed effects. The control variables are defined below.

The regression models are OLS models with binary dependent variables, also called Linear Probability Models (LPM). LPMs closely approximate marginal effects from logistic regression for the difference in the probability of the dependent variable for a unit difference in the independent variable. Relative to logistic regression, coefficients from LPMs are readily comparable between models and outcomes (Angrist and Pischke 2008; Mood 2010). Interpretation of interaction terms in logistic regression, in particular, can be misleading due to both non-linearity (Ai and Norton 2003; Mood 2010) and conflation with unobserved differences in residual variance between groups (Allison 1999). The OLS models predicting *Hours Vary* use Cameron and Miller's (2015) multiway clustering method to account for correlated errors within both individuals and states.[6] Standard error estimates with multiway clustering are very similar to those clustering within states only using the standard "cluster" option. Models predicting

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[6] Cameron and Miller's (2015) Stata command for multiway clustered errors is available from: http://faculty.econ.ucdavis.edu/faculty/dlmiller/statafiles/

Irregular Schedule include clustering within states only, as there are too few observations within persons for the cluster algorithm to reliably estimate standard errors (Cameron and Miller 2015). The robust-clustered errors also adjust for the inherent heteroskedasticity of binary outcomes in OLS.[7]

The second stage of the analysis complements the LPM results with predicted probability figures from logistic regression models with the same sets of variables. The figures present the average marginal effects of union membership for the probabilities of *Hours Vary* and *Irregular Schedule* across the range of state-level unionization rates. The average marginal effect (AME) is the predicted probability of the outcome variable for all observations if union membership equals one, minus the predicted probability if union membership equals zero. We estimate these marginal effects and associated confidence intervals in Stata using the "margins" command. We present these figures to for greater interpretability, and to demonstrate the similarity between the LPM results and those from logistic regression.

The third stage of the analysis reproduces the previous two stages in the two SIPP panels separately, before and during/after the Great Recession. Table 1 shows work variability was greater in the 2008 panel than 2004, and its relationship to unionization may also have changed. This robustness check assesses any such potential change.

Finally, the fourth stage of the analysis tests hypotheses 4 and 5. OLS regression models predict earnings with union membership, each measure of work variability, and all control variables. Next, the models include an interaction between union membership and work variability. The models including *Hours Vary* use multiway clustering for the standard errors, and the models including *Irregular Schedule* cluster only within states. The results from these models estimate the earnings premium for union workers, the earnings penalties for work variability, and the extent to which union membership ameliorates these penalties. Positive coefficients for the interaction term indicate the earnings penalty for work variability is smaller among union members.

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[7] The main results below are similar with random effects at the person and/or state levels.

Control Variables

State-level controls include: logged gross state product per capita, *ln(GSP PC)*, adjusted for inflation with the CPI; economic growth (percent change in GSP from the previous year); the unemployment rate; the inflation-adjusted state minimum wage (or federal if state is lower); the presence of "Right to Work" laws, limiting unions' abilities to compel membership or dues payments; logged state population; Census-defined geographic region (Northeast, South, Midwest, West). All data are from the University of Kentucky's Center for Poverty Research National Welfare Data (2015) except for "Right to Work" laws, which come from the Correlates of State Policy Project (Jordan and Grossmann 2016).

Individual-level controls include a variety of factors that may be correlated with union membership, work variability, and total monthly earnings: age; sex (female = 1); race/ethnicity (White, Black, Latino/a, Asian, other race); marital status (married, separated, divorced, widowed, never married); household size; the presence of children under 6 years-old (yes = 1); metropolitan status (in a metro area, not in a metro area, not identified); logged hourly wage rates, adjusted for inflation with the CPI; education (less than high school, high school, some college, college, postgraduate); public employment (yes = 1); 23 occupation categories; 13 industry categories. The means for selected control variables by SIPP panel are presented in Table 1. Full summary statistics for all variables are available upon request.

Results

Linear Models Predicting Hours Vary and Irregular Schedules

Table 2 presents results from LPMs predicting *Hours Vary* in the upper panel and *Irregular Schedule* in the lower panel. Models 1 and 3 do not include control variables. Models 2 and 4 include all controls, but do not display the coefficients for brevity. Coefficients for the control variables from model 4 for each dependent variable are presented in Table A1 in the appendix. Variable weekly hours are significantly more probable for workers with lower hourly wages, private sector workers, and those in states with higher unemployment rates. Hours variability is also more likely for the never married compared to the married, those with larger households, those without young children, and workers outside metropolitan areas. Irregular

schedules are significantly more common for lower-wage workers, younger workers, Whites than workers of color, the never married than the married, more educated workers, and those in Right-to-Work states.

[Table 2 here]

Models 1 and 2 in Table 2 test hypotheses 1 and 2, that union members and workers in more unionized states are less likely to experience work variability. In model 1 predicting *Hours Vary*, union members are 1.6 percent significantly less likely to report variable weekly hours than non-members, consistent with hypothesis 1. There is no significant association with state-level unionization rates, yielding no support for hypothesis 2. The coefficients in model 2 are conditional on all control variables, and neither individual- nor state-level unionization are significantly related to the probability of *Hours Vary*, providing no support for hypotheses 1 and 2.

Neither individual- nor state-level unionization in model 1 is significantly related to the probability of *Irregular Schedule*. Controlling for worker- and state-level characteristics in model 2, union members are 3.5 percent *more* likely to report irregular schedules than non-members. State-level unionization is not significant in model 2. These results for irregular schedules then contradict hypothesis 1, and give no support for hypothesis 2.[8] We return to this counter-intuitive positive coefficient below.

Models 3 and 4 include the interaction term between individual-level union membership and state-level unionization. The interaction term tests hypothesis 3, that the negative association between union membership and work variability is stronger in states with higher unionization rates. State-level unionization is centered around the sample median, 12.6 percent, so the 'main effect' of individual union membership is at median state-level unionization. The 'main effect' of state-level unionization is for non-members. The interaction term can be interpreted as the difference in the union member coefficient with greater state-level unionization rates compared to the median.

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[8] An alternative analysis predicted each of the separate schedule categories (rotating, split, irregular, regular evening, regular night, and other shifts) relative to regular daytime shifts using multinomial logistic regression, with the same right-hand-side variables as model 2 in Table 2. Compared to non-members, union members were significantly more likely to work all types of non-day shifts except split shifts.

Model 3 predicting *Hours Vary* does not include controls. At median state-level unionization, union members are 1.3 percent significantly less likely to report *Hours Vary* than non-members. The interaction term indicates the union member advantage is stronger by 0.1 percentage points for each percentage point greater state unionization. The interaction term is only marginally significant with p<0.10, however. Model 4 predicting *Hours Vary* includes all control variables. Union members and non-members have no significant difference in the probability of varying weekly hours at median state-level unionization. The null 'main-effect' for state-level unionization indicates the probability of varying hours is no different for non-members in states with higher unionization rates. However, the statistically significant negative coefficient for the interaction term indicates the probability of varying hours is significantly lower by 0.2 percentage points for union members when state unionization rates are one percentage point greater. These results, particularly from model 4 including control variables, support hypothesis 3.

None of the coefficients of interest in model 3 predicting *Irregular Schedule* is statistically significant. Including controls in model 4, union members are 3.8 percentage points *more* likely to report irregular schedules than non-members in states with median unionization rates. The 'main effect' for state unionization, which applies to non-members, is insignificant. However, the marginally significant (p<0.10) interaction term indicates the union member disadvantage is smaller in states with higher unionization rates. Though the results for irregular schedules contradict hypothesis 1, they are consistent with hypothesis 3. Nevertheless, the significantly greater probability of irregular schedules for union members is surprising, and we explore this relationship further in the Discussion section.

Taken together, the results from the LPMs provide some support for hypothesis 1, as union members have significantly lower probabilities of varying weekly hours than non-members. However, the significantly greater probability of irregular schedules for union members than non-members contradicts hypothesis 1. Neither outcome's probability significantly varied with state-level unionization, giving no support for hypothesis 2. Finally, results for both outcomes yield some support for hypothesis 3. Union members' advantage in lower probabilities of varying weekly hours compared to non-members is greater in states with

higher unionization rates. Though union members have a disadvantage in the probability of irregular schedules compared to non-members, this disadvantage is smaller in states with greater unionization.

The LPMs provide useful tests of hypotheses 1 through 3, particularly because their coefficients approximate marginal effects on the predicted probability scale and because they circumvent complications with interaction terms in logistic regression (Mood 2010). However, the models assume linear associations across the probability scale, and predicted probabilities can fall outside the range from zero to one. As described above, the following section presents complementary estimates of the average marginal effects of union membership for work variability based on logistic regression models.

Predicted Probabilities of Hours Vary and Irregular Schedule

Logistic regression models predict *Hours Vary* and *Irregular Schedule* with the same variables as model 4 in Table 2. The models adjust for clustering of standard errors within states. The AMEs of individual-level union membership are presented in Figure 1 with 95% confidence intervals. The AMEs are predicted across the approximate range of observed state-level unionization.[9]

[Figure 1 here]

The left-hand side of Figure 1 presents the estimated AME of union membership for *Hours Vary*. At two percent state-level unionization, union membership is associated with a 2.5 percentage point greater probability of varying weekly hours, and the AME is marginally significant with $p<0.10$. Up through at least 14 percent state-level unionization, including the median of 12.6, there is no significant difference in the probability of varying hours by union membership. Finally, union membership is associated with an almost three percentage point lower probability in states with the highest unionization rates. Like the results in Table 2, the AME of union membership for varying weekly hours supports hypotheses 1 and 3. Union members have significantly lower probabilities of varying weekly hours than non-members, but only in states with relatively moderate or high unionization rates.

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[9] The highest union density in the sample is 26.1 percent in New York in 2005, and the lowest is 2.3 percent in South Carolina in 2005.

The right-hand side of Figure 1 presents the AME of union membership for *Irregular Schedule*. As indicated by the coefficients in Table 2, union members have a greater probability of irregular schedules, but the association is contingent on state-level unionization. In states with the lowest unionization rates, union members have a 6.5 percentage point greater probability of irregular schedules than comparable non-members. A significant difference exists in states with all but the highest unionization rates. Though this pattern contradicts hypothesis 1, it is consistent with the interactive relationship predicted by hypothesis 3.

Differences between Panels?

Given the significant growth of work variability during the Great Recession (see Table 1), its relationship to unionization may also have changed. To test this, we reproduced model 4 in Table 2 and Figure 1 for the 2004 and 2008 panels separately. Results are available upon request. For both measures of work variability, the interaction term between union membership and state-level unionization is negatively signed in both panels and slightly stronger in the 2008 panel. For *Hours Vary*, the interaction term is significant with $p<0.01$ in the 2008 panel but only with $p<0.10$ in the 2004 panel. For *Irregular Schedule,* the interaction term is significant with $p<0.05$ in the 2008 panel but not in the 2004 panel. In pooled models, three-way interactions between union membership, state unionization, and an indicator for the 2008 panel were not significant. The marginal effects figures are substantively similar to Figure 1, but the slopes of the marginal effects against state unionization are steeper in the 2008 panel.

Work Variability, Union Membership, and Earnings

The next portion of the analysis tests hypotheses 4 and 5. We predict earnings are lower for those experiencing variability, but the difference is attenuated for union members. This analysis can help illuminate the total impact of union membership given that total earnings are one of workers' primary concerns about work variability. Table 4 presents results from regression models predicting logged monthly earnings from workers' primary jobs. All models include but do not present all control variables. Coefficients for the control variables from model 4 are presented in Table A1 in the appendix.

[Table 4 here]

Union members have about 12 percent ($0.12 = e^{0.110} - 1$) higher monthly earnings than non-members in model 1. Prior estimates of the union wage premium are considerably higher, about 20 percent (Hirsch 2004; Rosenfeld 2014). However, these estimates are based on estimated hourly wages, rather than total monthly earnings controlling for hourly wages. Net of controls for hourly wages and variable hours in model 1, union members likely work more hours per week and/or receive additional compensation above and beyond hourly wages. Next, the earnings penalty associated with varying weekly hours is profound, as predicted by hypothesis 4. Workers with variable weekly hours earn about 25 percent less ($-0.25 = e^{-0.283} - 1$) than comparable workers not reporting variable hours.

Model 2 includes the interaction term between union membership and varying hours. The union coefficient is the predicted earnings difference for union members compared to non-members among those without varying hours. The coefficient for *Hours Vary* is the earnings difference among non-union members. The interaction coefficient is the earnings difference associated with variable hours among union members compared to the difference among non-members. Among non-members, those with varying weekly hours earn about 25 percent less per month. The interaction term indicates this earnings penalty is significantly smaller among union members, about 20 percent ($-0.20 = e^{-0.291+0.062} - 1$), but still large. The smaller earnings penalty for variable weekly hours among union members supports hypothesis 5.

Model 3 predicts logged monthly earnings with union membership, working an irregular schedule, and all controls. As in the previous models, union members earn significantly more per month than comparable non-members. Those working irregular schedules earn significantly less, about 15 percent, than those with regular schedules. Again, these results support hypothesis 4, that work variability is associated with significantly lower earnings even net of hourly wages.

Model 4 includes the interaction term between union membership and irregular schedules. Among non-members, working irregular schedules is associated with 17 percent lower monthly earnings. The earnings penalty is significantly weaker among union members, again consistent with hypothesis 5. Among union members, the earnings penalty is only about eight percent.

Overall, the results strongly support the argument that union membership ameliorates the earnings penalty for work variability. Non-union workers reporting variable weekly hours have substantially lower monthly earnings, by about 25 percent, than those that do not. However, predicted monthly earnings for a union member with varying hours are only about 12 percent lower $(-0.12 = e^{0.105-0.291+0.062} - 1)$ than for a non-member reporting regular hours. The contrast is even stronger with irregular schedules. Non-union workers with irregular schedules have 17 percent lower monthly earnings that those without, but earnings for union members with irregular schedules are not significantly different from non-members with regular schedules.[10]

Discussion

This article examined the relationship between work variability and unionization, contributing to broader literatures on precarious work and labor unionization. The study examines the 2004 and 2008 panels of the SIPP to estimate the prevalence of two forms of work variability: varying hours from week to week, and irregular schedules. These forms of work variability can have substantial negative impacts on millions of workers' economic stability, family life, and general social engagement (Golden 2015; Henly and Lambert 2014; Lambert 2008). Our analysis shows work variability is fairly common, particularly after the Great Recession. About 32 percent of workers ever reported varying weekly hours between 2008 and 2012, and 21 percent reported irregular schedules in either 2010 or 2011.

Based on prior studies (Bernhardt et al. 2003; Brady et al. 2013; Freeman and Medoff 1984; Rosenfeld 2014), we hypothesized that work variability is less common with unionization at the individual and state levels. We also hypothesized that unionization at the two levels interact; the benefit of individual union membership is greater in states with higher unionization rates. We find mixed support for the hypotheses. Union members have significantly lower probabilities of varying weekly hours, but only in states with relatively high levels of unionization. In states with around the highest union densities, 26 percent, union members are about three percentage points less likely to report varying hours than comparable non-members.

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[10] Statistical significance is from the "margins" command in Stata.

In contrast, union members have significantly higher probabilities of irregular schedules in all but the most highly unionized states. In the least unionized states, around two percent, union members are 6.5 percentage points more likely to report irregular schedules than non-members. Despite the opposing direction of the union membership difference for the two forms of work variability, both demonstrate the conditional importance of union membership on local union density. The findings echo the observation by Bernhardt et al.'s (2003:57) interviewee, "In a union town, you pay if you're non-union. In a non-union town, you pay if you're union."

Finally, our study examined the potential for union membership to moderate any negative impact of work variability on total monthly earnings. The earnings difference associated with work variability was considerable. Even controlling for hourly wage rates and other relevant characteristics, workers reporting varying weekly hours have 25 percent lower predicted monthly earnings. Those with irregular schedules have 18 percent lower earnings. As hypothesized, union members experienced significantly smaller earnings penalties when reporting work variability. Even when union membership does not appear to protect workers from varying hours or especially irregular schedules, it does appear to help mitigate some of the economic consequences.

To further understand the unexpected positive association between union membership and irregular schedules, we examined potential heterogeneity by industry and occupation. Tables A2 and A3 in the appendix present the estimated percentages of workers reporting varying hours and irregular schedules by union membership and major occupation/industry group. Note that sample sizes for some occupation/industry groups are small, and estimates should be treated cautiously. Table A3 shows production workers are the largest occupation group with considerably more union members (about 16 percent) than non-members (about 10 percent) reporting irregular schedules. Similarly in Table A2, manufacturing is the largest industry group with considerably greater rates of irregular schedules for union members (about 16 percent) than non-members (about 8 percent).

Though greater probabilities of irregular schedules for union members was unexpected, the finding is consistent with the reported experiences of auto workers and UAW members

(Gardner 2015). Manufacturing workers who are union members are more likely to work irregular schedules than non-members, but not more likely to experience varying hours from week to week. Moreover, we union members with irregular schedules do not have significantly different total earnings than comparable non-members with standard schedules. These patterns suggest the UAW has been successful in boosting pay rates for irregular or weekend shifts (Williams and Jewell 2015). Unions then protect their members from the earnings penalties of irregular schedules, even when they cannot reduce irregularity itself.

The present study is not without limitations of course, which future research may overcome. First, the SIPP data have limited abilities to discern employer-driven work variability versus employee-driven flexibility. Substantial fractions of workers reporting non-standard work also report their schedules are employer driven (Lambert et al. 2014). Still, workers' abilities to create flexible schedules around their non-work lives could represent a promising avenue for resolving increasingly common work-life conflicts (Henly et al. 2006; Kalleberg 2009). Research could then focus on resolving the significant gender differences in requests for flexible work arrangements (Clawson and Gerstel 2014), and negative evaluations of the requesting employees (Munsch 2016).

Second, the SIPP data have limited information on workers' employers, and none on labor unions' negotiations with them. More detailed firm-level or organizational information (Tomaskovic-Devey 2014) would illuminate the specific practices and policies through which employers increase work variability and unions limit it. We describe efforts by UNITE HERE and the UAW as illustrative examples, and encourage more detailed case studies (i.e., Appelbaum et al. 2003) for a fuller understanding of the dynamics at work.

Third, our analysis cannot extend decades back to peak periods of unionization. Given the general decline of unions' size and strength (Rosenfeld 2014), it is possible that unions were once much more effective at regulating work variability than in recent years. The Great Recession and subsequent recovery were characterized by widespread unemployment, involuntary part-time work, and substantial growth of "bad jobs" replacing the "good jobs" that were lost (Golden 2015). If union membership and density have any significant association with

work variability in such an inhospitable labor market, they were very likely more salient in earlier decades.

Fourth, causal inference is an inherent challenge for studies of this type. Fortunately our analyses have a rich set of controls, notably including hourly wage rates and state characteristics that may be correlated with unionization and work variability. Still, it is difficult to rule out potential unobserved endogeneity completely. Common approaches to controlling for unobservables like fixed-effects models are not fitting for our study, as within-person variation in union membership and even state unionization is extremely limited. However, we are not aware of any compelling alternative explanation for our findings net of the controls we include.

Unions have traditionally been one of the most prominent labor market institutions protecting workers in a variety of capacities (Freeman and Medoff 1984). However, their steady and substantial decline in recent decades undermines any certainty that union members continue to substantially benefit (Rosenfeld 2014). Though unionization continued to demonstrate significantly positive effects on earnings and equality up to the Great Recession (Brady et al. 2013; Western and Rosenfeld 2011), we find its benefits for work variability are mixed. Continued examination of unions' declines is crucial for understanding possible long-term trajectories of worker risk and precarity in the US labor market (Kalleberg 2009). Such examinations should consider additional consequences of unionization spilling beyond the workplace (e.g., Reynolds and Brady 2012).

We conclude by briefly considering alternative ways to limit work variability beyond labor unionization. Many state and local governments have instituted various labor regulations similar to conditions collectively bargained for by unions. For example, "pay reporting" laws require employers to pay workers for at least some portion of their scheduled shift in the event of last minute cuts (Alexander and Haley-Lock 2015). Similarly, the city of San Francisco passed multiple ordinances in 2014 through 2016 comprising what labor activists called the "Retail Workers Bill of Rights."[11] These ordinances require retail employers to provide their workers with estimates of their work amount when hired, schedules at least two weeks in advance, expanded "pay reporting" protections, and pay for "on-call" shifts. Though the decline of labor

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[11] The ordinances are described by the San Francisco Office of Labor Standards Enforcement here: http://sfgov.org/olse/formula-retail-employee-rights-ordinances

unions in the United States has limited workers' abilities to secure favorable working conditions, alternative forms of mobilization continue to push for comparable labor regulations at multiple levels of government and directly with employers (Alexander and Haley-Lock 2015; Ben-Ishai et al. 2014).

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Table 1. Means and (standard deviations) for key outcome and explanatory variables, and selected control variables.

Variable	2004 Panel Mean	(SD)	2008 Panel Mean	(SD)
Outcomes				
Hours Vary	0.07		0.11	
Irregular Schedule	0.13		0.16	
Monthly Earnings	2865.81	(2290.18)	2,509.57	(2142.48)
ln(Earnings)	7.73	(0.74)	7.65	(0.77)
Unionization				
Union Member	0.15		0.13	
State Unionization	12.19	(5.98)	11.61	(5.82)
Selected Controls				
GSP PC ($1,000s)	53.10	(8.64)	51.95	(9.16)
Economic Growth	10.87	(2.32)	0.78	(2.70)
Unemployment Rate	2.78	(0.92)	8.47	(1.95)
Minimum Wage	4.99	(0.94)	7.38	(0.66)
Right-to-Work	0.38	(10.54)	0.42	(11.05)
Population (mill.)	12.63		13.27	
Age	39.22	(8.86)	39.37	(9.16)
Female	0.50		0.50	
White	0.62		0.60	
Black	0.13		0.13	
Latino/a	0.19		0.20	
Asian	0.03		0.03	
Other Race	0.03		0.03	
Married	0.58		0.55	
HH Size	3.33	(1.59)	3.33	(1.67)
Children under 6	0.28		0.31	
Hourly Wage Rate	16.63	(7.35)	16.24	(7.67)
ln(Hourly Rate)	2.72	(0.44)	2.68	(0.46)
Less than HS	0.13		0.11	
HS/GED	0.32		0.30	
Some College	0.41		0.41	
College	0.12		0.14	
Postgrad	0.03		0.03	
Private Sector	0.89		0.89	
Public Sector	0.11		0.11	

Persons	31,352	32,096
Person-Waves	154,242	194,382

Notes: All means are calculated using SIPP cross-sectional weights. Irregular Schedule was measured in only wave wave of the the 2004 panel (persons = 15,131) and twice in the 2008 panel (person-waves = 24,208).

Table 2. Results from linear probability models predicting work variability, presented as percentage-point coefficients and (robust-clustered t-statistics).

	Model 1	Model 2	Model 3	Model 4
Hours Vary				
Union Member	-0.016***	-0.003	-0.013**	0.000
	(-3.62)	(-0.71)	(-3.10)	(0.06)
State Unionization	-0.001	-0.000	-0.001	0.000
	(-0.97)	(-0.07)	(-0.66)	(0.35)
Union Member x State Unionization			-0.001+	-0.002**
			(-1.72)	(-2.60)
Persons	61,024	61,024	61,024	61,024
Person-Periods	322,459	322,459	322,459	322,459
Irregular Schedule				
Union Member	0.008	0.035***	0.010	0.038***
	(0.99)	(5.16)	(1.25)	(5.23)
State Unionization	-0.000	0.001	-0.000	0.001
	(-0.45)	(0.62)	(-0.22)	(0.92)
Union Member x State Unionization			-0.001	-0.002+
			(-1.09)	(-1.87)
Persons	30,435	30,435	30,435	30,435
Person-Periods	37,850	37,850	37,850	37,850

Notes: Models 2 and 4 include all control variables. State-level unionization is centered at 12.6 percent. All models apply cross-sectional weights, and cluster standard errors at the person and/or state levels.

+ $p<0.10$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$
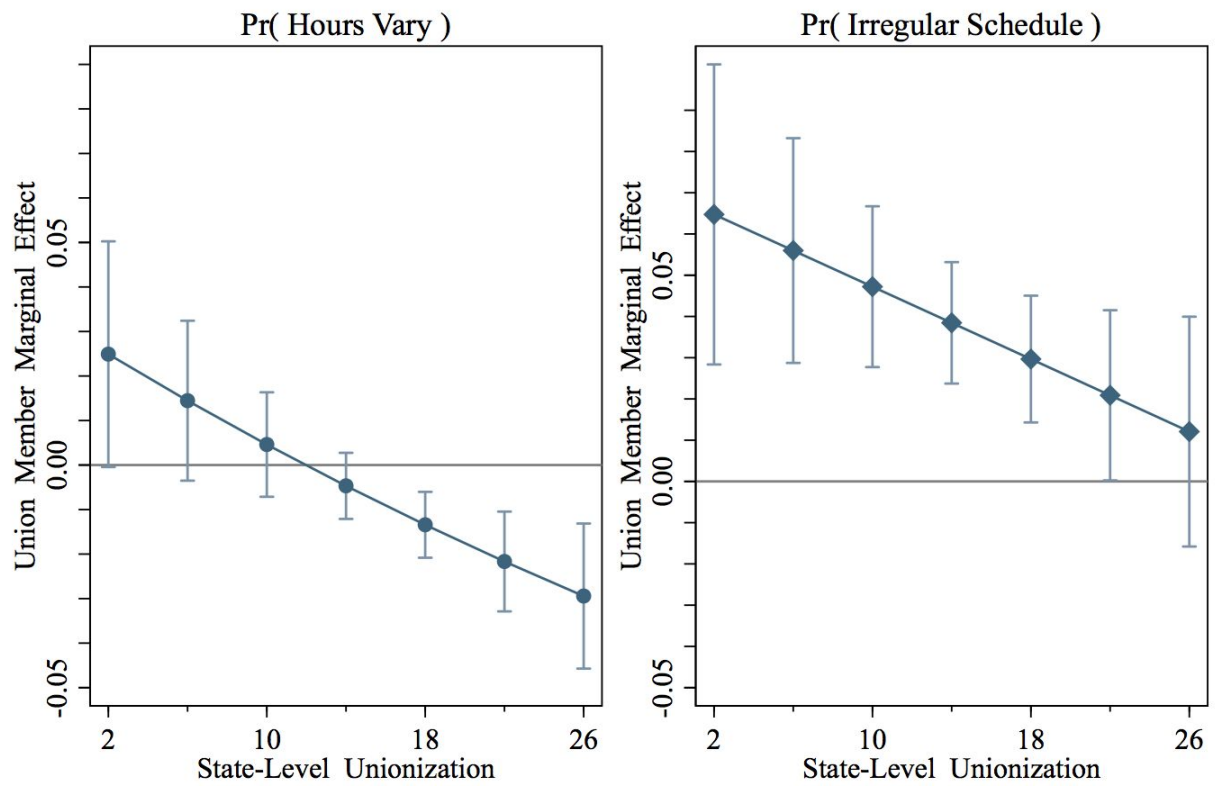
Figure 1. Differences in predicted probabilities of work variability between union members and non-members as a function of state-level unionization.

Note: The predicted probabilities are from logistic regression models predicting work variability equivalent to model 4 in Table 2, including all control variables and with standard errors clustered within persons and states.

Table 3. Results from linear models predicting logged total monthly earnings with (robust-clustered t-statistics).

	Model 1	Model 2	Model 3	Model 4
Union Member	0.110***	0.105***	0.128***	0.112***
	(14.31)	(13.04)	(9.98)	(8.51)
Hours Vary	-0.283***	-0.291***		
	(-20.94)	(-19.58)		
Union x Hours Vary		0.062*		
		(2.57)		
Irregular Schedule			-0.168***	-0.182***
			(-12.19)	(-12.47)
Union x Irregular Schedule				0.098***
				(5.68)
Persons	61,024	61,024	30,435	30,435
Person-Periods	322,459	322,459	37,850	37,850

Notes: All models include all control variables. All models apply cross-sectional weights, and cluster standard errors at the person and/or state levels.

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Appendix

Inconsistencies within Persons between Waves

Some key variables within the SIPP have differences within persons between waves that indicate probable misreporting or person misidentification. The proportion of likely miscoded observations for each variable is relatively small, most below one percent except education. We excluded individuals from the sample with inconsistent sex (320 out of 131,892 persons ever in the 2008 SIPP). Though gender identity and reporting is certainly malleable, close inspection of several cases reveal misidentification of individuals between waves. One example is a husband and wife in a married-couple household whose identifiers swapped between two survey waves. We also excluded an additional 1,627 individuals with age differences larger than likely misreporting (age larger by two years in preceding wave, or smaller by five years). Again, close inspection of several of these cases indicated misidentification of individuals between waves.

Next, we resolved within-person inconsistencies with education, nativity, citizenship, and race by using the modal category reported across all waves. Individuals' education was replaced with their modal categories (2.23% of all person-months) if their reported education declined between waves, or increased two or more categories between four-month waves. Nativity was replaced with the modal category when reporting changed with persons, affecting 0.03% of all person-months. Similarly, citizenship status was replaced with the modal category for individuals switching from citizens to non-citizens between waves (only 15 individuals).

Race/ethnicity was replaced with the modal category for individuals reporting different categories between waves, affecting 0.2% of all person-months. Individuals with multiple modal categories were recoded as "Other Race." This recoding is not meant to negate the socially constructed and context-dependent nature of racial identification. However, fixed categories within persons facilitate comparison of longitudinal and cumulative employment outcomes between groups. Additionally, we emphasize that most inconsistencies within persons resemble misidentification, and a very small fraction of person-months are recoded.

Self-Employment Status

In each wave, the SIPP longitudinally tracked up to two jobs in each four-month wave, as well as up to two self-owned businesses. Respondents also report the number of businesses they own in each wave. We code employed person-months as self-employed for respondents with missing values for both job identifiers ("eeno1" and "eeno2"), but at least one self-owned business ("ebuscntr"). These observations are then excluded from the analysis.

Additional Tables

[Table A1-A3 here]

Table A1. Coefficients for control variables from Tables 2 and 3.

	Hours Vary (Table 2, Model 4)	Irregular Schedule (Table 2, Model 4)	Monthly Earnings (Table 3, Model 2)	Monthly Earnings (Table 3, Model 4)
State-Level Controls				
ln(GSP PC)	0.042	0.039	-0.040	-0.059
	(1.61)	(1.10)	(-1.33)	(-1.34)
Economic Growth	-0.001	0.000	0.000	0.002
	(-1.53)	(0.13)	(0.04)	(0.82)
Unemployment Rate	0.007*	0.002	-0.006*	-0.008*
	(2.57)	(0.62)	(-2.43)	(-2.05)
Minimum Wage	-0.008+	0.006	-0.001	0.004
	(-1.87)	(1.10)	(-0.26)	(0.60)
Right-to-Work	-0.004	0.023*	0.023*	0.027+
	(-0.46)	(2.29)	(2.36)	(1.84)
ln(Population)	0.001	-0.000	0.009*	0.007
	(0.41)	(-0.09)	(2.40)	(1.38)
Individual-Level Controls				
Age	0.000*	-0.001**	-0.000	0.000
	(2.17)	(-2.91)	(-0.16)	(1.05)
Female	0.001	-0.009	-0.161***	-0.150***
	(0.43)	(-1.64)	(-22.64)	(-12.99)
Black	-0.003	-0.020**	0.045***	0.036**
	(-0.60)	(-3.37)	(5.83)	(2.77)
Latino/a	-0.009+	-0.042***	0.055***	0.059***
	(-1.72)	(-6.89)	(6.48)	(4.97)
Asian	0.010	-0.015+	0.079***	0.053**
	(1.10)	(-1.70)	(5.15)	(3.30)
Other Race	0.006	-0.016	0.003	0.019
	(0.54)	(-1.50)	(0.27)	(0.95)
Separated	0.005	0.035*	0.011	-0.001
	(1.00)	(2.08)	(1.37)	(-0.03)
Divorced	0.004	0.006	0.038***	0.039***
	(1.46)	(0.94)	(5.89)	(3.56)
Widowed	0.006	-0.009	0.006	0.011

	(0.87)	(-0.45)	(0.29)	(0.52)
Never Married	0.011*	0.018**	-0.014*	-0.009
	(2.51)	(3.15)	(-2.14)	(-0.97)
HH Size	0.002*	0.002	-0.008***	-0.010***
	(2.16)	(1.46)	(-4.30)	(-4.41)
Children under 6	-0.007*	-0.006	-0.018***	-0.006
	(-2.40)	(-0.91)	(-3.62)	(-0.64)
Non-Metro	0.026**	-0.003	-0.003	-0.016
	(2.64)	(-0.44)	(-0.36)	(-1.43)
Not Identified	0.005	-0.013	0.039+	0.034
	(0.34)	(-1.13)	(1.65)	(1.24)
ln(Hourly Rate)	-0.036***	-0.037***	0.915***	0.919***
	(-12.65)	(-6.40)	(56.54)	(42.67)
HS/GED	-0.003	0.004	0.055***	0.056***
	(-0.46)	(0.63)	(5.30)	(4.00)
Some College	-0.002	0.019*	0.058***	0.065***
	(-0.52)	(2.20)	(5.33)	(4.44)
College	0.005	0.030**	0.044***	0.048**
	(0.91)	(3.08)	(3.96)	(2.80)
Post-Graduate	0.019+	0.071***	0.031	0.040
	(1.74)	(5.00)	(1.50)	(1.41)
Public Sector	-0.012***	-0.011	-0.071***	-0.061***
	(-3.42)	(-1.33)	(-4.41)	(-3.80)
N	322,459	37,850	322,459	37,850

Notes: All models apply cross-sectional weights, and cluster standard errors at the individual and/or state levels. Models include but do not show coefficients for variables in the main tables, 24 occupation categories, 13 industry categories, 4 geographic regions, and year fixed-effects.

+ $p<0.10$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Table A2: Work variability by major industry group, weighted percentage of sample in each industry group, and weighted percentage of sample with union membership.

Industry	% of Sample	% Union	Hours Vary		Irregular Schedule	
			Non-Union	Union	Non-Union	Union
Ag, Forest, Fish, Hunt	1.1	1.0	15.7	7.1	14.2	0.0
Mining	0.5	9.6	14.0	1.9	28.4	36.7
Construction	8.5	21.9	12.9	9.4	9.1	7.1
Manufacturing	14.6	16.6	6.7	5.9	7.8	15.7
Wholesale and Retail Trade	15.2	7.8	9.2	6.3	20.2	26.4
Transportation & Utilities	5.3	38.8	9.5	9.9	13.7	18.3
Information	1.7	22.9	7.1	4.9	14.4	10.2
Financial Activities	4.2	3.7	5.0	10.5	6.1	17.0
Prof & Bus Services	8.9	4.5	10.2	10.5	12.0	11.4
Ed & Health Services	22.7	12.5	8.6	5.3	15.5	13.8
Leisure & Hospitality	9.5	5.8	12.6	9.6	25.1	15.0
Other Services	3.6	5.2	9.9	9.9	16.7	16.9
Public Administration	4.2	38.9	6.1	6.7	11.3	16.5
Armed Forces	0.1	20.1	14.3	3.6	6.7	0.0

Table A3: Work variability by major occupation group, weighted percentage of sample in each occupation group, and weighted percentage of sample with union membership.

Occupation	% of Sample	% Union	Hours Vary		Irregular Schedule	
			Non-Union	Union	Non-Union	Union
Managers	2.9	7.2	9.4	7.2	13.0	5.1
Management Related	2.1	9.6	5.6	3.2	8.2	6.6
Arch & Engineering	0.5	10.5	6.2	12.7	7.6	3.2
Math & Computer	0.8	6.9	4.9	2.3	5.9	19.5
Health Pract & Tech	6.1	11.4	8.7	6.0	21.0	25.4
Teaching & Library	3.2	17.3	10.8	5.6	14.3	6.3
Life, Phys, Soc Sci	0.3	14.9	8.0	6.0	2.3	21.6
Community & Soc Workers	0.8	15.3	8.3	2.1	19.6	1.4
Law	0.1	8.7	12.9	0.0	9.4	40.3
Arts, Athl, & Entertain	0.9	7.9	12.0	7.9	17.2	25.9
Technicians	1.8	14.2	6.1	19.3	9.1	36.8
Sales	8.1	6.8	10.4	8.2	25.2	30.1
Admin Support	17.0	10.3	6.1	5.9	9.7	11.7
Personal Care & Serv	3.4	11.5	12.0	8.6	19.4	19.9
Protective Service	2.4	35.2	10.0	10.7	24.1	25.6
Food Prep & Serv	6.9	6.4	12.6	8.1	25.3	25.5
Health Support	5.1	10.5	11.0	8.7	20.1	23.8
Cleaning & Maintenance	2.6	18.1	7.9	3.5	10.3	5.0
Farm, Fish, & Forest	2.3	4.1	13.6	6.2	12.2	1.8
Install, Maint, Repair	4.6	20.3	7.4	5.8	8.9	6.5
Construction	5.8	26.0	12.3	8.6	8.3	7.9
Extraction	0.2	8.1	19.2	0.8	43.6	19.5
Production	11.8	16.2	7.4	6.1	10.0	16.1
Transp & Mat Moving	10.3	19.6	11.5	8.1	13.3	15.3
Armed Forces	0.1	19.7	14.4	3.6	6.8	0.0