Collective Bargaining and Faculty Job Satisfaction

JOHN M. KRIEG, CHARLES S. WASSELL JR., DAVID W. HEDRICK, and STEVEN E. HENSON*

Estimates of the impact of union membership on job satisfaction suffer from non-random self-selection of employees into unions. In this paper, we circumvent this problem by examining the impact on satisfaction of collective bargaining representation, rather than of union membership. We use a two-stage technique that controls for nonrandom selection of faculty into institutions, and apply that to a panel of faculty at repeatedly observed four-year universities. We find that bargaining agreements increase satisfaction with compensation but reduce satisfaction with faculty workload. Bargaining has no statistically measurable impact on overall job satisfaction or on faculty's satisfaction with their authority to make decisions regarding their instructional duties.

Introduction

STATE LEGISLATORS HAVE RECENTLY TURNED THEIR ATTENTION TOWARD COLLECTIVE bargaining on university campuses. Citing potential budgetary savings, the states of Ohio and Wisconsin, among others, have moved to limit the scope of collective bargaining by faculty in higher education. Among the many arguments against these moves, union supporters claim that unions increase faculty satisfaction with their jobs, thus creating a better work environment which leads to less turnover (Clark 2001; Kosteas 2011), less absenteeism (Clegg 1983), and higher productivity (Mangione and Quinn 1975). This study empirically tests the impact of collective bargaining on faculty satisfaction with their job, workplace, compensation, and ability to influence campus decisions.

Union objectives may be broadly characterized as improving workers' welfare and satisfaction through enhancing the work environment and compensation.

Yet a number of studies have come to the puzzling conclusion that union members are less satisfied than nonunionized workers (in the United States, Borjas 1979, and Schwochau 1987; in Australia, Miller 1990; in the UK, Bender and Sloane 1998; in Canada, Meng 1990). Numerous explanations have been offered to account for the apparent negative relationship between union membership and satisfaction. Most commonly, these studies compare members with nonmembers in national samples of industrialized workers. However, as pointed out by Pfeffer and Davis-Blake (1990), there is tremendous within-industry and within-occupation variation in working conditions, which influence job satisfaction. Typical controls for these conditions in national surveys are crude and likely fail to capture covariates with worker satisfaction. In a similar vein, unobserved individual characteristics may influence estimation of satisfaction. If individuals who experience lower satisfaction are more likely to join unions, then finding a negative impact of unions on satisfaction is not surprising. In other words, being a union member *per se* may bear little relation to job satisfaction, once the self-sorting of workers has been considered.[1] Indeed, using a nationwide British survey, Bryson, Cappellari, and Lucifora (2004) present evidence that self-sorting into unions is the cause of estimated lower satisfaction among union members.

Given that faculty's right to engage in collective bargaining is under debate in the United States, this study departs from previous work by examining the impacts of collective bargaining on satisfaction, rather than further exploring the effects of union membership. Thus, rather than focusing on the difference between individuals who choose to join a union and those who do not, we explore the impact of bargaining agreements that cover all employees—both union members and nonmembers—and compare faculty covered by an agreement with those who are not. This approach has significant advantages over prior work that examines the membership–satisfaction relationship. First, while the individual decision to become a union member is largely immune from public policy influence, policy can create or eliminate the right of faculty to enter into collective bargaining agreements. Improved understanding of the impact collective bargaining has on all faculty will better inform policymakers regarding the role of collective bargaining in universities. Second, by focusing on collective bargaining rather than on membership, this study avoids the potential simultaneity of union membership and satisfaction that biases estimates of the effect that individual membership choice has on satisfaction. Of course, it is possible that individuals self-select into institutions with (or

---

[1] Bender and Sloane (1998) attempt to deal with this by using a two-step estimation methodology in which membership in a union is first predicted and then used to estimate satisfaction. Their findings suggest the negative impact of unionization is reduced, but not eliminated.

without) collective bargaining agreements; however, we control for this possibility through an instrumental variables estimator.

Two recent papers, Bryson, Cappellari, and Lucifora (2011) and Green and Heywood (2010), account for the impact on job satisfaction of being covered by a collective bargaining agreement. Bryson et al. present evidence that nonrandom sorting into covered occupations explains lower job satisfaction among union members, while union membership reduces satisfaction among members in noncovered occupations. Utilizing a worker fixed-effect specification, Green and Heywood find that job dissatisfaction is still associated with union membership. This finding in the presence of fixed effects reduces the likelihood that reported dissatisfaction results from nonrandom sorting of individuals into unions. Interestingly, Green and Heywood also find that while union members are less satisfied, they are also less willing to quit their jobs. Both papers utilize data from Britain where union membership and collective bargaining representation are less highly correlated than they are in the United States. In Britain, union members may or may not be covered by collective bargaining agreements. In the American labor market generally, and college and universities specifically, union membership is confined to institutions that collectively bargain. Thus, it is unclear how the results of these two papers apply to labor markets in United States.

This study employs the National Study of Postsecondary Faculty (NSOPF), a nationally representative survey that contains detailed information on faculty background, work conditions, compensation, and satisfaction. By focusing on collegiate faculties, we eliminate a shortcoming of prior literature that pools different job types across many different industries. The NSOPF inquires into multiple facets of the workplace which potentially are impacted by unions, including satisfaction with benefits, salary, authority to make decisions, and workload. As pointed out by D'Addio, Erickson, and Frijters (2007), estimates of job satisfaction that neglect unobserved workplace heterogeneity suffer from severe bias. We address this unobserved workplace heterogeneity by using an institutional-level random-effects estimator that reduces the weight on within-institution variance and thereby limits such bias.

After controlling for unobserved workplace heterogeneity and nonrandom selection of faculty into unionized institutions, we find that overall job satisfaction is negatively correlated with union membership, consistent with the common finding mentioned above. The results with regard to collective bargaining, however, are more nuanced. We present evidence that collective bargaining increases satisfaction with salary and benefits but reduces satisfaction with faculty workload. Further, in contradiction to the "voice" hypothesis wherein unions increase members' ability to influence workplace

decisions, we find no evidence that bargaining impacts faculty satisfaction with their ability to make instructional decisions on campus. Estimates of collective bargaining impacts on overall job satisfaction are negative but are measured with enough imprecision to preclude inferring that unions reduce overall satisfaction. The fact that overall satisfaction remains statistically unchanged in light of greater satisfaction with compensation and less satisfaction with workload suggests that institutions with collective bargaining trade off higher compensation for increased workload.

Our results paint a picture in which union members are less satisfied with their jobs than nonmembers (perhaps due to nonrandom self-selection into membership), while the broader group of individuals under collective bargaining (both members and nonmembers) are about as satisfied with their work as are those without bargaining agreements. Given that satisfaction studies in the United States have focused only on the membership question, this study presents novel evidence that collective bargaining, *per se*, does not alter overall job satisfaction.

Data Description

The NSOPF is conducted about every 5 years by the National Center for Education Statistics (NCES) of the U.S. Department of Education. To date, it has been administered four times: in 1988, 1993, 1999, and 2004. Each cycle uses a similar two-stage sampling process. At the first stage, institutions from all states in the United States are sampled, and in the second stage, faculty members are sampled from within the selected institutions.[2] In the institutional questionnaire, a representative of the school's administration is asked about institutional characteristics, policies, faculty benefits, and whether any faculty at the institution are represented by a union for the purposes of collective bargaining. In separate individual surveys, individual faculty are asked about their professional experience and background, responsibilities and workload, compensation, demographic characteristics, and satisfaction with various aspects of their job.

Sample sizes for the original NSOPF and for the sample used in our analysis are given in Table 1. Over all four cycles, a total of 78,310 faculty and

---

[2] The NSOPF treats each campus in a multi-campus system as a separate institution for sampling purposes. It oversamples doctoral-granting institutions and faculty members who are either women or minorities, or who teach in the humanities. The NSOPF provides researchers with sample weights that can be used with or without imputed data that replaces missing observations. For this study, we drop all missing observations and choose not to use the imputed data. Further, we have estimated the models of Tables 4, 5, and 6 with the NSOPF provided weights and while the standard errors change, the qualitative findings of this study do not.

TABLE 1

SAMPLE SIZE

	Number of institutions		Number of faculty	
Year	NSOPF	Sample	NSOPF	Sample
1988	450	300	8380	3630
1993	970	480	25,780	6800
1999	890	490	18,040	4490
2004	1020	580	26,110	8400
Sum	1900	1050	78,310	23,310

NOTE: NSOPF, National Study of Postsecondary Faculty. Sample sizes are rounded to the nearest ten to comply with National Center for Education Statistics disclosure requirements. Columns may not sum to totals due to rounding. Because many institutions are repeatedly sampled over different years, the total number of institutions does not equal the sum of institutions over the 4 years.

1900 institutional questionnaires have been returned.[3] The NSOPF includes instructors, lecturers, and tenure-track and tenured faculty members at 2-year and 4-year colleges and universities. To avoid aggregation bias, we focus our analysis on full-time faculty members at 4-year institutions. This reduces the sample to 44,330 faculty observations at 1160 institutions. After eliminating faculty whose principal activity is neither teaching nor research, those for whom data were missing,[4] and those whose basic salary received from their institution was less than $20,000 or greater than $350,000 in 2004 dollars, we have a final sample of 23,320 faculty at 1050 different institutions. Table 2 presents the panel structure of the institutional observations over time. About half of all institutions are observed once, a quarter are observed twice, about a sixth are observed three times, and eight percent appear in all four surveys.

As pointed out by Hedrick et al. (2011), the questions on the NSOPF institution survey used to determine the collective bargaining status of faculty introduce measurement error due to the fact that multiple bargaining groups representing different types of faculty can exist on a single campus.[5] To avoid this measurement problem, we make use of a periodic comprehensive survey of unionized

[3] As noted in Hedrick et al. (2011), many institutions were sampled multiple times. It is possible that individual faculty members may have been sampled more than once, but this would be purely coincidental and the NSOPF does not identify which, if any, faculty were repeatedly sampled. Faculty and institution counts are rounded to the nearest ten to comply with NCES confidentiality requirements.

[4] The NSOPF imputes data when respondents fail to answer a question. All observations with imputed variables used in this analysis were dropped.

[5] The NSOPF institution question asks "Are any full-time faculty and instructional staff legally represented by a union (or other association) for purposes of collective bargaining?" To understand the measurement problem, consider the University of California system, where adjuncts engage in collective bargaining but tenure-track faculty do not. Administrators at these institutions respond to the NSOPF question affirmatively and, under the NSOPF methodology, this affirmative answer is assigned to all faculty at those institutions resulting in measurement error for tenure-track faculty.

TABLE 2

REPLICATION PATTERN FOR INSTITUTIONS

Times observed	Survey year	Number of institutions		Percent of institutions	
4	1988, 1993, 1999, 2004	80	80	8	8
3	1988, 1993, 1999	20	160	2	15
	1988, 1993, 2004	20		2	
	1988, 1999, 2004	30		3	
	1993, 1999, 2004	90		8	
2	1988, 1993	20	240	2	23
	1988, 1999	30		3	
	1988, 2004	20		2	
	1993, 1999	50		5	
	1993, 2004	50		5	
	1999, 2004	70		7	
1	1988	80	560	8	53
	1993	140		13	
	1999	120		11	
	2004	220		21	
Totals		1050	1050	100	100

NOTE: Sample sizes are rounded to the nearest ten to comply with National Center for Education Statistics disclosure requirements. Columns may not sum to totals due to rounding.

institutions from the National Center for the Study of Collective Bargaining in Higher Education and the Professions (NCSCBHEP) compiled by Moriarty and Savarese (2006). The NCSCBHEP data identify the date of initial collective bargaining for four faculty subgroups within all U.S. institutions: full-time permanent faculty, part-time permanent faculty, adjuncts, and librarians. Using these data, we construct a variable *ColBargain* that equals one if the individual faculty member's subgroup at an institution is part of a collective bargaining agreement. For tenure-track faculty, 190 institutions had collective bargaining agreements during the entire four cycles of the NSOPF, 770 institutions did not have agreements, and ten institutions changed collective bargaining status between the beginning and ending of the four survey cycles. For adjunct faculty, 50 institutions had agreements for all four cycles, 810 had no agreements, and 40 switched status during the course of the surveys. The small proportion of institutions that experienced changes in collective bargaining status during the period of observation precludes the use of the fixed-effects estimator. Because of this, we estimate satisfaction using a random-effects estimator.

In all 4 years, the NSOPF faculty survey asks five questions regarding satisfaction with different characteristics of their job. These survey questions follow the format: "With regard to your job at {Insert Institution Name} during the {Insert Year} Fall Term, would you say you were very satisfied, somewhat

satisfied, somewhat dissatisfied, or very dissatisfied with {Insert Satisfaction Type}" where satisfaction types are as follows:

1. Your job at this institution, overall (*Job*)
2. Your workload (*Workload*)
3. Your salary (*Salary*)
4. The benefits available to you (*Benefits*)
5. Authority to make decisions about course content and methods (*Authority*)[6]

These five variables take on the integer values of one (very dissatisfied), two (somewhat dissatisfied), three (somewhat satisfied), and four (very satisfied).[7] Figure 1 presents histograms of each satisfaction variable by *ColBargain*. These suggest that faculty who bargain are less satisfied than their nonunion counterparts with their jobs and workloads and are more satisfied with their salaries and benefits.

In addition to the satisfaction variables, the NSOPF gathers a wide variety of faculty-level information. Table 3 defines these variables and offers descriptive statistics by bargaining status. The first five rows of this table present means and standard deviations of the satisfaction variables. Faculty in institutions with collective bargaining agreements[8] average more satisfaction in terms of their salary and benefits but are less satisfied with their workload and their job overall. There is no mean difference in satisfaction with authority to make instructional decisions by bargaining status; however, relative to the other measures of satisfaction, faculty appear more satisfied with their decision-making authority than with the other aspects of their job. This relatively high level of *Authority* may be due to some imprecision in the actual survey question. It is not clear whether the question refers to decisions about daily activities a faculty member may undertake (e.g., what topics to cover and what methods to use) or to periodic decisions (such as which textbook to assign). On the

---

[6] All regressions involving *Authority* have about 560 fewer observations than regressions employing the other satisfaction variables. This is likely because all questions except *Authority* were asked of all faculty and instructional staff, but the *Authority* question was asked of all faculty and instructional staff "with instructional responsibilities" during the quarter in which the survey was administered. Results should be interpreted in light of this fact. In the 2004 survey, the words "about content and methods in the courses I teach" were dropped from the question; however, the distribution of responses is quite similar to previous years, suggesting that respondents were interpreting the question in a similar manner.

[7] The 2004 survey also asks about satisfaction with technology-based activities, equipment and facilities, and institutional support for teaching improvement. Because these questions were not included in the previous surveys, we exclude them from this analysis.

[8] To be precise, when we refer to "institutions with collective bargaining agreements," we mean "institutions with a collective bargaining agreement for the faculty member's subgroup," where the subgroups are those used to define *ColBargain*. For expository convenience, we use the former expression.

FIGURE 1

Measures of Satisfaction, by Bargaining Status
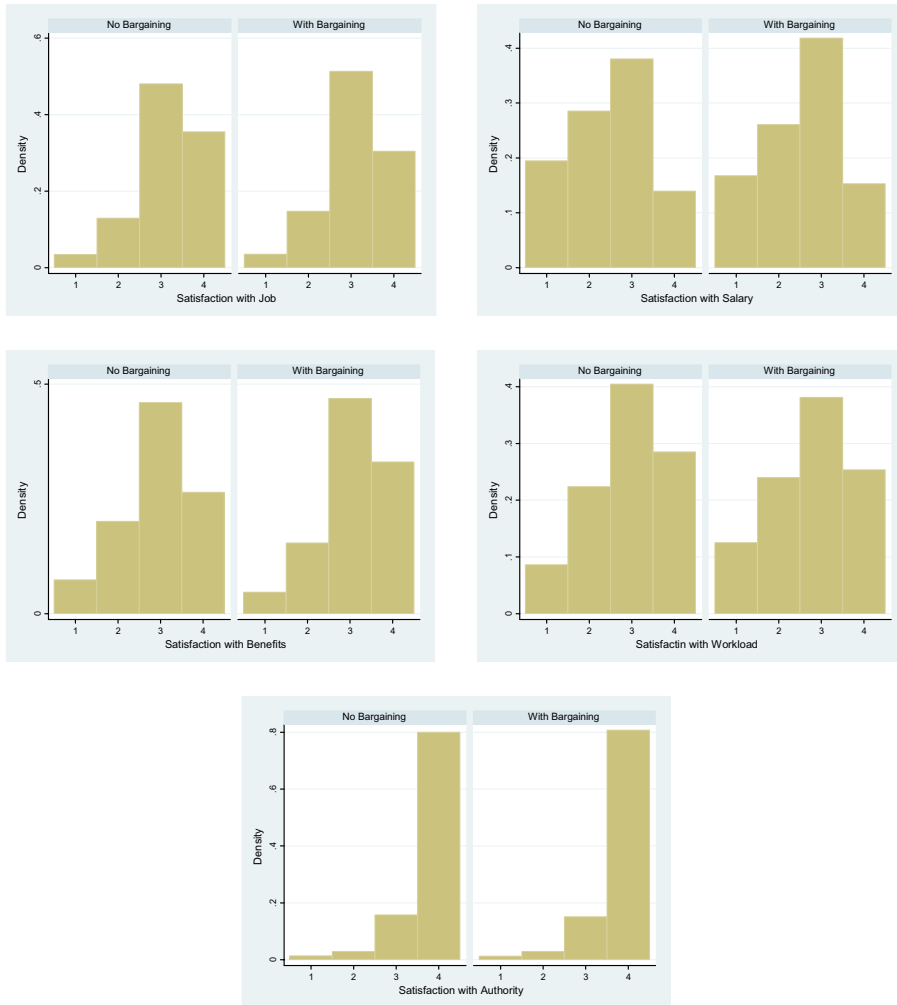
other hand, this simply may indicate that faculty have a relatively high degree of autonomy in decisions directly related to the content and delivery of their courses and are therefore likely to be highly satisfied.

The differences in mean job, salary, benefits, and workload satisfaction reported in Table 3 are possibly explained by the fact that faculty at unionized institutions average more total salary, have more experience (both in their current position and since earning their highest degree), are more likely to hold the rank of full professor, spend less time doing research, and are more likely

TABLE 3

Descriptive Statistics

		ColBargain = 1		*ColBargain* = 0
Individual variables				
Job	Satisfaction with job	3.08 (0.76)	<	3.16 (0.77)
Workload	Satisfaction with workload	2.76 (0.98)	<	2.89 (0.92)
Salary	Satisfaction with salary	2.56(0.94)	>	2.46 (0.95)
Benefits	Satisfaction with benefits	3.08 (0.81)	>	2.91 (0.87)
Authority	Satisfaction with authority	3.75 (0.566)	=	3.74 (0.576)
Membership	Binary = 1 if union member	0.740 (0.438)	>	0.046 (0.211)
RTotalSal	Real total salary, adjusted for local cost of living	67,615 (24,082)	>	65,642 (30,772)
Exp	Years of experience at current institution	12.63 (9.87)	>	10.68 (9.57)
Degexp	Years of experience since earning highest degree	16.40 (10.12)	>	15.19 (10.16)
Female	Binary = 1 if female	0.346 (0.475)	=	0.355 (0.479)
Married	Binary = 1 if currently married	0.726 (0.445)	<	0.747 (0.434)
Wasmarried	Binary = 1 if previously married	0.110 (0.314)	=	0.104 (0.305)
Hispanic	Binary = 1 if Hispanic	0.051 (0.220)	>	0.041 (0.197)
Indian	Binary = 1 if American Indian	0.011 (0.105)	=	0.010 (0.001)
Asian	Binary = 1 if Asian	0.077 (0.266)	>	0.058 (0.235)
Black	Binary = 1 if Black	0.045 (0.208)	=	0.053 (0.221)
Pacific	Binary = 1 if Pacific Islander	0.002 (0.044)	=	0.0009 (0.031)
Lecturer	Binary = 1 if academic rank is lecturer	0.026 (0.159)	=	0.029 (0.169)
Instructor	Binary = 1 if academic rank is instructor	0.032 (0.175)	<	0.065 (0.247)
Assistant	Binary = 1 if academic rank is assistant professor	0.253 (0.434)	<	0.306 (0.461)
Associate	Binary = 1 if academic rank is associate professor	0.296 (0.456)	>	0.273 (0.445)
Full	Binary = 1 if academic rank is professor	0.385 (0.486)	>	0.306 (0.460)
Tenured	Binary = 1 if observation holds tenure	0.678 (0.467)	>	0.525 (0.499)
Tentrack	Binary = 1 if observation in tenure track, but not tenured	0.251 (0.433)	=	0.263 (0.440)
Masters	Highest degree is a master's	0.162 (0.368)	<	0.196 (0.397)
Profession	Highest degree is a professional degree	0.041 (0.197)	<	0.059 (0.235)
Doctorate	Highest degree is a doctorate	0.788 (0.408)	>	0.731 (0.443)
Citizen	Binary = 1 if U.S. citizen	0.913 (0.282)	=	0.917 (0.276)
Funded	Binary = 1 if research is externally funded	0.315 (0.465)	<	0.344 (0.475)
First job	Binary = 1 if first academic job	0.389 (0.487)	=	0.400 (0.490)
Percent Teaching	Percent of work time spent teaching	61.67 (22.42)	>	59.97 (24.77)
Percent Research	Percent of work time spent researching	20.34 (20.01)	<	22.09 (22.88)
TA	Binary = 1 if observation has a teaching assistant	0.700 (0.458)	=	0.690 (0.462)
Institutional variables				
Enrollment	Institutions enrollment, in thousands	12.77 (9.23)	>	11.07 (10.63)
Public Doctoral	Binary = 1 if institution is public, doctoral granting	0.360 (0.480)	>	0.337 (0.473)

TABLE 3 (Cont.)

		ColBargain = 1		ColBargain = 0
Private Doctoral	Binary = 1 if institution is private, doctoral granting	0.017 (0.133)	<	0.144 (0.351)
Public Comp.	Binary = 1 if institution is public comprehensive	0.504 (0.500)	>	0.176 (0.381)
Private Comp.	Binary = 1 if institution is private comprehensive	0.036 (0.186)	<	0.116 (0.320)
Public LA	Binary = 1 if institution is public, liberal arts	0.026 (0.157)	>	0.012 (0.111)
Private LA	Binary = 1 if institution is private, liberal arts	0.024 (0.154)	<	0.143 (0.349)
Other	Binary = 1 if none of the above	0.031 0.174	<	0.067 0.250
N		4470		18,850
N_j		210		940

Notes: Standard deviations in parentheses. <, > represent statistical difference of the means at the 5 percent level. Sample sizes are rounded to the nearest ten to comply with National Center for Education Statistics disclosure requirements.

to be at public institutions[9] and at schools with higher student enrollments. The next section provides a method to disentangle these effects from one another.

Methodology

D'Addio, Erickson, and Frijters (2007) demonstrate the importance of controlling for unobserved workplace heterogeneity in estimates of job satisfaction. This, and the fact that the NSOPF allows pooling of institutional observations across surveys, argues for the use of random-effects ordered logit models to estimate individual faculty satisfaction. We assume that the satisfaction of individual i at institution j in bargaining subgroup r during time period t is summarized by a continuous latent variable S^*_{ijrt} given by:

$$S^*_{ijrt} = \gamma ColBargain_{ijrt} + \mathbf{X}_{ijrt}\boldsymbol{\beta} + \mathbf{Z}_{jt}\boldsymbol{\delta} + \alpha_j + \varepsilon_{ijrt} \qquad (1)$$

where S^*_{ijrt} is one of the five measures of satisfaction, and $\mathbf{X}$ and $\mathbf{Z}$ are vectors of individual and institutional variables, respectively, listed in Table 3. Also included in $\mathbf{X}$ are thirty-one binary variables representing the faculty member's discipline, squares of overall job experience and tenure at the current institution, and years since earning the faculty member's highest degree. $\mathbf{Z}$ also

---

[9] The higher incidence of unionization at public institutions is a result of the U.S. Supreme Court decision in *NLRB v. Yeshiva University*, 444 U.S. 672 (1980), in which the Court ruled that faculty at Yeshiva University were essentially managerial employees and therefore lacked collective bargaining rights given to private-sector employees under the National Labor Relations Act. This ruling applied to faculty at private institutions. Hence, collective bargaining in higher education is primarily, but not exclusively, a public sector phenomenon.

includes three binaries representing the NSOPF survey year and the square of institutional enrollment. The error term α_j represents unobserved institutional-level heterogeneity—which under the random-effects specification is assumed to be uncorrelated with *ColBargain*, **X**, **Z**, and ε_{ijrt}. $\boldsymbol{\beta}$ and $\boldsymbol{\delta}$ are vectors of estimated coefficients. The parameter of interest is γ, which captures the impact of the presence of a collective bargaining agreement on satisfaction.

The observed response to the satisfaction question is S_{ijrt}, which is connected to the latent variable S^*_{ijrt} by the rule:

$$S_{ijrt} = k \quad \text{if } \tau_{k-1} < S^*_{ijrt} \leq \tau_k \quad k = 1, \ldots, 4 \tag{2}$$

where thresholds τ are assumed to be strictly increasing ($\tau_k < \tau_{k+1}$ for all k), $\tau_0 = -\infty$, and $\tau_4 = \infty$. The distributional assumption completing the specification of the panel ordered logit model is that conditional on **X**, **Z,** and α_j, the ε_{ijrt} are i.i.d. standard logistically, or:

$$F(u_{ijrt}) = \frac{1}{1 + \exp(-u_{ijrt})} \equiv \Lambda(u_{ijrt}) \tag{3}$$

where $u_{ijrt} = \alpha_j + \varepsilon_{ijrt}$ is the composite error term. The probability of observing outcome k for individual i at institution j during time t using (1), (2), and (3) is as follows:

$$
\begin{aligned}
Pr(y_{ijrt} = k : \mathbf{X}_{ijrt}) = {}& \Lambda(\tau_{jk} + \gamma \text{ColBargain}_{ijrt} + \mathbf{X}_{ijrt}\boldsymbol{\beta} + \mathbf{Z}_{jt}\boldsymbol{\delta}) \\
& - \Lambda(\tau_{jk-1} + \gamma \text{ColBargain}_{ijrt} + \mathbf{X}_{ijrt}\boldsymbol{\beta} + \mathbf{Z}_{jt}\boldsymbol{\delta})
\end{aligned}
\tag{4}
$$

Maximum likelihood estimation based upon (4) requires a random-effects specification. Random-effects estimates of ordered response models have a long history (see Contoyannis and Jones 2004; Groot and van den Brink 2003; Winkelmann 2003). We employ the weighting scheme outlined by Greene and Hensher (2010) to arrive at efficient random-effects estimates.

One variable missing from equation (1) is the level of financial compensation received. A number of studies (e.g., Lillydahl and Singell 1993) have pointed out that wages positively impact overall job satisfaction. Consider the equation:

$$S^*_{ijrt} = \gamma ColBargain_{ijrt} + \eta RTotalSal_{ijrt} + \mathbf{X}_{ijrt}\boldsymbol{\beta} + \mathbf{Z}_{jt}\boldsymbol{\delta} + \alpha_j + \varepsilon_{ijrt} \tag{5}$$

where *RTotalSal* measures the real total salary adjusted for local cost of living differences received by faculty member i.[10]

---

[10] The NSOPF faculty survey asks numerous questions regarding the financial compensation of individuals including the total annual salary received from the institution. This includes the value of the base contract as well as payments made for supplementary duties such as summer teaching, overload courses, and internal research funding. This compensation was then corrected for inflation using the CPI and corrected for local cost of living differences using the rent adjustment process fully described in Hedrick et al. (2011).

If collective bargaining agreements simultaneously impact salary and satisfaction, then omitting salary as in equation (1) will bias estimates of γ through traditional omitted variables bias. However, it is possible that satisfaction and salary are jointly determined. If the full compensation of a faculty member is broadly defined as the sum of his or her monetary compensation and job satisfaction, then it is conceivable that individuals substitute between salary and satisfaction. If collective bargaining agreements alter the ability to substitute between these variables (perhaps by making salary schedules rigid or through bargaining workplace conditions), then equation (5) may be best thought of as a structural equation in a system of two equations where the other equation determines the level of salary. Our estimation approach is to report models with and without *RTotalSal* and compare estimates of γ in each. We take unchanged estimates of γ between these models as evidence that the joint determination of satisfaction and salary is not a significant issue in these data.[11]

As pointed out in the Introduction, faculty may nonrandomly select into institutions based upon their collective bargaining status. To determine the causal impact of bargaining on satisfaction, two cases must be considered. First, consider the more traditional case of selection where, at the time of job search, individuals (partly) choose their place of work based upon its collective bargaining status. Individuals with a taste for collective bargaining are more likely to work at unionized institutions and, because they are in their preferred bargaining environment, experience greater levels of satisfaction. Ignoring this selection mechanism precludes interpreting γ as the causal impact of collective bargaining on satisfaction. We control for this possibility by employing an instrument which is correlated with *ColBargain* but not correlated with the ε_{ijrt} in equations (1) and (5). A good candidate for such an instrument is the prior level of private sector unionization in the state in which the institution is located. States with histories of high levels of unionization are more likely to have sentiment, legislation, and policies that make the unionization of faculty more likely. To be specific, our instrument is the percentage of nonagricultural workers in an institution's state that were unionized during 1964 (*Mem64*).[12] As demonstrated in Figure 2, among all 4-year institutions listed by the

---

[11] Another potential endogenous relationship exists between tenure at an institution (*Exp*) and satisfaction. We look for evidence of this in the same way we look for it with regard to salary. We first estimate models with *Exp* (and its square) and then re-estimate models excluding these measures. In our preferred two-stage least squares specification of Table 4, the coefficients on *ColBargain* change only in the third or fourth decimal place suggesting that if endogeneity exists between *Exp* and satisfaction, it does little to bias our estimates of the impacts of collective bargaining.

[12] Taken from Hirsch, Macpherson, and Vroman (2001) and available under the title "State Union Membership Density in the U.S., 1964–2008" at unionstats.gsu.edu.

FIGURE 2

DATES OF INITIAL BARGAINING AGREEMENTS
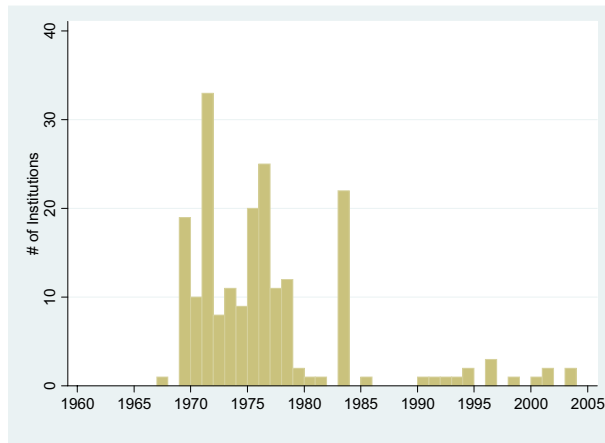
SOURCE: Moriarty and Savarese (2006).

NCSCBHEP, unionization began in the late 1960s, peaked in the early 1970s, and was virtually complete by the mid-1980s. By choosing our instrument to predate faculty unionization, we eliminate the possibility that faculty unions led to unionization in the nonagricultural areas of the state. As demonstrated later, *Mem64* is highly correlated with an institution's bargaining status but sufficiently distant in the past so as to be uncorrelated with the error terms in the satisfaction equations. We use Wooldridge's (2002, p. 623) recommended two-stage instrumental variables technique. In the first stage, we estimate a logit equation in which *ColBargain* is regressed on *Mem64*, **X,** and **Z**. We then employ the predicted probability from this logit as an instrument for *ColBargain* in equations (1) and (5).

A related selection issue occurs in the rare cases where an institution changes collective bargaining status. If individuals select into institutions based upon unobserved tastes for collective bargaining, then when institutions switch bargaining regimes, these faculty will express dissatisfaction not because of the characteristics of their job, but instead because their collective bargaining status now differs relative to their original preferences. In this case, estimates of γ will be the sum of two factors: the dissatisfaction caused by switching regimes, and the inherent (dis)satisfaction generated by collective bargaining. From the point of view of the institution, the dissatisfaction caused by regime change is transitory. As the impacted faculty leave the institution, they will be replaced by individuals who know the institution's bargaining status. As can be seen in Figure 2, during the

TABLE 4

Estimates of γ

	Pooled ordered logit				Random-effects ordered logit		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Row 1: *Job*	−0.191*** (0.042)	−0.144*** (0.044)	−0.070 (0.044)	−0.077* (0.043)	−0.043 (0.045)	−0.065 (0.049)	−0.021 (0.114)
Row 2: *Workload*	−0.228*** (0.057)	−0.190*** (0.051)	−0.114** (0.047)	−0.115** (0.047)	−0.083 (0.052)	−0.103* (0.053)	−0.352*** (0.120)
Row 3: *Salary*	0.178*** (0.060)	0.232*** (0.066)	0.302*** (0.065)	0.292*** (0.058)	0.133*** (0.028)	0.247*** (0.041)	0.547*** (0.148)
Row 4: *Benefits*	0.359*** (0.066)	0.415*** (0.074)	0.446*** (0.076)	0.443*** (0.074)	0.365*** (0.080)	0.420*** (0.076)	0.948*** (0.197)
Row 5: *Authority*	0.044 (0.053)	−0.037 (0.051)	0.032 (0.054)	0.029 (0.054)	0.049 (0.053)	0.032 (0.059)	0.114 (0.135)
Faculty variables included	No	Yes	Yes	Yes	Yes	Yes	Yes
Institution variables included	No	No	Yes	Yes	Yes	Yes	Yes
RTotalSal included	No	No	No	Yes	Yes	Yes	Yes
Excluded data after regime change	No	No	No	No	No	Yes	Yes
Instrument for *ColBargain*	No	No	No	No	No	No	Yes
Coefficient of *Mem64* in first-stage logit	–	–	–	–	–	–	0.092*** (0.006)
Chi-square test of first-stage regression (*p*-value)	–	–	–	–	–	–	1020.36 (0.000)
N	23,310	23,310	23,310	23,310	23,310	21,680	21,680
N_j	1050	1050	1050	1050	1050	1050	1050

Notes: Standard errors corrected for clustering at the institutional level are in parentheses. *** {**}, [*] represent statistical significance at the 1 percent {5 percent} [10 percent] level. Sample sizes are rounded to the nearest ten to comply with National Center for Education Statistics disclosure requirements. All regressions contain each variable listed in Table 3; the squares of *Exp*, *Degexp*, and *Enrollment*; thirty-one binaries indicating faculty member's discipline; and three binaries representing the survey year.

years 1988–2004 spanned by the four rounds of the NSOPF, relatively few institutions switched into collective bargaining. Thus, the impact of regime switches is likely to be small. However, to control for this potential source of dissatisfaction, we identify the faculty who were hired at an institution which later switched bargaining status. In some specifications, we exclude these faculty from the analysis. In the case where these observations are excluded, we interpret γ as being the inherent impact of collective bargaining on satisfaction. When these observations are not excluded, γ is better thought of as a summation of effects including the causal effect of collective bargaining and the transitory impacts of switching regimes on satisfaction.

Results

As noted above, our focus on the impacts of collective bargaining rather than union membership circumvents endogeneity issues between membership decisions and job satisfaction that plagued earlier studies. However, before proceeding to our results, it is useful for comparison purposes to examine the membership–satisfaction relationship using the NSOPF data. Define the binary variable, *Membership*, as equal to 1 if faculty member positively responds to the NSOPF question "Are you a member of a union or other bargaining association that is legally recognized to represent the faculty at {insert institution name}?" We substitute *Membership* for *ColBargain* in equation (5) and estimate the model using random-effects ordered logit on the entire sample and *Job* as the dependent variable. Results are not tabulated, but are available from the authors on request. The coefficient on *Membership* is –0.079 ($p = 0.076$). This corresponds to reductions of 1.5 and 0.7 percentage points in the likelihood of union members being very satisfied and satisfied, respectively, and increases of 0.8 and 0.3 percentage points in the probability of members being somewhat and very dissatisfied with their job overall. This finding is similar to the wider literature that finds a negative relationship between job satisfaction and union membership.[13] This suggests that while collegiate faculty are clearly a different subset of the overall population of workers, faculty appear to follow a pattern similar to general workers in that union membership is negatively related to overall job satisfaction.

Turning now to the results using collective bargaining, we begin our analysis by focusing on *Job*, the NSOPF's measure of overall job satisfaction. The first

---

[13] See, for instance, Bryson, Cappellari, and Lucifora (2011).

row of Table 4 presents seven different estimates of the impact of *ColBargain* on *Job* where each estimate represents a different model specification. To understand the impacts of these model specifications, the first four columns of Table 4 ignore the panel nature of the data and estimate γ with simple ordered logit models. The first column includes only *ColBargain* as a regressor. The estimate in column 1 of $\gamma = -0.191$ corresponds to the estimated mean difference between institutions with and without bargaining demonstrated in the first row of Table 3. Including faculty-level covariates $\mathbf{X}$ (column 2) reduces this estimate of γ by about 25 percent, and including the institution-level $\mathbf{Z}$ variables (column 3) reduces this estimate by about half again to $\gamma = -0.070$. Including these regressors suggests that much, but not all, of the average difference in job satisfaction between faculty at collective bargaining institutions and those at institutions without bargaining are due to observable personal or institutional characteristics. To put the coefficient of -0.070 into perspective, relative to nonunionized faculty, under collective bargaining the probability that a faculty member is very dissatisfied with his or her job is 0.2 percentage points higher, of being somewhat dissatisfied is 0.7 percentage points higher, of being somewhat satisfied is 0.6 percentage points higher, and of being very satisfied is 1.5 percentage points lower. A second method of understanding this result is to consider coefficients on other variables. For instance, the coefficient on being tenured (0.23) is roughly three times the magnitude of γ. Other coefficients of potential interest are the presence of a teaching assistant (0.18), receiving financial support for scholarly activities (0.08), increasing the time spent on teaching by one percent (-0.002), and being in one's first faculty job (0.14).[14]

The specification in column 3 corresponds to equation (1) and omits the real value of total salary (*RTotalSal*). As noted above, if job satisfaction is simultaneously correlated with collective bargaining and compensation, then estimates of γ excluding *RTotalSal* would be biased. However, as pointed out by Lillydahl and Singell (1993), if *RTotalSal* and *Job* are jointly determined, then including salary may lead to simultaneity bias. To measure the importance of these effects, column 4 reports γ with total salary included as a regressor as in equation (5). The estimate of γ falls slightly after the inclusion of *RTotalSal* ($\gamma = -0.077$), but this estimate is statistically no different from that estimated without *RTotalSal* (*p* value = 0.832). The similarity of the γ's between columns 3 and 4 suggests the inclusion of *RTotalSal* has little impact on our estimates of satisfaction. For thoroughness, we include this variable in subsequent estimates.

---

[14] Full results are available from the authors upon request.

Before proceeding to estimates using panel techniques, it is worth examining the preliminary impacts of collective bargaining on the other satisfaction variables listed in rows 2 through 5 of Table 4. Like the prior results involving *Job*, workers under collective bargaining are less satisfied with their workload, and the magnitude of this dissatisfaction diminishes as individual and institutional variables are included. The ordered logit estimate containing all variables (column 4, row 2 of Table 4) suggests that faculty at collective bargaining institutions are 0.9 percentage points more likely to be very dissatisfied, 1.5 percentage points more likely to be somewhat dissatisfied, 0.3 percentage points less likely to be somewhat satisfied, and 2.2 percentage points less likely to be very satisfied regarding their workload compared with their nonunion counterparts.

Unlike *Job* and *Workload*, collective bargaining increases satisfaction with total compensation (*Salary* and *Benefits*). Also unlike *Job* and *Workload*, the magnitudes of the estimated coefficients associated with *Salary* and *Benefits* rise with the inclusion of individual and institutional covariates. Again focusing on the column 4 results, faculty at collective bargaining institutions are 5.4 and 2.3 percentage points less likely to be somewhat and very dissatisfied with their benefits, respectively, and are 3.8 and 3.4 percentage points more likely to be somewhat and very satisfied with their salaries. This positive impact occurs even when *RTotalSal* is included (column 4), although there is no statistical difference in γ between this estimate and that of column 3 when *RTotalSal* is excluded (p-value = 0.834 for *Salary* estimates and p-value of 0.966 for *Benefits* estimates). This positive γ in the presence of actual salaries suggests that collective bargaining raises satisfaction with salaries through indirect channels and not directly through actual alterations in salary. Perhaps faculty at bargaining institutions are led to believe that their union is actively raising their compensation and are therefore more satisfied with that aspect of their job. This "perception" theory is possible in light of Hedrick et al. (2011) who, using the NSOPF, found that collective bargaining agreements fail to substantially raise salaries of full-time faculty in 4-year institutions.

Row 5 of Table 4 suggests that collective bargaining has no impact on *Authority*. In all specifications of *Authority*, the estimated γ's are small both statistically and practically. A number of reasons can be given for the lack of impact bargaining has on *Authority*. First, as demonstrated in Figure 1 and the descriptive statistics of Table 3, the average level of *Authority* for bargaining (3.75) and nonbargaining (3.74) faculties is extraordinarily high leaving little room for improvement. Second, the authority question is quite broad and may be interpreted by respondents as having to do with a range of possible activities from the day to day (e.g., what to do in a class) to the quarter to quarter (e.g., which books to adopt) to the year to year (e.g., what courses to teach or

what committees to serve on). Another possibility is that unions serve as perfect substitutes for traditional faculty governance structures and hence do little to alter comparisons of satisfaction with respect to *Authority* across campuses.

As demonstrated by Pfeffer and Davis-Blake (1990), studies of satisfaction typically suffer from failure to control for unobserved heterogeneity between workplaces. However, the NSOPF's sampling of institutions at different time periods in principle could provide the opportunity to control for time-variant institution heterogeneity through the use of ordered logit panel techniques with institutional-level fixed effects. However, changes in collective bargaining status are extremely rare over the time period spanned by the four rounds of the NSOPF. This precludes the estimation of *ColBargain* using fixed effects. To provide some control for such heterogeneity, we utilize Greene and Hensher's (2010) random-effects estimator. Column 5 of Table 4 applies the random-effects estimator to the models of column 4. The inclusion of random effects decreases the magnitude of γ for all previously statistically significant measures of satisfaction. While the coefficients in the *Workload*, *Salary*, and *Benefits* equations remain statistically significant and of similar sign to column 4, the estimate of overall job satisfaction becomes statistically insignificant with the inclusion of random effects.[15] This statistical insignificance of *Job* occurs in all subsequent estimates using panel techniques.

Column 6 presents results from random-effects ordered logits excluding faculty members who were hired prior to a switch in their institution's bargaining status. The omitted individuals are those whose satisfaction is the result of two separate union effects: the direct effect that a union has on satisfaction and the impact on satisfaction of being at an institution which switches collective bargaining status after the faculty member is hired. By excluding these individuals, we interpret the coefficients in column 6 as being the impact of collective bargaining on satisfaction absent the (dis)satisfaction caused by a posthire change in institutional bargaining status. We believe this is a better measure of union impacts as switching is a rare event, and switching can have impacts on faculty satisfaction that are large for the individual, but transitory from the institution's perspective. The exclusion of this relative small group of faculty (about 7 percent of the total sample) significantly increases the magnitudes of all coefficients, except that of *Authority*, relative to the complete sample. We interpret this as being the result of nonrandom selection into bargaining institutions by faculty members and the subsequent dissatisfaction of those faculty who experienced a change contrary to their original preferences.

---

[15] All standard errors throughout the study are corrected for clustering of individuals into institutions.

An additional sample selection issue arises when interpreting γ. Even ignoring the impact of institutions switching bargaining status, it is likely that individuals nonrandomly self-select into institutions based upon bargaining status. If this selection is correlated with satisfaction, then γ will not represent the causal impacts of bargaining. To account for this possibility, we instrument for collective bargaining using *Mem64*, the percentage of the institution's state workforce that was unionized in 1964. It is unlikely that *Mem64* is related to unobserved variables that affect an individual's satisfaction level; however, the *chi-square* test of first-stage significance (reported in Table 4) indicates that it is positively correlated with the probability that an institution has a collective bargaining agreement. Incorporating this instrument into the random-effects estimator produces the results of column 7. As in the case of excluding individuals who experience a switch in bargaining, the IV estimates substantially increase in magnitude. Indeed, the IV coefficient estimates are double those of column 6 for the *Salary* and *Benefit* estimates and triple for the *Workload* and *Authority* estimates. This large increase in coefficients could be due to a downward bias in estimates that fail to account for nonrandom selection into bargaining status or it might be the result of utilizing an instrument that is correlated with the u_{ijrt}. We explore this possibility in the following section.

Robustness Checks and Heterogeneity

One concern with the use of *Mem64* as an instrument is that faculty members may nonrandomly select into institutions based upon state characteristics correlated with *Mem64*. For instance, the structure and philosophies of states with high values of *Mem64* may be attractive to faculty with a predisposition toward bargaining. If faculty are attracted to an institution because of the characteristics of the state in which it resides, and if these characteristics embodied in *Mem64* change slowly over time, then it is possible that *Mem64* would be correlated with the error term in equation (5). One method of dealing with this would be to augment equation (5) with state-level fixed effects. This purges the error term of unobserved, time-invariant state-level effects and eliminates their correlation with the state-level *Mem64* instrument. The drawback of this approach is the well-known finding that the use of fixed effects in nonlinear models can produce biased coefficients (See Greene 2001, and Heckman 1981).

To gauge the importance of state-level fixed effects on the IV estimator, we estimate the models in column 6 of Table 4 with linear, institution-level random-effects models augmented by state-level fixed effects using *ColBargain* as a regressor. By using linear models, we avoid the bias produced with the inclusion of fixed effects in nonlinear models and simultaneously provide a

TABLE 5

Linear Random-Effects Estimates of γ

	(1)	(2)	(3)
Row 1: *Job*	−0.021 (0.019)	−0.030 (0.026)	−0.074 (0.063)
Row 2: *Workload*	−0.048* (0.025)	−0.024 (0.032)	−0.224*** (0.080)
Row 3: *Salary*	0.116*** (0.028)	0.081** (0.032)	0.151** (0.080)
Row 4: *Benefits*	0.190*** (0.028)	0.139*** (0.032)	0.208*** (0.076)
Row 5: *Authority*	0.007 (0.013)	0.006 (0.017)	0.012 (0.042)
Faculty variables included	Yes	Yes	Yes
Institution variables included	Yes	Yes	Yes
RTotalSal included	Yes	Yes	Yes
Excluded data after regime change	Yes	Yes	Yes
Instrument for *ColBargain*	No	No	Yes
State-level fixed effects	No	Yes	Yes
Coefficient of *Mem64* in first-stage logit			0.092*** (0.006)
Chi-square test of first-stage regression (*p*-value)			1020.36 (0.000)
N	21,680	21,680	21,680
N_j	1050	1050	1050

Note: See notes to Table 4.

method to check the impact of state-level fixed effects on the IV estimates. Table 5 presents coefficients from these models. The first column of Table 5 introduces an institutional random-effects model without state fixed effects. This model is identical to the one used in column 6 of Table 4, except that Table 5 treats the measures of satisfaction as linear rather than ordinal. Indeed, the linear estimates in the first column of Table 5 are qualitatively similar to the random-effects logit models of Table 4: collective bargaining improves satisfaction with salaries and benefits, reduces it with respect to workload, and does not alter satisfaction with respect to *Job* and *Authority*. Introducing state-level fixed effects (column 2 of Table 5) reduces the magnitudes of all coefficients except that of *Job*, which marginally increases. Column 3 of Table 5 instruments for *ColBargain* using *Mem64* in the presence of state fixed effects. This substantially increases the magnitude of the estimates of γ relative to column 2, as was the case between columns 6 and 7 of Table 4. Thus, in comparing the two approaches—linear models with state fixed effects in Table 5, versus nonlinear models without state fixed effects in Table 4—the use of *Mem64* as an instrument has similar effects on the results. This is reassuring. It reinforces our confidence both in the use of *Mem64* as an instrument and in the robustness of our qualitative findings that collective bargaining raises satisfaction with compensation and reduces it with respect to workload.

Another concern is that collective bargaining may have differential impacts on faculty satisfaction based upon subgroup status. To check for this, we split the sample into the two faculty subgroups identified by NCSCBHEP (tenured and tenure-track faculty in one group, and adjuncts in the other) and re-estimate the models of columns 6 and 7 of Table 4 separately for each. Returning to the random-effects logit models, these estimates are presented in Table 6. Concentrating first on the tenured/tenure-track faculty, the patterns are similar to those of the previous table. Collective bargaining increases satis-faction with compensation and decreases satisfaction with workload. Bargain-ing has no apparent impact on overall job satisfaction or on the authority to make decisions. As before, controlling for self-selection using the IV estimator causes a dramatic increase in the magnitudes of these estimates. Indeed, using the estimates from column 2, faculty at institutions that collectively bargain are 5.0 percentage points less likely to be very satisfied with their workload and 9.3 and 21.0 percentage points more likely to be very satisfied with their salary and benefits, respectively. The IV estimates suggest that collective bar-gaining raises satisfaction with authority to make decisions among tenured/ten-ure-track faculty; however, possibly due to the two-stage estimator, this is measured imprecisely and does not statistically differ from zero.

Among non-tenure-track faculty (columns 3 and 4 of Table 6), the presence of collective bargaining increases satisfaction with respect to benefits. The IV estimates suggest these faculty gain satisfaction with their overall job and sala-ries under bargaining, although again these estimates are measured imprecisely. The lack of significance associated with the IV estimates among non-tenure-track faculty is likely due to the larger standard errors when using two-stage least squares and the smaller sample size associated with non-ten-ure-track faculty.

A final concern has to do with the fact that unionization in American higher education is primarily a public sector phenomenon. In our data, 8.8 percent of private institutions have faculties who bargain while 38.9 percent of public institutions bargain. Given the correlation between bargaining and public insti-tutions, it is possible that our strategy confuses the impact of collective bargaining with that of public status on satisfaction. We control for this by eliminating from the data of all private institution observations. In this case, we identify the impact of collective bargaining by comparing bargaining versus nonbargaining faculty at public institutions only. Again, we use *Mem64* as an instrument for bargaining to avoid the nonrandom selection of faculty into institutions. Results from this experiment are reproduced in column 5 of Table 6. These results show that even within public institutions, faculty who bargain are more satisfied than their nonbargaining counterparts with

TABLE 6
RANDOM-EFFECTS ORDERED LOGIT ESTIMATES OF γ

	Tenured or tenure track		Non-tenure-track		All faculty types, public institutions
	(1)	(2)	(3)	(4)	(5)
Row 1: *Job*	−0.049 (0.051)	−0.009 (0.121)	−0.115 (0.138)	0.171 (0.348)	0.017 (0.118)
Row 2: *Workload*	−0.120** (0.057)	−0.331** (0.131)	−0.051 (0.135)	0.050 (0.370)	−0.348*** (0.127)
Row 3: *Salary*	0.296*** (0.065)	0.574*** (0.152)	0.005 (0.138)	0.548 (0.340)	0.507*** (0.158)
Row 4: *Benefits*	0.451*** (0.082)	0.900*** (0.235)	0.345** (0.166)	1.91*** (0.385)	1.19*** (0.192)
Row 5: *Authority*	0.045 (0.062)	0.175 (0.144)	−0.034 (0.182)	−0.196 (0.443)	0.117 (0.148)
Faculty variables included	Yes	Yes	Yes	Yes	Yes
Institution variables included	Yes	Yes	Yes	Yes	Yes
RTotalSal included	Yes	Yes	Yes	Yes	Yes
Excluded data after regime change	Yes	Yes	Yes	Yes	Yes
Instrument for *ColBargain*	No	Yes	No	Yes	Yes
Coefficient of *Mem64* in first-stage logit		0.103*** (0.008)		0.100*** (0.012)	0.097*** (0.007)
Chi-square test of first-stage regression (*p*-value)		637.45*** (0.0000)		306.78*** (0.0000)	635.98*** (0.0000)
N	19,320	19,320	2350	2350	13,740
N_j	1050	1050	680	680	590

NOTE: See notes to Table 4.

compensation, less satisfied with workload, and equally satisfied with their overall job and authority to make decisions.

Discussion and Conclusions

This study demonstrates that the presence of collective bargaining alters specific measures of job satisfaction among faculty at 4-year colleges and universities. Using a nonlinear institutional-level random-effects estimator, we find that faculty covered by collective bargaining agreements are more satisfied with their salaries and benefits but less satisfied with their workload than faculty not represented by unions. This finding remains unchanged when controlling for actual levels of salary and increases in magnitude after controlling for the transitory impacts of institutions switching bargaining status mid-sample. When a two-stage estimator is used to control for nonrandom selection of faculty into institutions, the magnitudes of the impacts of bargaining on satisfaction increase further.

In addition, this study finds that while union members are less satisfied with their jobs overall—a finding similar to that documented by a number of researchers for workers in other sectors—collective bargaining does not change overall job satisfaction. In a general equilibrium setting, it is not surprising that the presence of collective bargaining raises satisfaction with compensation, lowers it with respect to workload, and does not impact overall job satisfaction. In a competitive environment, if bargaining institutions predictably reduced overall job satisfaction, it would be more difficult for them to attract and retain high-quality faculty. Thus, unions and institutions are constrained in their negotiations. For instance, if they agree to increase workload, overall faculty job satisfaction would decrease, some faculty might leave, and prospective hires might go elsewhere. This could be remedied by generating increased satisfaction through other job aspects such as compensation. Thus, this evidence is consistent with collective bargaining creating a trade-off between workload and compensation in such a way as to leave overall job satisfaction, on average, unchanged.

The NSOPF makes few inquiries about workload issues for individual faculty. Among those that it does address are the number of paid hours per week spent in teaching, research, administrative duties, and other job-related activities; the number of unpaid hours spent in activities such as job-related public service, recruiting, and attending institution events; the number of courses and the total number of students taught; and whether a teaching assistant is provided to the faculty member. To better understand why faculty at institutions with collective bargaining report less satisfaction with their

workload, we regress each of these measures on the full set of independent variables used in equation (5).[16] The conditional estimates from these regressions reveal that faculty with a collective bargaining contract report working 3.8 percent ($p = 0.000$) fewer hours per week for pay and 6.5 percent ($p = 0.002$) more hours per week without pay. Additionally, unionized faculty are 1.8 percentage points ($p = 0.043$) less likely to have a teaching assistant, but tend to teach the same number of courses ($p = 0.535$) and students ($p = 0.380$), and spend the same number of hours per week on administrative duties ($p = 0.191$) as do nonunionized faculty.

The fact that unionized faculty are more satisfied with their salaries is interesting in light of Hedrick et al. (2011) who, employing a similar sample from the NSOPF, find no statistical difference between salaries at institutions with and without collective bargaining. One possible explanation for this apparent contradiction is that unions may increase salary satisfaction by altering either faculty's expectations or their perceptions. For instance, unions may advertise wage advances procured through negotiations. Faculty, not knowing what wages would have been absent collective bargaining, may believe those advances are larger than the (unknowable) nonbargaining counterfactual. Perhaps knowing or believing an organization is advocating for higher salaries induces faculty to be more satisfied with their earnings. Indeed, these explanations are consistent with estimates of equation (5) which include the actual level of salaries as independent variables in estimation of salary satisfaction. The positive coefficients associated with collective bargaining in these models suggest that unions raise salary satisfaction via a route other than through the level of salaries themselves.

Another possible explanation is that, while unions might fail to raise the *overall* level of faculty salaries, they might affect the *distribution* of salaries across ranks, disciplines, seniority levels, and other faculty characteristics, and this, in turn, impacts satisfaction. There is substantial evidence from other sectors that unions reduce the dispersion or variance of wages across workers. Through their egalitarian effect on salaries and workers' perceptions of fairness, unions have a "sword of justice" impact (see, for example, Metcalf 2001; Metcalf, Hansen, and Charlwood 2001). The evidence regarding such distributional effects on salaries in higher education is scant, and the possible impacts of such effects, if any, on faculty satisfaction is an open research question.

A common argument put forth by union proponents is that collective bargaining provides workers a voice in decisions that influence the workplace

---

[16] We use a linear random effects estimator in each model. Full results are available from the authors on request.

(e.g., Bryson, Gomez, and Willman 2008, or Freeman and Medoff 1984). The lack of statistical significance in any of the *Authority* regressions suggests that bargaining agreements fail to appreciably generate faculty satisfaction in areas of decision making. At first glance, this might be taken to indicate there are no voice effects within faculty unions. However, the NSOPF's *Authority* question is broad enough that it might encompass areas of work that are not traditionally thought of in the union voice literature. The text of the question refers to an individual's "authority to make decisions," but the scope of these decisions remains unspecified. Indeed, the high average of *Authority* (3.75 of a possible of 4 for the entire sample) suggests little room for improvement in *Authority*, regardless of what it is measuring. A second possibility is that collective bargaining agreements are used as substitutes for traditional faculty governance structures. Under both scenarios, on average, faculty may have equal abilities to influence campus policy.

Despite the rich data on satisfaction and individual faculty characteristics, it is important to note that unions may impact faculty in ways unmeasured by the NSOPF. For instance, collective bargaining agreements often address issues of grievances, promotion, amenities, and the bureaucratic nature of multi-tiered organizations. While all of these are presumably part of overall job satisfaction, the NSOPF does not contain data that allow for investigating these effects individually.

Further, due to the nature of collective bargaining in some states, it is possible that a bargaining agreement with one faculty subgroup has spillover effects on other faculty subgroups. For instance, if an institution signs a bargaining agreement with full-time faculty, then the nature of the institution's relationship with part-time faculty is likely to change. These spillover effects could be an important issue in states such as California where legally collective bargaining occurs only among some faculty subgroups. This is yet another topic which merits further investigation.

References

Bender, Keith A., and Peter J. Sloane. 1998. "Job Satisfaction, Trade Unions and Exit-Voice Revisited." *Industrial and Labor Relations Review* 51(2): 222–40.

Borjas, George J. 1979. "Job Satisfaction, Wages, and Unions." *Journal of Human Resources* 14(1): 21–40.

Bryson, Alex, Lorenzo Cappellari, and Claudio Lucifora. 2004. "Does Union Membership Really Reduce Job Satisfaction." *British Journal of Industrial Relations* 42(3): 439–59.

———, ———, and ———. 2011. "Why So Unhappy? The Effects of Unionization on Job Satisfaction." *Oxford Bulletin of Economics and Statistics* 72(3): 357–80.

———, Rafael Gomez, and Paul Willman. 2008. "Trading Places: Employers, Unions and the Manufacture of Voice." CEP Discussion Paper #0884. London, England: London School of Economics, Center for Economic Performance.

Clark, Andrew E. 2001. "What Really Matters in a Job? Hedonic Measurement Using Quit Data." *Labour Economics* 8(2): 223–42.

Clegg, Chris W. 1983. "Psychology of Employee Lateness, Absence, and Turnover: A Methodological Critique and an Empirical Study." *Journal of Applied Psychology* 68(1): 88–101.

Contoyannis, Paul, and Andrew M. Jones. 2004. "The Dynamics of Health in the British Household Panel Survey." *Journal of Applied Econometrics* 19(4): 473–503.

D'Addio, Anna C., Tor Erickson, and Paul Frijters. 2007. "An Analysis of the Determinants of Job Satisfaction When Individuals' Baseline Satisfaction Levels May Differ." *Applied Economics* 39(19): 2413–23.

Freeman, Richard, and James Medoff. 1984. *What Do Unions Do?* New York, NY: Basic Books.

Green, Colin, and John S. Heywood. 2010. "Unions, Dissatisfied Workers and Sorting." Lancaster University Management School Working Paper 2010/052. Lancaster, England: Lancaster University.

Greene, William H. 2001. "Estimating Econometric Models with Fixed Effects." Working Paper 01-10. New York, NY: Stern School of Business, Department of Economics, New York University.

———, and David A. Hensher. 2010. *Modeling Ordered Choices: A Primer*. New York, NY: Cambridge University Press.

Groot, Wim, and Henriette M. van den Brink. 2003. "Firm-Related Training Tracks: A Random Effects Ordered Probit Model." *Economics of Education Review* 22(6): 581–89.

Heckman, James J. 1981. "The Incidental Parameters Problem and the Problem of Initial Conditions in Estimating a Discrete Time-Discrete Data Stochastic Process." In *Structural Analysis of Discrete Data with Econometric Applications*, edited by Charles F. Manski and Daniel McFadden, pp. 179–95. Cambridge, MA: MIT Press.

Hedrick, David W., Steven E. Henson, John M. Krieg, and Charles S. Wassell Jr. 2011. "Is There Really a Faculty Union Salary Premium?" *Industrial and Labor Relations Review* 64(3): 558–75.

Hirsch, Barry T., David A. Macpherson, and Wayne G. Vroman. 2001. "Estimates of Union Density by State." *Monthly Labor Review* 124(7): 51–55.

Kosteas, Vasilios D. 2011. "Job Satisfaction and Promotions." *Industrial Relations: A Journal of Economy and Society* 50(1): 174–94.

Lillydahl, Jane, and Larry Singell. 1993. "Job Satisfaction, Salaries and Unions: The Determination of University Faculty Compensation." *Economics of Education Review* 12(3): 233–43.

Mangione, Thomas W., and Robert P. Quinn. 1975. "Job Satisfaction, Counterproductive Behavior, and Drug Use at Work." *Journal of Applied Psychology* 60(1): 114–16.

Meng, Ronald. 1990. "The Relationship Between Unions and Job Satisfaction." *Applied Economics* 22(12): 1635–48.

Metcalf, David. 2001. "British Unions: Dissolution or Resurgence Revisited." Centre for Economic Performance Discussion Paper No. 493 (April). London, England: London School of Economics.

———, Kirstine Hansen, and Andy Charlwood. 2001. "Unions and the Sword of Justice: Unions and Pay Systems, Pay Inequality, Pay Discrimination and Low Pay." *National Institute Economic Review* 176 (April): 61–75.

Miller, Paul W. 1990. "Trade Unions and Job Satisfaction." *Australian Economic Papers* 29(2): 226–28.

Moriarty, Joan, and Michelle Savarese. 2006. *Directory of Faculty Contracts and Bargaining Agents in Institutions of Higher Education*. New York: National Center for the Study of Collective Bargaining in Higher Education and the Professions, Hunter College of the City University of New York.

Pfeffer, Jeffrey, and Allison Davis-Blake. 1990. "Unions and Job Satisfaction: An Alternative View." *Work and Occupations* 17(3): 259–83.

Schwochau, Susan. 1987. "Union Effects on Job Satisfaction." *Industrial and Labor Relations Review* 40(2): 209–24.

Winkelmann, Rainer. 2003. *Econometric Analysis of Count Data*, 4th ed. Heidelberg, Germany: Springer.

Wooldridge, Jeffrey M. 2002. *Econometric Analysis of Cross Section and Panel Data*. Cambridge, MA: MIT Press.