# Will I Ever Be Satisfied? Job Quality and Unionization*

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**Abstract**

We study the relationship between hard-to-observe aspects of job quality and unionization in the U.S. economy. Establishments where workers report a decline in job quality are more likely to experience a unionization effort, even within the same firm. This dissatisfaction with job quality does not reflect differences or widening gaps in pay, but rather differences and widening gaps in working conditions such as culture, management, and work-life balance. Given the hard-to-observe nature of job quality, union organizing would appear to reflect grassroots movements from within. Even after workers successfully vote to unionize, job quality does not appear to improve. Though the traditional exit-voice hypothesis postulates that unionization reduces employee turnover, our analysis reveals the causation may run the other way, as workers who seek to unionize exhibit longer firm tenure even before seeking out representation.

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*All mistakes are our own.

# 1 Introduction

Workers consider aspects of work beyond their wage when making their labor supply decisions. Non-pecuniary reasons help drive job exit decisions (Akerlof et al., 1988) and workers place substantial value, perhaps more than one-half the average wage, on the quality of job amenities (Maestas et al., 2018). Whether anticipated work schedules (Mas and Pallais, 2017), flexible work arrangements (Chen et al., 2019), a reduced risk of harassment (Folke and Rickne, 2022), or other factors, workers value many dimensions of work that are hard to observe from the outside, for researchers and jobseekers alike (Johnson, 1978; Menzio and Shi, 2011; Sockin and Sojourner, Forthcoming). Despite the importance of non-wage aspects of jobs, how such characteristics drive and respond to unionization remains under-studied. In trying to understand why workers unionize and how unionization affects jobs, prior research has focused either on a narrow set of employers or a narrow set of predictors. In this study, we harness a relatively new source of information, Glassdoor's detailed worker reports on many aspects of their job in the U.S. since mid-2008. By combining such data with representation election data from the National Labor Relations Board (NLRB), we directly monitor job quality before and after unionization to identify its predictors and effects.

Our first research question illuminates what kinds of workplaces workers seek to unionize. Our key outcome is whether workers in a given firm and place will soon file a petition with the NLRB asking for a unionization election. The NLRB requires at least 30 percent of the employees in a potential bargaining unit to sign a petition expressing support for a union before it will hold an election on whether to unionize. We observe firm-places where the workers successfully filed for an NLRB election. We refer to the combination of a firm and a place (city or town) as an *establishment*, although it captures the set of establishments in that firm and place.[1] We contrast the evolution of employees' job satisfaction and pay at soon-to-file establishments in the years preceding the establishments' NLRB filings versus with the evolution of job satisfaction and pay in otherwise-similar establishments that did not file for an election. From this, key findings emerge. While differential trends in hourly pay do not predict a representation filing, the worsening of employee satisfaction does.

Despite the plethora of research on the effects of unionization on workers and firms[2], which establishments attempt or achieve union representation remains an open debate. The work most related to ours, Dinlersoz et al. (2017), highlights this divide, arguing the literature on unions' effects has expanded "without a precise understanding of the union selection process." With adminitrative data on establishments, but not employee sentiment, Dinlersoz

[1] Worker reports in Glassdoor are about jobs in a firm and place; street address is not recorded. We refer to firm-place as establishment for convenience.

[2] See Freeman and Medoff (1984) and Laroche et al. (2017) for comprehensive reviews of this literature.

et al. (2017) investigate what establishment-level characteristics predict union activity and find that age, size, and productivity are key determinants, with unions targeting more-productive establishments in pursuit of greater benefits to doing so, e.g., higher wages. Relatedly, Hirsch and Berger (1984) find that industries that are more concentrated and capital-intensive, have larger establishments, and exhibit greater risk of injury on the job have greater union membership. Indeed, Sojourner et al. (2010) suggest there is a greater likelihood of unionization in nursing homes that are larger and Farber (2014) shows union organizing has shifted over time toward larger potential bargaining units.

Prior work would suggest that the pursuit of greater pay is not the driving factor behind unionization efforts. In interviews with 114 union members, Seidman et al. (1951) found that not a single member stated that they had joined the union for higher wages. According to surveys, workers want, more than anything, their voices to be heard (Freeman and Rogers, 1999).[3] This accords with a view of workers valuing more than their paycheck. Sockin (2022) finds that one-third of job amenities have a greater influence on job satisfaction than pay does, and Akerlof et al. (1988) conclude that most job-related quits are motivated by non-pecuniary reasons. This paper solidifies this view. Through a panel analysis of employee sentiment over time for soon-to-file and never-file establishments, the analysis here finds that workers who are increasingly unsatisfied with work are more likely to seek unionization. Analyzing the free-text descriptions workers use to describe the Pros and Cons of their jobs, we find that dissatisfaction reflects an array of relatively worse working conditions, such as with leadership, workplace social relations, respect, communication, support, and investments in human capital. This strengthens the micro-survey findings of Kochan and Helfman (1981) that unionized workers' dissatisfaction pertains largely to working conditions, such as supervisors, prospects for promotion, job content, and resource adequacy, and not pecuniary outcomes. This deterioration in employee sentiment may help explain, or perhaps reflect, why worsening product quality precedes unionization attempts, e.g., patient outcomes at hospitals (Dube et al., 2016).

Our second research question asks about the effects of union certification, an imperfect proxy for unionization as only about half of certifications ever lead to a union contract (DiNardo and Lee, 2004; Ferguson, 2008), on employee satisfaction and pay. Among establishments with elections, we look at the within-establishment change in outcomes after the election using difference-in-difference and regression discontinuity design principles. In contrast with establishments that do not have unionization elections, satisfaction changes more

[3] In line with this view, Juravich et al. (2006) find that within a sample of 175 union first contracts, 96 percent established a grievance procedure with third party arbitration. Additionally, 73 percent dictated some form of anti-discrimination protections and 70 percent just cause for disciplines and discharges.

negatively among establishments with successful elections albeit imprecisely. To isolate the effect of union strength and given that the probability of certification shifts discontinuously above 50 percent vote share, we contrast average outcome changes between establishments that had different votes shares along the lines of Wang and Young (2021). Union certification seems to reduce average firm pay (DiNardo and Lee, 2004; Frandsen, 2021) and somewhat-noisy estimates suggest it does not reliably improve job satisfaction, even when unions win strong majorities. Examining the free-response descriptions employees write about their workplaces reveals that, if anything, workers' perceptions of the firm's culture and their work schedules worsen after a narrow majority vote for unionization.

Though the broad consensus had been that there was a negative relation between union representation and job satisfaction, recent evidence called this interpretation into question. A meta-analysis by Laroche (2016) concludes that while cross-sectional comparisons indeed find a significantly negative relation, estimates derived from panel data are considerably weaker—pointing to selection into unionization as the driving force rather than causation.[4] Consistent with this view, our analysis uncovers evidence that workers in establishments where satisfaction is declining select into unionization. Additionally, the correlation between job satisfaction and union membership may have reversed from negative to positive around the 2000s (Blanchflower and Bryson, 2020; Artz et al., 2022). However, our findings are at odds with this claim, since establishments with dissatisfied workers are more likely to file for unionization and unions do not appear to boost satisfaction.

Our work extends the literature using regression discontinuity analysis to analyze union certification with heterogeneous effects based on the degree of union support to new outcomes. DiNardo and Lee (2004) initiated a budding literature on the causal effects of union certification with the introduction of a regression discontinuity framework. The outcomes studied through this research design have focused predominantly on either pecuniary compensation, such as wages (DiNardo and Lee, 2004; Frandsen, 2021) and fringe benefits (Knepper, 2020), or on establishment-level outcomes, such as equity value (Lee and Mas, 2012), hours and service quality (Sojourner et al., 2015), innovation (Bradley et al., 2017), and survival probability (Frandsen, 2021; Wang and Young, 2021). Limited attention has been paid to outcomes related to working conditions or job quality.[5]

[4]There are exceptions thought that find lower satisfaction among union members even within a panel setting (e.g., Heywood et al., 2002).

[5]An exception is Sojourner and Yang (2022) who show that unionization increases the probability that an establishment is inspected by the Occupational Safety and Health Administration. Other work has examined unions and non-wage employee outcomes, but not in a causal setting. Union workers are more likely to have health insurance coverage (Petach and Wyant, 2022), claim workers' compensation (Hirsch et al., 1997) and unemployment benefits (Budd and McCall, 1997), have a lower incidence and extent of hours worked overtime (Trejo, 1993), and receive paid vacation (Farber et al., 2021).

Our third question focuses on why unionized workers tend to be both longer-tenured and more-dissatisfied with their jobs than non-union workers. Compared with non-union workers, are unionized workers more likely to use their voices to stay and fight to improve their jobs rather than exiting for another job? Freeman (1978) first uncovered the puzzle that unionized workers report lower levels of job satisfaction yet quit less often. Freeman (1980) posited that because unions support employee voice—by encouraging workers to express discontent during negotiations and make formal grievances—unions offer workers an alternative to express discontent with working conditions rather than separating.[6] Other theories for why unions cause lower job satisfaction beyond worker voice have been put forth, such as the politicization of the workforce and flatter earnings profiles (Borjas, 1979), genuine dissatisfaction reflecting poor industrial relations (Bender and Sloane, 1998), or union members exhibiting different expectations, values, and reference points for assessing jobs (Hammer and Avgar, 2005). On the other hand, Pfeffer and Davis-Blake (1990) argue unions could instead cause job satisfaction to rise, as unions reduce wage inequality (e.g., DiNardo et al., 1996; Card, 2001; Farber et al., 2021) and increase worker control and commitment.

While prior research has looked at this union phenomenon primarily cross-sectionally, we uncover new evidence that soon-to-file establishments already have greater shares of long-tenured and dis-satisfied workers. It does not appear that unionization induces or even strengthens the relationship; instead, it would appear that dissatisfaction and lack of exit seem to drive unionization rather than the other way around. In finding a limited role for voice substituting for exit vis-à-vis union representation, these findings comport with those of Harju et al. (2021)—that voluntary turnover did not fall following the passage of legislation that directly amplified worker voice—but are at variance with results from randomized experiments in which workers were allowed to offer feedback on their supervisors (Cai and Wang, 2022) or jobs more broadly (Adhvaryu et al., 2022). Perhaps workers with few good outside options try to unionize to improve their worsening inside options; we hope other researchers will build off our empirical evidence and investigate this theory further.

The rest of this paper is organized as follows. Section 2 describes the Glassdoor and NLRB data, Section 3 investigates which establishments try to unionize, Section 4 explores how employee outcomes change when establishments do unionize, Section 5 considers possible mechanisms driving our findings, and Section 6 concludes.

[6] Bryson et al. (2010) finds evidence consistent with this voice hypothesis, documenting that even among workers who are all covered by collective bargaining, those with union membership exhibited less satisfaction.

# 2 Data Description

To tackle these research questions, we combine data from two sources. The first comes from Glassdoor, an online labor market platform that collects workers' voluntary reports of their pay and their job satisfaction. The second comes from the NLRB, the federal agency responsible for legally recognizing most U.S. private-sector employees' unions that hosts records on union election processes. The latter allows us to identify which establishments file unionization petitions, the former to study how job satisfaction evolves therein.

## 2.1 Glassdoor

Glassdoor is as an information-sharing online platform, whereby visitors can learn about other workers' perceptions of their employers. Respondents are incentivized to contribute to the platform through a "give-to-get" mechanism, whereby providing their own informational content unlocks access to that disclosed by others.[7] Workers can contribute primarily in two ways. The first is a pay report, the second an employer review. From the former we gauge hourly pay, the latter employee satisfaction and job quality. Data for both the pay and review datasets span the years 2008 through 2022. Workers can provide this information about their employers while they are still currently employed with them, or retroactively as former employees. Although we will account for differences between current and former employees in our regression analysis, former employees may inject bias or noise into our estimates for a handful of reasons.[8] At the same time, former employees may have chosen to separate from their employers exactly because working conditions on the job deteriorated. While our benchmark specifications include former employees, our takeaway results hold as well when only current employees are considered (Table D1).

When submitting a pay report, respondents provide the following relevant information: employer, job title, employment status, base income, pay frequency at which that income is received, whether and how much is received in variable income, place of employment, and years of experience. An image is shown in Figure A3. We restrict the sample to three categories of employment status, specifically full-time, part-time, and contract, and account for differences between them in our analysis by including an indicator for employed full-time. Our principal measure of earnings is the base hourly wage, which we construct using

[7] For an in-depth discussion of this mechanism and evidence for it reducing possible bias in online reviews, see Marinescu et al. (2021).

[8] For one, former employees are no longer on the job and may not have experience any decline in satisfaction or job quality that precedes a petition filing. Two, former employees may exhibit recall bias with regards to recollecting their previous pay or job satisfaction. And three, sentiment reported by former employees may in part reflect frustration from those who have been laid off rather than genuine experience on the job.

base income, employment status, and pay frequency.[9] To mute the influence of outliers, we truncate the bottom and top 0.5 percent of hourly wages. Place is a free response field that largely aligns with U.S. city—a level of aggregation sufficiently granular enough to identify establishments that file NLRB petitions. Finally, we assign each pay report to a calendar year-quarter based on the date it is submitted.

As a proprietary dataset of voluntarily-provided wages, it is critical that we have confidence our pay analysis has external validity. In aggregate, Glassdoor data do over-represent young, college-educated males from professional services industries (Liu et al., 2022); however, since we will account for differences between industries and job titles throughout our analysis, the concern is more whether the data are representative when dis-aggregated. Other work has found this to be the case. When compared with representative datasets, Glassdoor pay data exhibit highly similar patterns between industries and regions (Karabarbounis and Pinto, 2018), occupations (Gibson, 2021), and industry-occupation pairings (Sockin and Sockin, 2019). With this in mind, in each of our analyses, we account for the employer's industry. Not all employers in Glassdoor though are assigned an industry so we exclude those for which it is not—though this is immaterial for our results.[10] Further, though income is reported voluntarily, Oyer (2004) finds that workers overestimate their earnings by only about 5 percent. As such, we believe the Glassdoor pay data capture meaningful differences in pay between establishments.

When submitting an employer review, respondents include the following information: employer, employment status, overall rating of job satisfaction, sub-ratings for five categories of job quality (career opportunities, compensation and benefits, culture and values, senior management, and work-life balance), and free-response descriptions of the positive ('Pros') and negative ('Cons') aspects of their jobs. An image is shown in Figure A4. Workers can volunteer, but are not required to include, their job title and their place of employment. Since we are interested in comparing employee satisfaction between specific establishments, not just their parent firms, observing the place of employment is necessary; as such, we exclude the 42 percent of employer reviews for which the place is not included. Since we are interested in comparing similar workers between establishments, yet workers may strategically conceal their job title (Sockin and Sojourner, Forthcoming), we consider specifications with and without job title fixed effects. Unionization may also affect the decision to disclose such

[9] For workers that report an hourly pay frequency, no imputation is required. For full-time employees that report an annual pay frequency, we divide base income by 2000 hours. For full-time employees that report a monthly pay frequency, we assume they work 2000 hours over 12 months. We exclude pay reports that do not fall in any of these groups.

[10] About 95 percent of observations for filing establishments and 80 percent for non-filing ones are assigned an industry. In unreported results, incorporating employers with missing industries as a separate category alters the main estimates for before and after a petition is filed little.

identifying information, a possibility we explore in Section 5. As with pay reports, we restrict the sample to full-time, part-time, and contract employment status, and account for differences between these categories in our analysis. Our principal measures of interest are workers' overall and sub-category ratings, which are submitted on a 1–5 stars Likert scale, where more stars constitutes more satisfaction. We focus most of our satisfaction analysis on the overall satisfaction measure because it offers a simple, holistic measure. Workers do not have to report a rating for each sub-category, but most do. Given the difficulty in measuring employee sentiment at scale, evidence with regards to the external validity of these employer reviews is limited. That said, Sockin (2022) shows that industries and occupations with greater satisfaction and more positive discussion of workplace amenities in Glassdoor also exhibit greater satisfaction and more positive sentiment toward amenities in representative surveys.

It is worth noting that in both datasets, we observe for each worker their firm and place, but not necessarily their exact establishment *per se*. Each place in our sample, as the combination of a city and state, has geographical precision. For instance, within the New York City metropolitan statistical area alone, there are 940 places recorded in our sample. Nationally, we observe 42,640 places. Each place though is more coarse than a specific latitude and longitude. So, a single firm may have many establishments within the same place, for instance, a popular fast-food franchise in an urban city. However, for ease of reference, we will refer to the combination of a firm and place as an "establishment" and recognize that this may indeed reflect a collection of a firm's establishments. If a firm has multiple establishments in the same place, then our "establishment" effectively averages across them.

## 2.2 National Labor Relations Board

The NLRB election data detail all cases when U.S. private sector employees try to unionize through the official process and how that process ultimately unfolded. If at least 30 percent of employees in a work group petition the NLRB saying they are interested in bargaining collectively with their employer in a particular union, the NLRB will hold a vote among the whole work group (i.e., the bargaining unit). Voter turnout among NLRB elections was historically around 92 percent dating back to the 1970s, but has fallen sharply since the mid-1990s, reaching 84 percent by the mid-2000s (Farber, 2010). If a majority of those who do vote want to bargain via through that union, the NLRB certifies the union as collective bargaining agent for the work group, creating a legal duty on the employer to bargain with the union in good faith over the group's terms and conditions of employment. Within the

NLRB data, each election includes the following information: a petition filing date for each bargaining unit that goes to election, the employer name, worksite address, the date when the election is tallied, and the numbers of votes that were in favor of and against the union. From the latter, we measure the pro- and anti-union vote shares and whether a majority voted for the union.

To construct a crosswalk between the NLRB election data and Glassdoor, we rely on three identifiers: the employer, the city, and the state. The NLRB data include the name of the employer and from the worksite address, we obtain the latter two. We proceed in linking the two datasets in a number of steps. First, since Glassdoor and the NLRB have different nomenclatures, we use textual analysis to align employer names and city names between the two.[11] Not every employer name in the NLRB data can be successfully mapped to one in Glassdoor; the share of NLRB petitions filed each year with a matched employer name is fairly stable at around 40–50 percent and is slightly higher at the beginning and end of the sample window (Figure A1: panel a). Second, the same employer may have multiple filings in the NLRB data for the same place (even in the same year). Since we are interested in the lead up to and the outcomes following a petition filing, we focus only on the first petition filing for each employer-place. Restricting to first filings reduces the share of NLRB filings each year with a matched employer name by around 10–20 percentage points. Third, we match on the location, i.e., the exact city and state, which accounts for 95 percent of the matched petitions in our sample. For the remaining 5 percent, we could not match precisely on the petition's city; however, we could match instead on the major city associated with the petition city's metropolitan area.

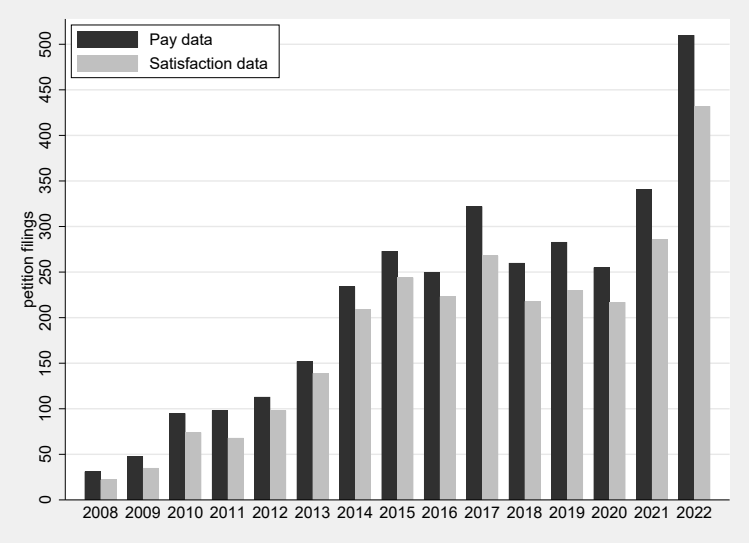
The number of first petitions ultimately represented in our pay and satisfaction samples is presented in Figure 1, organized according to NLRB petition filing year. As Glassdoor coverage has increased over time, so too does the number of matched petitions. At the beginning of the sample, there are fewer than 100 petitions included, compared with 250 or more towards the end of the sample. As a share of all petitions filed each year, near zero are represented in 2008 (as there are few pre-filing reports available) and grows roughly linearly to about one-quarter by 2022 (Figure A1: panel b).[12]

In total, there are 3,279 petitions matched at the establishment level to the pay or satisfaction data, summary statistics for which are presented in Table 1. All but 11 matched election records have observed vote data. On average, 86.3 workers vote in an election, 65 percent of voters support unionization, and a majority voted to support unionization in 70

[11] We accomplish this primarily through *fuzzymatch* algorithms, and secondarily through manual additions.

[12] Because we condition on having pre-filing data in Glassdoor, this mechanically excludes more petitions submitted in early years because Glassdoor first started collecting data in 2008.

Figure 1: Petition Filings Matched with Glassdoor Data by Year Filed




Notes: This figure displays the total number of petition filings with the NLRB that can be matched with Glassdoor pay data (dark gray, left bars) and Glassdoor satisfaction data through employer reviews (light gray, right bars). Sample of matched filings restricted to those with observations available before the calendar half-year in which the petition was filed.

percent of elections. Matched establishments average 22 pay reports with a median of 3 and 12 satisfaction reports with a median of 3.

Table 1: Summary Statistics for Matched Elections

| Measure | N | Mean | Standard deviation | Min | p10 | Median | p90 | Max |
|---|---|---|---|---|---|---|---|---|
| Year filed | 3,361 | 2017.00 | 3.63 | 2008.00 | 2012.00 | 2017.00 | 2022.00 | 2022.00 |
| Year tallied | 3,361 | 2017.00 | 3.63 | 2008.00 | 2012.00 | 2017.00 | 2022.00 | 2023.00 |
| Votes cast | 3,350 | 86.61 | 556.00 | 1.00 | 5.00 | 25.00 | 176.00 | 30019.00 |
| Share vote for union | 3,350 | 0.65 | 0.27 | 0.00 | 0.28 | 0.67 | 1.00 | 1.00 |
| 1(Majority union) | 3,361 | 0.69 | 0.46 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| N: pay data | 3,066 | 21.48 | 93.85 | 1.00 | 1.00 | 3.00 | 36.00 | 2684.00 |
| N: satisfaction data | 2,584 | 12.08 | 41.83 | 1.00 | 1.00 | 3.00 | 22.00 | 809.00 |
| 1(Matched on exact state-city) | 3,361 | 0.95 | 0.22 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |

Notes: This table provides petition-level summary statistics for filing establishments matched with Glassdoor.

## 2.3 Our Sample

For each matched NLRB petition, we trace employees' reports on Glassdoor for the corresponding establishment over time. Beyond these establishments, since we seek to understand which establishments select into union petition filing and the dynamics of their outcomes after filing, we also trace employees' reports on Glassdoor for all other, non-filing establish-

ments. With the resulting data, we measure the occurrence or absence of an NLRB election in each establishment between 2008 and 2022. In total, we observe 15.2 million pay reports spanning 2.89 million establishments, 405,000 of which are pay reports for filing establishments, and 6.7 million satisfaction reviews spanning 1.74 million establishments, 159,000 of which are reviews for filing establishments. Summary statistics for our main outcomes and observables in these two datasets are presented in Table 2. Additional summary statistics for secondary measures in each dataset are available in Table A1.

Looking first at the pay data, we see that workers at filing establishments are paid on average slightly less than their non-filing counterparts, with a mean of $25.85 per hour compared with $27.44 per hour. Whether this difference is significant after accounting for observable characteristics and reflects pre- or post-filing dynamcs we explore in the subsequent sections. Filing-establishment employees are also somewhat less likely to receive variable income, at an incidence rate of 17 percent compared with 20 percent, largely due to a difference in sales commissions (Table A1). With regards to observables, while workers are remarkably similar with regards to their years of accumulated human capital, employees at filing establishments are materially less likely to be salaried but more likely to be employed full time, with differences of 8 and 5 percentage points, respectively.

Table 2: Summary Statistics for Glassdoor Sample

| | Filing establishments | | | | | Non-filing establishments | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Measure | N | Mean | Standard deviation | Min | Max | N | Mean | Standard deviation | Min | Max |
| *Panel A. Pay data* | | | | | | | | | | |
| Hourly wage | 405 | 25.85 | 14.31 | 7 | 125 | 14,800 | 27.44 | 18.22 | 7 | 125 |
| Years of experience | 405 | 5.96 | 6.80 | 0 | 50 | 14,800 | 5.94 | 6.96 | 0 | 50 |
| 1(Hourly pay frequency) | 405 | 0.55 | 0.50 | 0 | 1 | 14,800 | 0.47 | 0.50 | 0 | 1 |
| 1(Full time) | 405 | 0.87 | 0.34 | 0 | 1 | 14,800 | 0.82 | 0.38 | 0 | 1 |
| 1(Current employee) | 405 | 0.64 | 0.48 | 0 | 1 | 14,800 | 0.62 | 0.48 | 0 | 1 |
| Observations per establishment | 405 | 55.72 | 282.69 | 1 | 6556 | 14,800 | 5.26 | 50.32 | 1 | 31950 |
| *Panel B. Satisfaction data* | | | | | | | | | | |
| Overall rating | 159 | 3.18 | 1.39 | 1 | 5 | 6,568 | 3.48 | 1.41 | 1 | 5 |
| Career opportunities rating | 134 | 2.97 | 1.41 | 1 | 5 | 5,737 | 3.20 | 1.47 | 1 | 5 |
| Compensation and benefits rating | 134 | 3.19 | 1.33 | 1 | 5 | 5,732 | 3.25 | 1.39 | 1 | 5 |
| Culture and values rating | 126 | 3.03 | 1.50 | 1 | 5 | 5,465 | 3.41 | 1.53 | 1 | 5 |
| Senior leadership rating | 132 | 2.74 | 1.49 | 1 | 5 | 5,675 | 3.15 | 1.56 | 1 | 5 |
| Work-life balance rating | 134 | 3.01 | 1.42 | 1 | 5 | 5,731 | 3.38 | 1.45 | 1 | 5 |
| 1(Full time) | 159 | 0.73 | 0.45 | 0 | 1 | 6,568 | 0.65 | 0.48 | 0 | 1 |
| 1(3+ years tenure) | 114 | 0.48 | 0.50 | 0 | 1 | 4,947 | 0.36 | 0.48 | 0 | 1 |
| 1(Current employee) | 159 | 0.54 | 0.50 | 0 | 1 | 6,568 | 0.53 | 0.50 | 0 | 1 |
| Observations per establishment | 159 | 25.20 | 105.26 | 1 | 2051 | 6,568 | 3.93 | 24.42 | 1 | 10049 |

Notes: This table provides summary statistics for pay and satisfaction data in Glassdoor, partitioned according to whether the establishment files a petition from 2008 to 2022.

Turning next to the job satisfaction data, the disparities we observe between filing and non-filing establishments, even in the raw data, are striking. While pay appears to be similar

between the two, job satisfaction is not. Overall job satisfaction averages 3.18 stars for filing establishments and 3.48 stars for non-filing establishments. Given a sample standard deviation in overall ratings of 1.4 stars, this raw difference at one-fifth of a standard deviation is considerable. Delving into the sub-categories of job quality workers provide ratings for as well reveals an important dichotomy. The overall satisfaction gap between filing and non-filing establishments does not appear universally. While we observe large differences in employees' assessments of career opportunities, culture and values, senior leadership, and work-life balance, those for compensation and benefits are much more similar. As in the pay data, workers at filing establishments are more likely to be employed full-time. They are also markedly more likely to have spent three or more years with their employer, a finding we explore in more detail in Section 5.3. Finally, the breakdown between current and former employees is similar in both datasets while filing establishments have on average more observations per establishment—though, as evidenced by the sample standard deviations, this largely reflects thicker right tails.

# 3 How do trends in pay and satisfaction differ in establishments where employees soon seek to unionize?

We first characterize how establishments that go on to file a petition for union representation with the NLRB within the next few years differ with respect to employee satisfaction and pay from establishments that will not. For purposes of notation, let $\mathbb{F}$ represent the set of all filing establishments. We focus primarily on the three (and in some cases, six) years preceding the first filing, excluding pay reports and reviews from filing establishments that arrive before then or after the first petition filing. The purpose for narrowing the sampling in this way is to isolate the working environment that exists in the build up to workers at the establishment first deciding they are interested in union representation. For comparison, the sample also includes all reports from all never-filing establishments.

We model the log hourly wage or rating of job satisfaction for worker $i$ reporting on firm $k$ located in place $p$ in year-quarter $t$ ($Y_{k,p,t,i}$). The model does not normalize away the group difference in a given period, so it's not a differences-in-differences model. Instead, it captures the trend in the average difference between soon-to-file establishments in the years leading up to each one's filing and never-filing establishments in the same calendar time. More formally, we estimate

$$Y_{k,p,t,i} = \beta \mathbb{1}\{(k,p) \in \mathbb{F}\} + \gamma W_{t,i} + \lambda_{\iota(k),t} + \lambda_{p,t} + \epsilon_{k,p,t,i}, \tag{1}$$

where $W_{t,i}$ is a vector of observable characteristics for the employee that includes an indicator for whether full-time and an indicator for whether a current employee. This vector also includes a fourth-order polynomial in years of experience when considering pay outcomes because pay reports, but not satisfaction reports, elicit experience. To account for differences in the occupational composition of employees across establishments, as well as potential disparities in job quality between workers within the same establishment, a second specification includes a set of indicators for employee job title in $W$, narrowing the comparison to focus solely on variation between employees with the same job title at different establishments and excluding between-job-title variation. We pull out additive industry by time shocks and place by time shocks to outcomes using industry-year-quarter ($\lambda_{\iota(k),t}$) and place-year-quarter ($\lambda_{p,t}$) fixed effects.

Because we are concerned with differences across establishments and because the frequency distribution of Glassdoor reports per establishment has a long right tail, we use a weighted regression where each establishment is given equal weight. We also cluster all standard errors at the employer level to allow for workers' reports to be correlated within firms. Our interpretation of the model relies on a maintained assumption that other unobserved influences on pay or satisfaction besides the coming petition filing are conditionally mean zero, i.e., unobservable shocks to employee outcomes are not coincident with petition filing.

Results from our model for workers' log wages and overall job satisfaction levels are presented in Table 3. Despite managers believing that wages and benefits are the principal factor behind a union organizing drive (Freeman and Kleiner, 1990a), workers at soon-to-file establishments are not paid lower wages than workers in never-filing establishments. When comparing workers within the same job title, workers at soon-to-file establishments average 4 percent higher wages than their never-filing counterparts in the three years prior to filing. While our primary measure for comparing employee pay is hourly base wage, we find minimal differences with regards to other aspects related to pay.[13] This also accords with the positive association between union representation activity and payroll per employee documented by Dinlersoz et al. (2017).

Despite higher pay, employees in soon-to-file establishments report lower overall satisfaction in the years leading up to filing than employees in never-filing establishments do (Table 3). Even when comparing workers with the same job titles, the disparity persists.

[13]Some employees are compensated through variable pay, aspects of compensation that vary markedly across firms (Sockin and Sockin, 2021). Employees in soon-to-file establishments and never-filing establishments report similar levels of variable pay including cash bonuses, profit sharing, and sales commissions when accounting differences across job titles (Table B3). Frequency of being paid also does not differ systematically between soon-to-file and never-filing establishments. While soon-to-file establishments have a significantly smaller share of employees who are salaried, accounting for job title fixed effects reverses this relation (Table B6).

Table 3: Employee Outcomes and Whether Their Establishment Will Soon File a Petition

| | Log wage | | Overall rating | |
|---|---|---|---|---|
| 1(Filing establishment) | 0.010 | 0.047*** | -0.180*** | -0.138*** |
| | (0.009) | (0.006) | (0.034) | (0.029) |
| Job title FE | | ✓ | | ✓ |
| N | 14,800,051 | 14,378,780 | 6,527,149 | 5,353,765 |
| Filings | 2,777 | 2,738 | 2,291 | 2,053 |
| Std. dev. DV | 0.589 | 0.589 | 1.411 | 1.401 |

Notes: This table summarizes the relationship between log pay or job satisfaction and whether the establishment files a unionization petition within the next three calendar years. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

Thus, while employees at soon-to-file establishments are not paid less, they express less satisfaction with their jobs overall. The gap in overall satisfaction is substantively large. The -0.129 point estimate implies 14 percent of a standard deviation lower satisfaction and has a 95 percent confidence interval of -10 percent to -17 percent of a standard deviation. For context, establishments where employees' hourly pay is twice as large tend to have less than four-tenths of a standard deviation greater overall satisfaction (Table B7). This gap in employee satisfaction shows up with another measure of overall sentiment as well. In addition to the 1–5 stars Glassdoor ratings, employees also describe the 'Pros' and 'Cons' of working at their establishments with written text when submitting their reviews. Employees at soon-to-file establishments dedicate on average 2.1–2.9 percentage points more of their total text to the 'Cons' section than employees in never-filing establishments (Table B2).

The positive compensation gap and negative satisfaction gap between soon-to-file and never-filers hold up in models that also include employer characteristics as predictors, though the gaps' estimated magnitudes diminish (Table B5). Specifically, we add employer characteristics, such as employer age and employer size proxied for by the number of employees, the number of years in operation, and the number of places with establishments.[14] Bigger firms have higher wages and lower satisfaction. Older firms have lower wages and satisfaction. We also test for geographic differences the pay and overall satisfaction gaps but uncover no substantial differences, suggesting these gaps are quite homogeneous across the United States (Table B4). We also consider a specification with review count fixed effects to account for the frequency of small sample sizes among filing establishments and the results do not change (Table D3). Finally, we evaluate a tighter comparison with non-filing establishments. There we enhance our fixed effects to be at the industry x place x year-quarter level. Further,

[14]Employer age and size are from an employer lookup table hosted by Glassdoor. The number of places covered by an employer

we exclude observations from places with no petition filing in our sample, which excludes about one-fifth of the sample. The results are similar to our benchmark specification (Table D2), except that hourly pay is now on average 2 log points lower at filing establishments when job title fixed effects are not included. Compared with never-filing establishments, employees reporting from soon-to-file establishments are significantly less likely be salaried, reflecting the types of jobs at such establishments, but more likely to be a current employee and employed full-time (Table B6). These observable differences though do not drive our results.

So far, we have compared soon-to-file establishments with never-filers looking between all establishments and controlling for differences between industries and between places. However, the richness of the Glassdoor data allow us to make an even finer comparison since we observe satisfaction data for multiple establishments within the umbrella of the same parent firm, some of which filed a representation petition and most of which did not. Even though we have showed that the results persist after accounting for the size of each establishment's parent firm (Table B5), firms may differ for a plethora of reasons beyond size. By adding firm fixed effects, we absorb all commonalities associated with the parent firm and thereby limit the contrast in outcomes to be among soon-to-file versus never-filing establishments of the same employer. In this case, still, while soon-to-file establishments exhibit similar levels of pay to never-filers, those that file display significantly lower levels of job satisfaction (Table 4). Thus, even within firm, places where employees file for unionization tend to be places with lower satisfaction, not lower pay.

Table 4: Workers' Outcomes Across Establishments within Firms

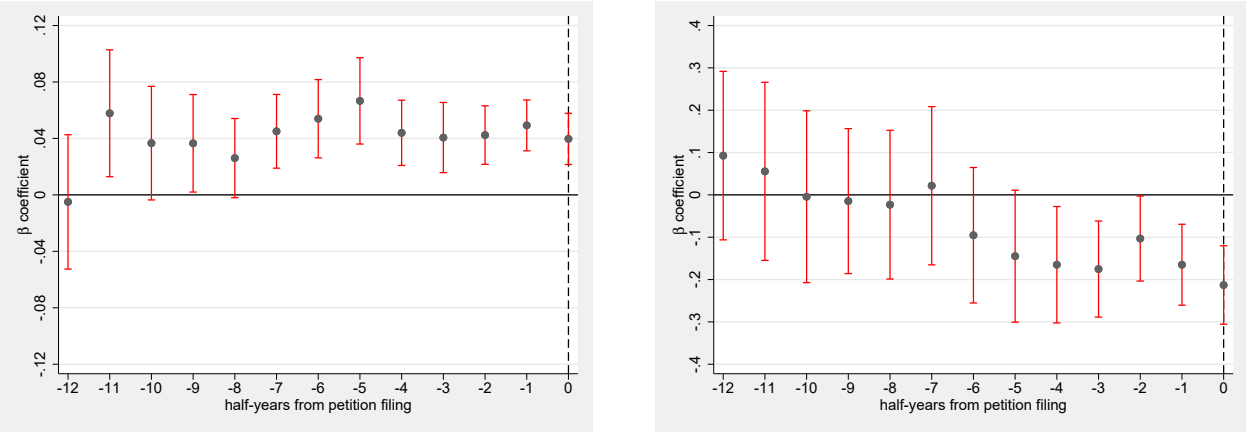
| | Log wage | | Overall rating | |
|---|---|---|---|---|
| 1(Filing establishment) | -0.003 | 0.012*** | -0.110*** | -0.122*** |
| | (0.006) | (0.004) | (0.023) | (0.025) |
| Firm FE | ✓ | ✓ | ✓ | ✓ |
| Job title FE | | ✓ | | ✓ |
| N | 14,656,798 | 14,234,528 | 6,398,174 | 5,224,858 |
| Filings | 2,748 | 2,707 | 2,247 | 2,000 |
| Std. dev. DV | 0.591 | 0.590 | 1.409 | 1.400 |

Notes: This table summarizes the relationship between log pay or job satisfaction and whether the establishment files a unionization petition within the next three calendar years when firm fixed effects are included. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

The dynamics of these gaps, allowing heterogeneity in the gap by time to filing, is illuminating. Wage tends to be stably higher in soon-to-file establishments across the period leading up to filing (Figure 2). In contrast, soon-to-file and never-filing establishments start

with similar average overall satisfaction levels during the period from six to four years prior to the filing. Then, overall satisfaction in soon-to-file establishments starts to deteriorate about three years before filing. By the time of the filing, filing-establishment employees report about a fifth of a standard deviation lower average satisfaction than similar workers in never-filing establishments.[15]

Figure 2: Trends in Hourly Wage and Overall Satisfaction Leading up to a Union Petition Filing Compared Against Trends in Similar Establishments




(a) Log(Hourly Wage)

(b) Overall Satisfaction

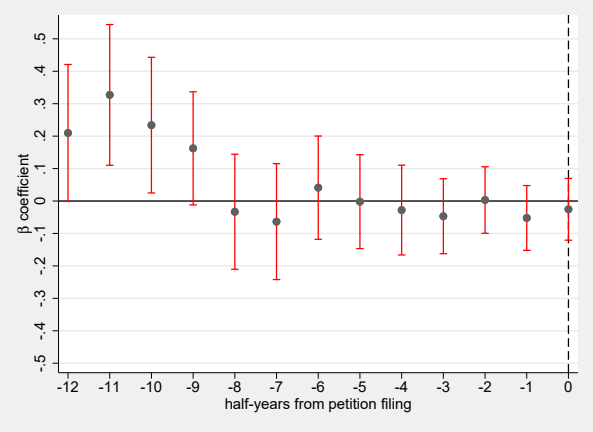
Notes: This figure summarizes the dynamics of log pay and overall job satisfaction in the six calendar years leading up to a petition filing for filing establishments. Standard errors are clustered by firm. Red vertical bars indicate 95% confidence intervals around each point estimate.

As with overall job satisfaction, satisfaction with all five aspects deteriorates in the years leading up to a filing in soon-to-file establishments relative to never-filing establishments ( Figure 3). Table C1 suggested differences across aspects but what differs is the aspects' starting gap five or six years before filing. For compensation and benefits, soon-to-file establishments start out with higher satisfaction than never-filers. But their compensation and benefits satisfaction advantage completely erodes by the time of the filing. Averaging across the preceding three years, compensation satisfaction is higher among soon-to-file establishments (Table C1). This could be misleading, but the dynamic analysis makes the deterioration apparent. In all aspects, employee satisfaction falls in soon-to-file establishments compared with never-filing ones over the years leading up to the unionization effort.

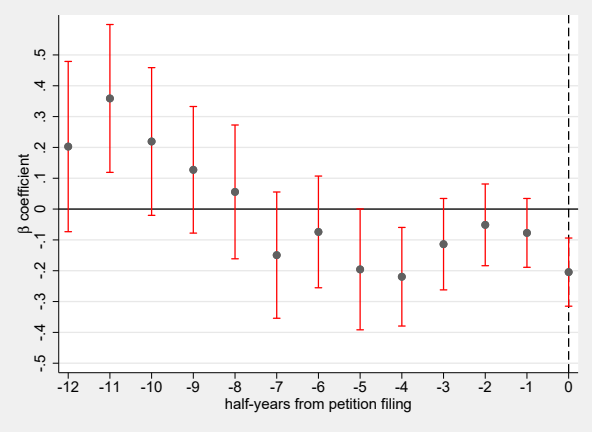
From the trends in Figure 3, it is telling to comprehensively compare job quality between soon-to-file and never-filing establishments over time. Six years before the petitions are filed,

[15]Figure **??** shows analogous figures without controls for job title. Table B1 confirms that the slope of satisfaction over time leading up to a filing is significantly negative. Table D4 shows that this significantly negative slope does not reflect a shifting composition of filing establishments in our sample over time.

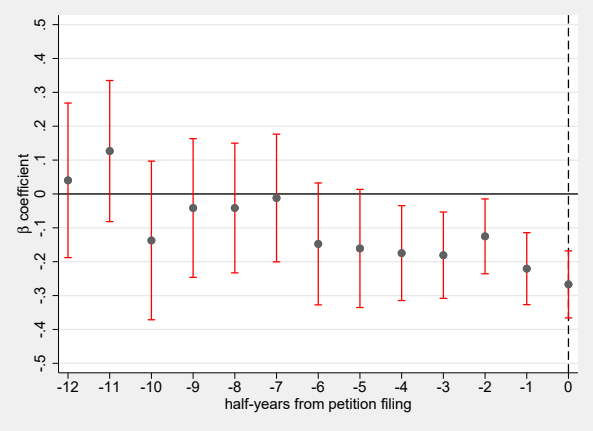
Figure 3: Trends in Satisfaction with Aspects of Job Leading up to a Union Petition Filing



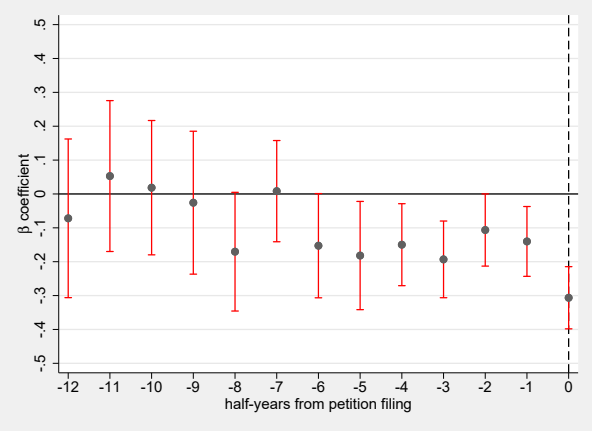

(a) Career opportunities



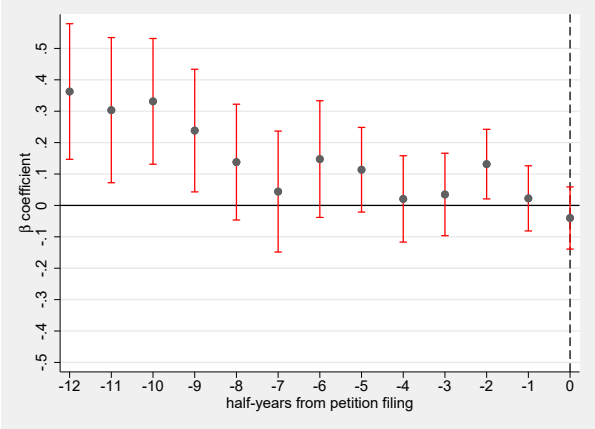

(b) Culture & values




(c) Senior leadership




(d) Work-life balance




(e) Compensation & benefits

Notes: This figure summarizes the dynamics of aspects of job quality in the six calendar years leading up to a petition filing for filing establishments. Standard errors are clustered by firm. Red vertical bars indicate 95% confidence intervals around each point estimate.

jobs at filing establishments *were better*. Workers at these establishments reported better career opportunities, culture, and compensation and benefits, and similar quality leadership and work-life balance. Fast forward to the time of the petition filing and such jobs *are worse*. Workers report similar career opportunities and compensation and benefits, but worse culture, leadership, and work-life balance. Temporally, it appears that the deterioration in job quality tends to happen over the span of a few years before the filing, rather than immediately before. Speculatively, soon-to-file employees had time to address the deterioration through other means but their sentiment did not improve. This evidence is consistent with employees who feel a loss or a betrayal of expectations seeking to unionize. It may also explain why such workers tend to be longer-tenured, since their jobs used to be attractive, high-quality jobs—a pattern we explore further in Section 5.3.

A novel strength of this study is the ability to add insight into workplace differences between establishments that petition to unionize and ones that do not by considering the free-response text that workers provide within their employer reviews. This review text offers an unprecedented advantage in understanding the nature of job quality differences associated with unionization efforts. It creates the opportunity to measure amenities in a far richer, more-nuanced way than prior work, or even than the Likert satisfaction scales analyzed here thus far. Because review text is free response, workers can report to each other in their own words about whatever are the best and worst aspects of their jobs. Because workers report the pros and cons of their job in separate fields, we can directly assign quality to each amenity, positive if discussed in the pros and negative if in the cons. Sockin (2022) developed, based on prior literature's evidence on what aspects of jobs workers value, 48 separate, well-defined amenities via semi-supervised topic modeling with Glassdoor reviews.

We focus on the same 48 amenities but instead identify them within the review text through a fully-supervised approach, whereby we flag whether a given set of identifying words is present within the pros and cons of each review.[16] For each amenity, the defining set of words, which reflect the anchored words from the semi-supervised model in Sockin (2022), are presented in Appendix Table A2. For each review written in any year $t$ by worker $i$ employed at firm $k$ in place $p$, we create an indicator for whether any of an amenity's defining words is present in the pros text $\{pro^a_{k,p,t,i}\}_{a=1}^{48}$ and an indicator for presence in the cons text $\{con^a_{k,p,t,i}\}_{a=1}^{48}$. We take the difference of these indicators to arrive at a measure

[16] A reasonable alternative would be to implement an unsupervised natural language processing approach whereby a machine learning algorithm, e.g., a random forest, is used to classify words that predict a unionization filing or a successful election. We have not taken this approach since we consider each firm equally throughout our analysis rather than each individual observation. We welcome suggestions for implementing a machine learning classification model that would allow firms to be treated equally without first aggregating from the review-level microdata.

of amenity quality $a_{k,p,t,i} = pro^a_{k,p,t,i} - con^a_{k,p,t,i} \in \{-1, 0, 1\}$, then standardize it to mean zero and standard deviation 1 to put measures in a common unit across amenities. We then re-estimate equation 5 using the quality of each amenity $a_{k,p,t,i}$ in lieu of pay and ratings. A positive coefficient would reflect that soon-to-file workplaces report that their workplaces are higher quality on this amenity (more likely to discuss it in the pros and less likely in the cons) than non-filers, a negative coefficient the opposite. Table 5 reports regression coefficients for each amenity, first without then with job-title fixed effects.

Through workers' own perspectives of their workplaces, we observe four key takeaways distinguishing filers from never-filers on these review-text based outcomes. First, the largest amenity discrepancy between soon-to-file and never-filers is leadership. In the three years prior to an establishment filing for representation, workers at such establishments talk on average 0.10–0.15 standard deviations more negatively about leadership than employees at establishments that never file. For added context, only two are words used to identify leadership in the Glassdoor text: 'leadership' and 'management.' Dissatisfaction with firm leadership is evidently top of mind for filing establishments' employees. Perhaps these workers see a need to join together to push back against leadership's perceived mismanagement of the enterprise. Presumably, they believe a union will help steer the enterprise in a better direction and perhaps improve employees' relations with leadership.

Second, dissatisfaction with more general social relations at work is an important predictor of a unionization effort in the next few years. For instance, dissatisfaction with relationships among coworkers, teams, customers, and managers, lack of support, lack of communication, and lack of respect—all of which involve social relations at work—are more prevalent at establishments in which there is a coming unionization effort. Along with the dissatisfaction in leadership, together there is no other categorization of job quality that mirrors this in breadth or in coherence. This dissatisfaction with social relations likely contributes in part to workers at such establishments also describing their workplaces has having significantly worse morale and being less fun.

Third, other aspects of the working environment, not just social relations, are reportedly worse at soon-to-file establishments. This includes working conditions, such as work schedules and the office space, as well as investments in human capital, such as promotions and on-the-job training. In sum, outside of pecuniary compensation, employees at soon-to-file establishments report they are in worse places to work.

Fourth, this amenity analysis refines our understanding of the finding that filers report higher satisfaction with "pay and benefits" and report higher salaries. Workers at soon-to-file establishments are significantly more satisfied with their pay than never-filers in the years preceding a representation filing, on the order of about 0.06 standard deviations more

Table 5: Amenity Quality and Whether Their Establishment Will Soon File a Petition

| | | Without job title FE | | With job title FE | |
|---|---|---|---|---|---|
| Category | Amenity | Coef | Std error | Coef | Std error |
| Pay | Pay | 0.062** | (0.026) | 0.055** | (0.022) |
| | Pay growth | -0.034* | (0.018) | -0.011 | (0.020) |
| | Bonuses | -0.030** | (0.014) | -0.029* | (0.016) |
| | Commissions | 0.005 | (0.014) | 0.002 | (0.015) |
| Fringe benefits | Paid time off | -0.016 | (0.016) | -0.021 | (0.017) |
| | Health insurance | 0.034* | (0.020) | 0.021 | (0.018) |
| | Retirement contributions | 0.026 | (0.019) | 0.014 | (0.017) |
| | Employee discounts | 0.014 | (0.021) | 0.020 | (0.014) |
| | Free food | 0.063 | (0.047) | 0.055* | (0.033) |
| Working conditions | Work-life balance | -0.000 | (0.000) | -0.001 | (0.001) |
| | Hours | -0.000 | (0.017) | -0.005 | (0.018) |
| | Work schedule | -0.040** | (0.017) | -0.045** | (0.018) |
| | Short breaks | -0.050*** | (0.016) | -0.026 | (0.018) |
| | Office space | -0.065*** | (0.015) | -0.065*** | (0.017) |
| | Commuting | -0.042** | (0.020) | -0.020 | (0.021) |
| | Teleworking | 0.001 | (0.008) | -0.001 | (0.009) |
| | Location | -0.012 | (0.017) | -0.011 | (0.019) |
| | Autonomy/responsibility | -0.044*** | (0.014) | -0.023 | (0.016) |
| | Respect/abuse | -0.062*** | (0.020) | -0.069*** | (0.022) |
| | Communication | -0.082*** | (0.020) | -0.055** | (0.023) |
| | Support | -0.087*** | (0.015) | -0.061*** | (0.017) |
| | Difficulty | -0.035 | (0.023) | -0.044** | (0.018) |
| | Requirements | -0.018 | (0.016) | -0.017 | (0.018) |
| | Stress | -0.053 | (0.037) | -0.030 | (0.029) |
| | Pace | -0.022* | (0.012) | -0.018 | (0.012) |
| | Safety | -0.036 | (0.022) | -0.050** | (0.023) |
| | Recognition | -0.034** | (0.014) | -0.027 | (0.017) |
| | Morale | -0.078*** | (0.016) | -0.069*** | (0.017) |
| | Fun | -0.046** | (0.019) | -0.031* | (0.016) |
| | Culture | -0.040*** | (0.013) | -0.051*** | (0.015) |
| | Diversity/inclusion | 0.003 | (0.016) | 0.013 | (0.015) |
| | Leadership | -0.145*** | (0.017) | -0.109*** | (0.020) |
| | Office politics | -0.039*** | (0.013) | -0.055*** | (0.015) |
| | Change | -0.071*** | (0.015) | -0.049*** | (0.016) |
| | Job security | -0.028* | (0.014) | -0.033* | (0.018) |
| Human capital | Career concerns | -0.023* | (0.014) | -0.012 | (0.015) |
| | Promotions | -0.050*** | (0.015) | -0.049*** | (0.015) |
| | Experience | -0.010 | (0.016) | 0.011 | (0.018) |
| | Skill development | -0.008 | (0.014) | -0.010 | (0.014) |
| | On-the-job training | -0.054*** | (0.018) | -0.036* | (0.019) |
| | Mentoring | -0.041*** | (0.013) | -0.025* | (0.014) |
| | Recruiting | -0.064*** | (0.015) | -0.048*** | (0.017) |
| | Contracting | -0.001 | (0.016) | 0.008 | (0.017) |
| | Industry | -0.060*** | (0.014) | -0.046*** | (0.015) |
| Relationships | Managers | -0.042*** | (0.015) | -0.037** | (0.016) |
| | Coworkers | -0.065*** | (0.015) | -0.062*** | (0.017) |
| | Teams | -0.069*** | (0.013) | -0.053*** | (0.015) |
| | Customers | -0.092*** | (0.035) | -0.077*** | (0.027) |

Notes: This table summarizes the relationship between 48 amenities and whether the establishment files a unionization petition within the next six calendar years. The dependent variable, amenity quality, is standardized normal in each regression. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

satisfied. However, they are not more positive on important fringe benefits, pay growth, commissions, nor bonuses. They appear more positive only about free food, an uncommon and low-cost amenity.

Once the NLRB determines that a filed petition validly demonstrates support for unionization from at least 30 percent of the work group, it establishes a voting process to determine if a majority want to unionize. Next, we study what happens after these elections.

# 4 Does union certification affect pay and satisfaction?

If workers seek out union representation because they have grown increasingly dissatisfied with their employer's working conditions, naturally the question arises whether unions can successfully turn things around. Can union representation reverse the decline we observed in employee satisfaction in the lead up to a petition filing? If so, it would add improving job quality to the positive effects unions can have, beyond reducing wage inequality (e.g., DiNardo et al., 1996; Card, 2001; Farber et al., 2021), increasing retirement benefits (Knepper, 2020), and establishing grievance systems (Freeman and Kleiner, 1990b). Given that filing establishments already have decreasing levels of satisfaction, this boon could be especially important to such workplaces. If they cannot however, then it speaks to the limitations of unionization in recent years. Employee morale may fall even further if the union increases awareness of poor working conditions through employee voice (Freeman and Medoff, 1984), politicizes the workforce (Borjas, 1979), or induces a hostile workplace through employers pushing back against union activity.[17]

Given that the probability of NLRB certification of a union and ultimately reaching a collective bargaining agreement jumps when the share voting for a union exceeds 50 percent (DiNardo and Lee, 2004), we measure the effects of NLRB certification on employee outcomes by partitioning elections into those that are successful and those that are not. First, in a difference-in-differences design, we compare outcome dynamics among winning elections versus never-filers. Second, in a regression discontinuity design, we contrast how satisfaction evolved between establishments where vote shares fell slightly above or below the 50 percent vote share threshold. As in the lead up to a filing, we consider both pay and satisfaction as outcomes of interest. The distribution of elections in our sample by the share supporting a union is presented in Figure A2. Although we observe an accumulation of elections with vote shares just below the threshold, suggesting possible employer manipulation to defeat the

[17] Bronfenbrenner (2022) finds, among 286 NLRB elections from 2016–2021, that employers frequently engage in coercive practices in response to unionizing drives. For instance, 74 percent hired management consultants to lead anti-union campaigns, 85 percent forced workers to attend mandatory meetings during work hours, and 44 percent used meetings to interrogate workers about union support.

unionization drive, the degree of lopsidedness around the threshold is much more timid than in other regression discontinuity analyses (e.g., Knepper, 2020; Frandsen, 2021), in part since we only consider first petitions and cannot include elections before 2008. A McCrary (2008) test for manipulation around the discontinuity indeed reveals no statistically discernible mass missing from either side of the threshold.[18]

We begin with a difference-in-differences design, allowing for differential effects by whether the election was successful in achieving a majority vote share for the union or not. Here, the underlying assumption is that, absent the NLRB filing, pay and satisfaction at establishments that filed petitions would have evolved similarly to pay and satisfaction at establishments that never filed. Though this might seem to contradict the decline in job satisfaction we relayed in Section 3, it is important to note that the differences between filers and never-filers appear relatively stable over the years immediately preceding a filing; the deterioration tends to happen further back. The sample includes establishments with elections unions won, establishments with elections that unions did not win, and never-filers. We also assume that the timing of the union election is not systematically related to establishment-specific shocks, e.g., a boost or decline in productivity caused by a different, contemporaneous shock. Let $\sigma(k,p)$ represent the share voting for a union in the election for establishment $(k,p) \in \mathbb{F}$. Our specification is given by

$$Y_{k,p,t,i} = \beta_1 \mathbb{1}\{\sigma(k,p) \in \mathbb{F}\} \times \mathbb{1}\{t \geq \tau_{k,p}\} + \beta_2 s \mathbb{1}\{\sigma(k,p) > 0.5\} \times \mathbb{1}\{t \geq \tau_{k,p}\} + \gamma W_{t,i} + \lambda_{k,p} + \lambda_{\iota(k),t} + \lambda_{p,t} + \epsilon_{k,p,t,i},$$

where $\tau_{k,p}$ is the tally or election date for establishment $(k,p) \in \mathbb{F}$. Here, $beta_1$ captures the average post-election effect on pay or job satisfaction after a losing election, whereas $\beta_2$ captures the marginal difference in average post-election effects between losing and winning elections. We report both for pay and job satisfaction in Table 6. We incorporate establishment fixed effects ($\lambda_{k,p}$) so that $\beta$ captures within-establishment variation from employee outcomes before and after a losing or winning petition is filed. As before, we pull out additive industry by quarter ($\lambda_{\iota(k),t}$) and place by quarter ($\lambda_{p,t}$) shocks. We consider an additional specification where job title effects are included as well to remove between-job variation.

First, relative to establishments with elections where unions failed to achieve a majority, after accounting for trends over time and between establishments and places, average pay grows2.4 percent slower, suggesting union certification may modestly lower average pay within the establishment. Second, the estimated effect of union certification on overall job

[18] We implement the estimation procedure of Cattaneo et al. (2020) for the two vote-share bandwidths, [0.15,0.85] and [0.3,0.7], we consider.

satisfaction is also slightly negative though the 95 percent confidence intervals are considerable, e.g., [-0.18,0.14] for the specification that includes job titles. The null change in overall satisfaction though may mask differences that arise within aspects of job quality. In Table C4, we test whether the sub-category ratings shift after a successful election. Here, we observe a meaningful decline in employee satisfaction with compensation and benefits and senior leadership. The former likely reflects the decline in pay, as unionization has been show to improve fringe benefits (Knepper, 2020). The latter may reflect the contentious nature of petition filing, especially for close elections, where employers will take actions to squash the unionization attempt.[19]

Table 6: Post-Election Outcomes by Election Result, Difference-in-Differences

| | Log wage | | Overall rating | |
|---|---|---|---|---|
| | Across job titles | Within job titles | Across job titles | Within job titles |
| 1(After petition is filed) | 0.002 | 0.011 | -0.027 | -0.015 |
| | (0.013) | (0.009) | (0.053) | (0.057) |
| 1(After petition is filed) × 1(Majority union) | -0.014 | -0.021* | -0.015 | -0.029 |
| | (0.015) | (0.011) | (0.065) | (0.073) |
| N | 13,135,326 | 12,721,750 | 5,496,136 | 4,401,150 |
| Filings | 2,592 | 2,567 | 2,152 | 1,960 |
| Std. dev. DV | 0.585 | 0.585 | 1.425 | 1.409 |

Notes: This table summarizes the change in log pay or job satisfaction after a unionization election for elections that achieved majority support for a union. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

Looking at winning elections versus never-filers though may not capture the causal effects from winning union representation if achieving a majority vote share is also correlated with unobservable workplace characteristics that may affect pay or job satisfaction. For instance, if the NLRB election improves coworker relations by banding together against management in efforts to achieve majority support, post-election satisfaction may reflect this newfound social capital within the firm rather than the effects of unionization per se. To this end, following the literature studying the causal effects of unionization (e.g., DiNardo and Lee, 2004; Knepper, 2020; Sojourner and Yang, 2022), we look at elections according to their pro-union vote share and narrow in on the discontinuity created by the 50 percent threshold. Because we are interested in the change in employee outcomes conditional on each election's

[19]For instance, with regards to how one employer responded to unionizing efforts, a federal judge wrote the company "showed a general disregard for the employees' fundamental rights" and called for the firm to halt its anti-union behaviors, including retaliating against employees for unionizing, promising improved compensation for renouncing the union, surveilling union-supporting workers on the job, discriminating against pro-union job candidates, and relocating union organizers to new stores (Bogage, 2023).

vote share, our approach is most akin to that of Frandsen (2021)—though our approach captures first-differences through a panel regression with establishment fixed effects as opposed to measuring first-differences over time directly. In the spirit of Wang and Young (2021), we partition our sample of elections according to their pro-union vote share into eight 12.5-percentage-point wide bins $\Sigma_{1...8}$.

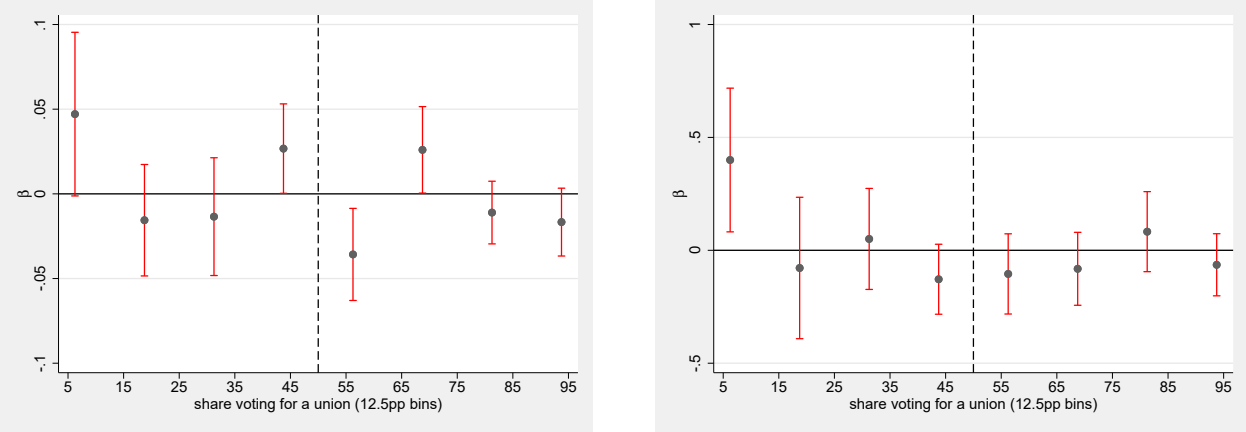
We examine how average pay and job satisfaction shifted within establishment after the election by estimating

$$Y_{k,p,t,i} = \beta_b \mathbb{1}\{\sigma(k,p) \in \Sigma_b\} \times \mathbb{1}\{t \geq \tau_{k,p}\} + \gamma W_{t,i} + \lambda_{k,p} + \lambda_{\iota(k),t} + \lambda_{p,t} + \epsilon_{k,p,t,i}, \qquad (2)$$

where we restrict the pre- and post-election periods to each span twelve quarters. We then plot the coefficients for each bin $\beta_b$ in Figure 4. Zooming in on the discontinuity, for hourly pay in panel (a), we observe a noticeable decline for the bin of elections just above, compared with the one just below, the 50-percent threshold. Hourly wages fall significantly for those where unions just won and may even rise where unions just lost. This evidence suggests union certification causes average pay to fall, consistent with the findings of others (e.g., DiNardo and Lee, 2004; Frandsen, 2021). This relies on the assumption that whether an election falls just below or just above the threshold for a majority is quasi-randomly assigned. However, Frandsen (2021) shows there is considerable bunching below the threshold. In work in progress, we are working to adjust our estimation procedure to account for this selection issue. When we examine the average change in job satisfaction around the discontinuity in panel (b), we find little difference between the elections above and those below the threshold consistent with no effect of union certification.

Away from the discontinuity, the lowest-vote-share bin is a clear outlier in changes in both pay and overall job satisfaction. Both log pay and overall satisfaction jump markedly in establishments where workers vote strongly against unions. Elections in this bin are noteworthy in that fewer than 12.5 percent of votes were ultimately cast for a union, though at least 30 percent of workers in these bargaining units signed the petition calling for an election for union representation. This means that between filing the petition and tallying the votes, (many) workers must have had a change of heart against unionizing. This may be unprovoked, or it could reflect employers offering concessions to their workers to dissuade them from unionizing, which can be an unfair labor practice in violation of the law. Such concessions could arrive as a "bribe" after filing but before the election, or as a promise-keeping reward after the election. In work in progress, we are working to examine the text of workers' reviews to better understand this dynamic. This outlier also motivates truncation of the sample window to exclude elections that are not competitive enough for the outcome

Figure 4: Change in Pay and Overall Rating by Share Voting for a Union




(a) Log(Pay)

(b) Overall Satisfaction

Notes: This figure summarizes the average change in pay or job satisfaction following the union election, partitioning elections according to the share who voted for a union. Standard errors are clustered by firm. Red vertical bars indicate 95% confidence intervals around each point estimate.

to be uncertain, since underlying our regression discontinuity analysis is the assumption of local continuity in (first-differences of) the outcome around the threshold (Knepper, 2020; Frandsen, 2021).

To capture the causal effect of union certification, we implement a regression discontinuity design combined with a differences-in-differences estimation. In particular, we reconsider equation 2, but instead of allowing the post-election coefficient to non-parametrically vary by election bin, we partition the sample by whether it is above and below the 50-percent threshold and include running variables in the vote share. Our RD-DiD equation is then

$$\begin{aligned} Y_{k,p,t,i} = \beta \mathbb{1}\{\sigma(k,p) - 0.5 > 0\} \times \mathbb{1}\{t \geq \tau_{k,p}\} \\ + \beta_{run}^{below} \mathbb{1}\{\sigma(k,p) - 0.5 <= 0\} \times \mathbb{1}\{t \geq \tau_{k,p}\} \times \sigma(k,p) \\ + \beta_{run}^{above} \mathbb{1}\{\sigma(k,p) - 0.5 > 0\} \times \mathbb{1}\{t \geq \tau_{k,p}\} \times \sigma(k,p) \\ + \gamma W_{t,i} + \lambda_{k,p} + \lambda_{\iota(k),t} + \lambda_{p,t} + \epsilon_{k,p,t,i}, \end{aligned} \tag{3}$$

where we restrict the sample of elections to those for which $\sigma(k,p) \in [0.15, 0.85]$ and consider a secondary, tighter bandwidth of comparison, $[0.30, 0.70]$, as well. We incorporate a piece-wise linear function in the running variable, $\sigma(k,p)$, along each side of the cutoff as in other regression discontinuity studies (e.g., Schmieder et al., 2012; Luca, 2016). We include non-filers to identify trends in pay and satisfaction by industry and place over time, and incorporate establishment fixed effects to extra the change within establishment post-election. Our coefficient of interest $\beta$ captures the additive effect on pay or job satisfaction at the

discontinuity, in other words, the causal effect from forming a union or voting to collectively bargain over forming a union. The estimates, with and without job title fixed effects, are presented in Table D5.

Reassuringly, in line with other studies that have investigated the causal impact unions have on employee wages in a regression discontinuity framework (e.g., DiNardo and Lee, 2004; Frandsen, 2021), average pay at establishments that unionize falls compared with average pay at establishments that just fail to unionize. Even when comparing similar workers with the same jobs, the effect remains sizable at a 4–7 percent decline. Turning to our focal measure, overall job satisfaction, we find no discernibly negative or positive effect. When accounting for differences between job titles, the effects are negative but imprecise. Even when we consider each of the sub-category ratings of job quality as the dependent variable, we detect no discernible improvements in these aspects of job quality among establishments with successful elections when accounting for differences between jobs (Table C5). Thus, although a decline in job satisfaction precipitates a petition filing, achieving a successful election does little to improve employee sentiment and, if anything, may sour it further.

Table 7: Post-Election Outcomes by Election Result, Regression Discontinuity

| | Log wage | | Overall rating | |
|---|---|---|---|---|
| *I. Vote share within 15% and 85%* | | | | |
| Post-election x 1(Majority union) | -0.037* | -0.021 | -0.067 | -0.200** |
| | (0.020) | (0.016) | (0.090) | (0.101) |
| Job title FE | | ✓ | | ✓ |
| Filings | 1,775 | 1,756 | 1,484 | 1,349 |
| *II. Vote share within 30% and 70%* | | | | |
| Post-election x 1(Majority union) | -0.079*** | -0.060*** | -0.087 | -0.157 |
| | (0.030) | (0.022) | (0.118) | (0.134) |
| Job title FE | | ✓ | | ✓ |
| Filings | 1,126 | 1,108 | 930 | 851 |

Notes: This table summarizes the relationship between log pay or job satisfaction and whether the unionization petition is successful under a regression discontinuity approach. The running variable is the share voting for a union minus one-half. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

Underlying this research design is the assumption that establishments which narrowly fell short of a majority offer a valid counterfactual for establishments that narrowly achieved a majority. We would anticipate the two groups to exhibit similar dynamics in pay and job satisfaction leading up to the election, and then possibly diverge thereafter. To that end, as in Wang and Young (2021), we consider an alternative specification where we allow the

coefficient on our intercept at the discontinuity to be time-varying, i.e., replacing $\beta \mathbb{1}\{\sigma(k,p) - 0.5 > 0\} \times \mathbb{1}\{t \geq \tau_{k,p}\}$ with $\beta_t \mathbb{1}\{\sigma(k,p) - 0.5 > 0\}$. These dynamic coefficients for pay and overall satisfaction are available in Figure B2, and those for the five sub-rating categories are available in Figure C2. For pay, the estimates appear stable over the six years preceding the election and then fall thereafter, furthering the causal interpretation of the negative effect NLRB certification has on average wages. As for overall and each sub-category of employee satisfaction, however, we observe no clear shifts after an election, furthering our conclusion of a null effect. Though the coefficients are positive five-to-six years before an election, they are stable around zero over the four years prior to an election, suggesting our underlying assumption is valid.

Following the literature analyzing NLRB elections in this regression discontinuity fashion, we consider a number of robustness exercises to test our modelling decisions. Since ex ante randomness in landing on either side of the threshold underpins the regression discontinuity framework, and there is less uncertainty for very small bargaining units, we consider a specification in Table D6 where we restrict the sample to only elections with at least twenty votes (e.g., DiNardo and Lee, 2004; Sojourner et al., 2015; Frandsen, 2021) and draw the same conclusions. Next, we allow pay and satisfaction to vary non-linearly with our running variable (pro-union vote share) around the discontinuity by considering a specification that includes a piece-wise quadratic in the running variable (e.g., Gelman and Imbens, 2019; Knepper, 2020). The takeaways again are similar (Table D7). We also consider as an alternative a tally-based running variable that, rather than using the share of votes away from having a majority, uses the total number of votes away from having a majority (e.g., Frandsen, 2021). Again, we draw similar conclusions when we compare elections that just achieved a majority compared with ones that fell just short using both 5-vote and 8-vote bandwidths (Table D8).

Finally, just as we used the review text to take a deeper dive into the aspects of job quality that differ between filers and never-filers, so too can the review text illuminate how jobs differentially change between establishments where the petition is successful and those where it is not. Taking the 48 text-based amenities as our measures of interest, we re-estimate the same difference-in-differences regression-discontinuity framework of equation 3. The results, with and without fixed effects for workers' job titles, are recorded in Table 8. From the perspective of employees in these close elections, it does not appear that union certification materially improves much about workers' jobs. We should caveat however that from focusing on close elections, the sample shrinks and our estimates have considerable standard errors of around 0.1 standard deviations. For context, only about one-half of the time that unions are certified after elections does the bargaining process ever lead to a first union contract; in

many cases, even after a majority of workers vote to unionize, management resists bargaining in good faith in a bid to forestall unionization or there is good-faith impasse. The estimates reported in Table 8 represent the contrast of certifications that do and do not lead to union contracts compared with petitions that lead to non-certifications.

That said, only four-to-six amenities in each model, or 8–12%, produce estimates that are significant at the 5% level. In other words, few exhibit positive changes. The quality of communication improves 0.22 standard deviations, perhaps due to the subsequent collective bargaining process, creation of grievance procedures in union contracts, or management attempts at union substitution through increased communication. When variation between jobs is includes, i.e., without job-title fixed effects, employees report 0.21 and 0.18 standard deviations improved satisfaction with pay growth and career concerns, respectively—possibly reflecting how first union contracts will often stipulate a step pay system as well as the posting of vacancies and internal candidates receiving first priority (Juravich et al., 2006). Inversely, in both models, we observe a robust one-quarter of a standard deviation decrease in the quality of the firm's culture. Given the relatively high import of culture in predicting job satisfaction (Sockin, 2022), this negative response helps rationalize why job satisfaction overall does not rise after a successful petition. There is also a somewhat significant decline of about one-fifth of a standard deviation in the quality of work schedules. The deterioration in culture and schedules we document could reflect management intransigence or retaliation, as documented in McNicholas et al. (2019) and Wang and Young (2021). Last, we note that although filing establishments' employees report comparatively poor social relations and leadership at their workplaces, neither appear to improve when the certification is successful.

# 5 Mechanisms and Sensitivity

## 5.1 Job Satisfaction and Whether Election is Successful

In this work, we have studied job satisfaction in the years leading up to and the years following a union representation filing. For our analysis of post-filing outcomes, we partitioned the sample by whether the filing was successful and narrowed in on outcomes for petitions for which the share voting for a union fell around the threshold for a petition being successful. A natural consideration absent from our study of post-filing outcomes though is the possibility that job satisfaction itself, or its deterioration, can affect the outcome of representation elections. In a meta-analysis of studies looking at individual-level voting behavior, Heneman III and Sandver (1983) conclude that nearly all studies reveal a negative relation between job satisfaction and pro-union voting behavior. However, none of the studies inluded in the

Table 8: Post-Election Amenities by Election Result, Regression Discontinuity

| | | Without job title FE | | With job title FE | |
|---|---|---|---|---|---|
| Category | Amenity | Coef | Std error | Coef | Std error |
| Pay | Pay | -0.123 | (0.101) | -0.165 | (0.117) |
| | Pay growth | 0.211*** | (0.076) | 0.093 | (0.099) |
| | Bonuses | 0.075 | (0.092) | 0.048 | (0.093) |
| | Commissions | -0.079 | (0.089) | -0.096 | (0.098) |
| Fringe benefits | Paid time off | 0.098 | (0.095) | 0.008 | (0.110) |
| | Health insurance | 0.021 | (0.101) | -0.006 | (0.120) |
| | Retirement contributions | -0.043 | (0.092) | 0.093 | (0.120) |
| | Employee discounts | 0.076 | (0.076) | 0.097 | (0.086) |
| | Free food | 0.092 | (0.094) | -0.002 | (0.119) |
| Working conditions | Work-life balance | 0.042 | (0.041) | 0.045 | (0.045) |
| | Hours | -0.048 | (0.099) | -0.140 | (0.118) |
| | Work schedule | -0.182* | (0.095) | -0.215* | (0.111) |
| | Short breaks | 0.046 | (0.093) | -0.006 | (0.113) |
| | Office space | 0.100 | (0.097) | 0.091 | (0.113) |
| | Commuting | 0.067 | (0.104) | 0.067 | (0.128) |
| | Teleworking | 0.055 | (0.043) | 0.060 | (0.050) |
| | Location | -0.016 | (0.105) | -0.052 | (0.105) |
| | Autonomy/responsibility | 0.008 | (0.068) | 0.036 | (0.074) |
| | Respect/abuse | -0.017 | (0.130) | -0.060 | (0.155) |
| | Communication | 0.125 | (0.091) | 0.220** | (0.103) |
| | Support | -0.004 | (0.084) | -0.046 | (0.096) |
| | Difficulty | 0.035 | (0.085) | -0.020 | (0.107) |
| | Requirements | 0.018 | (0.098) | 0.127 | (0.130) |
| | Stress | 0.041 | (0.089) | -0.082 | (0.091) |
| | Pace | -0.013 | (0.071) | -0.009 | (0.080) |
| | Safety | 0.131 | (0.126) | 0.010 | (0.124) |
| | Recognition | 0.033 | (0.082) | 0.068 | (0.087) |
| | Morale | 0.181** | (0.074) | 0.093 | (0.096) |
| | Fun | 0.013 | (0.088) | -0.005 | (0.103) |
| | Culture | -0.238*** | (0.080) | -0.248*** | (0.084) |
| | Diversity/inclusion | 0.157 | (0.106) | 0.010 | (0.107) |
| | Leadership | -0.173* | (0.094) | -0.087 | (0.114) |
| | Office politics | -0.012 | (0.046) | -0.023 | (0.069) |
| | Change | 0.014 | (0.080) | 0.048 | (0.101) |
| | Job security | -0.075 | (0.088) | -0.113 | (0.097) |
| Human capital | Career concerns | 0.184* | (0.105) | 0.129 | (0.117) |
| | Promotions | -0.099 | (0.096) | -0.053 | (0.099) |
| | Experience | 0.034 | (0.096) | 0.039 | (0.103) |
| | Skill development | -0.072 | (0.091) | 0.029 | (0.116) |
| | On-the-job training | 0.041 | (0.107) | 0.028 | (0.102) |
| | Mentoring | -0.061 | (0.056) | -0.089 | (0.066) |
| | Recruiting | 0.157 | (0.097) | 0.149 | (0.114) |
| | Contracting | 0.096 | (0.099) | 0.157 | (0.116) |
| | Industry | -0.091 | (0.086) | -0.169* | (0.096) |
| Relationships | Managers | -0.126 | (0.090) | -0.128 | (0.116) |
| | Coworkers | 0.062 | (0.092) | -0.040 | (0.105) |
| | Teams | -0.047 | (0.062) | -0.106 | (0.080) |
| | Customers | 0.047 | (0.083) | 0.071 | (0.097) |

Notes: This table summarizes the relationship between 48 amenities and whether the unionization petition is successful under a regression discontinuity approach. The dependent variable, amenity quality, is standardized normal in each regression. The running variable is the share voting for a union minus one-half. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

meta-analysis that used election-level data considered employee satisfaction, likely due to data limitations, an advantage of the data used here. If this were the case, this could pose a threat to a causal interpretation of our difference-in-difference and regression discontinuity results. Petitions with vote shares slightly above the majority threshold for union success would differ (in a typically unobservable way) from petitions with vote shares just below the threshold, in that one could have worse(ning) job quality than the other.

Given that we observe employee satisfaction in the lead up to petitions and the vote shares for each petition, we can directly test if there is a correlation between the two. To this end, we first require establishment-level employee outcomes for each filing establishment. Residualizing out differences between industries and places, we estimate

$$Y_{k,p,t,i} = \gamma W_{t,i} + \lambda_{\iota(k),t} + \lambda_{p,t} + \varepsilon_{k,p,t,i}, \tag{4}$$

again using a weighted regression where each establishment is given equal weight. Taking the fitted values from equation 4, we predict for each observation $\hat{Y}_{k,p,t,i}$. Collapsing to the establishment level by taking the average residual across workers, $\overline{\hat{Y}_{k,p}}$, expresses establishment-specific pay and establishment-specific satisfaction beyond what one would predict given observable characteristics of the employee and employer. We again consider an alternative, tighter specification that accounts for differences between jobs by including job title fixed effects. Restricting attention to filing establishments $(k,p) \in \mathbb{F}$, we investigate whether the outcome of the petition is related to this measure of residual job satisfaction by estimating

$$\sigma_{k,p} = \beta \overline{\hat{Y}_{k,p}} + \lambda_{\iota(k)} + \lambda_{t(k,p)} + \lambda_{s(p)} + \mu_{k,p}, \tag{5}$$

where $\sigma_{k,p}$ is a petition-level result related to the share voting for a union. We incorporate fixed effects for the filing year-quarter to account for trends over time ($\lambda_{t(k,p)}$) and differences in attitudes towards union representation that are correlated with industry ($\lambda_{\iota(k)}$) and U.S. state ($\lambda_{s(p)}$). We present the results in Table 9.

We look first at the share of voters supporting the union in the election, weighting each election by total votes cast. Weighting by vote total minimizes measurement error stemming from elections with very few voters, but gives outsize influence to elections with many voters.[20] We observe that while disparities in pay do not appear to predict whether workers will vote for union representation, job satisfaction does—though the magnitude is small. Establishments where employees exhibit one standard deviation greater satisfaction with their jobs on average are roughly 1.5 percentages points more likely to vote against union

[20]With regards to the latter, the results are similar if we exclude any petitions accounting for more than 0.5 percent of the cumulative vote total across all petitions (Table D9).

representation. Sub-category ratings reveal that this relation largely reflects how workers respond to experiencing greater satisfaction with senior management (Table C6).[21] When we instead consider as an outcome whether a majority voted against unionization, where we weight each petition equally, again we find no discernible effects. Thus, while employees who are more satisfied with management are slightly more likely to vote against a union, it does not change decisions on the margin at the threshold.

Table 9: Workers' Pre-Petition Outcomes And Share Voting Against a Union

| | Share voting against union | | Majority against union | |
|---|---|---|---|---|
| Standardized overall rating before filing | 0.011* | 0.010 | -0.005 | -0.007 |
| | (0.006) | (0.008) | (0.011) | (0.010) |
| Standardized log(pay) before filing | 0.002 | 0.006 | -0.007 | -0.002 |
| | (0.007) | (0.007) | (0.011) | (0.011) |
| Job title FE | | ✓ | | ✓ |
| Elections | 1,993 | 1,822 | 2,003 | 1,832 |
| R-squared | 0.57 | 0.58 | 0.14 | 0.14 |
| Outcome mean | 0.360 | 0.354 | 0.311 | 0.317 |

Notes: This table summarizes the relationship between pay or job satisfaction and the share of votes in the certification election that are against the union. Elections are weighted by their vote totals in the first two columns and equally weighted in the latter two. Each regression includes industry, state, and election year-quarter fixed effects. Standard errors are clustered by state. Significance levels: * 10%, ** 5%, *** 1%

## 5.2 Identity Concealment

One possibility is that union representation increases workers' willingness to openly disclose negative aspects of their work. In this case, the further decline, if any, in reported job quality we document following a winning election in Table D5 may reflect a composition shift towards workers with more-negative sentiment towards their firm or an increased willingness for workers to openly speak out about their jobs which would capture a within-worker shift, rather than a real reduction in average job quality. Workers with negative information to share may be reluctant to disclose out of fear of employer retaliation and thus, may turn to identity concealment as a means by which to mitigate this risk while still speaking out (Sockin and Sojourner, Forthcoming).

We investigate this possibility by analyzing an indicator for whether the worker chooses to conceal their job title as the outcome. When considering both all reviews and just reviews

[21] It is perhaps not surprising that the more satisfied workers are with their current management, the less likely they are to feel they need a union to represent their interests in dealing with management.

relaying negative sentiment, the likelihood that a respondent discloses their job title does not change meaningfully following a filing (Table 10). A change in reporting due to an effect of certification on concerns about retaliation risk does not appear to contribute to the effect, if any, certification has on satisfaction. It should be noted though that unhappy workers at soon-to-file establishments may not have feared employer retaliation any more so than workers at never-filing establishments, given that, as shown in the first two columns, their rates of concealment when relaying negative sentiment were comparable in the lead up a petition being filed.

Table 10: Job Title Concealment and Petition Filing

| | Before filing | | After filing | | | |
|---|---|---|---|---|---|---|
| | All reviews | 1-3 stars reviews | All reviews | 1-3 stars reviews | All reviews | 1-3 stars reviews |
| 1(Filing establishment) | 0.011* | 0.000 | | | | |
| | (0.006) | (0.007) | | | | |
| 1(After petition is filed) | | | -0.009 | -0.005 | | |
| | | | (0.014) | (0.018) | | |
| 1(After petition is filed) × 1(Majority union) | | | 0.001 | -0.004 | | |
| | | | (0.017) | (0.021) | | |
| Post-election x vote share for union | | | | | 0.025 | -0.089 |
| | | | | | (0.091) | (0.120) |
| Post-election x vote share for union x 1(Majority union) | | | | | -0.089 | 0.128 |
| | | | | | (0.147) | (0.212) |
| Post-election x 1(Majority union) | | | | | 0.012 | -0.011 |
| | | | | | (0.024) | (0.037) |
| N | 6,527,149 | 2,881,793 | 5,496,136 | 2,271,470 | 5,480,877 | 2,264,938 |
| Filings | 2,291 | 1,775 | 2,152 | 1,655 | 1,484 | 1,141 |
| Std. dev. DV | 0.307 | 0.335 | 0.322 | 0.349 | 0.322 | 0.349 |

Notes: This table summarizes whether employees from filing establishments conceal their job title in their employer reviews differently from employees at non-filing establishments before and after the petition. For regression discontinuity analysis, the range of vote shares included is 15–85 percent for the union. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

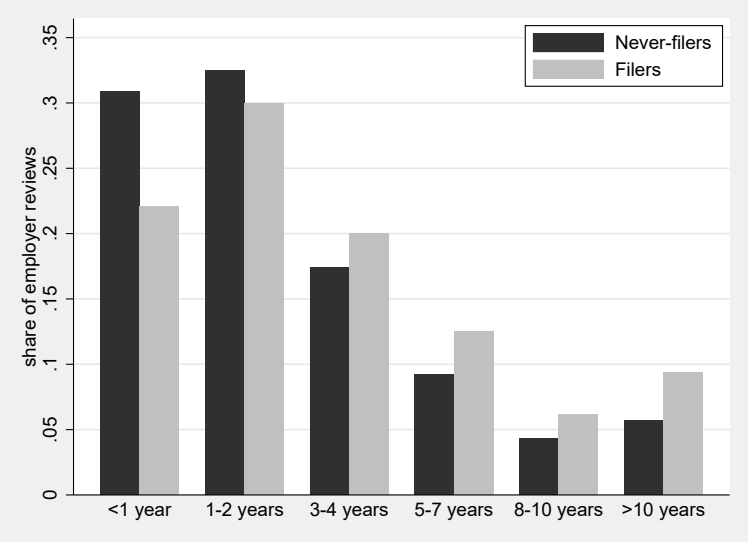
## 5.3 Long Tenure-Dissatisfaction Puzzle

Earlier we highlighted the puzzling pattern that unionized workers tend to report more job dissatisfaction but quit less often (Freeman, 1978). Building off the exit-voice theory of Hirschman (1970), this gave rise to a theory that, by promoting employee voice for improvements within a current employer, unions make staying and fighting a more attractive alternative to quitting (Freeman, 1980; Bryson et al., 2010). This finding is especially surprising given the close link between job satisfaction and turnover (Akerlof et al., 1988). The literature's understanding of this puzzle though stems from studies of unionized workers

after they have already unionized. Because our setting gives insight to pre-filing outcomes, by looking at workers before they (attempt to) unionize, and causal post-filing outcomes, by looking at close elections where unions only modestly achieve a majority, this study can shed unique light on this puzzle. In particular, we offer novel evidence on whether long-tenure workers select into unionization, unionization induces longer tenure, or both.

We caveat though that our measure for a worker's firm tenure from employer reviews, while informative, is coarse. Employees report their tenure in discrete bins: less than 1 year, 1–2 years, 3–4 years, 5–7 years, 8–10 years, and more than 10 years. Looking at the distribution of workers across these six tenure bins for establishments that file an NLRB petition and for those that do not in Figure 5 reveals a clear disparity between the two. Whereas 30.8 percent of workers at never-filing establishments report having tenure with the firm of less than one year, only 22.2 percent of workers at filing firms do. Such a gap is also present for 1-2 years of firm tenure though it is smaller at a difference of 2.5 percentage points. These disparities in short tenure translate into a greater frequency of each category of longer tenure among workers at filing establishments. Whether this disparity reflects pre- or post-unionization dynamics is unclear just from partitioning by filing and thus motivates the analysis in Table 11. For ease of exposition, we partition workers into either long tenure or not by whether they report having been employed with the firm for at least three years. We then repeat the pre-filing and post-election analyses of Sections 3 and 4, but use as the outcome an indicator for an employee being long-tenured.

Figure 5: Distribution of Employer Reviews by Firm Tenure




Notes: This figure displays the share of Glassdoor reviews within each firm tenure bin partitioned by whether the establishment never files a petition over our sample period (dark gray, left bars) or does file a petition (light gray, right bars).

Pre-filing employees at soon-to-file establishments are substantially more likely to be long-tenured than those at never-filing establishments, *even well before* the union petition filing. Employees at filing establishments are 5 percentage points more likely to be long-tenured in the three years leading up to a petition filing, 14 percent above the sample average for never-filers. Thus, the puzzle of longer tenure and more job dissatisfaction was present among filers before the unionization effort. Looking at the possible effects unionization has on employee tenure, we find little evidence that unionization induces longer tenure. Both through the difference-in-differences and regression discontinuity approaches, workplaces where workers voted to unionize do not exhibit an increased propensity for workers to be long-tenured after the election.

This suggests that unions causing workers to remain in their jobs longer despite being dissatisfied is not the principal driver behind this puzzling relation. Instead, places with long-tenured workers who are increasingly dissatisfied seek out union representation. What forces then might be at play if not for the substitution between exit and voice? Perhaps such workers have comparatively low bargaining power, are particularly immobile, or underestimate their outside options. Perhaps such firms make long-term promises that they do not keep or shift their priorities toward new hires or newer establishments, stunting satisfaction among long-tenured employees in the process. Further research into these possible channels we believe may prove fruitful.

# 6 Conclusion

Since the onset of the COVID-19 pandemic, there has been a resurgence in workers seeking out union representation, with petition filings rising 57 percent between the first half of Fiscal Year 2021 and the first half of Fiscal Year 2022 (NLRB, 2022). What might be fueling this rebound?

Our work offers evidence that it is not necessarily the quest for greater pay, but rather a souring of satisfaction and implicitly a reduction in job quality that predicts filing for unionization. This finding echoes news coverage of recent unionization drives at high-profile companies. At one Chipotle establishment, the worker who initiated the NLRB petition filing referred to their establishment as being "understaffed, employees aren't properly trained, and it's not, like, the cleanest" (Furman, 2022). Workers at multiple Amazon warehouses have walked out on the job demanding better working conditions, such as addressing discrimination, improving workplace safety, and extending short break times.[22] The union representing unionized Starbucks establishments includes on their website a list of demands; rather than

[22]See, for instance, Blumberg (2022) and Press (2022).

Table 11: Whether Employee Has Tenure of 3+ Years and Petition Filing

| | Before filing | | After filing | | | |
|---|---|---|---|---|---|---|
| 1(Filing establishment) | 0.051*** | 0.053*** | | | | |
| | (0.009) | (0.009) | | | | |
| 1(After petition is filed) | | | -0.011 | -0.002 | | |
| | | | (0.022) | (0.024) | | |
| 1(After petition is filed) × 1(Majority union) | | | -0.000 | -0.007 | | |
| | | | (0.026) | (0.028) | | |
| Post-election x vote share for union | | | | | -0.076 | -0.019 |
| | | | | | (0.148) | (0.164) |
| Post-election x vote share for union x 1(Majority union) | | | | | 0.013 | -0.202 |
| | | | | | (0.231) | (0.267) |
| Post-election x 1(Majority union) | | | | | 0.002 | 0.030 |
| | | | | | (0.038) | (0.043) |
| Job title FE | | ✓ | | ✓ | | ✓ |
| N | 4,904,010 | 4,022,574 | 4,063,309 | 3,249,932 | 4,052,038 | 3,240,476 |
| Filings | 1,873 | 1,700 | 1,901 | 1,717 | 1,313 | 1,184 |
| Std. dev. DV | 0.482 | 0.480 | 0.485 | 0.483 | 0.485 | 0.483 |

Notes: This table summarizes the incidence of whether employees from filing establishments have been employed with the firm for at least three years in their employer reviews compared with employees at non-filing establishments before and after the petition. For regression discontinuity analysis, the range of vote shares included is 15–85 percent for the union. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

mentioning pay, this list includes fifteen non-economic proposals related to aspects of work such as respect and dignity, health and safety, and hours and scheduling.[23]

More broadly, the United States has seen a structural decline in unionization over the last half-century (Farber et al., 2021). In 2022, 11.3 percent of all wage and salary workers and only 6.8 percent of those in the private sector were represented by a union.[24] In the 1940s and 1950s though, the unionized share of the U.S. workforce hovered around one-third (Farber et al., 2021). There is a debate about how much of the decline is due to falling worker demand for unionization, increasing employer opposition, or other factors (Nunn et al., 2019). Some aspects of job quality have improved, which may be expected to reduce worker demand for unionization. For example, since that passage of the Occupational Safety and Health Act of 1970, the incidence rate of non-fatal occupational injuries and illnesses in the private sector has fallen nearly four-fold (Brown, 2020). Moreover, production and non-supervisory workers' average weekly hours in the private sector have fallen from upwards of 38 hours per week in the mid-1960s to about 34 hours since the 2000s.[25] On the other hand, Kochan et al. (2019) report evidence from surveys across decades that worker demand

[23]See https://sbworkersunited.org/noneconomic-proposals.
[24]See https://www.bls.gov/news.release/pdf/union2.pdf.
[25]Bureau of Labor Statistics average work week hours.

for unionization has not fallen. Though consistent data on job quality dating back to the times of high U.S. unionization rates are hard to come by, determining whether and to what extent rising job quality has contributed to the decline in unionization may prove a fruitful line of future research.

Alternatively, more vigorous and sometimes unlawful managerial opposition to unionization offers another potential explanation (McNicholas et al., 2019; Wang and Young, 2021). Some employers go to great lengths to prevent their establishments from unionizing, possibly since there is evidence that unionization reduces profits (Lee and Mas, 2012). Opposition can include using costly anti-union consultants, law firms, psychologists, and communications specialists to persuade workers not to support the union. More than three-quarters of employers hire outside consultants when confronted with a union organizing drive (Logan, 2006) and McNicholas et al. (2019) estimate that over the 2014-2017 period, employers spent at least $340 million annually hiring union-avoidance consultants. Fierce resistance from employers may include illegal activity as well, such as violating workers' rights (e.g., Bogage, 2023). If anything, firms may even have an incentive to combat unionization illegally since the penalty for violating the National Labor Relations Act and its enforcement regimes may not create a sufficient incentive for employers to comply (Freeman and Kleiner, 1990a; Stansbury, 2021).

This work highlights the potential of union-substitution strategies, such as monitoring employee satisfaction and investing in job quality, to act as viable alternatives for deterring unionization to union-suppression strategies (Fiorito et al., 1987). Some employers use these tactics by, for instance, tracking and considering "team member sentiment" as one indicator for gauging the risk of a union forming at an establishment (Peterson, 2020). Monitoring employee satisfaction in real time can detect whether sentiment is deteriorating within an establishment; and if satisfaction is in decline, investing in job quality may help to reverse it. Making workers feel more respected can meaningfully improve employee satisfaction (Sockin, 2022). On the other hand, hiring anti-union consultants in the midst of an organizing drive does little to improve underlying working conditions. Especially if the marginal cost of providing job quality is cheaper than undertaking union-suppression strategies, management prioritizing job amenities may improve employee-employer relations. Workers would become more satisfied with their jobs, thereby reducing the demand for unionization.

# References

Adhvaryu, Achyuta, Teresa Molina, and Anant Nyshadham. 2022. Expectations, Wage Hikes and Worker Voice. The Economic Journal 132 (645):1978–1993.

Akerlof, George A., Andrew K. Rose, Janet L. Yellen, Laurence Ball, and Robert E. Hall. 1988. Job

switching and job satisfaction in the u.s. labor market. Brookings Papers on Economic Activity 1988 (2):495–594.

Artz, Benjamin, David G. Blanchflower, and Alex Bryson. 2022. Unions increase job satisfaction in the united states. Journal of Economic Behavior  Organization 203:173–188.

Bender, Keith A. and Peter J. Sloane. 1998. Job satisfaction, trade unions, and exit-voice revisited. Industrial and Labor Relations Review 51 (2):222–240.

Blanchflower, David G and Alex Bryson. 2020. Now unions increase job satisfaction and well-being. Working Paper 27720, National Bureau of Economic Research.

Blumberg, Nick. 2022. Amazon workers in joliet state walkout over pay and working conditions. https://news.wttw.com/2022/10/11/amazon-workers-joliet-stage-walkout-over-pay-and-working-conditions.

Bogage, Jacob. 2023. Starbucks committed 'egregious' violations in battling union, judge rules. https://www.washingtonpost.com/business/2023/03/01/starbucks-union-ruling-buffalo/.

Borjas, George J. 1979. Job satisfaction, wages, and unions. The Journal of Human Resources 14 (1):21–40.

Bradley, Daniel, Incheol Kim, and Xuan Tian. 2017. Do unions affect innovation? Management Science 63 (7):2251–2271.

Bronfenbrenner, Kate. 2022. Testimony before the united states house committee on education and labor. In Solidarity: Removing Barriers to Organizing .

Brown, Jeff. 2020. Nearly 50 years of occupational safety and health data. Beyond the Numbers: Workplace Injuries 9 (9).

Bryson, Alex, Lorenzo Cappellari, and Claudio Lucifora. 2010. Why so unhappy? the effects of unionization on job satisfaction. Oxford Bulletin of Economics and Statistics 72 (3):357–380.

Budd, John W. and Brian P. McCall. 1997. The effect of unions on the receipt of unemployment insurance benefits. Industrial and Labor Relations Review 50 (3):478–492.

Cai, Jing and Shing-Yi Wang. 2022. Improving Management Through Worker Evaluations: Evidence from Auto Manufacturing*. The Quarterly Journal of Economics 137 (4):2459–2497.

Card, David. 2001. The effect of unions on wage inequality in the u.s. labor market. ILR Review 54 (2):296–315.

Cattaneo, Matias D., Michael Jansson, and Xinwei Ma. 2020. Simple local polynomial density estimators. Journal of the American Statistical Association 115 (531):1449–1455.

Chen, M. Keith, Judith A. Chevalier, Peter E. Rossi, and Emily Oehlsen. 2019. The value of flexible work: Evidence from uber drivers. Journal of Political Economy 127 (6):2735–2794.

DiNardo, John, Nicole M. Fortin, and Thomas Lemieux. 1996. Labor market institutions and the distribution of wages, 1973-1992: A semiparametric approach. Econometrica 64 (5):1001–1044.

DiNardo, John and David S. Lee. 2004. Economic Impacts of New Unionization on Private Sector Employers: 1984–2001. The Quarterly Journal of Economics 119 (4):1383–1441.

Dinlersoz, Emin, Jeremy Greenwood, and Henry Hyatt. 2017. What businesses attract unions? unionization over the life cycle of u.s. establishments. ILR Review 70 (3):733–766.

Dube, Arindrajit, Ethan Kaplan, and Owen Thompson. 2016. Nurse unions and patient outcomes. ILR Review 69 (4):803–833.

Farber, Henry S. 2010. Rational choice and voter turnout: Evidence from union representation elections. Working Paper 16160, National Bureau of Economic Research.

———. 2014. Union organizing decisions in a deteriorating environment: The composition of representation elections and the decline in turnout. Working Paper 19908, National Bureau of Economic Research.

Farber, Henry S, Daniel Herbst, Ilyana Kuziemko, and Suresh Naidu. 2021. Unions and Inequality over the Twentieth Century: New Evidence from Survey Data. The Quarterly Journal of Economics 136 (3):1325–1385.

Ferguson, John-Paul. 2008. The eyes of the needles: A sequential model of union organizing drives, 1999–2004. ILR Review 62 (1):3–21.

Fiorito, Jack, Christopher Lowman, and Forrest D Nelson. 1987. The impact of human resource policies on union organizing. Industrial Relations: A Journal of Economy and Society 26 (2):113–126.

Folke, Olle and Johanna Rickne. 2022. Sexual Harassment and Gender Inequality in the Labor Market. The Quarterly Journal of Economics 137 (4):2163–2212.

Frandsen, Brigham R. 2021. The surprising impacts of unionization: Evidence from matched employer-employee data. Journal of Labor Economics 39 (4):861–894.

Freeman, R. B. 1978. Job satisfaction as an economic variable. The American Economic Review 68 (2):135–141.

Freeman, Richard and James Medoff. 1984. What do unions do. Basic Books.

Freeman, Richard B. 1980. The exit-voice tradeoff in the labor market: Unionism, job tenure, quits, and separations. The Quarterly Journal of Economics 94 (4):643–673.

Freeman, Richard B. and Morris M. Kleiner. 1990a. Employer behavior in the face of union organizing drives. Industrial and Labor Relations Review 43 (4):351–365.

———. 1990b. The impact of new unionization on wages and working conditions. Journal of Labor Economics 8 (1, Part 2):S8–S25.

Freeman, Richard B. and Joel Rogers. 1999. What workers want. Ithaca and London: Cornell University Press, ILR Press.

Furman, Jonah. 2022. Kansas chipotle workers latest to launch union drive. https://labornotes.org/blogs/2022/10/kansas-chipotle-workers-latest-launch-union-drive.

Gelman, Andrew and Guido Imbens. 2019. Why high-order polynomials should not be used in regression discontinuity designs. Journal of Business & Economic Statistics 37 (3):447–456.

Gibson, Matthew. 2021. Employer Market Power in Silicon Valley Working paper.

Hammer, Tove and Ariel Avgar. 2005. The impact of unions on job satisfaction, organizational commitment, and turnover. Journal of Labor Research 26:241–266.

Harju, Jarkko, Simon Jäger, and Benjamin Schoefer. 2021. Voice at work. Working Paper 28522, National Bureau of Economic Research.

Heneman III, Herbert G. and Marcus H. Sandver. 1983. Predicting the outcome of union certification elections: A review of the literature. ILR Review 36 (4):537–559.

Heywood, John S., W. S. Siebert, and Xiangdong Wei. 2002. Worker sorting and job satisfaction: The case of union and government jobs. Industrial and Labor Relations Review 55 (4):595–609.

Hirsch, Barry T. and Mark C. Berger. 1984. Union membership determination and industry characteristics. Southern Economic Journal 50 (3):665–679.

Hirsch, Barry T., David A. Macpherson, and J. Michael DuMond. 1997. Workers' compensation recipiency in union and nonunion workplaces. Industrial and Labor Relations Review 50 (2):213–236.

Hirschman, Albert O. 1970. Exit, voice, and loyalty: Responses to decline in firms, organizations, and states, vol. 25. Harvard university press.

Johnson, William R. 1978. A theory of job shopping. The Quarterly Journal of Economics 92 (2):261–277.

Juravich, Tom, Kate Bronfenbrenner, and Robert Hickey. 2006. Significant victories: An analysis

of union first contracts. Articles Chapters .

Karabarbounis, Marios and Santiago Pinto. 2018. What Can We Learn from Online Wage Postings? Evidence from Glassdoor. Economic Quarterly (4Q):173–189.

Knepper, Matthew. 2020. From the Fringe to the Fore: Labor Unions and Employee Compensation. The Review of Economics and Statistics 102 (1):98–112.

Kochan, Thomas A. and David E. Helfman. 1981. The effects of collective bargaining on economic and behavioral job outcome. Research in Labor Economics 4:321–365.

Kochan, Thomas A, Duanyi Yang, William T Kimball, and Erin L Kelly. 2019. Worker voice in america: Is there a gap between what workers expect and what they experience? ILR Review 72 (1):3–38.

Laroche, Patrice. 2016. A meta-analysis of the union–job satisfaction relationship. British Journal of Industrial Relations 54 (4):709–741.

Laroche, Patrice, Hristos Doucouliagos, and Richard Freeman. 2017. The economics of trade unions: A study of a research field and its findings.

Lee, David S. and Alexandre Mas. 2012. Long-Run Impacts of Unions on Firms: New Evidence from Financial Markets, 1961–1999. The Quarterly Journal of Economics 127 (1):333–378.

Liu, Tim, Christos A Makridis, Paige Ouimet, and Elena Simintzi. 2022. The Distribution of Nonwage Benefits: Maternity Benefits and Gender Diversity. The Review of Financial Studies 36 (1):194–234.

Logan, John. 2006. The union avoidance industry in the united states. British Journal of Industrial Relations 44 (4):651–675.

Luca, Michael. 2016. Reviews, reputation, and revenue: The case of yelp.com. Harvard Business School NOM Unit Working Paper No. 12-016 .

Maestas, Nicole, Kathleen J Mullen, David Powell, Till von Wachter, and Jeffrey B Wenger. 2018. The value of working conditions in the united states and implications for the structure of wages. Tech. Rep. 25204, National Bureau of Economic Research.

Marinescu, Ioana, Andrew Chamberlain, Morgan Smart, and Nadav Klein. 2021. Incentives can reduce bias in online employer reviews. Journal of Experimental Psychology: Applied 27 (2):393–407.

Mas, Alexandre and Amanda Pallais. 2017. Valuing alternative work arrangements. American Economic Review 107 (12):3722–59.

McCrary, Justin. 2008. Manipulation of the running variable in the regression discontinuity design: A density test. Journal of Econometrics 142 (2):698–714.

McNicholas, Celine, Margaret Poydock, Julia Wolfe, Ben Zipperer, Gordon Lafer, and Lola Loustaunau. 2019. Unlawful: Us employers are charged with violating federal law in 41.5% of all union election campaigns. Tech. rep., Economic Policy Institute.

Menzio, Guido and Shouyong Shi. 2011. Efficient search on the job and the business cycle. Journal of Political Economy 119 (3):468–510.

NLRB. 2022. Union election petitions increase 57% in first half of fiscal year 2022. https://www.nlrb.gov/news-outreach/news-story/union-election-petitions-increase-57-in-first-half-of-fiscal-year-2022.

Nunn, Ryan, Jimmy O'Donnell, and Jay Shambaugh. 2019. The shift in private sector union participation: explanation and effects. The Hamilton Project: Washington, DC, USA .

Oyer, Paul. 2004. Recall bias among displaced workers. Economics Letters 82 (3):397–402.

Petach, Luke and David Wyant. 2022. The union advantage: union membership, access to care, and the affordable care act. International Journal of Health Economics and Management 23:1–26.

Peterson, Hayley. 2020. Amazon-owned whole foods is quietly tracking its employees with a heat map tool that ranks each stores are most at risk of unionizing. https://www.businessinsider.com/whole-foods-tracks-unionization-risk-with-heat-map-2020-1.

Pfeffer, Jeffrey and Alison Davis-Blake. 1990. Unions and job satisfaction: An alternative view. Work and Occupations 17 (3):259–283.

Press, Associated. 2022. About 60 amazon workers stage walkouts over pay, break times. https://apnews.com/article/business-new-york-queens-c44924791a990a8ebbdda45d1fa53ce4.

Schmieder, Johannes F., Till von Wachter, and Stefan Bender. 2012. The Effects of Extended Unemployment Insurance Over the Business Cycle: Evidence from Regression Discontinuity Estimates Over 20 Years. The Quarterly Journal of Economics 127 (2):701–752.

Seidman, Joel, Jack London, and Bernard Karsh. 1951. Why workers join unions. The Annals of the American Academy of Political and Social Science 274:75–84.

Sockin, Jason. 2022. Show me the amenity: Are higher-paying firms better all around? CESifo Working Paper 9842.

Sockin, Jason and Michael Sockin. 2019. A pay scale of their own: Gender differences in variable pay Working paper.

———. 2021. Variable Pay and Risk Sharing between Firms and Workers Working paper.

Sockin, Jason and Aaron Sojourner. Forthcoming. What's the Inside Scoop? Challenges in the Supply and Demand for Information on Employers. Journal of Labor Economics .

Sojourner, Aaron and Jooyoung Yang. 2022. Effects of union certification on workplace-safety enforcement: Regression-discontinuity evidence. ILR Review 75 (2):373–401.

Sojourner, Aaron J, Brigham R Frandsen, Robert J Town, David C Grabowski, and Min M Chen. 2015. Impacts of unionization on quality and productivity: Regression discontinuity evidence from nursing homes. ILR Review 68 (4):771–806.

Sojourner, Aaron J., David C. Grabowski, Min Chen, and Robert J. Town. 2010. Trends in unionization of nursing homes. Inquiry 47 (4):331–342.

Stansbury, Anna. 2021. Do us firms have an incentive to comply with the flsa and the nlra? Working Paper 21-9, Peterson Institute for International Economics.

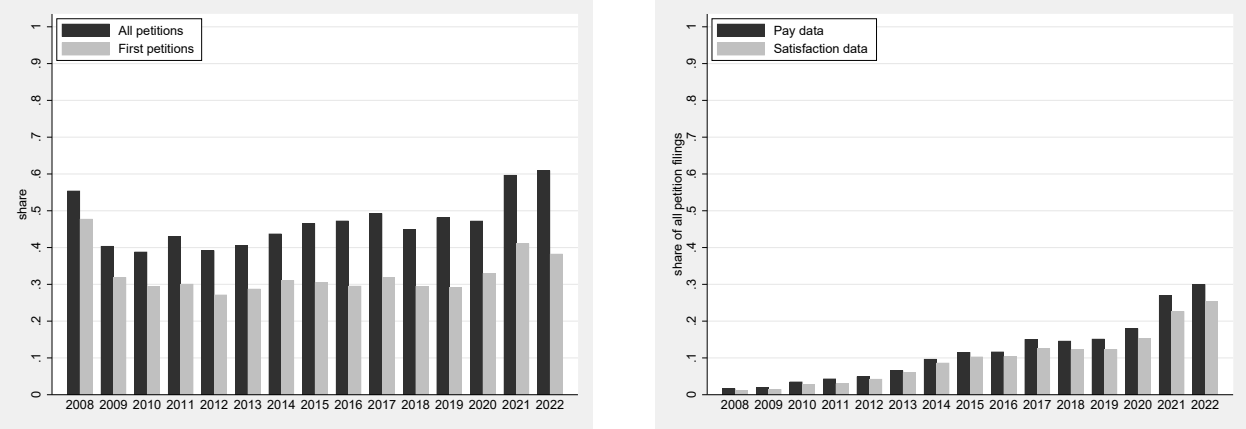
Trejo, Stephen J. 1993. Overtime pay, overtime hours, and labor unions. Journal of Labor Economics 11 (2):253–278.

Wang, Sean and Samuel Young. 2021. Unionization, employer opposition, and establishment closure .

# Internet Appendix for
# Will I Ever Be Satisfied? Job Quality and Unionization

## A Additional Summary Information

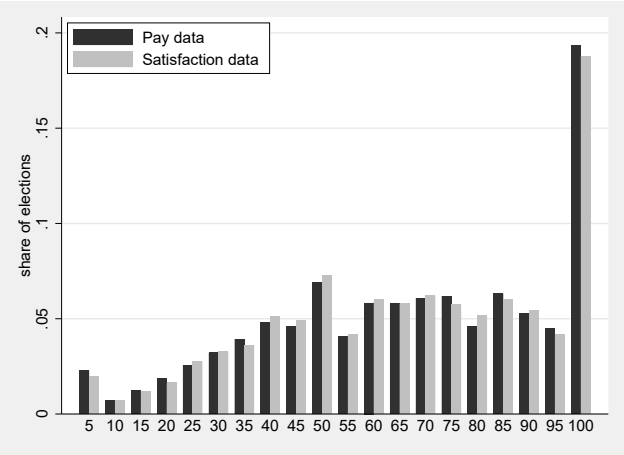
Figure A1: Petition Filings Matched with Glassdoor Data by Year Filed




(a) Matched employer names (b) Included in sample

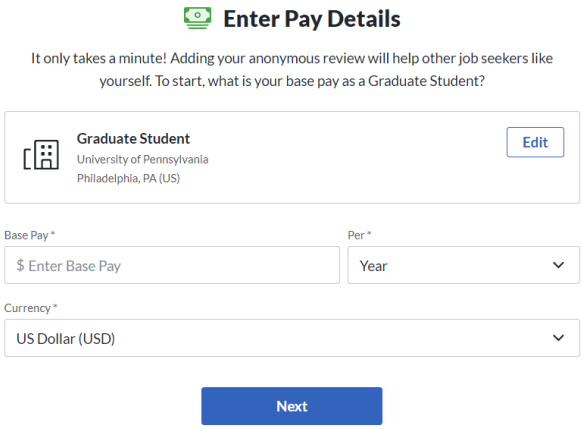
Notes: This figure displays the share of NLRB filings matched with Glassdoor data. Panel (a) reveals the share for which the employer (not necessarily employer-city) can be matched in Glassdoor, while panel (b) reveals the share of each year's petitions included in our sample, i.e., for which both the employer-city can be matched and data are available within the three calendar years before the petition is filed.

Figure A2: Petition Filings Matched with Glassdoor Data by Election Vote Share




Notes: This figure displays the distribution of NLRB filings matched with Glassdoor data by the share who voted for a union in the election. Filings are partitioned into twenty 5-percentage-points bins, where the vote shares displayed on the x-axis reflect the upper limit on each bin.

Figure A3: Pay Report Form



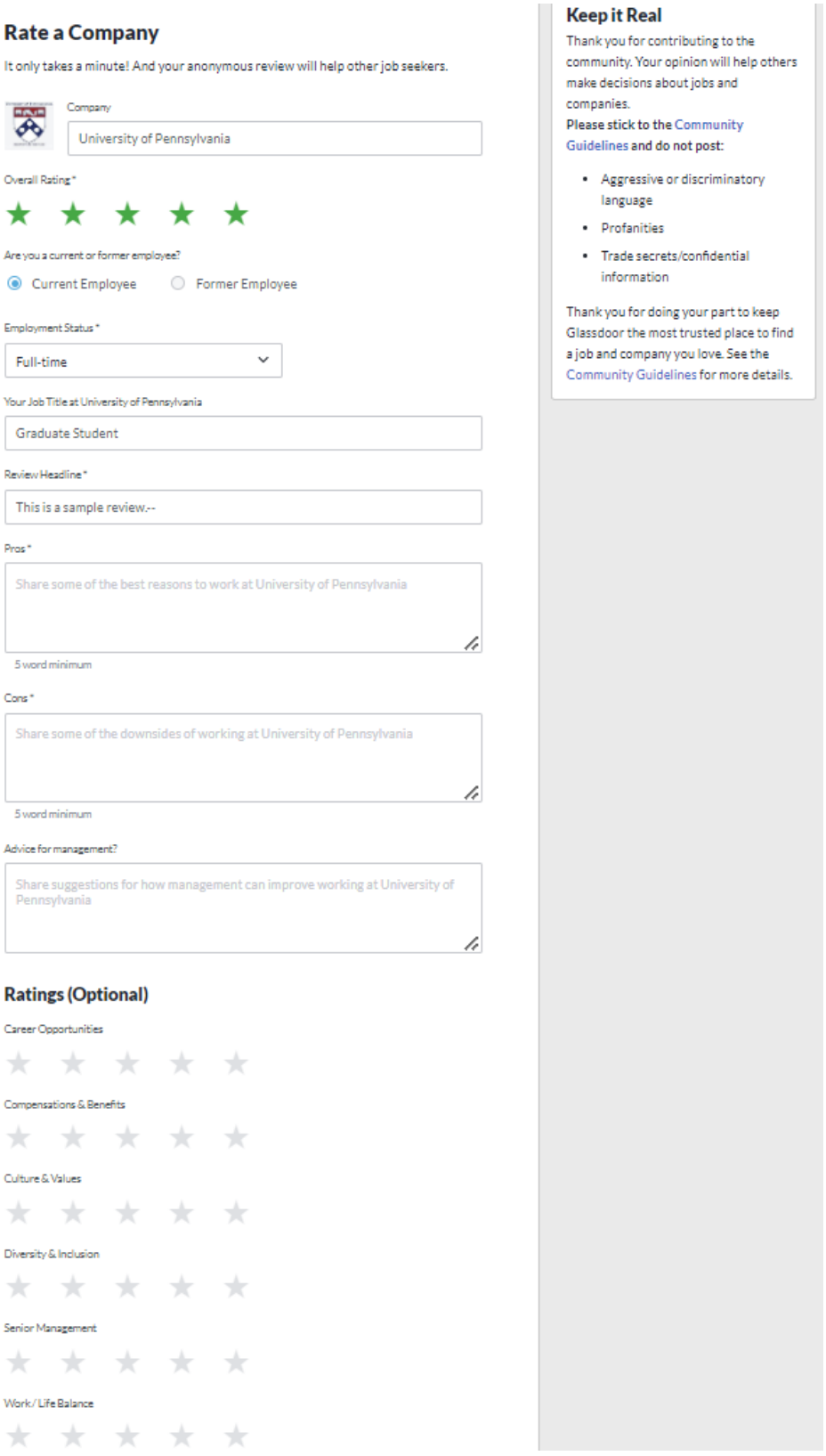

Notes: This figure displays the form for submitting a Glassdoor pay report.

Table A1: Summary Statistics for Glassdoor Sample, Additional Measures

| | Filing establishments | | | | | Non-filing establishments | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Measure | N | Mean | Standard deviation | Min | Max | N | Mean | Standard deviation | Min | Max |
| *Panel A. Pay data* | | | | | | | | | | |
| 1(Receives variable pay) | 405 | 0.17 | 0.38 | 0 | 1 | 14,800 | 0.20 | 0.40 | 0 | 1 |
| 1(Receives cash bonus) | 405 | 0.12 | 0.32 | 0 | 1 | 14,800 | 0.13 | 0.34 | 0 | 1 |
| 1(Receives stock bonus) | 405 | 0.01 | 0.09 | 0 | 1 | 14,800 | 0.01 | 0.10 | 0 | 1 |
| 1(Receives profit sharing) | 405 | 0.01 | 0.11 | 0 | 1 | 14,800 | 0.01 | 0.12 | 0 | 1 |
| 1(Receives sales commission) | 405 | 0.03 | 0.17 | 0 | 1 | 14,800 | 0.06 | 0.23 | 0 | 1 |
| 1(Receives tips or gratuities) | 405 | 0.02 | 0.14 | 0 | 1 | 14,800 | 0.02 | 0.13 | 0 | 1 |
| Firm employees in thousands | 404 | 40.64 | 83.00 | 0 | 618 | 14,700 | 20.56 | 72.71 | 0 | 10000 |
| Firm age in years | 373 | 59.96 | 43.86 | 0 | 386 | 12,100 | 50.17 | 44.25 | 0 | 430 |
| Establishments per firm | 405 | 441.03 | 905.18 | 1 | 5270 | 14,800 | 346.38 | 872.09 | 1 | 8343 |
| *Panel B. Satisfaction data* | | | | | | | | | | |
| Pros share of review text | 159 | 0.44 | 0.18 | 0 | 1 | 6,568 | 0.48 | 0.19 | 0 | 1 |
| Firm employees in thousands | 158 | 41.76 | 84.21 | 0 | 618 | 6,527 | 22.58 | 75.79 | 0 | 10000 |
| Firm age in years | 146 | 59.82 | 44.03 | 0 | 386 | 5,368 | 48.99 | 43.29 | 0 | 430 |
| Establishments per firm | 159 | 453.17 | 930.24 | 1 | 5270 | 6,568 | 392.71 | 944.41 | 1 | 8343 |

Notes: This table provides summary statistics for pay and satisfaction data in Glassdoor, partitioned according to whether the establishment files a petition from 2008 to 2022.

Figure A4: Employer Review Form




Notes: This figure displays the form for submitting a Glassdoor employer review.

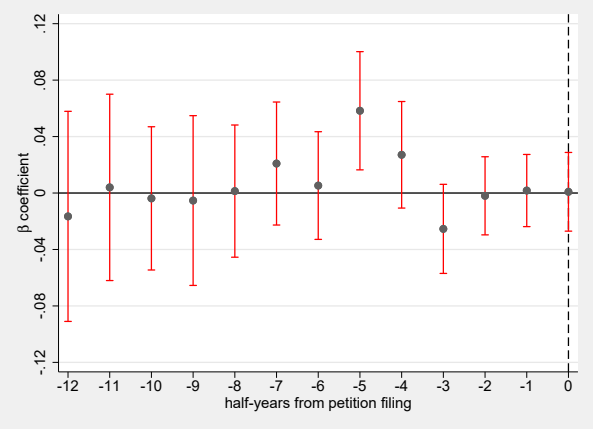
Table A2: Description of Amenities

| # | Amenity | Identifying words within review text |
|---|---|---|
| Pay | Pay | pay, salary, base, base pay, money |
| Pay | Pay growth | raise, annual raise, salary increase, pay raise, raise base |
| Pay | Bonuses | bonus, performance, cash, stock option |
| Pay | Commissions | sales, commission, quota |
| Fringe benefits | Paid time off | vacation, pto, sick days, leave, pay time off |
| Fringe benefits | Health insurance | insurance, health insurance, dental, vision |
| Fringe benefits | Retirement contributions | retirement, 401k, pension, contribution |
| Fringe benefits | Employee discounts | employee discount, discount, perk |
| Fringe benefits | Free food | lunch, food, free, cater lunch |
| Working conditions | Work-life balance | work life balance, work life |
| Working conditions | Hours | hours, full time, part time |
| Working conditions | Work schedule | hours, shift, schedule, flex time |
| Working conditions | Short breaks | break, rest, bathroom, lunch |
| Working conditions | Office space | office, desk, cubicle, cramp, building |
| Working conditions | Commuting | commute, parking, bus, drive |
| Working conditions | Teleworking | telecommute, telework, work home, home office, remote |
| Working conditions | Location | city, location, metro |
| Working conditions | Autonomy/responsibility | autonomy, independence, responsibility |
| Working conditions | Respect/abuse | respect, dignity, abuse, harass, hostile |
| Working conditions | Communication | communication, issue, concern, meeting |
| Working conditions | Support | help, support, supportive, encourage |
| Working conditions | Difficulty | challenge, growing pains, difficult, easy |
| Working conditions | Requirements | require, requirement, mandatory, optional |
| Working conditions | Stress | stress, pressure, high stress, high pressure |
| Working conditions | Pace | pace, fast pace, speed |
| Working conditions | Safety | injury, dangerous, safety, conditions, workplace |
| Working conditions | Recognition | hard work, effort, reward |
| Working conditions | Morale | morale, atmosphere |
| Working conditions | Fun | fun, boring, mundane, tedious |
| Working conditions | Culture | culture, values, environment, society, mission |
| Working conditions | Diversity/inclusion | diversity, ethnic, multicultural, inclusive, lgbtq, inclusion, equality, diverse |
| Working conditions | Leadership | leadership, management |
| Working conditions | Office politics | politics, bureaucracy, red tape, office politics |
| Working conditions | Change | change |
| Working conditions | Job security | layoff, lay off, turnover |
| Human capital | Career concerns | career, grow, improve, growth |
| Human capital | Promotions | promotion, promote, job title |
| Human capital | Experience | experience |
| Human capital | Skill development | develop, skill |
| Human capital | On-the-job training | train, training |
| Human capital | Mentoring | intern, internship, mentor |
| Human capital | Recruiting | hire, recruit, interview, learn |
| Human capital | Contracting | contract, offer, sign |
| Human capital | Industry | industry, market, startup, organization, project, product, technology, strategy, design |
| Relationships | Managers | boss, manager, ceo, owner |
| Relationships | Coworkers | coworkers, people, friend, family, colleague |
| Relationships | Teams | team, teamwork, collaborative |
| Relationships | Customers | customer, client |

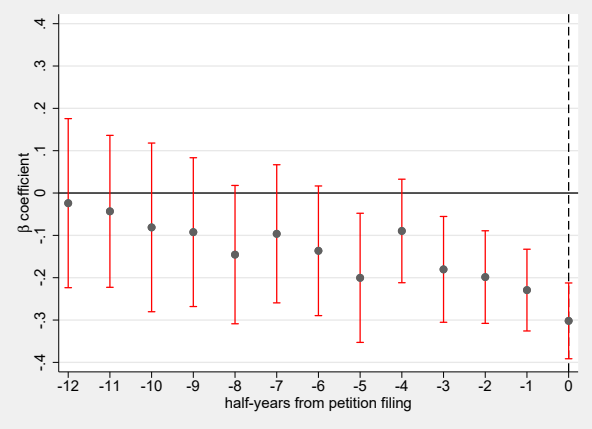
Notes: This table lists the amenities we consider from the review text alongside the set of words used to determine if the worker is describing them in their pros or cons text. Our amenities and their identifying words mirror the 48 anchored amenities and their respective anchor words from Sockin (2022).

# B Additional Results

Figure B1: Trends in Hourly Wage and Overall Satisfaction Leading up to Petition Filing without Control for Job Title



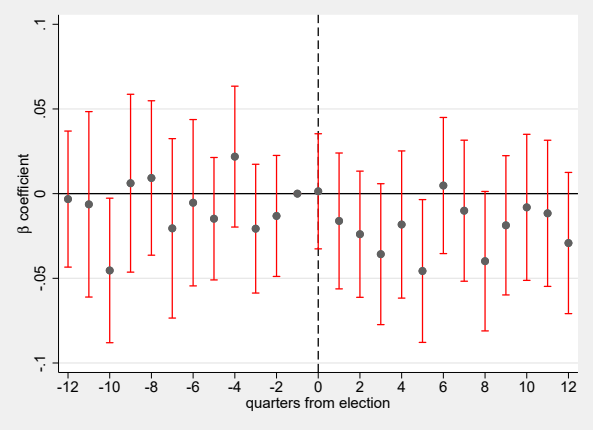

(a) Log(Pay)



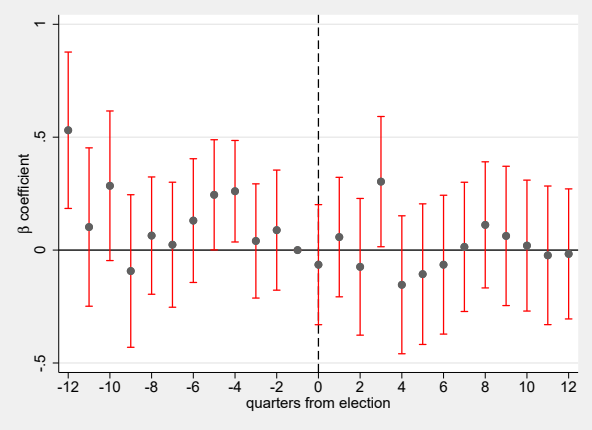

(b) Overall Satisfaction

Notes: These figures summarizes the dynamics of log pay and overall job satisfaction in the six calendar years leading up to a petition filing for filing establishments when job title fixed effects are not incorporated. Standard errors are clustered by firm. Red vertical bars indicate 95% confidence intervals around each point estimate.

Figure B2: Event Study for Regression Discontinuity Analysis of Pay and Satisfaction




(a) Log(Pay)




(b) Overall Satisfaction

Notes: These figures summarizes the dynamic effect from just winning a pro-union majority, i.e., the level shifter in the regression discontinuity design, on log pay and overall job satisfaction in the three years leading up and the three years following an election. Standard errors are clustered by firm. Red vertical bars indicate 95% confidence intervals around each point estimate.

Table B1: Workers' Outcomes Before a Union Petition is Filed, Time Trend

| | Log wage | | Overall rating | |
|---|---|---|---|---|
| 1(Before petition is filed) | 0.005 | 0.050*** | -0.232*** | -0.191*** |
| | (0.011) | (0.008) | (0.042) | (0.038) |
| 1(Before petition is filed) × half-years from filing | -0.001 | 0.001 | -0.018*** | -0.021*** |
| | (0.002) | (0.001) | (0.006) | (0.007) |
| Job title FE | | ✓ | | ✓ |
| N | 14,819,808 | 14,398,090 | 6,536,459 | 5,360,902 |
| Filings | 2,939 | 2,901 | 2,466 | 2,229 |
| Std. dev. DV | 0.589 | 0.589 | 1.411 | 1.401 |

Notes: This table summarizes the relationship between pay or job satisfaction and whether the establishment files a unionization petition within the next six calendar years, allowing for a linear trend over time. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

Table B2: Text-Based Measure of Workers Satisfaction Before a Union Petition is Filed

| | Pros share of review text | |
|---|---|---|
| 1(Filing establishment) | -0.029*** | -0.021*** |
| | (0.003) | (0.003) |
| Job title FE | | ✓ |
| N | 6,527,149 | 5,353,765 |
| Filings | 2,291 | 2,053 |
| Std. dev. DV | 0.185 | 0.184 |

Notes: This table summarizes the relationship between the share of an employee's review text apportioned to the 'Pros' section and whether the establishment files a unionization petition within the next three calendar years. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

Table B3: Additional Measures of Earnings Before a Union Petition is Filed

| | | Type of VP | | | | |
|---|---|---|---|---|---|---|
| | Any VP | Cash bonus | Stock bonus | Profit sharing | Sales commission | Tips or gratuities |
| *Panel A. Without job title FE* | | | | | | |
| 1(Filing establishment) | -0.029 | -0.015*** | 0.003 | -0.004*** | -0.028*** | 0.009 |
| | (0.019) | (0.005) | (0.005) | (0.002) | (0.004) | (0.015) |
| N | 14,937,884 | 14,937,884 | 14,937,884 | 14,937,884 | 14,937,884 | 14,937,884 |
| Filings | 2,782 | 2,782 | 2,782 | 2,782 | 2,782 | 2,782 |
| Std. dev. DV | 0.404 | 0.340 | 0.105 | 0.118 | 0.234 | 0.135 |
| *Panel B. With job title FE* | | | | | | |
| 1(Filing establishment) | -0.007 | 0.000 | 0.004 | -0.002 | -0.011*** | 0.001 |
| | (0.009) | (0.005) | (0.004) | (0.002) | (0.003) | (0.005) |
| N | 14,513,309 | 14,513,309 | 14,513,309 | 14,513,309 | 14,513,309 | 14,513,309 |
| Filings | 2,743 | 2,743 | 2,743 | 2,743 | 2,743 | 2,743 |
| Std. dev. DV | 0.404 | 0.340 | 0.105 | 0.117 | 0.234 | 0.136 |

Notes: This table summarizes the relationship between the receipt of variable pay and whether the establishment files a unionization petition within the next three calendar years. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

Table B4: Workers' Outcomes Before a Union Petition is Filed by U.S. Region

| | Log wage | | Overall rating | |
|---|---|---|---|---|
| 1(Filing establishment) | 0.019 | 0.053*** | -0.194*** | -0.131*** |
| | (0.014) | (0.010) | (0.047) | (0.042) |
| 1(Filing establishment) x Midwest | -0.003 | -0.009 | 0.020 | -0.038 |
| | (0.021) | (0.014) | (0.060) | (0.061) |
| 1(Filing establishment) x Northeast | -0.023 | -0.015 | 0.032 | -0.000 |
| | (0.018) | (0.013) | (0.059) | (0.063) |
| 1(Filing establishment) x South | -0.009 | -0.001 | 0.005 | -0.001 |
| | (0.021) | (0.017) | (0.059) | (0.059) |
| Job title FE | | ✓ | | ✓ |
| N | 14,781,157 | 14,360,524 | 6,519,419 | 5,347,292 |
| Filings | 2,770 | 2,731 | 2,289 | 2,051 |
| Std. dev. DV | 0.589 | 0.588 | 1.411 | 1.401 |

Notes: This table summarizes the relationship between log pay or job satisfaction and whether the establishment files a unionization petition within the next three calendar years by U.S. Census region. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

Table B5: Workers' Outcomes Before a Union Petition is Filed, Accounting for Firm Bigness

| | Log wage | | Overall rating | |
|---|---|---|---|---|
| 1(Filing establishment) | -0.008 | 0.029*** | -0.095** | -0.069** |
| | (0.009) | (0.006) | (0.044) | (0.030) |
| Log firm employment | 0.015*** | 0.011*** | -0.015*** | -0.017*** |
| | (0.001) | (0.001) | (0.003) | (0.002) |
| Log firm age | -0.017*** | -0.007*** | -0.010** | -0.006 |
| | (0.002) | (0.001) | (0.005) | (0.004) |
| Log firm locations | -0.026*** | -0.012*** | -0.031*** | -0.025*** |
| | (0.002) | (0.001) | (0.003) | (0.003) |
| Job title FE | | ✓ | | ✓ |
| N | 12,031,813 | 11,668,196 | 5,311,756 | 4,345,789 |
| Filings | 2,291 | 2,259 | 1,925 | 1,730 |
| Std. dev. DV | 0.603 | 0.603 | 1.397 | 1.389 |

Notes: This table summarizes the relationship between log pay or job satisfaction and whether the establishment files a unionization petition within the next three calendar years, incorporating three proxies for firm size. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

Table B6: Workers' Outcomes Before a Union Petition is Filed, Worker Composition

| | Pay Data | | Stacked Pay and Satisfaction Data | |
|---|---|---|---|---|
| | Years experience | Salaried | Full time | Current employee |
| *Panel A. Without job title FE* | | | | |
| 1(Filing establishment) | -0.160 | -0.035*** | 0.051*** | 0.060*** |
| | (0.134) | (0.013) | (0.012) | (0.006) |
| N | 14,937,884 | 14,800,051 | 21,631,406 | 21,631,406 |
| Filings | 2,782 | 2,777 | 3,118 | 3,118 |
| Std. dev. DV | 6.987 | 0.499 | 0.421 | 0.490 |
| *Panel B. With job title FE* | | | | |
| 1(Filing establishment) | 0.070 | 0.011** | 0.042*** | 0.052*** |
| | (0.093) | (0.006) | (0.006) | (0.006) |
| N | 14,513,309 | 14,378,780 | 20,303,455 | 20,303,455 |
| Filings | 2,743 | 2,738 | 3,020 | 3,020 |
| Std. dev. DV | 6.943 | 0.499 | 0.414 | 0.490 |

Notes: This table summarizes the relationship between worker observables and whether the establishment files a unionization petition within the next three calendar years. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

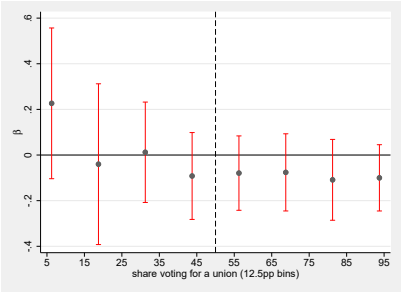
Table B7: Correlation of Average Job Satisfaction and Average Pay Across Establishments

| | Overall rating | |
|---|---|---|
| Log(pay) | 0.395*** | 0.277*** |
| | (0.007) | (0.005) |
| Firm FE | | ✓ |
| N | 1,067,409 | 1,067,409 |
| Std. dev. DV | 1.060 | 1.060 |

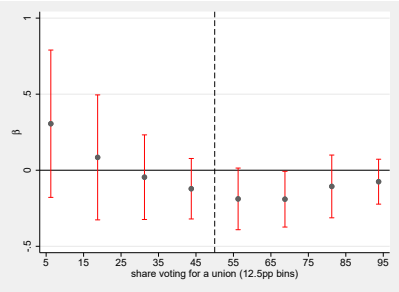
Notes: This table summarizes the relationship between job satisfaction and log pay across establishments in our sample. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

# C Results for Satisfaction Sub-Categories

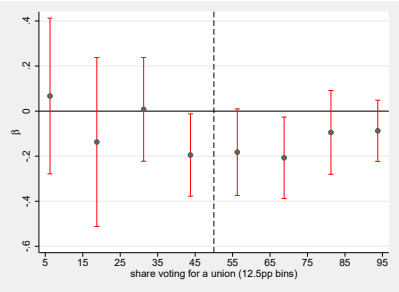
Figure C1: Change in Aspects of Job Quality by Share Voting for a Union



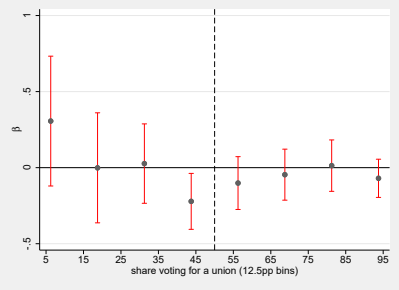

(a) Career opportunities



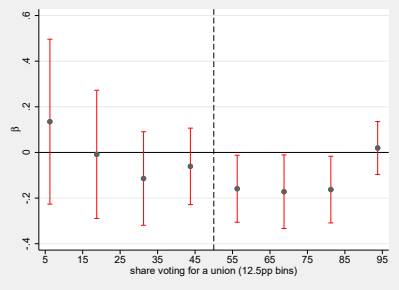

(b) Culture & values




(c) Senior leadership



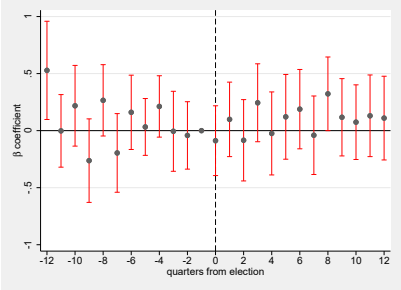

(d) Work-life balance



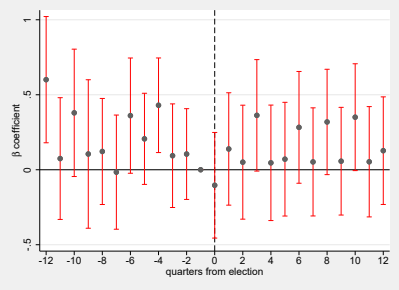

(e) Compensation & benefits

Notes: These figures summarize the average change on aspects of job quality following the filing of a petition, partitioning elections according to the share who voted for a union. Standard errors are clustered by firm. Red vertical bars indicate 95% confidence intervals around each point estimate.

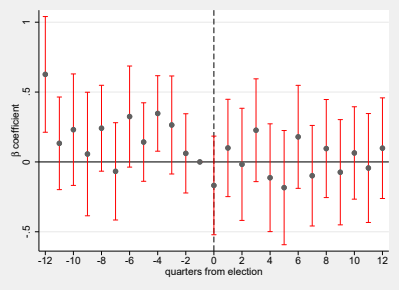
Figure C2: Event Study for Regression Discontinuity Analysis of Aspects of Job Quality



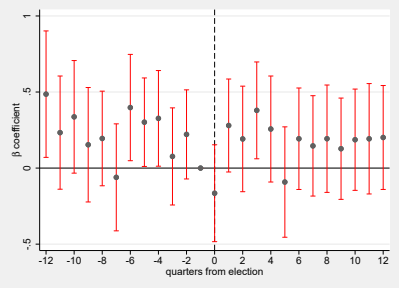

(a) Career opportunities



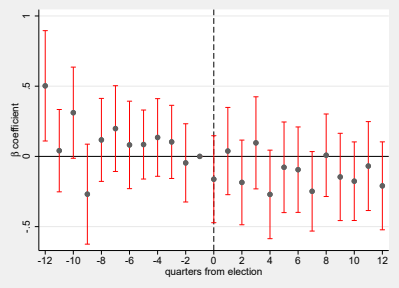

(b) Culture & values




(c) Senior leadership




(d) Work-life balance




(e) Compensation & benefits

Notes: These figures summarizes the dynamic effect from just winning a pro-union majority, i.e., the level shifter in the regression discontinuity design, on aspects of job quality in the three years leading up and the three years following an election. Standard errors are clustered by firm. Red vertical bars indicate 95% confidence intervals around each point estimate.

Table C1: Employee Satisfaction With Aspects of Job and Whether Employees Soon File a Unionization Petition

| | Career opportunities | Compensation & benefits | Culture & values | Senior management | Work-life balance |
|---|---|---|---|---|---|
| *Panel A. Without job title FE* | | | | | |
| 1(Filing establishment) | -0.084** | 0.066 | -0.158*** | -0.248*** | -0.181*** |
| | (0.034) | (0.063) | (0.056) | (0.033) | (0.026) |
| N | 5,687,507 | 5,682,734 | 5,425,210 | 5,625,008 | 5,681,896 |
| Filings | 2,218 | 2,219 | 1,943 | 2,210 | 2,217 |
| Std. dev. DV | 1.465 | 1.389 | 1.524 | 1.558 | 1.445 |
| *Panel B. With job title FE* | | | | | |
| 1(Filing establishment) | -0.022 | 0.081** | -0.098** | -0.173*** | -0.146*** |
| | (0.027) | (0.038) | (0.038) | (0.031) | (0.023) |
| N | 4,613,666 | 4,607,834 | 4,437,820 | 4,560,320 | 4,606,455 |
| Filings | 1,976 | 1,975 | 1,755 | 1,968 | 1,973 |
| Std. dev. DV | 1.461 | 1.390 | 1.516 | 1.554 | 1.445 |

Notes: This table summarizes the relationship between aspects of job quality and whether the establishment files a unionization petition within the next three calendar years. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

Table C2: Workers' Sub-Category Outcomes Before a Union Petition is Filed, Time Trend

| | Career opportunities | Compensation & benefits | Culture & values | Senior management | Work-life balance |
|---|---|---|---|---|---|
| 1(Before petition is filed) | -0.134*** | 0.005 | -0.228*** | -0.289*** | -0.218*** |
| | (0.041) | (0.055) | (0.055) | (0.043) | (0.038) |
| 1(Before petition is filed) × half-years from filing | -0.017*** | -0.019*** | -0.022*** | -0.017** | -0.012* |
| | (0.006) | (0.007) | (0.008) | (0.007) | (0.007) |
| N | 5,696,380 | 5,691,618 | 5,432,662 | 5,633,783 | 5,690,781 |
| Filings | 2,405 | 2,404 | 2,083 | 2,394 | 2,404 |
| Std. dev. DV | 1.465 | 1.389 | 1.524 | 1.558 | 1.445 |

Notes: This table summarizes the relationship between aspects of job quality and whether the establishment files a unionization petition within the next six calendar years, allowing for a linear trend over time. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

Table C3: Workers' Outcomes Across Establishments within Firms

| | Career opportunities | Compensation & benefits | Culture & values | Senior management | Work-life balance |
|---|---|---|---|---|---|
| *Panel A. Without job title FE* | | | | | |
| 1(Filing establishment) | -0.072*** | -0.043* | -0.092*** | -0.096*** | -0.044* |
| | (0.025) | (0.023) | (0.026) | (0.027) | (0.026) |
| Firm FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| N | 5,561,775 | 5,557,193 | 5,304,248 | 5,499,469 | 5,556,295 |
| Filings | 2,166 | 2,169 | 1,903 | 2,157 | 2,168 |
| Std. dev. DV | 1.465 | 1.390 | 1.523 | 1.556 | 1.447 |
| *Panel B. With job title FE* | | | | | |
| 1(Filing establishment) | -0.061** | -0.043* | -0.091*** | -0.096*** | -0.067** |
| | (0.026) | (0.025) | (0.028) | (0.029) | (0.027) |
| Firm FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| N | 4,488,608 | 4,482,956 | 4,316,221 | 4,435,471 | 4,481,490 |
| Filings | 1,919 | 1,920 | 1,708 | 1,911 | 1,918 |
| Std. dev. DV | 1.461 | 1.390 | 1.516 | 1.552 | 1.447 |

Notes: This table summarizes the relationship between aspects of job quality and whether the establishment files a unionization petition within the next three calendar years when firm fixed effects are included. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

Table C4: Post-Election Outcomes by Election Result, Difference-in-Differences

| | Career opportunities | Compensation & benefits | Culture & values | Senior management | Work-life balance |
|---|---|---|---|---|---|
| *Panel A. Without job title FE* | | | | | |
| 1(After petition is filed) | 0.013 | -0.013 | -0.038 | -0.045 | -0.059 |
| | (0.059) | (0.053) | (0.066) | (0.062) | (0.061) |
| 1(After petition is filed) × 1(Majority union) | -0.075 | -0.051 | -0.032 | -0.056 | 0.005 |
| | (0.068) | (0.061) | (0.078) | (0.072) | (0.070) |
| N | 4,763,877 | 4,760,518 | 4,523,365 | 4,709,563 | 4,759,789 |
| Filings | 2,085 | 2,084 | 1,998 | 2,077 | 2,085 |
| Std. dev. DV | 1.471 | 1.384 | 1.536 | 1.565 | 1.452 |
| *Panel B. With job title FE* | | | | | |
| 1(After petition is filed) | -0.026 | -0.051 | -0.027 | -0.094 | -0.058 |
| | (0.064) | (0.059) | (0.075) | (0.066) | (0.068) |
| 1(After petition is filed) × 1(Majority union) | -0.066 | -0.045 | -0.102 | -0.039 | 0.003 |
| | (0.078) | (0.069) | (0.088) | (0.079) | (0.079) |
| N | 3,760,909 | 3,756,408 | 3,601,857 | 3,715,138 | 3,755,362 |
| Filings | 1,882 | 1,876 | 1,806 | 1,869 | 1,878 |
| Std. dev. DV | 1.464 | 1.382 | 1.524 | 1.557 | 1.449 |

Notes: This table summarizes the change in aspects of job quality after a unionization election for elections that achieved majority support for a union. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

Table C5: Sub-Category Outcomes by Election Result, Regression Discontinuity

| | Career opportunities | Compensation & benefits | Culture & values | Senior management | Work-life balance |
|---|---|---|---|---|---|
| *Panel A. Without job title FE* | | | | | |
| *I. Vote share within 15% and 85%* | | | | | |
| Post-election x 1(Majority union) | 0.049 | -0.093 | -0.038 | -0.084 | -0.065 |
| | (0.094) | (0.089) | (0.112) | (0.103) | (0.104) |
| Filings | 1,436 | 1,433 | 1,372 | 1,429 | 1,436 |
| *II. Vote share within 30% and 70%* | | | | | |
| Post-election x 1(Majority union) | 0.096 | -0.047 | 0.087 | 0.022 | -0.084 |
| | (0.119) | (0.119) | (0.151) | (0.134) | (0.145) |
| Filings | 899 | 898 | 860 | 895 | 898 |
| *Panel B. With job title FE* | | | | | |
| *I. Vote share within 15% and 85%* | | | | | |
| Post-election x 1(Majority union) | -0.082 | -0.201** | -0.245* | -0.245** | -0.124 |
| | (0.109) | (0.099) | (0.127) | (0.124) | (0.112) |
| Filings | 1,301 | 1,296 | 1,243 | 1,287 | 1,297 |
| *II. Vote share within 30% and 70%* | | | | | |
| Post-election x 1(Majority union) | -0.048 | -0.231* | -0.150 | -0.202 | -0.160 |
| | (0.140) | (0.132) | (0.167) | (0.159) | (0.155) |
| Filings | 821 | 818 | 786 | 812 | 818 |

Notes: This table summarizes the relationship between aspects of job quality and whether the unionization petition is successful under a regression discontinuity approach. The running variable is the difference between the share voting for a union and one-half. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

Table C6: Workers' Pre-Petition Sub-Category Outcomes And Share Voting Against a Union

| | Career opportunities | Compensation & benefits | Culture & values | Senior management | Work-life balance |
|---|---|---|---|---|---|
| *Panel A. Without job title FE* | | | | | |
| Standardized rating before filing | 0.012 | 0.007 | 0.013* | 0.018** | 0.002 |
| | (0.009) | (0.009) | (0.007) | (0.008) | (0.006) |
| Standardized log(pay) before filing | 0.001 | 0.001 | -0.002 | 0.002 | 0.002 |
| | (0.008) | (0.008) | (0.007) | (0.008) | (0.008) |
| Elections | 1,932 | 1,934 | 1,734 | 1,926 | 1,932 |
| Outcome mean | 0.359 | 0.359 | 0.414 | 0.359 | 0.360 |
| *Panel B. With job title FE* | | | | | |
| Standardized rating before filing | 0.015* | 0.008 | 0.016** | 0.016* | 0.007 |
| | (0.008) | (0.009) | (0.007) | (0.008) | (0.006) |
| Standardized log(pay) before filing | -0.002 | -0.002 | -0.003 | -0.000 | -0.001 |
| | (0.008) | (0.008) | (0.007) | (0.008) | (0.008) |
| Elections | 1,764 | 1,766 | 1,593 | 1,760 | 1,764 |
| Outcome mean | 0.354 | 0.354 | 0.418 | 0.353 | 0.354 |

Notes: This table summarizes the relationship between aspects of job quality and the share of votes in the certification election that are against the union. Each election is weighted by its vote total. Standard errors are clustered by state. Significance levels: * 10%, ** 5%, *** 1%

# D Robustness

Table D1: Pre- and Post-Petition Outcomes Looking Only at Current Employees

| | Before filing | | After filing | | | |
|---|---|---|---|---|---|---|
| 1(Filing establishment) | -0.194*** | -0.132*** | | | | |
| | (0.035) | (0.031) | | | | |
| 1(After petition is filed) × 1(Majority union) | | | -0.078* | -0.122** | | |
| | | | (0.047) | (0.055) | | |
| Post-election x vote share for union | | | | | 0.018 | -0.382 |
| | | | | | (0.476) | (0.507) |
| Post-election x vote share for union x 1(Majority union) | | | | | -0.070 | 1.105 |
| | | | | | (0.706) | (0.800) |
| Post-election x 1(Majority union) | | | | | -0.067 | -0.255* |
| | | | | | (0.112) | (0.134) |
| Job title FE | | ✓ | | ✓ | | ✓ |
| N | 3,672,018 | 3,001,806 | 2,981,416 | 2,358,995 | 2,972,535 | 2,351,621 |
| Filings | 1,737 | 1,508 | 1,634 | 1,428 | 1,116 | 979 |
| Std. dev. DV | 1.286 | 1.274 | 1.296 | 1.280 | 1.296 | 1.280 |

Notes: This table summarizes the relationship between log pay or job satisfaction and whether the establishment files a unionization petition within the next three calendar years using only workers still employed at each establishment. For regression discontinuity analysis, the range of vote shares included is 15–85 percent for the union. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

Table D2: Workers' Outcomes Across Establishments within Firms, Tighter Comparison

| | Log wage | | Overall rating | |
|---|---|---|---|---|
| 1(Filing establishment) | -0.004 | 0.042*** | -0.190*** | -0.142*** |
| | (0.009) | (0.006) | (0.037) | (0.032) |
| Job title FE | | ✓ | | ✓ |
| N | 12,125,976 | 11,749,293 | 5,116,735 | 4,144,392 |
| Filings | 2,411 | 2,369 | 1,961 | 1,720 |
| Std. dev. DV | 0.588 | 0.587 | 1.415 | 1.404 |

Notes: This table summarizes the relationship between log pay or job satisfaction and whether the establishment files a unionization petition within the next three calendar years. Each regression includes worker observables and industry x locality x year-quarter fixed effects. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

Table D3: Workers' Outcomes Before a Union Petition is Filed, Observation Count FE

| | Log wage | | Overall rating | |
|---|---|---|---|---|
| 1(Filing establishment) | 0.009 | 0.045*** | -0.148*** | -0.117*** |
| | (0.009) | (0.006) | (0.037) | (0.030) |
| Job title FE | | ✓ | | ✓ |
| N | 14,800,051 | 14,378,780 | 6,527,149 | 5,353,765 |
| Filings | 2,777 | 2,738 | 2,291 | 2,053 |
| Std. dev. DV | 0.589 | 0.589 | 1.411 | 1.401 |

Notes: This table summarizes the relationship between log pay or job satisfaction and whether the establishment files a unionization petition within the next three calendar years, incorporating fixed effects for each establishment's Glassdoor observation count. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

Table D4: Employee Outcomes Leading Up to a Unionization Petition, Time Trend with Semi-Balanced Panel, Across Jobs

| | Log wage | | Overall rating | |
|---|---|---|---|---|
| 1(Before petition is filed) | 0.022* | 0.056*** | -0.216*** | -0.195*** |
| | (0.012) | (0.008) | (0.040) | (0.037) |
| 1(Before petition is filed) × half-years from filing | 0.001 | 0.001 | -0.016*** | -0.021*** |
| | (0.002) | (0.001) | (0.006) | (0.006) |
| Job title FE | | ✓ | | ✓ |
| N | 14,818,431 | 14,396,757 | 6,535,752 | 5,360,311 |
| Filings | 2,154 | 2,138 | 1,977 | 1,811 |
| Std. dev. DV | 0.589 | 0.589 | 1.411 | 1.401 |

Notes: This table summarizes the relationship between pay or job satisfaction and whether the establishment files a unionization petition within the next six calendar years, allowing for a linear trend over time and excluding filing establishments that are observed in fewer than six of the twelve half-years preceding the filing. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

Table D5: Post-Election Amenities by Election Result, Regression Discontinuity when Incorporating Job Title Fixed Effects

| | | Post-election x 1(Majority union) | |
|---|---|---|---|
| Category | Amenity | Coef | Std error |
| Pay | Pay | -0.093 | (0.066) |
| | Pay growth | 0.017 | (0.018) |
| | Bonuses | 0.011 | (0.021) |
| | Commissions | -0.021 | (0.022) |
| Fringe benefits | Paid time off | 0.002 | (0.028) |
| | Health insurance | -0.001 | (0.026) |
| | Retirement contributions | 0.016 | (0.021) |
| | Employee discounts | 0.020 | (0.018) |
| | Free food | -0.000 | (0.032) |
| Working conditions | Work-life balance | 0.000 | (0.000) |
| | Hours | -0.052 | (0.044) |
| | Work schedule | -0.097* | (0.050) |
| | Short breaks | -0.002 | (0.032) |
| | Office space | 0.025 | (0.030) |
| | Commuting | 0.021 | (0.041) |
| | Teleworking | 0.008 | (0.006) |
| | Location | -0.011 | (0.021) |
| | Autonomy/responsibility | 0.004 | (0.009) |
| | Respect/abuse | -0.010 | (0.027) |
| | Communication | 0.062** | (0.029) |
| | Support | -0.017 | (0.035) |
| | Difficulty | -0.006 | (0.032) |
| | Requirements | 0.021 | (0.022) |
| | Stress | -0.017 | (0.019) |
| | Pace | -0.002 | (0.016) |
| | Safety | 0.001 | (0.018) |
| | Recognition | 0.012 | (0.015) |
| | Morale | 0.018 | (0.019) |
| | Fun | -0.001 | (0.028) |
| | Culture | -0.116*** | (0.039) |
| | Diversity/inclusion | 0.002 | (0.017) |
| | Leadership | -0.044 | (0.057) |
| | Office politics | -0.003 | (0.009) |
| | Change | 0.011 | (0.023) |
| | Job security | -0.020 | (0.017) |
| Human capital | Career concerns | 0.050 | (0.046) |
| | Promotions | -0.011 | (0.021) |
| | Experience | 0.011 | (0.029) |
| | Skill development | 0.007 | (0.028) |
| | On-the-job training | 0.008 | (0.030) |
| | Mentoring | -0.015 | (0.011) |
| | Recruiting | 0.050 | (0.038) |
| | Contracting | 0.041 | (0.030) |
| | Industry | -0.065* | (0.037) |
| Relationships | Managers | -0.045 | (0.041) |
| | Coworkers | -0.021 | (0.055) |
| | Teams | -0.036 | (0.027) |
| | Customers | 0.022 | (0.030) |

Notes: This table summarizes the relationship between 48 amenities and whether the unionization petition is successful under a regression discontinuity approach when job title fixed effects are incorporated. The running variable is the share voting for a union minus one-half. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

Table D6: Post-Election Outcomes using Regression Discontinuity, Only Elections With 20 or More Votes

| | Log wage | | Overall rating | |
|---|---|---|---|---|
| Post-election x 1(Majority union) | -0.080** | -0.048* | -0.096 | -0.279** |
| | (0.035) | (0.025) | (0.124) | (0.142) |
| Job title FE | | ✓ | | ✓ |
| N | 13,056,454 | 12,644,453 | 5,463,797 | 4,374,199 |
| Filings | 812 | 798 | 676 | 614 |
| Std. dev. DV | 0.585 | 0.585 | 1.425 | 1.410 |

Notes: This table summarizes the relationship between log pay or job satisfaction and whether the unionization petition is successful under a regression discontinuity approach, excluding elections with fewer than 20 votes. The running variable is the share voting for a union minus one-half. The range of vote shares included is 30–70 percent for the union. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

Table D7: Post-Election Outcomes using Regression Discontinuity, Allowing for Quadratic in Running Variable Around Threshold

| | Log wage | | Overall rating | |
|---|---|---|---|---|
| Post-election x 1(Majority union) | -0.095*** | -0.068** | -0.001 | -0.040 |
| | (0.035) | (0.027) | (0.140) | (0.163) |
| Job title FE | | ✓ | | ✓ |
| N | 13,096,956 | 12,684,160 | 5,480,877 | 4,388,362 |
| Filings | 1,775 | 1,756 | 1,484 | 1,349 |
| Std. dev. DV | 0.585 | 0.585 | 1.425 | 1.409 |

Notes: This table summarizes the relationship between log pay or job satisfaction and whether the unionization petition is successful under a regression discontinuity approach, incorporating a piece-wise quadratic in the running variable around the discontinuity. The running variable is the share voting for a union minus one-half. The range of vote shares included is 15–85 percent for the union. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

Table D8: Post-Election Outcomes using Regression Discontinuity, Votes from Majority Threshold as Running Variable

| | Log wage | | Overall rating | |
|---|---|---|---|---|
| *I. Within ±8 votes of majority union* | | | | |
| Post-election x 1(Majority union) | -0.029* | -0.029** | 0.042 | 0.013 |
| | (0.018) | (0.014) | (0.073) | (0.084) |
| Job title FE | | ✓ | | ✓ |
| Filings | 1,620 | 1,602 | 1,295 | 1,188 |
| *II. Within ±5 votes of majority union* | | | | |
| Post-election x 1(Majority union) | -0.049** | -0.040** | 0.022 | -0.021 |
| | (0.020) | (0.017) | (0.088) | (0.100) |
| Job title FE | | ✓ | | ✓ |
| Filings | 1,311 | 1,293 | 1,041 | 957 |

Notes: This table summarizes the relationship between log pay or job satisfaction and whether the unionization petition is successful under a regression discontinuity approach, where the running variable is the difference between the total votes for a union and the number of votes needed to secure a majority. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%

Table D9: Share Voting Against a Union, Censoring Large Vote Totals

| | Overall rating | | Senior Management | |
|---|---|---|---|---|
| Standardized rating before filing | 0.012** | 0.011* | 0.018** | 0.016** |
| | (0.006) | (0.006) | (0.008) | (0.008) |
| Standardized log(pay) before filing | 0.008 | 0.006 | 0.007 | 0.006 |
| | (0.008) | (0.007) | (0.008) | (0.007) |
| Job title FE | | ✓ | | ✓ |
| Elections | 1,979 | 1,809 | 1,912 | 1,741 |
| R-squared | 0.31 | 0.32 | 0.31 | 0.32 |
| Outcome mean | 0.415 | 0.418 | 0.414 | 0.418 |

Notes: This table summarizes the relationship between aspects of job quality and the share of votes in the certification election that are against the union, excluding elections that represent more than 0.5 percent of the cumulative vote total across elections. Each election is weighted by its vote total. Standard errors are clustered by state. Significance levels: * 10%, ** 5%, *** 1%