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Alex Bryson, Ryo Kambayashi, Susumu Kuwahara, Akie Nakamura,  
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# Desire for Union Membership, Presence of an On-site Union, and Subjective Wellbeing: A Demand-Supply Perspective \*

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## Abstract

Using repeated cross-sectional survey data for private-sector workers in metropolitan Japan (2011–2024), we examine how job and life satisfaction relate to union demand and supply, distinguishing realized membership from frustrated demand. Frustrated demand is associated with lower job and life satisfaction only where no on-site union is present; where one is present, workers with frustrated demand are about as satisfied as those with no interest in membership, indicating that it is the mismatch between demand and supply, not unmet demand per se, that is costly. This pattern is sharpest among standard (*seishain*) employees, whereas among non-standard employees union presence does little to reduce frustrated demand, consistent with limited eligibility. We find that union presence is associated with higher satisfaction among non-members who have no interest in joining only if they regard unions as necessary, consistent with spillovers that create scope for free-riding, while the lower satisfaction of members who do not think unions are necessary is unrelated to union presence. The wellbeing consequences of unionization in Japan thus depend not on demand or supply alone, but on whether the two are matched.

JEL codes: J51; I31

Key words: union membership; union presence; union demand and supply; spillovers; free-riding; non-standard employment; job satisfaction; life satisfaction.

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# 1 Introduction

Unions seek to improve their members' wages and working conditions through provision of worker voice and collective bargaining in what Freeman and Medoff (1984) referred to as their voice and monopoly faces. Evidence from around the world indicates that, where unions are present, they continue to impact wage and non-wage amenities suggesting workers continue to benefit from union membership. At the same time, unions face problems of collective action arising through their provision of a public good creating opportunities for union covered workers to free-ride thus foregoing union membership dues. Incentives to free-ride may partly explain declining union density, apparent across many countries in recent decades, especially in those countries where unions have limited influence beyond the workplace and where closed shop arrangements (in which workers can be required to join a union prior to or after hiring) are no longer enforceable.

Others suggest that a decline in workers' demand for union services lies behind declining union density in recent decades (Farber and Western, 2001; Farber and Krueger, 1993). However, survey evidence suggests a sizeable representation gap in English-speaking countries like the United States, Canada and the United Kingdom where workers continue to demand unionization but do not get it (Towers, 1998; Bryson and Gómez, 2003; Bryson et al., 2005; Bryson and Freeman, 2013). A representation gap signals a union supply problem which may be linked to unions' financial difficulties (Willman et al., 2020) and the costliness of union organizing, especially in countries where employers seek to block union organizing through unfair labor practices (Logan, 2006). This literature indicates high and persistent levels of frustrated demand for union membership.

For half a century the literature on what workers get from union membership has focused on job satisfaction as a measure that might proxy the utility workers get from their jobs, as well as being an important predictor of worker behaviors in terms of quits (Freeman, 1978; Borjas, 1979). Notwithstanding unions' objective in improving workers' terms and conditions the partial correlation between unionization and job satisfaction is frequently negative. A variety of reasons have been suggested for this negative correlation. Some propose a causal linkage. For instance, Freeman and Medoff (1984) point to what they call union "voice-induced complaining", a strategic mechanism for strengthening unions' bargaining hand. A second causal mechanism is worker voice which, by reducing the propensity of dissatisfied workers to exit the employment contract in the face of problems, increases the stock of dissatisfied workers (Freeman, 1978). A third causal mechanism is the increased information unions provide to workers about the workplace and their position in it which can engender increased dissatisfaction due to transparency about the worker's relative terms and conditions or managerial shortcomings. But the literature also points to unobserved confounders, such as the poor working conditions that may trigger unionization in the first place, and the possibility that it is workers with a propensity for dissatisfaction who choose to become union members. There is evidence for many of these causal mechanisms and for selection effects, with more positive effects of unionization emerging in panel data analyses which account for worker selection into unionization (Bryson and White, 2016).

The recent literature indicates that even the simple partial correlation between union member-

ship and worker wellbeing has switched from negative to positive in the United States (Artz et al., 2022) and Europe (Blanchflower et al., 2022) in the last few decades. Observed union membership, however, reflects not only workers’ desire for union representation but also whether such representation is available to them. Thus, non-members may differ in whether they have no interest in unionization or would like to join but cannot. The job satisfaction literature takes no account of non-members’ desire for union membership. We draw on this distinction to bring a demand-supply perspective to the study of unionization and worker wellbeing. In doing so we move beyond the traditional focus on union membership by distinguishing between non-members who want union membership (those with ‘frustrated demand’) and those who do not, whilst also simultaneously capturing the supply of the union good with a dummy variable capturing the presence of a union at the workplace.

Our empirical analysis focuses on Japan, a country in which, according to official statistics, union density is in decline (although survey data seem to be at odds with this conclusion (Bryson et al., 2025)). As discussed in Moriguchi (2000), Japan’s modern industrial relations system has its origins in the early post-War period during United States’ occupation. Under the system unions are enterprise-based with newly organized enterprises setting up new trade unions. Consequently, there are 45,100 trade unions in Japan today (Ministry of Health, Labour and Welfare, 2025).<sup>1</sup> These trade unions function in a similar fashion to trade unions in Western developed economies and perform similar bargaining and representation functions. Union organizing costs are lower than those faced by unions in the United States because Japanese employers are less likely to resort to unfair labor practices than their American counterparts and do, in some cases, rely on check-off arrangements and post-entry closed shop deals to support union membership (that is, arrangements under which workers are hired without prior union membership but are required to join the union shortly after recruitment as a condition of continued employment; see Section 3.3). Nevertheless, as we shall show, a substantial share of workers would like to join a union but are not members, in part because enterprise unions have traditionally focused on representing standard (*seishain*) employees in the primary jobs sector, and many do not extend membership to non-standard employees working alongside them. This makes Japan a natural setting in which to study frustrated demand: because a union at the workplace does not necessarily make membership available to every worker there, frustrated demand arises not only where unions are absent but also where they are present, allowing us to observe how it relates to workers’ job and life satisfaction under different conditions of supply.

Using repeated cross-sectional data on private-sector workers in metropolitan Japan from 2011 to 2024, we investigate the association between union membership and frustrated demand for union membership, together with the supply of the union good captured by the workplace presence of a trade union, on two aspects of workers’ wellbeing, namely their job satisfaction and life satisfaction.

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<sup>1</sup> The Basic Survey on Labour Unions reports the number of *tan’i kumiai*, commonly abbreviated *tanso*: a labor union whose constitution provides for individual membership by workers and capable of conducting independent activities of its own. This is the appropriate unit for our purposes because on-site union presence, as we measure it, captures the workplace-level union that workers actually interact with, regardless of whether it belongs to a larger federation.

Estimating linear models for job and life satisfaction with various controls, we document three main patterns. First, frustrated demand is associated with lower job and life satisfaction, but only where no on-site union is present; where a union is present at the workplace, workers with frustrated demand are about as satisfied as workers with no interest in membership, indicating that it is the mismatch between demand and supply, rather than unmet demand per se, that is costly. Second, this pattern is sharpest among standard employees, for whom the presence of an on-site union largely eliminates frustrated demand. Among non-standard employees, it does far less to do so, which is consistent with on-site unions not admitting them, so that their demand remains unrealized even where a union is present. Third, distinguishing workers by whether they regard unions as necessary reveals an asymmetry between non-members and members. Among non-members who express no interest in joining, union presence at the workplace is associated with higher satisfaction only for those who nonetheless regard unions as necessary, and with lower satisfaction for those who do not, consistent with spillovers that create scope for free-riding. Among members, those who do not regard unions as necessary are less satisfied than those who do, but by the same margin whether or not an on-site union is present, giving no indication that compulsory membership under union shop agreements is costly.

By integrating union demand-supply frictions with subjective wellbeing, our study shows that the wellbeing consequences of unionization in Japan depend not on demand or supply alone, but on their interaction: unmet demand is costly when supply is absent, the benefits of union presence spill over to non-members who value unions without joining them, and whether union presence constitutes supply depends on whether workers are eligible to join.

## 2 Literature review

Until recently the empirical literature examining the relationship between unionization and job satisfaction pointed to a negative association between membership and satisfaction; for a review of this literature, see Laroche (2016). Estimates of the partial correlation between membership and job satisfaction treated all non-members as if they were the same. However, the supply of the union good is not always guaranteed, something that has led to a sizeable ‘representation gap’ in countries like the United States and the United Kingdom (Towers, 1998; Bryson and Gómez, 2003), whereupon some non-members or uncovered workers may desire union membership or union representation.

Termed ‘frustrated demand’ in the literature, this may arise where it is costly for the union to supply the union good or occur in workplaces where the demand among non-members is insufficient to trigger union representation and bargaining rights. Unions may decide it is too costly to supply the union good where the marginal costs of organizing exceed the benefits, as in the case of smaller workplaces with high labor turnover. In some circumstances frustrated demand for unionization emerges because the union must meet a high threshold of support in order to trigger bargaining rights, as in the case of the Wagner system in the United States (Ferguson, 2008). By

contrast, Japanese labor law imposes minimal formal requirements for union formation, requiring no registration with authorities and allowing any group of two or more workers to establish a legally recognized union simply by adopting bylaws (Hanami et al., 2015, pp. 167–169).

The literature confirms that poor working conditions and dissatisfaction with those conditions is often associated with a greater desire for union representation (Bryson and Freeman, 2013). There is a fairly high incidence of frustrated demand for unionization in some English-speaking countries as indicated by the small number of surveys asking non-members whether they would vote for a union if a vote was held (Freeman et al., 2007; Bryson, 2008). In some countries levels of frustrated demand have been rising due to increasing financial problems unions face in organizing workers and servicing members (Willman et al., 2020), and with high levels of employer opposition to unionization raising organizing costs (Logan, 2006; Naidu, 2022).

The idea that it is dissatisfied workers who are likely to become union members raises questions as to how to interpret the negative partial correlation between unionization and job satisfaction. Evidence from panel studies tracking the job satisfaction of workers switching union membership or coverage status suggests that worker fixed effects account for all or part of the negative correlation such that, in panel data, a positive correlation between unionization and job satisfaction emerges, especially with respect to pay satisfaction (Bryson and White, 2016). This suggests that part of the cross-sectional correlation between unionization and job dissatisfaction arises from the selection of already-dissatisfied workers into unions. Bender and Sloane (1998) identify a second contributory factor, namely omitted variables bias arising from the poor working conditions that trigger unionization in the first place. They find a negative correlation between union membership and job satisfaction disappears when accounting for working conditions, suggesting omitted variables bias drives the seeming dissatisfaction of unionized workers whilst confirming the importance of working conditions as a trigger for unionization.

The association between frustrated demand and job satisfaction has yet to be tested in the literature. It may be that those wishing for union assistance to tackle problems at work will be the least satisfied workers in a workplace. Within the demand-supply framework, a mismatch between workers’ preferences and their membership status can also run in either direction. On the one hand, some non-members may actively choose not to join, even if a union is available to them, in expectation that they may receive the public good benefits unions procure without the need to pay union dues (Olson, 1971), a behavior often termed “free-riding” (Bryson, 2008). On the other hand, some members may belong to a union they would prefer not to belong to, which Bryson and Gómez (2003) term “oversupply”. In Japan, the latter can arise because, whilst pre-entry closed shops are prohibited, post-entry closed shops are generally permitted, so that a worker may be required to join the union even if they are doubtful about its benefits.

## 3 Data and Measurement

### 3.1 Survey description

We draw on the repeated cross-sectional survey conducted by the Japanese Trade Union Confederation Research Institute for Advancement of Living Standards (RENGO-RIALS). Each wave samples private-sector workers aged 20–64 in the Tokyo metropolitan and Kansai areas, and the survey has been administered twice a year (April and October) since 2001.<sup>2</sup> The survey was conducted by mail with around 1,000 respondents per wave until April 2011, when it switched to web mode and the sample was enlarged to approximately 2,000. In April 2018, a separate sample of approximately 2,000 workers outside these areas was added using the same questionnaire, and RENGO-RIALS reports the two samples separately. To ensure a consistent sampling frame across the period analyzed, and to avoid response changes induced by changes in survey mode, we focus on the 28 waves from April 2011 to October 2024 and restrict attention to the metropolitan area. The questionnaire is designed to capture both the *supply* of union activities, proxied by the presence of a union at the respondent’s workplace, and the *demand* for union affiliation and activity, including realized membership and the intention to join. In addition, it elicits attitudes toward unions’ necessity, which we use to construct a supportive attitude measure applicable to both members and non-members. Finally, the questionnaire also captures respondents’ job satisfaction and overall life satisfaction; the former proxies for workers’ evaluation of their job and workplace, while the latter captures their broader subjective wellbeing.

### 3.2 Key union measures

We rely on four core items concerning union activities:

1. **Workplace union presence** (Question A): “Is there a labor union at your workplace?” (Yes/No/Do not know).
2. **Current membership** (Question B): “Are you currently a member of a labor union?” with options distinguishing workplace and external unions and past membership.
3. **Intention to join** (Question C): Asked of non-members: “Do you have the intention to join a labor union?” (Want/May join if approached/Do not want/Do not know).
4. **Supportive attitude** (Question D): “Do you think labor unions are necessary?” (Definitely necessary/Rather better to have/Doesn’t matter/Better not to have/Don’t know).

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<sup>2</sup> The survey uses quota sampling based on the Employment Status Survey to match the metropolitan workforce distribution by gender, age group, and employment type (regular/non-regular) in the Tokyo metropolitan and Kansai areas. Within each quota cell, excess respondents are dropped at random, so the resulting sample is self-weighting on these dimensions; survey weights are not provided by the survey organizers, and we do not use weights in our analysis.

Questions A–C allow us to construct demand and supply variables and to identify *frustrated demand* (non-members with the intention to join). Question D informs supportive attitudes toward union activities.

### 3.3 Variable construction

We define the following variables consistent with Appendix Table 1:

- *Realized demand*: equals 1 if the respondent is currently a member of any labor union (from Question B), and 0 otherwise.
- *Total Demand*: equals 1 if the respondent is a union member *or*, if not a member, would like to join or would join if approached (from Questions B and C), and 0 otherwise (“no interest”). Following Bryson et al. (2005), non-members who answer “Do not know” to Question C are classified as no interest.
- *Frustrated demand*: equals 1 if Total Demand = 1 while Realized demand = 0; that is, a positive intention without realized membership à la Bryson et al. (2005).
- *Union-on-site*: equals 1 if a union exists at the respondent’s workplace (from Question A), and 0 otherwise. Because we assume an external union is always accessible, the absence of an on-site union means that the worker’s choice is limited to external union membership (“only external choice”). Respondents who do not know whether their workplace has a union are coded 0: a union whose existence a worker is unaware of cannot serve as a channel of voice for that worker.
- *Support*: equals 1 for respondents choosing positive options in Question D, either “Definitely necessary” or “Rather better to have”, and 0 otherwise.

“Total demand” is the sum of union membership and desire for membership among non-members. Although pre-entry closed shop agreements (which would require union membership as a condition for being hired) are prohibited in Japan, post-entry closed shop agreements (which require workers to join a union after being hired) are generally permitted. Under a union shop agreement, employees are required to join the established enterprise union within a specified period after being hired. (The implication is that some workers may be union members even if they would prefer not to belong to their on-site union, so that our measure of total demand includes any over-supply and is therefore an upper bound.) However, this requirement is not absolute: employees must still be allowed to join or remain members of external unions (unions organized outside the company) to protect their constitutional right to freedom of association.<sup>3</sup>

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<sup>3</sup>Mitsui Soko Koun case, Supreme Court (First Petty Bench), December 14, 1989, *Minshu* Vol. 43, No. 12, p. 2051.

The survey question regarding union membership (Question B), therefore, is independent of the question regarding the presence of a union on-site (Question A) allowing us to distinguish between membership of an on-site union and membership of an off-site union.<sup>4</sup>

### 3.4 Outcomes and covariates

**Outcomes.** Our outcomes are job satisfaction and overall life satisfaction. Job satisfaction is elicited by the question “Are you satisfied with your job at your current workplace?” and life satisfaction by the question “Are you satisfied with your life in general?”. Both are answered on a five-point scale (“very dissatisfied”, “somewhat dissatisfied”, “neither satisfied nor dissatisfied”, “somewhat satisfied”, “very satisfied”), which we code from 1 to 5.<sup>5</sup>

**Covariates.** Worker attributes comprise age (five-year bands), gender, tenure (five-year bands), education (university graduate or not), and marital status (married, divorced or widowed, never married). Workplace characteristics comprise occupation, industry, firm size (seven categories and a separate category for respondents who do not know the size of their firm), and job title (*seishain* or *hi-seishain*).<sup>6</sup> For occupation and firm size, respondents who answered “don’t know” are kept as separate categories; no respondent answered “don’t know” for industry. Working conditions comprise log annual earnings and log weekly hours worked. Annual earnings are the respondent’s own gross (pre-tax) wage income over the past year, reported in 15 brackets. We assign each respondent the midpoint of the bracket and 20 million yen to the top bracket; respondents reporting no wage income are excluded. Weekly hours are the respondent’s approximate actual weekly working hours, including overtime, in the previous month, reported in eight brackets. We assign the midpoint of each bracket and 60 hours to the top bracket. Area (Tokyo metropolitan or Kansai) and survey-wave fixed effects are included in all specifications.

We now examine the estimation sample before describing how demand and supply are jointly distributed among workers.

### 3.5 Sample and descriptive overview

We include private-sector workers aged 20–64 in the Tokyo metropolitan and Kansai areas for 2011–2024, which yields 56,000 observations. For the descriptive analysis and for all regressions,

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<sup>4</sup> A small number of respondents (2.3 percent of members at workplaces with an on-site union) report being members of an external union although their workplace has a union. They are classified as realized demand with union-on-site.

<sup>5</sup> Because both outcomes are measured on subjective scales, respondents may use these scales differently, which could bias our estimates if such differences are correlated with union presence, demand status, or attitudes toward unions. We discuss this issue in Section 5.2.

<sup>6</sup> “Job title” refers to the informal employment classification within the workplace (in Japanese, *koshou*), which is closely tied to a worker’s career track. Workers are typically classified into two broad categories, *seishain* (typically interpreted as *standard* employees) and *hi-seishain* (typically interpreted as *non-standard* employees). Kambayashi and Kato (forthcoming) show that this classification, rather than whether a worker’s contract is of fixed or indefinite duration, is the primary determinant of career track in the Japanese labor market, for example through differences in the extent of firm-sponsored training investment.

we use 55,820 and 54,614 observations, respectively, unless otherwise stated.<sup>7</sup> Table 1 reveals four broad scenarios: (i) nearly half (46.3%) of workers who have no union on-site and express no interest in union membership; (ii) nearly one-quarter (24.8%) of workers who are members of an on-site union; (iii) nearly one-in-ten (8.9%) of workers with a workplace union present, but with no interest in unionization; and (iv) nearly one-fifth (19.0%) of workers who would like to be a union member but are not most of whom (16.7% of all workers) were working in a workplace with no trade union.

Table 1: Cross-tabulation of Union Demand and Workplace Union Presence (Cell Percentages)

|                                                          | Existence of company union<br>(union-on-site = 1) | Only external choice<br>(union-on-site = 0) | Total       | Canada <sup>(a)</sup> | U.S. <sup>(a)</sup> | Britain <sup>(a)</sup> |
|----------------------------------------------------------|---------------------------------------------------|---------------------------------------------|-------------|-----------------------|---------------------|------------------------|
| Not interested in being a member<br>(total demand=0)     | <b>8.9</b>                                        | <b>46.3</b>                                 | 55.2        | 43 <sup>(b)</sup>     | 51 <sup>(b)</sup>   | 41 <sup>(b)</sup>      |
| frustrated demand<br>(total demand=1, realized demand=0) | 2.3                                               | 16.7                                        | <b>19.0</b> | 21 <sup>(c)</sup>     | 33 <sup>(c)</sup>   | 24 <sup>(c)</sup>      |
| Realized member<br>(total demand=1, realized demand=1)   | 24.8                                              | 1.0                                         | <b>25.7</b> | 36 <sup>(d)</sup>     | 16 <sup>(d)</sup>   | 35 <sup>(d)</sup>      |
| Total                                                    | 36.0                                              | 64.0                                        | 100.0       | 100                   | 100                 | 100                    |

*Source:* Pooled observations from 28 waves of RENG0-RIALS survey (2011–2024), private-sector workers aged 20–64 in Tokyo metropolitan and Kansai area ( $N = 55,820$ ). (a) Figures in Table 2 of Bryson et al. (2005). (b) Authors’ calculation by  $1 - Pr(U = 1) - Pr(D = 1, U = 0)$ . (c)  $Pr(D = 1, U = 0)$ : The probability that a worker demands union representation but is not employed on a union job (frustrated demand). Computed as  $Pr(D = 1 | U = 0) \cdot Pr(U = 0)$ . (d)  $Pr(U = 1)$ : The probability that a worker is a union member. Unlike in Bryson et al. (2005), this measure records unconditional union membership and does not distinguish satisfied from dissatisfied members; any “oversupply” of union membership (members who would prefer to leave) is therefore included in  $Pr(U = 1)$ , reflected in the figures in the “Realized member” row. Results are substantively unchanged when the Japanese sample is restricted to workers aged 25 and over to match Bryson et al. (2005). Detailed tabulations are available from the authors upon request.

Frustrated demand is concentrated where an external union is the only option: about 26.1% of workers who can only join an external union are willing to participate in union activities but have not yet done so, compared with 6.5% where a workplace union is present.<sup>8</sup>

These patterns diverge notably from those documented for Canada, the United States, and Britain (Bryson et al., 2005). Japan exhibits a larger share of workers with no interest in union membership (55.2%) than Canada (43%), the U.S. (51%), or Britain (41%), consistent with the comparatively low overall demand for unions. Yet this headline figure conceals a sharp compositional asymmetry: among workers with an on-site company union, only 24.7% report no interest,

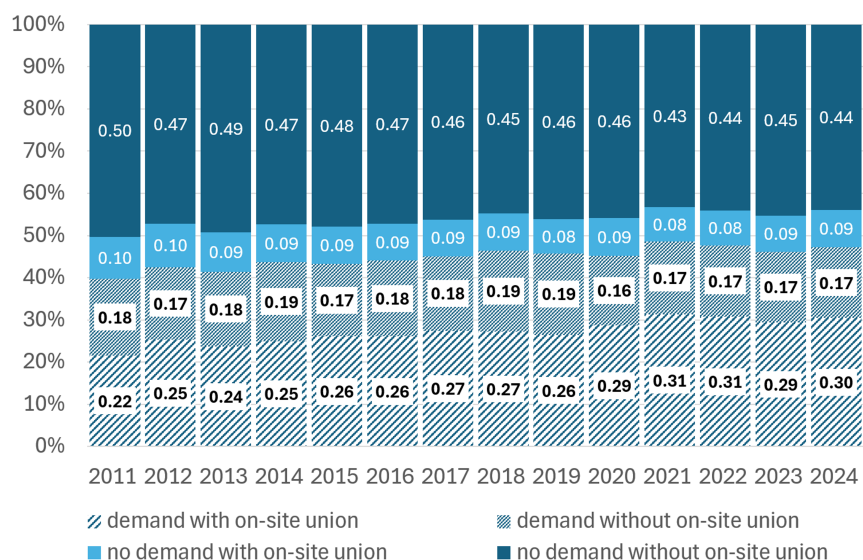
<sup>7</sup> For descriptive analysis we exclude 180 respondents who did not report their union membership status, for whom demand cannot be defined. For regressions, we further exclude 1,206 respondents reporting no annual earnings. Respondents who do not know the size of their firm (6,030 in the regression sample, more than half of whom also do not know whether their workplace has a union) are retained with a separate firm-size category. The composition of demand in the regression sample (55.1% no interest, 19.1% frustrated demand, 25.8% realized demand) is close to that in the descriptive sample.

<sup>8</sup> These conditional shares are computed from cell counts: 9,303 out of 35,701 workers without an on-site union, and 1,305 out of 20,119 workers with one.

a share below every comparator country, whereas among workers confined to external options the figure rises to 72.4%.

Having established this cross-sectional asymmetry between workers with and without on-site supply, we next examine whether it is stable over time. Figure 1 presents the corresponding yearly decomposition; note that, unlike the six-cell breakdown in Table 1, here we collapse frustrated demand and realized demand into a single demand category, yielding four demand–supply cells for each year from 2011 to 2024.

Figure 1: Yearly Transition of Demand–Supply Components, 2011–2024



Source: Pooled observations from 28 waves of RENGO-RIALS survey (2011–2024), private-sector workers aged 20–64 in Tokyo metropolitan and Kansai area ( $N = 55,820$ ).

The percentage of workers with no union on-site who did not want to be union members has declined gradually, from 50% in 2011 to 44% in 2024, while total demand (membership plus the desire for membership) where a union is present on-site has risen from 22% to around 30%. By contrast, the percentage of workers with no demand despite on-site union presence has remained roughly constant at 8 to 10%, as has the percentage expressing desire for a union in the absence of an on-site union (16 to 19%). This pattern indicates that demand has not declined over the period; the growth in total demand is concentrated among workers with access to a company union, rather than reflecting a broader rise in demand among those confined to external options.

Having shown that the demand–supply mismatch varies substantially depending on whether a union is present on-site, we turn to two measures of subjective wellbeing that assess how this mismatch bears on workers themselves: job satisfaction and overall life satisfaction. Table 2 presents

the cross-tabulation of both measures.

Table 2: Cross-tabulation of Job and Life Satisfaction (cell %)

|                  |                                    | life satisfaction |                       |                                    |                    |                | Total |
|------------------|------------------------------------|-------------------|-----------------------|------------------------------------|--------------------|----------------|-------|
|                  |                                    | Very dissatisfied | Somewhat dissatisfied | Neither satisfied nor dissatisfied | Somewhat satisfied | Very satisfied |       |
| job satisfaction | Very dissatisfied                  | 4.2               | 2.6                   | 1.9                                | 1.1                | 0.1            | 9.9   |
|                  | Somewhat dissatisfied              | 1.8               | 7.1                   | 4.8                                | 2.8                | 0.2            | 16.7  |
|                  | Neither satisfied nor dissatisfied | 2.1               | 6.9                   | 20.7                               | 8.5                | 0.5            | 38.7  |
|                  | Somewhat satisfied                 | 0.9               | 3.2                   | 6.4                                | 16.8               | 1.6            | 28.9  |
|                  | Very satisfied                     | 0.2               | 0.3                   | 0.7                                | 2.4                | 2.2            | 5.7   |
|                  | Total                              | 9.2               | 20.1                  | 34.5                               | 31.7               | 4.6            | 100.0 |

*Notes:* Job satisfaction is elicited by the question "Are you satisfied with your job at your current workplace?" and life satisfaction by the question "Are you satisfied with your life in general?". Pooled observations from 28 waves of RENG0-RIALS survey (2011–2024), private-sector workers aged 20–64 in Tokyo metropolitan and Kansai area. Number of observations is 55,820. A Stuart–Maxwell test rejects marginal homogeneity between the two distributions ( $\chi^2(4) = 618.22, p < 0.01$ ), confirming that job and life satisfaction are not identically distributed, though the difference in means is modest (3.04 versus 3.02; see Table 3).

Table 2 presents the joint distribution of job and life satisfaction. Just over half of respondents (51.0%) report the same category for both measures, concentrated around the midpoint of the joint distribution. Among the remainder, job satisfaction exceeds life satisfaction slightly more often than the reverse (24.9% versus 24.1%). We next examine whether these satisfaction levels vary with union presence and demand status, as reported in Table 3.

Table 3: Mean and Standard Deviation of Job and Life Satisfaction by Union Presence and Demand Status

|                                         | job satisfaction |      | life satisfaction |      | n     |
|-----------------------------------------|------------------|------|-------------------|------|-------|
|                                         | mean             | s.d. | mean              | s.d. |       |
| <b>union presence</b>                   |                  |      |                   |      |       |
| on-site union                           | 3.09             | 1.04 | 3.14              | 1.01 | 20119 |
| no on-site union [external choice only] | 3.01             | 1.04 | 2.96              | 1.04 | 35701 |
| <b>demand for union</b>                 |                  |      |                   |      |       |
| no interest                             | 3.07             | 1.02 | 3.02              | 1.03 | 30839 |
| frustrated demand                       | 2.90             | 1.10 | 2.90              | 1.08 | 10608 |
| realized                                | 3.08             | 1.03 | 3.12              | 1.01 | 14373 |
| <b>total</b>                            |                  |      |                   |      |       |
|                                         | 3.04             | 1.04 | 3.02              | 1.03 | 55820 |

Notes: Pooled observations from 28 waves of RENG0-RIALS survey (2011–2024), private-sector workers aged 20–64 in Tokyo metropolitan and Kansai area ( $N = 55,820$ ).

Table 3 shows that satisfaction levels are systematically higher where an on-site union is present, and that this gap is more pronounced for life satisfaction (3.14 versus 2.96) than for job satisfaction (3.09 versus 3.01). A similar pattern emerges by demand status: workers with frustrated demand report the lowest satisfaction on both measures (2.90 for each). Workers with realized demand report about the same job satisfaction as those with no interest in union membership (3.08 versus 3.07), but higher life satisfaction (3.12 versus 3.02).<sup>9</sup>

Taken together, these descriptive patterns suggest that the presence of an on-site union and the realization of union demand are systematically related to how workers evaluate both their jobs and their lives more broadly. We now turn to a multivariate analysis to examine these relationships formally controlling individual and workplace characteristics.

## 4 The association of demand and supply with workers’ subjective wellbeing

Having documented the incidence of union demand and its mismatch with supply in Section 3.5, we turn to the relationship between union demand and supply and workers’ job and life satisfaction.<sup>10</sup> To do so, we estimate linear regressions in which the dependent variable is job satisfaction or overall life satisfaction.

There is a long history of examining the links between unionization and job satisfaction, much

<sup>9</sup> Two-sample  $t$ -tests indicate that all the differences in this paragraph are statistically significant at the 1 percent level, except the difference in job satisfaction between workers with realized demand and those with no interest in membership ( $t = 0.7$ ).

<sup>10</sup> Appendix Table 3 shows that demand is also systematically related to individual attributes such as age, gender, and tenure.

of it reviewed in Sections 1 and 2. It is generally recognized that job satisfaction is informative because it captures the dimensions of the job that unions seek to influence through their voice and monopoly roles, by summarizing employees' attitudes towards a broad set of job attributes that are hard to observe directly (such as perceived voice, fairness, security, workload pressure, and workplace climate). However, this literature tends to capture unionization through union membership, union presence at the workplace, or collective bargaining coverage, and thus treats all non-members alike. Section 3.5 showed that whether demand for union membership is met depends heavily on whether a union is present at the workplace. If the mismatch between demand and supply matters for workers' wellbeing, membership status alone cannot distinguish, among non-members, those whose demand is unmet from those who have no demand at all, and union presence alone cannot distinguish members from non-members. We therefore consider demand and supply jointly, and examine the extent to which the (mis)match between them is associated with workers' wellbeing.

Our key explanatory variables are *total demand*, *realized demand* (actual union membership), *frustrated demand* (unrealized intention to join without membership), and *union-on-site* (a supply-side indicator equal to one when the workplace has a union) while controlling for various individual attributes, workplace characteristics, and working conditions.

#### 4.1 Econometric specification and estimation

We estimate linear models of the form

$$Satisfaction_{it} = \beta_1 Demand_{it} + \beta_2 Supply_{it} + \mathbf{X}_{it}\gamma + \mathbf{Y}_{it}\delta + \mathbf{Z}_{it}\theta + \tau_t + \varepsilon_{it}, \quad (1)$$

where  $Satisfaction_{it}$  denotes job or life satisfaction;  $Demand_{it}$  includes *total demand*, *realized demand*, and *frustrated demand*, whereas  $Supply_{it}$  is defined by *union-on-site* (Section 3.3). Because  $Demand_{it}$  can be decomposed into *realized demand* and *frustrated demand*, we also estimate a decomposition in which *realized demand* and *frustrated demand* enter separately.  $\mathbf{X}_{it}$ ,  $\mathbf{Y}_{it}$ , and  $\mathbf{Z}_{it}$  denote worker attributes, workplace characteristics, and working conditions, respectively (Section 3.4), and  $\tau_t$  represents time (year-wave) fixed effects. Equation (1) is our most saturated specification. We arrive at it in stages, starting from a model with only area and time fixed effects and adding worker attributes, workplace characteristics, and working conditions in turn, so as to assess how sensitive the coefficients of interest are to the set of controls. Working conditions are added last because earnings and hours are themselves objects of union bargaining and voice, and may therefore be endogenous to union demand and supply. Standard errors are clustered by survey wave (28 clusters). Although the outcomes are ordinal, we prefer linear models for interpretability with interactions and time fixed effects.<sup>11</sup>

To examine whether the association of demand with satisfaction depends on supply, we then

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<sup>11</sup> Ordered logit estimates confirm the qualitative patterns as shown in Appendix Table 11 and discussed in Section 4.6.

estimate

$$Satisfaction_{it} = \sum_{d \in \{F, R\}} \alpha_d D_{it}^d + \sum_{d \in \{N, F, R\}} \lambda_d \left( D_{it}^d \times Supply_{it} \right) + \mathbf{X}_{it}\gamma + \mathbf{Y}_{it}\delta + \mathbf{Z}_{it}\theta + \tau_t + \varepsilon_{it}, \quad (2)$$

where  $D^N$ ,  $D^F$ , and  $D^R$  are indicators for **N**o interest, **F**rustrated demand, and **R**ealized demand, respectively. The base category is a worker with no interest in membership and no on-site union, which is the largest of the six demand-supply cells.<sup>12</sup>  $\alpha_F$  and  $\alpha_R$  therefore measure the differences between demand states among workers without an on-site union, while  $\lambda_d$  measures the difference between workers with and without an on-site union *within* demand state  $d$ . This specification is equivalent to a model with a full set of six demand-supply cells, but reports directly the two comparisons of interest: across demand states for a given supply, and across supply for a given demand state.

## 4.2 Job Satisfaction

Table 4 reports OLS estimates for job satisfaction using four specifications across columns (1) through (12) to assess the association between union demand/supply indicators and job satisfaction.

Columns (1) through (3) report estimated associations between a few sets of the union demand/supply indicators and job satisfaction, controlling only for geography and time fixed effects. Columns (4) through (6) control for worker-attributes. Columns (7) through (9) add workplace controls, and finally Columns (10) through (12) add controls for working conditions.

Columns (1), (4), (7), and (10) report the association between total demand and job satisfaction under an increasingly demanding set of controls. Total demand is negatively associated with job satisfaction throughout, with the coefficient stable at around  $-0.06$  to  $-0.07$ . Notably, the association remains negative and similar in size even after further controlling for earnings and hours worked in column (10), suggesting that the demand for voice is related to aspects of the workplace beyond pay and hours.

Columns (2), (5), (8), and (11) introduce the on-site union indicator alongside total demand. On-site union presence is positively and significantly associated with job satisfaction throughout (0.15, 0.14, 0.13, and 0.12, respectively). Conditional on the presence of an on-site union, the coefficient on total demand becomes more negative: from  $-0.07$  to  $-0.14$  with no controls, from  $-0.07$  to  $-0.13$  with worker-attribute controls, from  $-0.06$  to  $-0.11$  with workplace-characteristic controls, and from  $-0.06$  to  $-0.10$  with the full set of controls. This pattern arises because union presence is correlated with both demand and satisfaction: workers with an on-site union are both more satisfied and more likely to demand union membership (Tables 1 and 3), so that the coefficient on total demand partly reflects these associations when union presence is not controlled. Once union presence is held constant, the negative association between demand and job satisfaction becomes stronger.

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<sup>12</sup> This cell accounts for 46.3% of workers in the descriptive sample and 46.1% in the regression sample.

Table 4: OLS Estimates of Job Satisfaction on Union Demand and Supply

| VARIABLES                                            | (1)                | (2)                | (3)                | (4)                | (5)                | (6)                | (7)                | (8)                | (9)                | (10)               | (11)               | (12)               |
|------------------------------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| total demand<br>(vs no interest)                     | -0.07***<br>(0.01) | -0.14***<br>(0.02) |                    | -0.07***<br>(0.01) | -0.13***<br>(0.02) |                    | -0.06***<br>(0.01) | -0.11***<br>(0.02) |                    | -0.06***<br>(0.01) | -0.10***<br>(0.02) |                    |
| realized demand<br>(vs no interest or frustrated)    |                    |                    | -0.08***<br>(0.02) |                    |                    | -0.07***<br>(0.02) |                    |                    | -0.01<br>(0.02)    |                    |                    | -0.01<br>(0.02)    |
| frustrated demand<br>(vs no interest or realization) |                    |                    | -0.17***<br>(0.02) |                    |                    | -0.16***<br>(0.02) |                    |                    | -0.15***<br>(0.02) |                    |                    | -0.15***<br>(0.02) |
| on-site union<br>(vs only external choice)           |                    | 0.15***<br>(0.01)  | 0.10***<br>(0.01)  |                    | 0.14***<br>(0.01)  | 0.10***<br>(0.01)  |                    | 0.13***<br>(0.01)  | 0.05***<br>(0.02)  |                    | 0.12***<br>(0.01)  | 0.05***<br>(0.02)  |
| Constant                                             | 3.07***<br>(0.01)  | 3.05***<br>(0.01)  | 3.06***<br>(0.01)  | 3.21***<br>(0.01)  | 3.19***<br>(0.01)  | 3.19***<br>(0.01)  | 3.30***<br>(0.02)  | 3.23***<br>(0.02)  | 3.23***<br>(0.02)  | 2.51***<br>(0.16)  | 2.49***<br>(0.16)  | 2.49***<br>(0.16)  |
| Observations                                         | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             |
| R-squared                                            | 0.00               | 0.01               | 0.01               | 0.02               | 0.02               | 0.02               | 0.03               | 0.03               | 0.03               | 0.03               | 0.04               | 0.04               |
| period                                               | all                | all                | all                | all                | all                | all                | all                | all                | all                | all                | all                | all                |
| worker attributes                                    | NO                 | NO                 | NO                 | YES                | YES                | YES                | YES                | YES                | YES                | YES                | YES                | YES                |
| workplace chara.                                     | NO                 | NO                 | NO                 | NO                 | NO                 | NO                 | YES                | YES                | YES                | YES                | YES                | YES                |
| working conditions                                   | NO                 | NO                 | NO                 | NO                 | NO                 | NO                 | NO                 | NO                 | NO                 | YES                | YES                | YES                |
| area and time                                        | YES                | YES                | YES                | YES                | YES                | YES                | YES                | YES                | YES                | YES                | YES                | YES                |

*Notes:* Dependent variable: job satisfaction (five categories). Worker-attribute controls: age, education, gender, tenure, and marital status. Workplace characteristics: job title, firm size, occupation, and industry. Working-condition controls: earnings and hours worked. All specifications include area and time fixed effects. Standard errors clustered by survey wave (28 clusters) are reported in parentheses. Summary statistics are reported in Appendix Table 4. Detailed results for estimation are reported in Appendix Table 5. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

Columns (3), (6), (9), and (12) decompose total demand into realized demand (union membership) and frustrated demand, alongside the on-site union indicator. Realized demand is negatively associated with job satisfaction with no controls or worker-attribute controls (columns (3) and (6):  $-0.08$  and  $-0.07$ ), consistent with prior work (e.g., Artz et al. (2022)), but the association becomes small and statistically insignificant once workplace characteristics are included (columns (9) and (12):  $-0.01$ ). By contrast, frustrated demand remains strongly and significantly negatively associated with job satisfaction across all four specifications ( $-0.17$ ,  $-0.16$ ,  $-0.15$ , and  $-0.15$ ), indicating that this relationship is not primarily explained by observed differences in workplace characteristics or working conditions.

Taken together, these results point to three patterns. First, observed workplace characteristics, such as firm size, occupation, industry, and job title, rather than pay and hours specifically, largely account for the raw association between union membership and job satisfaction.<sup>13</sup> Second, frustrated demand remains strongly and negatively associated with job satisfaction throughout, and observed characteristics do not account for this association. The contrast with realized demand is informative. Where the demand for union representation is realized through membership, its association with job satisfaction is absorbed by the observed characteristics of the workplace: holding these characteristics constant, union members are as satisfied as workers with no interest in membership. Where the demand is not realized, by contrast, it remains associated with lower satisfaction even among workers in workplaces with similar observed characteristics. Third, the association between union-on-site and job satisfaction weakens but remains positive even after accounting for actual union membership (column (12):  $0.05$ ), implying that the presence of a union at the workplace is associated with higher job satisfaction on average, regardless of membership. Two questions follow. Does the dissatisfaction associated with frustrated demand arise from not being a member as such, or from the absence of a union at the workplace to turn to? And does the positive association of on-site union presence reflect spillovers to non-members? We therefore turn to the interaction specification.

### 4.3 Interaction of Demand and Supply

Table 5 reports estimates of equation (2) for job satisfaction (columns (1)–(4)) and life satisfaction (columns (5)–(8)), across four increasingly saturated specifications for each outcome. The first two rows report the differences between demand states among workers without an on-site union ( $\alpha_F$  and  $\alpha_R$ ); the next three rows report the difference between workers with and without an on-site union within each demand state ( $\lambda_N$ ,  $\lambda_F$ , and  $\lambda_R$ ). For each outcome, the first column (columns

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<sup>13</sup> This attenuation is consistent with the broader finding that cross-sectional and panel estimates of the union-satisfaction relationship diverge, with panel studies that exploit within-worker variation over time typically finding a less negative, or even positive, association once time-invariant worker heterogeneity is accounted for (Bryson and White, 2016). One plausible source of such heterogeneity is that workers with an underlying propensity toward union membership may also differ systematically in their underlying propensity toward satisfaction, for reasons unrelated to workplace characteristics per se. Adding observable controls can be understood as an attempt to approximate an adjustment for such unobserved worker heterogeneity. However, because our data are repeated cross-sections rather than a panel, this source of bias cannot be fully resolved.

(1) and (5)) includes only area and time fixed effects, and the last column (columns (4) and (8)) includes the full set of controls. The two rows at the bottom of the table report, among workers with an on-site union, the differences between frustrated or realized demand and no interest, with their  $p$ -values. We use these estimates to revisit, in turn, the three patterns identified in Table 4.

Table 5: Association of Interactions of Union Demand and Supply with Subjective Wellbeing

| VARIABLES                                           | (1)<br>job sat.    | (2)<br>job sat.    | (3)<br>job sat.    | (4)<br>job sat.    | (5)<br>life sat.   | (6)<br>life sat.   | (7)<br>life sat.   | (8)<br>life sat.   |
|-----------------------------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| frustrated demand<br>(only external choice)         | -0.20***<br>(0.02) | -0.18***<br>(0.02) | -0.17***<br>(0.02) | -0.17***<br>(0.02) | -0.12***<br>(0.02) | -0.11***<br>(0.01) | -0.13***<br>(0.02) | -0.12***<br>(0.02) |
| realized demand<br>(only external choice)           | 0.12***<br>(0.04)  | 0.12***<br>(0.04)  | 0.13***<br>(0.04)  | 0.11***<br>(0.04)  | 0.04<br>(0.04)     | 0.01<br>(0.04)     | -0.01<br>(0.04)    | -0.04<br>(0.04)    |
| union-on-site:<br>no interest                       | 0.08***<br>(0.02)  | 0.08***<br>(0.02)  | 0.03*<br>(0.02)    | 0.03<br>(0.02)     | 0.20***<br>(0.02)  | 0.13***<br>(0.02)  | 0.07***<br>(0.02)  | 0.05***<br>(0.02)  |
| union-on-site:<br>frustrated demand                 | 0.27***<br>(0.03)  | 0.25***<br>(0.03)  | 0.20***<br>(0.03)  | 0.20***<br>(0.03)  | 0.21***<br>(0.03)  | 0.15***<br>(0.03)  | 0.12***<br>(0.03)  | 0.11***<br>(0.03)  |
| union-on-site:<br>realized demand                   | -0.11***<br>(0.04) | -0.10***<br>(0.04) | -0.10**<br>(0.04)  | -0.08**<br>(0.04)  | 0.09**<br>(0.04)   | 0.07*<br>(0.04)    | 0.05<br>(0.04)     | 0.07*<br>(0.04)    |
| constant<br>(no interest x<br>only external choice) | 3.07***<br>(0.01)  | 3.20***<br>(0.01)  | 3.24***<br>(0.02)  | 2.49***<br>(0.16)  | 2.97***<br>(0.01)  | 3.24***<br>(0.02)  | 3.38***<br>(0.02)  | 1.50***<br>(0.15)  |
| Observations                                        | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             |
| R-squared                                           | 0.01               | 0.02               | 0.03               | 0.04               | 0.01               | 0.05               | 0.06               | 0.07               |
| worker attributes                                   | NO                 | YES                | YES                | YES                | NO                 | YES                | YES                | YES                |
| workplace chara.                                    | NO                 | NO                 | YES                | YES                | NO                 | NO                 | YES                | YES                |
| working conditions                                  | NO                 | NO                 | NO                 | YES                | NO                 | NO                 | NO                 | YES                |
| area and time                                       | YES                | YES                | YES                | YES                | YES                | YES                | YES                | YES                |
| on-site: frustrated vs no interest                  | 0.00               | -0.01              | 0.00               | 0.00               | -0.11              | -0.09              | -0.07              | -0.07              |
| p frustrated                                        | 0.92               | 0.75               | 0.92               | 0.99               | 0.01               | 0.02               | 0.06               | 0.08               |
| on-site: realized vs no interest                    | -0.07              | -0.06              | 0.00               | 0.00               | -0.07              | -0.05              | -0.03              | -0.02              |
| p realized                                          | 0.00               | 0.00               | 0.86               | 0.83               | 0.00               | 0.00               | 0.17               | 0.22               |

*Notes:* Estimates of equation (2). Detailed results are reported in Appendix Tables 6 and 8. The base category (constant) is a worker with no interest in membership and only external choice. Rows labeled “(only external choice)” report differences from the base among workers without an on-site union. Rows labeled “union-on-site:” report the difference between workers with and without an on-site union within the indicated demand state. Dependent variable: job satisfaction (five categories) in columns (1)–(4) and life satisfaction (five categories) in columns (5)–(8). The rows “on-site: frustrated vs no interest” and “on-site: realized vs no interest” report the differences between the indicated demand state and no interest among workers with an on-site union, computed as  $\alpha_F + \lambda_F - \lambda_N$  and  $\alpha_R + \lambda_R - \lambda_N$ , respectively, with their  $p$ -values. Worker-attribute controls: age, education, gender, tenure, marital status. Workplace characteristics: job title, firm size, occupation, industry. Working-condition controls: earnings, hours worked. All specifications include area and time fixed effects. Standard errors clustered by survey wave (28 clusters) are reported in parentheses. Summary statistics are in Appendix Table 4. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

The first pattern in Table 4 was that the negative association between realized demand and job satisfaction is absorbed by workplace characteristics. Table 5 allows us to examine this pattern separately by supply. Within workplaces with an on-site union, where almost all union members (96%) work, members report lower job and life satisfaction than workers with no interest in mem-

bership without controls ( $-0.07$  for both; columns (1) and (5) of the row “on-site: realized vs no interest”), but the difference becomes small and statistically insignificant once workplace characteristics are controlled ( $0.00$  for job satisfaction and  $-0.02$  for life satisfaction with the full set of controls; columns (4) and (8) of the same row). Within workplaces with only external choice, by contrast, members of external unions report higher job satisfaction than workers with no interest in membership ( $0.11$  to  $0.13$ ; second row, columns (1)–(4)), a difference that is not absorbed by controls, while their life satisfaction does not differ (columns (5)–(8)). This group is, however, small (516 observations, or 0.9% of the sample) and likely to be selected on a positive orientation toward unions, since joining an external union requires an active choice. The absorption documented in Table 4 thus reflects members of on-site unions: once workplace characteristics are accounted for, they are about as satisfied with their jobs and their lives as non-members with no interest in membership who work in the same type of workplace.

The second pattern was that frustrated demand remains strongly negatively associated with job satisfaction regardless of controls. Most workers with frustrated demand (88%) work in workplaces without an on-site union, and it is there that the cost of frustrated demand is concentrated. Where only an external union is accessible, frustrated demand is associated with lower satisfaction than having no interest in membership, by  $0.20$  to  $0.17$  points for job satisfaction and about  $0.12$  points for life satisfaction, and these gaps are hardly affected by controls (first row; columns (1)–(4) for job and (5)–(8) for life satisfaction). Within frustrated demand, however, workers with an on-site union report job satisfaction  $0.27$  to  $0.20$  points higher, and life satisfaction  $0.21$  to  $0.11$  points higher, than those without (fourth row, same columns), almost exactly offsetting the cost. Compared with workers with no interest in membership in workplaces with an on-site union, workers with frustrated demand in the same type of workplace report job satisfaction that is statistically indistinguishable in every specification (row “on-site: frustrated vs no interest”, columns (1)–(4)); their life satisfaction is lower without controls ( $-0.11$ , column (5)), but the gap shrinks to  $-0.07$  and is significant only at the 10 percent level with the full set of controls (column (8),  $p = 0.08$ ). Because these workers would join a union but have not, this answers the first question raised at the end of Section 4.2: the dissatisfaction associated with frustrated demand arises when there is no union in the workplace to turn to, rather than from not being a member as such. What Table 4 identified as a cost of frustrated demand is better understood as a cost of the mismatch between demand and supply.

These two patterns can be related to the explanations for the negative association between unionization and job satisfaction reviewed in Sections 1 and 2: causal effects of membership, such as voice-induced complaining (Freeman and Medoff, 1984); the selection of dissatisfied workers into unions (Bryson and White, 2016); and omitted workplace characteristics that both trigger unionization and lower satisfaction (Bender and Sloane, 1998). For members of on-site unions, the negative association disappears once workplace characteristics are controlled, which is consistent with the last explanation and leaves little room for either causal effects of membership or the selection of dissatisfied workers into membership. Because members of external unions must actively choose to join, the selection of dissatisfied workers should be most pronounced among them; yet they

report higher, not lower, job satisfaction than workers with no interest in membership. Selection may also operate on demand rather than on membership: dissatisfied workers are more likely to demand union representation (Bryson and Freeman, 2013). If this were the whole story, frustrated demand would be associated with lower satisfaction regardless of supply. Instead, workers with frustrated demand are as satisfied with their jobs as workers with no interest in membership where an on-site union is present, and less satisfied only where none is present. The negative association between frustrated demand and satisfaction therefore cannot be attributed solely to the selection of dissatisfied workers into demand; it depends on the absence of supply. Distinguishing demand from supply thus relocates the dissatisfaction that the literature has associated with unionization: it lies not with union members, but with workers whose demand for representation meets no union at the workplace.

The third pattern was that the presence of an on-site union is positively associated with job satisfaction, regardless of membership. The additive specification constrains this association to be the same for every demand state; Table 5 relaxes this constraint. Within frustrated demand, as just seen, the on-site difference is large and robust to controls. Within realized demand, the on-site difference compares members of on-site unions with members of external unions, which we do not interpret for the reason given above. Within no interest, by contrast, the on-site difference in job satisfaction is positive without controls (0.08, column (1)) but shrinks to 0.03 once workplace characteristics are included, significant only at the 10 percent level in column (3) and insignificant in column (4) (third row). The positive association of union presence with job satisfaction in Table 4 therefore largely reflects, in mirror image, the cost of frustrated demand where no union is present, rather than spillovers to non-members who express no interest in joining. For life satisfaction, the on-site difference within no interest is larger (0.20 without controls, column (5)) and, although it also shrinks with controls, remains positive and significant with the full set of controls (0.05, column (8)). The second question raised at the end of Section 4.2, whether union presence benefits non-members through spillovers, thus remains open: on average, the on-site difference among workers with no interest in membership is weak for job satisfaction once workplace characteristics are controlled, and modest for life satisfaction. We return to both outcomes in Section 4.5.

Taken together, workers who demand union representation are about as satisfied as workers with no interest in membership in the same type of workplace, whether their demand is realized through membership or remains unrealized where a union is present; it is only where demand meets no supply that it is associated with lower satisfaction. This interpretation, however, rests on the presence of an on-site union being a valid measure of supply, that is, on the union at the workplace being available to the worker. Before returning to the question of spillovers, we examine this assumption in the next subsection.

#### 4.4 Standard and non-standard employees

An on-site union may be present without being available to every worker at the workplace: Japanese enterprise unions have traditionally organized standard employees, and many of them do not admit

non-standard employees, even where the latter work alongside union members. For non-standard employees, therefore, Question A may overstate the supply of union membership, whereas for standard employees it is most plausibly a valid measure of supply. Consistent with this, Table 6 shows that the presence of an on-site union almost eliminates frustrated demand among standard employees but not among non-standard employees.

Table 6: Union Demand by Job Title and Workplace Union Presence (Regression Sample)

|                   | Standard title |               | Non-standard title |               |
|-------------------|----------------|---------------|--------------------|---------------|
|                   | Only external  | Union-on-site | Only external      | Union-on-site |
| No interest       | 68.6           | 20.8          | 78.1               | 37.8          |
| Frustrated demand | 29.6           | 4.5           | 21.0               | 13.2          |
| Realized demand   | 1.8            | 74.7          | 1.0                | 49.0          |
| Total             | 100.0          | 100.0         | 100.0              | 100.0         |
| <i>N</i>          | 21,045         | 15,189        | 13,804             | 4,576         |

*Notes:* Column percentages. Regression sample ( $N = 54,614$ ). Job title refers to the classification within the workplace (*koshou*); see footnote 6.

Among standard employees, the share of workers with frustrated demand falls from 29.6% where only an external union is accessible to 4.5% where an on-site union is present, and three-quarters (74.7%) of standard employees with an on-site union are members. Among non-standard employees, the share falls only from 21.0% to 13.2%, and fewer than half (49.0%) of those with an on-site union are members. This difference does not reflect a generally higher demand for unions among non-standard employees: where only an external union is accessible, frustrated demand is in fact less common among them than among standard employees. It is consistent, rather, with an on-site union not being available to many non-standard employees.

If Question A is a cleaner measure of supply among standard employees, the mismatch pattern identified in Table 5 should be sharper among them. Table 7 re-estimates equation (2) separately by job title, reporting the no-control and full-control specifications.

Among standard employees, the mismatch pattern is as sharp as or sharper than in the pooled sample. Where only an external union is accessible, frustrated demand is associated with lower job satisfaction ( $-0.21$  without controls and  $-0.19$  with the full set of controls) and lower life satisfaction ( $-0.12$  and  $-0.11$ ). Within frustrated demand, the presence of an on-site union is associated with higher job satisfaction (0.31 and 0.21) and higher life satisfaction (0.29 and 0.12), offsetting the cost of frustrated demand almost exactly.

Among non-standard employees, frustrated demand is associated with lower satisfaction where only an external union is accessible ( $-0.11$  for job and  $-0.13$  for life satisfaction with the full set of controls), but the on-site difference within frustrated demand is smaller than among standard employees for job satisfaction. Within frustrated demand, the on-site difference is 0.16 for job

Table 7: Interactions of Union Demand and Supply by Job Title

| VARIABLES                                   | (1)<br>job sat.    | (2)<br>job sat.    | (3)<br>life sat.   | (4)<br>life sat.   | (5)<br>job sat.    | (6)<br>job sat.    | (7)<br>life sat.   | (8)<br>life sat.   |
|---------------------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| frustrated demand<br>(only external choice) | -0.21***<br>(0.02) | -0.19***<br>(0.02) | -0.12***<br>(0.02) | -0.11***<br>(0.02) | -0.12***<br>(0.03) | -0.11***<br>(0.02) | -0.14***<br>(0.03) | -0.13***<br>(0.02) |
| realized demand<br>(only external choice)   | 0.21***<br>(0.04)  | 0.17***<br>(0.05)  | 0.08<br>(0.05)     | 0.00<br>(0.05)     | -0.06<br>(0.07)    | -0.07<br>(0.06)    | -0.14<br>(0.08)    | -0.15<br>(0.09)    |
| union-on-site:<br>no interest               | 0.12***<br>(0.02)  | 0.01<br>(0.02)     | 0.23***<br>(0.02)  | 0.03*<br>(0.02)    | 0.03<br>(0.02)     | 0.04<br>(0.03)     | 0.12***<br>(0.03)  | 0.07***<br>(0.03)  |
| union-on-site:<br>frustrated demand         | 0.31***<br>(0.04)  | 0.21***<br>(0.04)  | 0.29***<br>(0.03)  | 0.12***<br>(0.03)  | 0.16***<br>(0.05)  | 0.16***<br>(0.05)  | 0.16***<br>(0.05)  | 0.11**<br>(0.05)   |
| union-on-site:<br>realized demand           | -0.16***<br>(0.04) | -0.14**<br>(0.05)  | 0.04<br>(0.05)     | 0.03<br>(0.05)     | 0.05<br>(0.07)     | 0.06<br>(0.06)     | 0.17*<br>(0.08)    | 0.15*<br>(0.09)    |
| Constant                                    | 3.00***<br>(0.01)  | 0.02<br>(0.30)     | 3.01***<br>(0.01)  | -1.05***<br>(0.28) | 3.17***<br>(0.01)  | 3.90***<br>(0.15)  | 2.89***<br>(0.01)  | 2.59***<br>(0.17)  |
| Observations                                | 36,234             | 36,234             | 36,234             | 36,234             | 18,380             | 18,380             | 18,380             | 18,380             |
| R-squared                                   | 0.01               | 0.04               | 0.01               | 0.07               | 0.01               | 0.04               | 0.01               | 0.07               |
| title                                       | standard           | standard           | standard           | standard           | non-standard       | non-standard       | non-standard       | non-standard       |
| worker attributes                           | NO                 | YES                | NO                 | YES                | NO                 | YES                | NO                 | YES                |
| workplace chara.                            | NO                 | YES                | NO                 | YES                | NO                 | YES                | NO                 | YES                |
| working conditions                          | NO                 | YES                | NO                 | YES                | NO                 | YES                | NO                 | YES                |
| area and time                               | YES                | YES                | YES                | YES                | YES                | YES                | YES                | YES                |
| on-site: frustrated vs no interest          | -0.03              | 0.01               | -0.07              | -0.02              | 0.01               | 0.01               | -0.10              | -0.09              |
| p frustrated                                | 0.60               | 0.92               | 0.11               | 0.53               | 0.83               | 0.89               | 0.09               | 0.11               |
| on-site: realized vs no interest            | -0.07              | 0.03               | -0.11              | 0.00               | -0.05              | -0.04              | -0.09              | -0.07              |
| p realized                                  | 0.02               | 0.35               | 0.00               | 0.99               | 0.23               | 0.25               | 0.02               | 0.08               |

Notes: Same specification as Table 5, estimated separately for workers with standard and non-standard job titles. Columns report no-control and full-control specifications for job satisfaction (columns (1)–(2) standard, (5)–(6) non-standard) and life satisfaction (columns (3)–(4) standard, (7)–(8) non-standard). Standard errors clustered by survey wave (28 clusters) are reported in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

satisfaction and 0.11 for life satisfaction with the full set of controls, compared with 0.21 and 0.12 among standard employees, so that it falls short of the cost of frustrated demand for life satisfaction. Compared with workers with no interest in membership in workplaces with an on-site union (row “on-site: frustrated vs no interest”), the life satisfaction of workers with frustrated demand is lower by 0.09 among non-standard employees and by 0.02 among standard employees, although neither gap is statistically significant with the full set of controls.<sup>14</sup>

Two points follow. First, the mismatch pattern does not depend on the inclusion of non-standard employees, for whom Question A may overstate the availability of an on-site union; on the contrary, it is sharpest among standard employees, for whom Question A most plausibly measures supply. Second, among non-standard employees, both the descriptive evidence in Table 6 and the on-site difference in Table 7, which is smaller than among standard employees for job satisfaction and leaves a gap in life satisfaction relative to workers with no interest, suggest that the presence of an on-site union does not fully resolve frustrated demand. We cannot distinguish whether non-standard employees with frustrated demand in a workplace with an on-site union are ineligible to join or have been discouraged from joining. Either way, for these workers demand is not independent of supply, and the presence of a union at the workplace does not constitute supply.

Restricting the sample to standard employees does not, however, change the picture for workers with no interest in membership. Among standard employees, the on-site difference within no interest is positive without controls (0.12 for job and 0.23 for life satisfaction) but small with the full set of controls (0.01 and 0.03, the latter significant only at the 10 percent level). The question of spillovers left open in Section 4.3 therefore cannot be resolved by refining the measure of supply. It requires distinguishing among non-members themselves, which we do in the next subsection.

## 4.5 Interactions with supportive attitude

If an on-site union provides collective goods from which non-members can benefit, the workers most likely to appreciate these benefits are those who value what unions provide but are unwilling to bear the cost of membership, since it is for them that the incentive to free-ride is strongest. As discussed in Section 3.2, the survey elicits a supportive attitude toward unions by asking “Do you think labor unions are necessary?” Expressing support carries no direct cost, whereas realized and frustrated demand both reflect a willingness to incur the cost of actual or intended membership. Workers with no interest in membership who nevertheless express positive support (answering “Definitely necessary” or “Rather better to have”) are thus those for whom the free-riding incentive is strongest, while those who do not (answering “Doesn’t matter,” “Better not to have,” or “Don’t know”) place no value on what unions provide. Comparing the two groups holds constant the unwillingness to bear the cost of membership, and isolates whether workers value unions in the cost-free sense.

We therefore split workers with no interest in membership by supportive attitude. For symmetry,

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<sup>14</sup> Among non-standard employees, members of an on-site union report higher life satisfaction (0.15) than members of an external union. Because the latter group is very small among non-standard employees (133 observations), we do not interpret this difference.

we apply the same split to union members, and interact each of the five resulting demand-support groups with union-on-site (Appendix Table 2). The base category is a worker with no interest in membership and no positive support, without an on-site union. Among workers with no interest in membership, 57.4% of those with an on-site union, and 29.2% of those without, express positive support. Among union members with an on-site union, 26.4% do not express positive support.

Table 8 reports the results. Among workers with no interest in membership, the on-site difference is positive and large for those who express positive support: 0.21 to 0.15 points for job satisfaction and 0.29 to 0.13 points for life satisfaction, depending on the specification, all significant (row “union-on-site: no interest, positive support”; columns (1)–(4) for job and (5)–(8) for life satisfaction). For those who do not (row “union-on-site: no interest, no support”), the on-site difference is negative for job satisfaction ( $-0.06$  to  $-0.10$ ) and small for life satisfaction ( $0.07$  to  $-0.02$ ). The difference between the two groups, reported in the row “free-riding DiD” at the bottom of the table, is 0.25 to 0.28 for job satisfaction and 0.22 to 0.15 for life satisfaction, significant at the 1 percent level in every specification and hardly affected by controls.

The weak average on-site difference for workers with no interest in Table 5 thus conceals two opposing associations, particularly for job satisfaction. Because both groups are equally unwilling to bear the cost of membership, the remaining difference between them is whether they value unions in the cost-free sense. Workers who value what unions provide, without wishing to pay for it, appear to benefit from the presence of an on-site union, while workers who place no value on unions do not, and are less satisfied with their jobs where one is present. The contrast is not a general difference between supportive and unsupportive non-members: where only an external union is accessible, workers with no interest and positive support are slightly less satisfied with their jobs than those without ( $-0.03$  to  $-0.05$ ; first row, columns (1)–(4)). This pattern is consistent with spillovers from union-provided collective goods that create scope for free-riding.

The same split applied to union members yields an additional, more limited result. As discussed in Section 2, union shop agreements may require workers to join a union even if they do not value it, a situation that Bryson and Gómez (2003) term “oversupply”. If such compulsory membership were costly, members who do not value unions should be less satisfied specifically where an on-site union is present. Within workplaces with an on-site union, members who do not express positive support do report much lower satisfaction than members who do: with the full set of controls (columns (4) and (8)), 0.35 points lower for job satisfaction ( $-0.06 - 0.18$  versus  $0.26 - 0.15$ , summing the “(only external choice)” and “union-on-site:” rows for each group) and 0.24 points lower for life satisfaction. The gap is not, however, specific to workplaces with an on-site union: among members of external unions, whose membership is voluntary, it is almost identical (0.32 for job satisfaction and 0.26 for life satisfaction). Accordingly, the “oversupply DiD” (bottom row), the difference in the on-site difference between unsupportive and supportive members, is close to zero and statistically insignificant ( $-0.08$  to  $-0.03$  for job satisfaction and  $-0.03$  to  $0.01$  for life satisfaction). The lower satisfaction of unsupportive members therefore appears to reflect a general association between attitudes toward unions and satisfaction, rather than a cost of compulsory membership. We note,

Table 8: Interactions between Union Demand, Supportive Attitude, and Supply

| VARIABLES                                                   | (1)<br>job sat.    | (2)<br>job sat.    | (3)<br>job sat.    | (4)<br>job sat.    | (5)<br>life sat.   | (6)<br>life sat.   | (7)<br>life sat.   | (8)<br>life sat.   |
|-------------------------------------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| no interest, positive support<br>(only external choice)     | -0.03**<br>(0.01)  | -0.04***<br>(0.01) | -0.05***<br>(0.01) | -0.05***<br>(0.01) | -0.00<br>(0.01)    | -0.02<br>(0.01)    | -0.02<br>(0.01)    | -0.01<br>(0.01)    |
| frustrated demand<br>(only external choice)                 | -0.21***<br>(0.02) | -0.19***<br>(0.02) | -0.19***<br>(0.02) | -0.18***<br>(0.02) | -0.12***<br>(0.02) | -0.12***<br>(0.01) | -0.13***<br>(0.02) | -0.13***<br>(0.02) |
| realized demand, no support<br>(only external choice)       | -0.03<br>(0.06)    | -0.04<br>(0.06)    | -0.03<br>(0.06)    | -0.06<br>(0.06)    | -0.09*<br>(0.05)   | -0.13**<br>(0.05)  | -0.13**<br>(0.05)  | -0.17***<br>(0.05) |
| realized demand, positive support<br>(only external choice) | 0.25***<br>(0.05)  | 0.26***<br>(0.05)  | 0.27***<br>(0.05)  | 0.26***<br>(0.05)  | 0.16**<br>(0.06)   | 0.13**<br>(0.06)   | 0.10*<br>(0.06)    | 0.09<br>(0.06)     |
| union-on-site:<br>no interest, no support                   | -0.07**<br>(0.03)  | -0.06**<br>(0.03)  | -0.10***<br>(0.03) | -0.10***<br>(0.03) | 0.07***<br>(0.02)  | 0.03<br>(0.02)     | -0.02<br>(0.03)    | -0.02<br>(0.03)    |
| union-on-site:<br>no interest, positive support             | 0.21***<br>(0.02)  | 0.21***<br>(0.02)  | 0.16***<br>(0.03)  | 0.15***<br>(0.02)  | 0.29***<br>(0.02)  | 0.22***<br>(0.02)  | 0.14***<br>(0.02)  | 0.13***<br>(0.02)  |
| union-on-site:<br>frustrated demand                         | 0.27***<br>(0.03)  | 0.25***<br>(0.03)  | 0.21***<br>(0.03)  | 0.20***<br>(0.03)  | 0.21***<br>(0.03)  | 0.15***<br>(0.03)  | 0.13***<br>(0.03)  | 0.12***<br>(0.03)  |
| union-on-site:<br>realized demand, no support               | -0.24***<br>(0.06) | -0.21***<br>(0.06) | -0.20***<br>(0.06) | -0.18***<br>(0.06) | 0.01<br>(0.05)     | 0.01<br>(0.05)     | -0.01<br>(0.05)    | 0.02<br>(0.05)     |
| union-on-site:<br>realized demand, positive support         | -0.16***<br>(0.06) | -0.15***<br>(0.05) | -0.15***<br>(0.05) | -0.15**<br>(0.05)  | 0.04<br>(0.07)     | 0.01<br>(0.06)     | -0.00<br>(0.06)    | 0.01<br>(0.06)     |
| Constant                                                    | 3.07***<br>(0.00)  | 3.20***<br>(0.01)  | 3.24***<br>(0.02)  | 2.51***<br>(0.16)  | 2.96***<br>(0.01)  | 3.24***<br>(0.02)  | 3.37***<br>(0.02)  | 1.50***<br>(0.15)  |
| Observations                                                | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             |
| R-squared                                                   | 0.02               | 0.03               | 0.04               | 0.04               | 0.01               | 0.05               | 0.07               | 0.07               |
| sample                                                      | all                | all                | all                | all                | all                | all                | all                | all                |
| worker attributes                                           | NO                 | YES                | YES                | YES                | NO                 | YES                | YES                | YES                |
| workplace chara.                                            | NO                 | NO                 | YES                | YES                | NO                 | NO                 | YES                | YES                |
| working conditions                                          | NO                 | NO                 | NO                 | YES                | NO                 | NO                 | NO                 | YES                |
| area and time                                               | YES                | YES                | YES                | YES                | YES                | YES                | YES                | YES                |
| free-riding DiD                                             | 0.27               | 0.28               | 0.26               | 0.25               | 0.22               | 0.19               | 0.16               | 0.15               |
| p free-riding                                               | 0.00               | 0.00               | 0.00               | 0.00               | 0.00               | 0.00               | 0.00               | 0.00               |
| oversupply DiD                                              | -0.08              | -0.06              | -0.05              | -0.03              | -0.03              | 0.00               | -0.01              | 0.01               |
| p oversupply                                                | 0.38               | 0.52               | 0.61               | 0.73               | 0.72               | 0.97               | 0.92               | 0.86               |

Notes: Detailed results are reported in Appendix Table 9. The base category (constant) is a worker with no interest in membership and no positive support, with only external choice. Rows labeled “(only external choice)” report differences from the base among workers without an on-site union. Rows labeled “union-on-site:” report the difference between workers with and without an on-site union within the indicated group. “Free-riding DiD” is the difference between the on-site differences of non-members with no interest with and without positive support. “Oversupply DiD” is the difference between the on-site differences of members without and with positive support. Dependent variable: job satisfaction (five categories) in columns (1)–(4) and life satisfaction (five categories) in columns (5)–(8). Controls as in Table 5. Standard errors clustered by survey wave (28 clusters) are reported in parentheses. Results for standard employees only are reported in Appendix Table 10. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

however, that this comparison relies on the small group of external union members, split further by supportive attitude (255 and 261 observations).

Appendix Table 10 repeats the analysis for standard employees, for whom Question A most plausibly measures supply, as shown in Section 4.4, and among whom union shop agreements are most likely to apply. The results are similar. Among standard employees with no interest in membership, the on-site difference with the full set of controls is 0.19 for job satisfaction and 0.14 for life satisfaction among those with positive support, and  $-0.16$  and  $-0.09$  among those without, so that the free-riding difference is, if anything, larger than in the pooled sample (0.35 and 0.23). The oversupply difference is somewhat larger than in the pooled sample for job satisfaction ( $-0.17$  to  $-0.13$ ), but it is significant only at the 10 percent level in the first three specifications and insignificant with the full set of controls ( $p = 0.15$ ), and it is small and insignificant for life satisfaction ( $-0.06$  to  $-0.01$ ).

These results answer the question left open in Section 4.3. The presence of an on-site union is associated with higher satisfaction among non-members who value unions without joining them, and with lower job satisfaction among non-members who do not value unions; the two associations offset each other on average. By contrast, we find no evidence that workers who have joined without valuing unions are harmed by the presence of an on-site union.

## 4.6 Robustness and sensitivity checks

We assess the stability of our findings in several ways. First, for the additive specification in Table 4 (column (12)) and the corresponding specification for life satisfaction, ordered logit models for the five-category outcomes yield the same directions of effects and similar significance levels (Appendix Table 11, columns (1) and (2)). We focus on the additive specification here, since the coefficients on interaction terms in non-linear models are not directly comparable to their linear counterparts. Second, excluding external-union members in workplaces without an on-site union (516 observations) does not alter the qualitative patterns (columns (3) and (4)). Third, results are stable across the first (2011–2017) and second (2018–2024) halves of the period (columns (5) to (8)), suggesting that the associations are not driven by specific shocks.

Fourth, we re-estimate equation (2) separately by gender, educational attainment, age, and birth cohort (Appendix Tables 12 to 15). The central result proves robust across all subgroups. With the full set of controls, frustrated demand is associated with lower job satisfaction where only an external union is accessible ( $-0.11$  to  $-0.23$ ), and within frustrated demand the presence of an on-site union is associated with higher job satisfaction (0.16 to 0.24), in every one of the eight subgroups. Likewise, the on-site difference for workers with no interest in membership is close to zero for job satisfaction in every subgroup once all controls are included (at most 0.06). The life satisfaction results vary more across subgroups. Within frustrated demand, the on-site difference in life satisfaction is significant for men (0.15) but not for women (0.05), possibly reflecting the higher share of non-standard employees among women. Within realized demand, the comparison between members of on-site and external unions varies in sign and significance across subgroups, which is

consistent with the small size of the external-member group and confirms that this comparison should not be interpreted.

## 5 Interpretation, Limitations, Concluding Remarks

### 5.1 Synthesis of findings

Across job satisfaction and life satisfaction, a coherent picture emerges. The central finding of this paper is that unmet demand for union representation is costly mainly when supply is absent: frustrated demand is associated with lower job and life satisfaction where no on-site union is present, while workers with frustrated demand in a workplace with an on-site union are as satisfied with their jobs as workers with no interest in membership, and only slightly less satisfied with their lives. This pattern is sharpest among standard employees, for whom an on-site union is most plausibly available, and for job satisfaction it holds across gender, education, age, and birth cohort.

A second finding concerns non-members with no interest in joining. On average, the presence of an on-site union is only weakly associated with their satisfaction once workplace characteristics are controlled. This average, however, conceals two opposing associations, particularly for job satisfaction: union presence is associated with higher job and life satisfaction among non-members who nonetheless regard unions as necessary, and with lower job satisfaction among those who do not. One interpretation is that the former capture spillovers from union-provided collective goods without incurring the costs of membership, which is the configuration in which the incentive to free-ride is strongest. This pattern admits other explanations, discussed in Section 5.2.

A third finding concerns union members. Once workplace characteristics are controlled, members of an on-site union are about as satisfied as non-members with no interest in the same type of workplace. Members who do not regard unions as necessary are considerably less satisfied than those who do, but the gap is the same whether or not an on-site union is present. We therefore find no evidence that compulsory membership through union shop agreements, or oversupply, depresses the wellbeing of members. Together with the first finding, this suggests that the dissatisfaction the literature has associated with unionization lies not with union members, but with workers whose demand for representation meets no union at the workplace.

Finally, the presence of an on-site union does not mean the same thing for every worker. Among non-standard employees, an on-site union reduces frustrated demand far less than among standard employees, and offsets the cost of frustrated demand less fully. For these workers demand appears to depend on supply, whether through ineligibility or discouragement, and the presence of a union at the workplace does not constitute supply.

### 5.2 Limitations

Several limitations warrant caution in interpreting these results. First, our data are repeated cross-sectional rather than a panel, so the associations we document may reflect selection into union membership, workplace union presence, and supportive attitudes, rather than the causal effect of

any one on wellbeing. Reverse causality cannot be ruled out; for instance, dissatisfied workers may be more or less likely to notice or seek out union representation, and supportive attitudes toward unions may themselves be shaped by satisfaction with the workplace. Selection may also operate through workplace-specific channels we do not observe: workers who become union members may do so for reasons particular to their own workplace, such as dissatisfaction with management that does not manifest in the working conditions we observe but instead prompts union membership directly. Workers with frustrated demand may also sort into workplaces with or without a union for reasons related to their satisfaction that our workplace controls do not capture.

Second, several of our measures are imperfect. Our measure of supply is based on workers' reports of whether their workplace has a union. Workers who do not know whether their workplace has a union are treated as having no on-site union. We justify this coding with respect to the voice channel, on the grounds that a union a worker is unaware of cannot serve as a channel of voice for that worker, although such a union may still affect the worker through other channels, such as the coverage of collective agreements or wage spillovers. Awareness, however, may not be random. Workers with stronger incentives to use unions, whether because of a desire for membership or because of unobserved characteristics such as workplace problems, may be more likely to notice their presence. If awareness varies systematically across groups, this coding introduces differential measurement error, and the measured difference in on-site union presence between workers with no interest in membership and those with frustrated demand may partly reflect differences in awareness rather than in actual union presence. Addressing this concern requires objective information on union presence at the establishment level.

The supply measure is limited in a further respect. Our data do not indicate whether non-standard employees are eligible to join the on-site union or whether a company operates a union shop agreement. We therefore cannot distinguish directly between ineligibility and discouragement among non-standard employees, or between voluntary and compulsory membership among members. Our test of oversupply is indirect and relies on comparisons with the small group of external union members.

A separate concern arises because our outcomes, job and life satisfaction, are measured on subjective scales. Respondents may use these scales differently, and if such differences in scale use are correlated with on-site union presence, the estimated associations may be biased. This issue is particularly relevant to our voice argument, since union presence may affect not only workers' wellbeing but also how they evaluate and report it. Calibration questions, such as vignettes, can help identify and correct for such scale-use heterogeneity (Benjamin et al., 2026), but our data contain no such questions. Including them in future surveys would allow this correction.<sup>15</sup>

Third, our controls capture only a coarse approximation of the workplace environment. The

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<sup>15</sup>The desire for union membership and the supportive attitude toward unions are also self-reported. If scale-use heterogeneity affects both these measures and subjective wellbeing, it may induce a correlation between the explanatory variables and the regression error term, creating an additional source of bias (Benjamin et al., 2026). Addressing this problem would require extending their approach to account for scale-use heterogeneity on both sides of the regression, with calibration questions for each variable if scale use differs between them. Our data do not permit such a correction.

survey does not provide workplace identifiers, preventing multi-level modeling that would allow us to separate individual-level from workplace-level variation more cleanly, and our working-condition controls are limited to earnings and hours worked; institutional features such as parental leave, remote-work arrangements, or other work-life balance provisions, which company unions may help secure and which could explain the residual association between on-site union presence and life satisfaction, are not directly observed.

Finally, our evidence is drawn entirely from Japan, where enterprise-based unionism and a legal environment permitting union shop agreements, but not pre-entry closed shops, create a distinctive institutional backdrop for the demand-supply mismatches we document. Whether the mechanisms we identify here also operate in labor markets with different union structures, such as sectoral or craft unionism in much of Europe, or the more adversarial, less enterprise-bound unionism of the United States, remains an open question that our data cannot address.

### **5.3 Concluding Remarks**

This paper examined how frictions between the demand for and supply of union representation relate to workers' subjective wellbeing, using repeated cross-sectional data on private-sector workers in metropolitan Japan from 2011 to 2024. Rather than treating union membership as a binary outcome, we distinguished realized demand from frustrated demand, and both from workplace union presence on the supply side; interacting these measures, and considering workers' attitudes toward unions, proved essential to uncovering the patterns documented in Section 4. Taken together, our findings suggest that the persistence of low union density alongside stated demand for representation is not simply a story of apathy or institutional inertia. Unmet demand is costly where workers have no union to turn to; some workers who remain outside unions are not indifferent to their existence, and appear to benefit from them without joining; and for a sizeable group of non-standard employees, the union at their workplace does not appear to be available to them. Our evidence speaks only to cross-sectional associations, and is confined to Japan's enterprise-based union system, but within these bounds, the results indicate that whether union demand goes unmet, and what workers gain or lose from its non-realization, depends on whether the union present at the workplace is actually available to them.

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## A Appendix Table

Appendix Table 1: Definition of Union Demand and Realization Variables

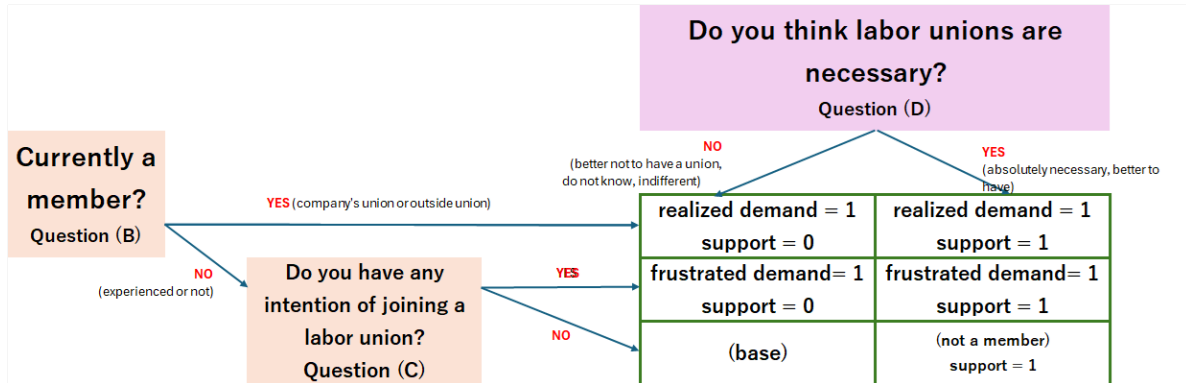
|                                                                                                                   |                                      | (B) "Are you a member of a labor union?" |                                         |                                           |                                         |
|-------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------------|-----------------------------------------|-------------------------------------------|-----------------------------------------|
|                                                                                                                   |                                      | a member of company's union              | a member of outside union               | member of a union in the past but not now | have never been a member of union       |
| (C) (For those who are not currently members of a union)<br>"Do you have any intention of joining a labor union?" | would like to join (or plan to join) | total demand = 1<br>realized demand = 1  | total demand = 1<br>realized demand = 1 | total demand = 1<br>realized demand = 0   | total demand = 1<br>realized demand = 0 |
|                                                                                                                   | it's OK to join if I am approached   |                                          |                                         | total demand = 1<br>realized demand = 0   | total demand = 1<br>realized demand = 0 |
|                                                                                                                   | would not like to join               |                                          |                                         | total demand = 0<br>realized demand = 0   | total demand = 0<br>realized demand = 0 |
|                                                                                                                   | do not know                          |                                          |                                         | total demand = 0<br>realized demand = 0   | total demand = 0<br>realized demand = 0 |

|         |                                   |
|---------|-----------------------------------|
|         | realized demand [realized demand] |
|         | frustrated demand                 |
| [blank] | no interest [no demand]           |

Notes: Demand combines current membership and intention to join; realization equals 1 for current members only. See survey Questions B and C.

Appendix Table 2: Definition of Demand and Support Variables



Notes: Support equals 1 for positive views on union necessity ("Definitely necessary" or "Rather better to have" in Question D), and 0 otherwise. Demand and realization constructed from Questions B and C.

Appendix Table 3: Statistical Association between Demands for Union Activities and Workers' Attributes

| VARIABLES                                  | (1)<br>total demand<br>vs<br>no interest | (2)<br>realized demand<br>vs<br>no interest | (3)<br>frustrated demand<br>vs<br>no interest | (4)<br>supportive<br>vs<br>zero |
|--------------------------------------------|------------------------------------------|---------------------------------------------|-----------------------------------------------|---------------------------------|
| on-site union<br>(vs only external choice) | 0.44***<br>(0.01)                        | 0.69***<br>(0.01)                           | -0.05***<br>(0.01)                            | 0.24***<br>(0.01)               |
| log of annual earnings                     | -0.00<br>(0.00)                          | -0.00<br>(0.00)                             | -0.00<br>(0.00)                               | -0.02***<br>(0.00)              |
| log of weekly hours worked                 | 0.02***<br>(0.00)                        | -0.01**<br>(0.00)                           | 0.03***<br>(0.01)                             | 0.00<br>(0.01)                  |
| female                                     | -0.03***<br>(0.01)                       | 0.00<br>(0.00)                              | -0.05***<br>(0.01)                            | -0.02***<br>(0.01)              |
| less than university                       | 0.03***<br>(0.00)                        | 0.02***<br>(0.00)                           | 0.01**<br>(0.01)                              | -0.02***<br>(0.00)              |
| non-standard title in workplace            | -0.11***<br>(0.01)                       | -0.12***<br>(0.01)                          | -0.03***<br>(0.01)                            | -0.05***<br>(0.01)              |
| age: 20-24                                 | -0.02*<br>(0.01)                         | -0.00<br>(0.01)                             | -0.03**<br>(0.01)                             | -0.03***<br>(0.01)              |
| age: 30-34                                 | 0.00<br>(0.01)                           | -0.02***<br>(0.00)                          | 0.02*<br>(0.01)                               | 0.02**<br>(0.01)                |
| age: 35-39                                 | -0.02***<br>(0.01)                       | -0.04***<br>(0.00)                          | 0.00<br>(0.01)                                | 0.02**<br>(0.01)                |
| age: 40-44                                 | -0.04***<br>(0.01)                       | -0.06***<br>(0.01)                          | -0.01<br>(0.01)                               | 0.03***<br>(0.01)               |
| age: 45-49                                 | -0.06***<br>(0.01)                       | -0.08***<br>(0.01)                          | -0.02**<br>(0.01)                             | 0.04***<br>(0.01)               |
| age: 50-54                                 | -0.10***<br>(0.01)                       | -0.10***<br>(0.00)                          | -0.05***<br>(0.01)                            | 0.04***<br>(0.01)               |
| age: 55-59                                 | -0.10***<br>(0.01)                       | -0.10***<br>(0.01)                          | -0.05***<br>(0.01)                            | 0.07***<br>(0.01)               |
| age: 60-64                                 | -0.13***<br>(0.01)                       | -0.12***<br>(0.01)                          | -0.07***<br>(0.01)                            | 0.09***<br>(0.01)               |
| tenure: 5-9                                | -0.00<br>(0.01)                          | 0.01*<br>(0.00)                             | -0.01<br>(0.01)                               | -0.00<br>(0.01)                 |
| tenure: 10-14                              | -0.01**<br>(0.00)                        | 0.02***<br>(0.00)                           | -0.03***<br>(0.01)                            | -0.01**<br>(0.01)               |
| tenure: 15-19                              | 0.01<br>(0.01)                           | 0.03***<br>(0.01)                           | -0.02***<br>(0.01)                            | -0.01<br>(0.01)                 |
| tenure: 20-24                              | -0.03***<br>(0.01)                       | 0.01<br>(0.01)                              | -0.06***<br>(0.01)                            | -0.04***<br>(0.01)              |
| tenure: 25-29                              | -0.05***<br>(0.01)                       | -0.01<br>(0.01)                             | -0.07***<br>(0.01)                            | -0.05***<br>(0.01)              |
| tenure: over 30                            | -0.08***<br>(0.01)                       | -0.04***<br>(0.01)                          | -0.08***<br>(0.01)                            | -0.04***<br>(0.01)              |
| Constant                                   | 0.37***<br>(0.05)                        | 0.17***<br>(0.04)                           | 0.31***<br>(0.05)                             | 0.89***<br>(0.05)               |
| Observations                               | 54,614                                   | 44,205                                      | 40,508                                        | 54,614                          |
| R-squared                                  | 0.27                                     | 0.63                                        | 0.04                                          | 0.09                            |
| period                                     | all                                      | all                                         | all                                           | all                             |

Notes: Standard errors clustered by survey wave (28 clusters) are reported in parentheses. Base categories for age and tenure are age 25-29 and tenure 0-4, respectively. Marriage status, firm size, occupation, industry, metropolitan area, and time fixed effects are included as controls. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

Appendix Table 4: Summary Statistics for Regression

| Variable                        | Mean   | SD    | Min    | Max    |
|---------------------------------|--------|-------|--------|--------|
| job satisfacation               | 3.04   | 1.04  | 1      | 5      |
| life satisfaction               | 3.025  | 1.032 | 1      | 5      |
| log of annual earnings          | 14.929 | .853  | 13.122 | 16.811 |
| log of weekly hours worked      | 3.548  | .509  | 2.303  | 4.094  |
| total demand                    |        |       |        |        |
| (vs no interest)                | .449   | .     | 0      | 1      |
| realized demand                 |        |       |        |        |
| (vs no interest or frustrated)  | .258   | .     | 0      | 1      |
| frustrated demand               |        |       |        |        |
| (vs no interest or realization) | .191   | .     | 0      | 1      |
| on-site union                   |        |       |        |        |
| (vs only external choice)       | .362   | .     | 0      | 1      |
| supportive attitude             | .53    | .     | 0      | 1      |
| age: 20-24                      | .046   | .     | 0      | 1      |
| age: 25-29 (base)               | .155   | .     | 0      | 1      |
| age: 30-34                      | .104   | .     | 0      | 1      |
| age: 35-39                      | .147   | .     | 0      | 1      |
| age: 40-44                      | .121   | .     | 0      | 1      |
| age: 45-49                      | .146   | .     | 0      | 1      |
| age: 50-54                      | .117   | .     | 0      | 1      |
| age: 55-59                      | .09    | .     | 0      | 1      |
| age: 60-64                      | .073   | .     | 0      | 1      |
| less than university            | .469   | .     | 0      | 1      |
| tenure: 0-4 (base)              | .385   | .     | 0      | 1      |
| tenure: 5-9                     | .235   | .     | 0      | 1      |
| tenure: 10-14                   | .135   | .     | 0      | 1      |
| tenure: 15-19                   | .082   | .     | 0      | 1      |
| tenure: 20-24                   | .063   | .     | 0      | 1      |
| tenure: 25-29                   | .043   | .     | 0      | 1      |
| tenure: over 30                 | .057   | .     | 0      | 1      |
| married                         | .52    | .     | 0      | 1      |
| divorced or widowed             | .079   | .     | 0      | 1      |
| never married                   | .401   | .     | 0      | 1      |
| non-standard title in workplace | .337   | .     | 0      | 1      |
| firm size: under 29             | .184   | .     | 0      | 1      |
| firm size: 30-99                | .144   | .     | 0      | 1      |

**Continued**

| Variable                       | Mean | SD | Min | Max |
|--------------------------------|------|----|-----|-----|
| firm size: 100-299             | .13  | .  | 0   | 1   |
| firm size: 300-499             | .06  | .  | 0   | 1   |
| firm size: 500-999             | .072 | .  | 0   | 1   |
| firm size: 1000-2999           | .095 | .  | 0   | 1   |
| firm size: 3000 (base)         | .204 | .  | 0   | 1   |
| firm size: unknown             | .11  | .  | 0   | 1   |
| occupation: do not know        | .021 | .  | 0   | 1   |
| occupation: manager            | .094 | .  | 0   | 1   |
| occupation: specialist (base)  | .176 | .  | 0   | 1   |
| occupation: administration     | .288 | .  | 0   | 1   |
| occupation: sales              | .139 | .  | 0   | 1   |
| occupation: service            | .133 | .  | 0   | 1   |
| occupation: security           | .008 | .  | 0   | 1   |
| occupation: others             | .14  | .  | 0   | 1   |
| industry: construction         | .054 | .  | 0   | 1   |
| industry: manufacturing (base) | .224 | .  | 0   | 1   |
| industry: utilities            | .015 | .  | 0   | 1   |
| industry: information          | .085 | .  | 0   | 1   |
| industry: transportation       | .065 | .  | 0   | 1   |
| industry: retail, wholesale    | .133 | .  | 0   | 1   |
| industry: finance              | .064 | .  | 0   | 1   |
| industry: real estate          | .028 | .  | 0   | 1   |
| industry: medical              | .075 | .  | 0   | 1   |
| industry: education            | .03  | .  | 0   | 1   |
| industry: service              | .189 | .  | 0   | 1   |
| industry: others               | .04  | .  | 0   | 1   |

*Notes:* Pooled observations from 28 waves of RENGO-RIALS survey (2011–2024), private-sector workers aged 20–64 in Tokyo metropolitan and Kansai area. Number of observations is 54,614. Demand combines current membership (realized demand) and intention to join (frustrated demand); on-site union indicates workplace union presence.

Appendix Table 5: Detailed Results for OLS Estimates of Job Satisfaction (1)

| VARIABLES                                            | (1)                | (2)                | (3)                | (4)                | (5)                | (6)                | (7)                | (8)                | (9)                |
|------------------------------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| total demand<br>(vs no interest)                     | -0.07***<br>(0.01) | -0.14***<br>(0.02) |                    | -0.07***<br>(0.01) | -0.13***<br>(0.02) |                    | -0.06***<br>(0.01) | -0.10***<br>(0.02) |                    |
| realized demand<br>(vs no interest or frustrated)    |                    |                    | -0.08***<br>(0.02) |                    |                    | -0.07***<br>(0.02) |                    |                    | -0.01<br>(0.02)    |
| frustrated demand<br>(vs no interest or realization) |                    |                    | -0.17***<br>(0.02) |                    |                    | -0.16***<br>(0.02) |                    |                    | -0.15***<br>(0.02) |
| on-site union<br>(vs only external choice)           |                    | 0.15***<br>(0.01)  | 0.10***<br>(0.01)  |                    | 0.14***<br>(0.01)  | 0.10***<br>(0.01)  |                    | 0.12***<br>(0.01)  | 0.05***<br>(0.02)  |
| log of annual earnings                               |                    |                    |                    |                    |                    |                    | 0.09***<br>(0.01)  | 0.09***<br>(0.01)  | 0.09***<br>(0.01)  |
| log of weekly hours worked                           |                    |                    |                    |                    |                    |                    | -0.17***<br>(0.01) | -0.17***<br>(0.01) | -0.17***<br>(0.01) |
| non-standard title in workplace                      |                    |                    |                    |                    |                    |                    | 0.13***<br>(0.01)  | 0.13***<br>(0.01)  | 0.14***<br>(0.01)  |
| female                                               |                    |                    |                    | 0.17***<br>(0.01)  | 0.17***<br>(0.01)  | 0.17***<br>(0.01)  | 0.17***<br>(0.02)  | 0.16***<br>(0.02)  | 0.16***<br>(0.02)  |
| less than university                                 |                    |                    |                    | -0.07***<br>(0.01) | -0.06***<br>(0.01) | -0.06***<br>(0.01) | -0.03***<br>(0.01) | -0.03***<br>(0.01) | -0.03***<br>(0.01) |
| age: 20-24                                           |                    |                    |                    | 0.09***<br>(0.02)  | 0.09***<br>(0.02)  | 0.08***<br>(0.02)  | 0.10***<br>(0.02)  | 0.10***<br>(0.02)  | 0.10***<br>(0.02)  |
| age: 30-34                                           |                    |                    |                    | -0.07***<br>(0.02) | -0.07***<br>(0.02) | -0.06***<br>(0.02) | -0.08***<br>(0.02) | -0.07***<br>(0.02) | -0.07***<br>(0.02) |
| age: 35-39                                           |                    |                    |                    | -0.09***<br>(0.02) | -0.08***<br>(0.02) | -0.07***<br>(0.02) | -0.09***<br>(0.02) | -0.09***<br>(0.02) | -0.08***<br>(0.02) |
| age: 40-44                                           |                    |                    |                    | -0.13***<br>(0.02) | -0.12***<br>(0.02) | -0.11***<br>(0.02) | -0.15***<br>(0.02) | -0.14***<br>(0.02) | -0.13***<br>(0.02) |
| age: 45-49                                           |                    |                    |                    | -0.17***<br>(0.01) | -0.15***<br>(0.01) | -0.15***<br>(0.01) | -0.20***<br>(0.01) | -0.19***<br>(0.01) | -0.18***<br>(0.01) |
| age: 50-54                                           |                    |                    |                    | -0.17***<br>(0.01) | -0.16***<br>(0.01) | -0.15***<br>(0.01) | -0.21***<br>(0.01) | -0.20***<br>(0.01) | -0.20***<br>(0.01) |
| age: 55-59                                           |                    |                    |                    | -0.13***<br>(0.02) | -0.11***<br>(0.02) | -0.11***<br>(0.02) | -0.18***<br>(0.02) | -0.16***<br>(0.02) | -0.16***<br>(0.02) |
| age: 60-64                                           |                    |                    |                    | -0.02<br>(0.02)    | -0.01<br>(0.02)    | 0.00<br>(0.02)     | -0.08***<br>(0.02) | -0.06**<br>(0.02)  | -0.06**<br>(0.02)  |
| tenure: 5-9                                          |                    |                    |                    | -0.03**<br>(0.01)  | -0.04***<br>(0.01) | -0.04***<br>(0.01) | -0.03***<br>(0.01) | -0.04***<br>(0.01) | -0.04***<br>(0.01) |
| tenure: 10-14                                        |                    |                    |                    | -0.02<br>(0.02)    | -0.03**<br>(0.02)  | -0.04**<br>(0.01)  | -0.03*<br>(0.02)   | -0.03**<br>(0.02)  | -0.04**<br>(0.02)  |
| tenure: 15-19                                        |                    |                    |                    | -0.02<br>(0.01)    | -0.04**<br>(0.01)  | -0.04***<br>(0.01) | -0.03**<br>(0.01)  | -0.04***<br>(0.01) | -0.05***<br>(0.01) |
| tenure: 20-24                                        |                    |                    |                    | -0.00<br>(0.02)    | -0.04*<br>(0.02)   | -0.04*<br>(0.02)   | -0.03<br>(0.02)    | -0.05**<br>(0.02)  | -0.05**<br>(0.02)  |
| tenure: 25-29                                        |                    |                    |                    | 0.03<br>(0.02)     | -0.02<br>(0.02)    | -0.02<br>(0.02)    | -0.03*<br>(0.02)   | -0.06***<br>(0.02) | -0.06***<br>(0.02) |
| tenure: over 30                                      |                    |                    |                    | 0.06**<br>(0.03)   | 0.00<br>(0.03)     | 0.00<br>(0.03)     | -0.01<br>(0.03)    | -0.04<br>(0.03)    | -0.04<br>(0.03)    |
| Constant                                             | 3.07***<br>(0.01)  | 3.05***<br>(0.01)  | 3.06***<br>(0.01)  | 3.21***<br>(0.01)  | 3.19***<br>(0.01)  | 3.19***<br>(0.01)  | 2.51***<br>(0.16)  | 2.49***<br>(0.16)  | 2.49***<br>(0.16)  |
| Observations                                         | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             |
| R-squared                                            | 0.00               | 0.01               | 0.01               | 0.02               | 0.02               | 0.02               | 0.03               | 0.04               | 0.04               |
| period                                               | all                | all                | all                | all                | all                | all                | all                | all                | all                |
| area and time                                        | YES                | YES                | YES                | YES                | YES                | YES                | YES                | YES                | YES                |

Notes: Dependent variable: job satisfaction (five categories). Base categories are age 25-29 and tenure 0-4. Other controls includes marital status, firm size, occupation, and industry. All specifications include area and time fixed effects. Standard errors clustered by survey wave (28 clusters) are reported in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

Appendix Table 6: Detailed Results for OLS estimates of Job Satisfaction (2)

| VARIABLES                                | (1)                | (2)                | (3)                | (4)                |
|------------------------------------------|--------------------|--------------------|--------------------|--------------------|
| frustrated demand (only external choice) | -0.20***<br>(0.02) | -0.18***<br>(0.02) | -0.17***<br>(0.02) | -0.17***<br>(0.02) |
| realized demand (only external choice)   | 0.12***<br>(0.04)  | 0.12***<br>(0.04)  | 0.13***<br>(0.04)  | 0.11***<br>(0.04)  |
| union-on-site: no interest               | 0.08***<br>(0.02)  | 0.08***<br>(0.02)  | 0.03*<br>(0.02)    | 0.03<br>(0.02)     |
| union-on-site: frustrated demand         | 0.27***<br>(0.03)  | 0.25***<br>(0.03)  | 0.20***<br>(0.03)  | 0.20***<br>(0.03)  |
| union-on-site: realized demand           | -0.11***<br>(0.04) | -0.10***<br>(0.04) | -0.10**<br>(0.04)  | -0.08**<br>(0.04)  |
| log of annual earnings                   |                    |                    |                    | 0.09***<br>(0.01)  |
| log of weekly hours worked               |                    |                    |                    | -0.17***<br>(0.01) |
| non-standard title in workplace          |                    |                    | 0.13***<br>(0.01)  | 0.14***<br>(0.01)  |
| female                                   |                    | 0.17***<br>(0.01)  | 0.16***<br>(0.02)  | 0.16***<br>(0.02)  |
| less than university                     |                    | -0.06***<br>(0.01) | -0.03***<br>(0.01) | -0.03***<br>(0.01) |
| age: 20-24                               |                    | 0.08***<br>(0.02)  | 0.09***<br>(0.02)  | 0.10***<br>(0.02)  |
| age: 30-34                               |                    | -0.07***<br>(0.02) | -0.06***<br>(0.02) | -0.07***<br>(0.02) |
| age: 35-39                               |                    | -0.07***<br>(0.02) | -0.08***<br>(0.02) | -0.08***<br>(0.02) |
| age: 40-44                               |                    | -0.11***<br>(0.02) | -0.13***<br>(0.02) | -0.13***<br>(0.02) |
| age: 45-49                               |                    | -0.15***<br>(0.01) | -0.17***<br>(0.01) | -0.18***<br>(0.01) |
| age: 50-54                               |                    | -0.15***<br>(0.01) | -0.18***<br>(0.01) | -0.20***<br>(0.01) |
| age: 55-59                               |                    | -0.11***<br>(0.02) | -0.14***<br>(0.02) | -0.16***<br>(0.02) |
| age: 60-64                               |                    | 0.00<br>(0.02)     | -0.04<br>(0.02)    | -0.06**<br>(0.02)  |
| tenure: 5-9                              |                    | -0.04***<br>(0.01) | -0.03***<br>(0.01) | -0.04***<br>(0.01) |
| tenure: 10-14                            |                    | -0.04**<br>(0.01)  | -0.03*<br>(0.02)   | -0.04**<br>(0.02)  |
| tenure: 15-19                            |                    | -0.04***<br>(0.01) | -0.04***<br>(0.01) | -0.05***<br>(0.01) |
| tenure: 20-24                            |                    | -0.04*<br>(0.02)   | -0.04*<br>(0.02)   | -0.05**<br>(0.02)  |
| tenure: 25-29                            |                    | -0.02<br>(0.02)    | -0.04**<br>(0.02)  | -0.06***<br>(0.02) |
| tenure: over 30                          |                    | 0.00<br>(0.03)     | -0.02<br>(0.03)    | -0.04<br>(0.03)    |
| Constant                                 | 3.07***<br>(0.01)  | 3.20***<br>(0.01)  | 3.24***<br>(0.02)  | 2.49***<br>(0.16)  |
| Observations                             | 54,614             | 54,614             | 54,614             | 54,614             |
| R-squared                                | 0.01               | 0.02               | 0.03               | 0.04               |
| area and time                            | YES                | YES                | YES                | YES                |

*Notes:* Dependent variable: job satisfaction (five categories). Estimates of equation (2). Base categories are age 25-29 and tenure 0-4. Other controls includes marital status, firm size, occupation, and industry. All specifications include area and time fixed effects. Standard errors clustered by survey wave (28 clusters) are reported in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

Appendix Table 7: Detailed Results for OLS Estimates of Life Satisfaction (1)

| VARIABLES                                            | (1)               | (2)                | (3)                | (4)                | (5)                | (6)                | (7)                | (8)                | (9)                | (10)               | (11)               | (12)               |
|------------------------------------------------------|-------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| total demand<br>(vs no interest)                     | -0.00<br>(0.01)   | -0.10***<br>(0.01) |                    | -0.02**<br>(0.01)  | -0.09***<br>(0.01) |                    | -0.05***<br>(0.01) | -0.09***<br>(0.01) |                    | -0.05***<br>(0.01) | -0.09***<br>(0.01) |                    |
| realized demand<br>(vs no interest or frustrated)    |                   |                    | -0.06***<br>(0.02) |                    |                    | -0.05***<br>(0.02) |                    |                    | -0.03*<br>(0.02)   |                    |                    | -0.03*<br>(0.02)   |
| frustrated demand<br>(vs no interest or realization) |                   |                    | -0.12***<br>(0.02) |                    |                    | -0.11***<br>(0.02) |                    |                    | -0.12***<br>(0.02) |                    |                    | -0.12***<br>(0.02) |
| on-site union<br>(vs only external choice)           |                   | 0.22***<br>(0.01)  | 0.19***<br>(0.01)  |                    | 0.16***<br>(0.01)  | 0.13***<br>(0.01)  |                    | 0.12***<br>(0.01)  | 0.08***<br>(0.01)  |                    | 0.11***<br>(0.01)  | 0.07***<br>(0.01)  |
| log of annual earnings                               |                   |                    |                    |                    |                    |                    |                    |                    |                    | 0.17***<br>(0.01)  | 0.16***<br>(0.01)  | 0.16***<br>(0.01)  |
| log of weekly hours worked                           |                   |                    |                    |                    |                    |                    |                    |                    |                    | -0.17***<br>(0.01) | -0.17***<br>(0.01) | -0.17***<br>(0.01) |
| non-standard title in workplace                      |                   |                    |                    |                    |                    |                    | -0.10***<br>(0.01) | -0.10***<br>(0.01) | -0.09***<br>(0.01) | -0.03**<br>(0.01)  | -0.03**<br>(0.01)  | -0.03**<br>(0.01)  |
| female                                               |                   |                    |                    | 0.18***<br>(0.01)  | 0.19***<br>(0.01)  | 0.19***<br>(0.01)  | 0.23***<br>(0.02)  | 0.23***<br>(0.02)  | 0.23***<br>(0.02)  | 0.26***<br>(0.02)  | 0.26***<br>(0.02)  | 0.26***<br>(0.02)  |
| less than university                                 |                   |                    |                    | -0.20***<br>(0.01) | -0.19***<br>(0.01) | -0.19***<br>(0.01) | -0.11***<br>(0.01) | -0.11***<br>(0.01) | -0.11***<br>(0.01) | -0.10***<br>(0.01) | -0.10***<br>(0.01) | -0.10***<br>(0.01) |
| age: 20-24                                           |                   |                    |                    | 0.11***<br>(0.02)  | 0.11***<br>(0.02)  | 0.11***<br>(0.02)  | 0.11***<br>(0.02)  | 0.11***<br>(0.02)  | 0.10***<br>(0.02)  | 0.14***<br>(0.02)  | 0.13***<br>(0.02)  | 0.13***<br>(0.02)  |
| age: 30-34                                           |                   |                    |                    | -0.07***<br>(0.02) | -0.06***<br>(0.02) | -0.06***<br>(0.02) | -0.07***<br>(0.02) | -0.06***<br>(0.02) | -0.06***<br>(0.02) | -0.08***<br>(0.02) | -0.08***<br>(0.02) | -0.07***<br>(0.02) |
| age: 35-39                                           |                   |                    |                    | -0.15***<br>(0.02) | -0.14***<br>(0.02) | -0.14***<br>(0.02) | -0.14***<br>(0.02) | -0.13***<br>(0.02) | -0.13***<br>(0.02) | -0.15***<br>(0.02) | -0.15***<br>(0.02) | -0.14***<br>(0.02) |
| age: 40-44                                           |                   |                    |                    | -0.23***<br>(0.02) | -0.21***<br>(0.02) | -0.21***<br>(0.02) | -0.22***<br>(0.02) | -0.21***<br>(0.02) | -0.21***<br>(0.02) | -0.23***<br>(0.02) | -0.22***<br>(0.02) | -0.22***<br>(0.02) |
| age: 45-49                                           |                   |                    |                    | -0.24***<br>(0.02) | -0.23***<br>(0.02) | -0.22***<br>(0.02) | -0.23***<br>(0.02) | -0.22***<br>(0.02) | -0.22***<br>(0.02) | -0.25***<br>(0.02) | -0.24***<br>(0.02) | -0.23***<br>(0.02) |
| age: 50-54                                           |                   |                    |                    | -0.28***<br>(0.02) | -0.26***<br>(0.02) | -0.26***<br>(0.02) | -0.27***<br>(0.02) | -0.26***<br>(0.02) | -0.25***<br>(0.02) | -0.29***<br>(0.02) | -0.28***<br>(0.02) | -0.27***<br>(0.02) |
| age: 55-59                                           |                   |                    |                    | -0.26***<br>(0.02) | -0.24***<br>(0.02) | -0.23***<br>(0.02) | -0.24***<br>(0.02) | -0.23***<br>(0.02) | -0.22***<br>(0.02) | -0.26***<br>(0.02) | -0.25***<br>(0.02) | -0.24***<br>(0.02) |
| age: 60-64                                           |                   |                    |                    | -0.15***<br>(0.02) | -0.13***<br>(0.02) | -0.12***<br>(0.02) | -0.08***<br>(0.02) | -0.07***<br>(0.03) | -0.06***<br>(0.03) | -0.10***<br>(0.02) | -0.09***<br>(0.02) | -0.08***<br>(0.02) |
| tenure: 5-9                                          |                   |                    |                    | 0.05***<br>(0.01)  | 0.04***<br>(0.01)  | 0.04***<br>(0.01)  | 0.02<br>(0.01)     | 0.01<br>(0.01)     | 0.01<br>(0.01)     | 0.01<br>(0.01)     | 0.00<br>(0.01)     | 0.00<br>(0.01)     |
| tenure: 10-14                                        |                   |                    |                    | 0.09***<br>(0.01)  | 0.07***<br>(0.01)  | 0.07***<br>(0.01)  | 0.03***<br>(0.01)  | 0.03***<br>(0.01)  | 0.02***<br>(0.01)  | 0.01<br>(0.01)     | 0.01<br>(0.01)     | 0.01<br>(0.01)     |
| tenure: 15-19                                        |                   |                    |                    | 0.13***<br>(0.02)  | 0.11***<br>(0.01)  | 0.11***<br>(0.01)  | 0.05***<br>(0.01)  | 0.04***<br>(0.01)  | 0.04***<br>(0.01)  | 0.02***<br>(0.01)  | 0.01<br>(0.01)     | 0.01<br>(0.01)     |
| tenure: 20-24                                        |                   |                    |                    | 0.15***<br>(0.02)  | 0.11***<br>(0.02)  | 0.11***<br>(0.02)  | 0.04***<br>(0.02)  | 0.02<br>(0.02)     | 0.02<br>(0.02)     | 0.01<br>(0.02)     | -0.01<br>(0.02)    | -0.01<br>(0.02)    |
| tenure: 25-29                                        |                   |                    |                    | 0.19***<br>(0.02)  | 0.13***<br>(0.02)  | 0.13***<br>(0.02)  | 0.03<br>(0.02)     | 0.01<br>(0.02)     | 0.01<br>(0.02)     | -0.01<br>(0.02)    | -0.03<br>(0.02)    | -0.03<br>(0.02)    |
| tenure: over 30                                      |                   |                    |                    | 0.26***<br>(0.02)  | 0.19***<br>(0.02)  | 0.19***<br>(0.02)  | 0.08***<br>(0.02)  | 0.05***<br>(0.02)  | 0.05***<br>(0.02)  | 0.03<br>(0.02)     | 0.01<br>(0.02)     | 0.01<br>(0.02)     |
| Constant                                             | 2.99***<br>(0.01) | 2.96***<br>(0.01)  | 2.97***<br>(0.01)  | 3.27***<br>(0.02)  | 3.23***<br>(0.02)  | 3.24***<br>(0.02)  | 3.44***<br>(0.02)  | 3.38***<br>(0.02)  | 3.38***<br>(0.02)  | 1.52***<br>(0.15)  | 1.50***<br>(0.15)  | 1.50***<br>(0.15)  |
| Observations                                         | 54,614            | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             |
| R-squared                                            | 0.00              | 0.01               | 0.01               | 0.05               | 0.05               | 0.05               | 0.06               | 0.06               | 0.06               | 0.07               | 0.07               | 0.07               |
| period                                               | all               | all                | all                | all                | all                | all                | all                | all                | all                | all                | all                | all                |
| area and time                                        | YES               | YES                | YES                | YES                | YES                | YES                | YES                | YES                | YES                | YES                | YES                | YES                |

Notes: Dependent variable: life satisfaction (five categories). Specifications as in Table 4. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

Appendix Table 8: Detailed Results for OLS estimates of life Satisfaction (2)

| VARIABLES                                | (1)                | (2)                | (3)                | (4)                |
|------------------------------------------|--------------------|--------------------|--------------------|--------------------|
| frustrated demand (only external choice) | -0.12***<br>(0.02) | -0.11***<br>(0.01) | -0.13***<br>(0.02) | -0.12***<br>(0.02) |
| realized demand (only external choice)   | 0.04<br>(0.04)     | 0.01<br>(0.04)     | -0.01<br>(0.04)    | -0.04<br>(0.04)    |
| union-on-site: no interest               | 0.20***<br>(0.02)  | 0.13***<br>(0.02)  | 0.07***<br>(0.02)  | 0.05***<br>(0.02)  |
| union-on-site: frustrated demand         | 0.21***<br>(0.03)  | 0.15***<br>(0.03)  | 0.12***<br>(0.03)  | 0.11***<br>(0.03)  |
| union-on-site: realized demand           | 0.09**<br>(0.04)   | 0.07*<br>(0.04)    | 0.05<br>(0.04)     | 0.07*<br>(0.04)    |
| log of annual earnings                   |                    |                    |                    | 0.16***<br>(0.01)  |
| log of weekly hours worked               |                    |                    |                    | -0.17***<br>(0.01) |
| non-standard title in workplace          |                    |                    | -0.09***<br>(0.01) | -0.03**<br>(0.01)  |
| female                                   |                    | 0.19***<br>(0.01)  | 0.23***<br>(0.02)  | 0.26***<br>(0.02)  |
| less than university                     |                    | -0.19***<br>(0.01) | -0.11***<br>(0.01) | -0.10***<br>(0.01) |
| age: 20-24                               |                    | 0.11***<br>(0.02)  | 0.10***<br>(0.02)  | 0.13***<br>(0.02)  |
| age: 30-34                               |                    | -0.06***<br>(0.02) | -0.06***<br>(0.02) | -0.07***<br>(0.02) |
| age: 35-39                               |                    | -0.14***<br>(0.02) | -0.13***<br>(0.02) | -0.14***<br>(0.02) |
| age: 40-44                               |                    | -0.21***<br>(0.02) | -0.21***<br>(0.02) | -0.22***<br>(0.02) |
| age: 45-49                               |                    | -0.22***<br>(0.02) | -0.22***<br>(0.02) | -0.23***<br>(0.02) |
| age: 50-54                               |                    | -0.26***<br>(0.02) | -0.25***<br>(0.02) | -0.27***<br>(0.02) |
| age: 55-59                               |                    | -0.23***<br>(0.02) | -0.22***<br>(0.02) | -0.24***<br>(0.02) |
| age: 60-64                               |                    | -0.12***<br>(0.02) | -0.06**<br>(0.03)  | -0.08***<br>(0.02) |
| tenure: 5-9                              |                    | 0.04***<br>(0.01)  | 0.01<br>(0.01)     | 0.00<br>(0.01)     |
| tenure: 10-14                            |                    | 0.07***<br>(0.01)  | 0.02*<br>(0.01)    | 0.01<br>(0.01)     |
| tenure: 15-19                            |                    | 0.11***<br>(0.01)  | 0.04**<br>(0.01)   | 0.01<br>(0.01)     |
| tenure: 20-24                            |                    | 0.11***<br>(0.02)  | 0.02<br>(0.02)     | -0.01<br>(0.02)    |
| tenure: 25-29                            |                    | 0.13***<br>(0.02)  | 0.01<br>(0.02)     | -0.03<br>(0.02)    |
| tenure: over 30                          |                    | 0.19***<br>(0.02)  | 0.05**<br>(0.02)   | 0.01<br>(0.02)     |
| Constant                                 | 2.97***<br>(0.01)  | 3.24***<br>(0.02)  | 3.38***<br>(0.02)  | 1.50***<br>(0.15)  |
| Observations                             | 54,614             | 54,614             | 54,614             | 54,614             |
| R-squared                                | 0.01               | 0.05               | 0.06               | 0.07               |
| area and time                            | YES                | YES                | YES                | YES                |

Notes: See footnote of Table 5. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

Appendix Table 9: Detailed Results for Interaction with Supportive Attitude

| VARIABLES                                                | (1)<br>job sat.    | (2)<br>job sat.    | (3)<br>job sat.    | (4)<br>life sat.   | (5)<br>life sat.   | (6)<br>life sat.   |
|----------------------------------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| no interest, positive support (only external choice)     | -0.03**<br>(0.01)  | -0.04***<br>(0.01) | -0.05***<br>(0.01) | -0.00<br>(0.01)    | -0.02<br>(0.01)    | -0.01<br>(0.01)    |
| frustrated demand (only external choice)                 | -0.21***<br>(0.02) | -0.19***<br>(0.02) | -0.18***<br>(0.02) | -0.12***<br>(0.02) | -0.12***<br>(0.01) | -0.13***<br>(0.02) |
| realized demand, no support (only external choice)       | -0.03<br>(0.06)    | -0.04<br>(0.06)    | -0.06<br>(0.06)    | -0.09*<br>(0.05)   | -0.13**<br>(0.05)  | -0.17***<br>(0.05) |
| realized demand, positive support (only external choice) | 0.25***<br>(0.05)  | 0.26***<br>(0.05)  | 0.26***<br>(0.05)  | 0.16**<br>(0.06)   | 0.13**<br>(0.06)   | 0.09<br>(0.06)     |
| union-on-site: no interest, no support                   | -0.07**<br>(0.03)  | -0.06**<br>(0.03)  | -0.10***<br>(0.03) | 0.07***<br>(0.02)  | 0.03<br>(0.02)     | -0.02<br>(0.03)    |
| union-on-site: no interest, positive support             | 0.21***<br>(0.02)  | 0.21***<br>(0.02)  | 0.15***<br>(0.02)  | 0.29***<br>(0.02)  | 0.22***<br>(0.02)  | 0.13***<br>(0.02)  |
| union-on-site: frustrated demand                         | 0.27***<br>(0.03)  | 0.25***<br>(0.03)  | 0.20***<br>(0.03)  | 0.21***<br>(0.03)  | 0.15***<br>(0.03)  | 0.12***<br>(0.03)  |
| union-on-site: realized demand, no support               | -0.24***<br>(0.06) | -0.21***<br>(0.06) | -0.18***<br>(0.06) | 0.01<br>(0.05)     | 0.01<br>(0.05)     | 0.02<br>(0.05)     |
| union-on-site: realized demand, positive support         | -0.16***<br>(0.06) | -0.15***<br>(0.05) | -0.15**<br>(0.05)  | 0.04<br>(0.07)     | 0.01<br>(0.06)     | 0.01<br>(0.06)     |
| log of annual earnings                                   |                    |                    | 0.09***<br>(0.01)  |                    |                    | 0.16***<br>(0.01)  |
| log of weekly hours worked                               |                    |                    | -0.16***<br>(0.01) |                    |                    | -0.17***<br>(0.01) |
| non-standard title in workplace                          |                    |                    | 0.14***<br>(0.01)  |                    |                    | -0.03*<br>(0.01)   |
| female                                                   |                    | 0.17***<br>(0.01)  | 0.16***<br>(0.02)  |                    | 0.19***<br>(0.01)  | 0.26***<br>(0.02)  |
| less than university                                     |                    | -0.06***<br>(0.01) | -0.03***<br>(0.01) |                    | -0.19***<br>(0.01) | -0.10***<br>(0.01) |
| age: 20-24                                               |                    | 0.08***<br>(0.02)  | 0.10***<br>(0.02)  |                    | 0.11***<br>(0.02)  | 0.13***<br>(0.02)  |
| age: 30-34                                               |                    | -0.07***<br>(0.02) | -0.07***<br>(0.02) |                    | -0.06***<br>(0.02) | -0.07***<br>(0.02) |
| age: 35-39                                               |                    | -0.07***<br>(0.02) | -0.08***<br>(0.02) |                    | -0.13***<br>(0.02) | -0.14***<br>(0.02) |
| age: 40-44                                               |                    | -0.11***<br>(0.02) | -0.13***<br>(0.02) |                    | -0.21***<br>(0.02) | -0.22***<br>(0.02) |
| age: 45-49                                               |                    | -0.14***<br>(0.01) | -0.17***<br>(0.01) |                    | -0.22***<br>(0.02) | -0.23***<br>(0.02) |
| age: 50-54                                               |                    | -0.14***<br>(0.01) | -0.19***<br>(0.01) |                    | -0.25***<br>(0.02) | -0.27***<br>(0.02) |
| age: 55-59                                               |                    | -0.10***<br>(0.02) | -0.15***<br>(0.02) |                    | -0.23***<br>(0.02) | -0.24***<br>(0.02) |
| age: 60-64                                               |                    | 0.01<br>(0.02)     | -0.05**<br>(0.02)  |                    | -0.12***<br>(0.02) | -0.08***<br>(0.02) |
| tenure: 5-9                                              |                    | -0.04***<br>(0.01) | -0.04***<br>(0.01) |                    | 0.04***<br>(0.01)  | 0.00<br>(0.01)     |
| tenure: 10-14                                            |                    | -0.04**<br>(0.01)  | -0.04**<br>(0.02)  |                    | 0.07***<br>(0.01)  | 0.00<br>(0.01)     |
| tenure: 15-19                                            |                    | -0.04***<br>(0.01) | -0.05***<br>(0.01) |                    | 0.11***<br>(0.01)  | 0.01<br>(0.01)     |
| tenure: 20-24                                            |                    | -0.04**<br>(0.02)  | -0.05**<br>(0.02)  |                    | 0.11***<br>(0.02)  | -0.01<br>(0.02)    |
| tenure: 25-29                                            |                    | -0.03<br>(0.02)    | -0.06***<br>(0.02) |                    | 0.13***<br>(0.02)  | -0.03<br>(0.02)    |
| tenure: over 30                                          |                    | -0.01<br>(0.03)    | -0.05*<br>(0.03)   |                    | 0.18***<br>(0.02)  | 0.00<br>(0.02)     |
| Constant                                                 | 3.07***<br>(0.00)  | 3.20***<br>(0.01)  | 2.51***<br>(0.16)  | 2.96***<br>(0.01)  | 3.24***<br>(0.02)  | 1.50***<br>(0.15)  |
| Observations                                             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             | 54,614             |
| R-squared                                                | 0.02               | 0.03               | 0.04               | 0.01               | 0.05               | 0.07               |
| area and time                                            | YES                | YES                | YES                | YES                | YES                | YES                |

Notes: See footnote of Table 8. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

Appendix Table 10: Interactions between Union Demand, Supportive Attitude, and Supply: Standard Employees

| VARIABLES                                                   | (1)<br>job sat.    | (2)<br>job sat.    | (3)<br>job sat.    | (4)<br>job sat.    | (5)<br>life sat.   | (6)<br>life sat.   | (7)<br>life sat.   | (8)<br>life sat.   |
|-------------------------------------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| no interest, positive support<br>(only external choice)     | -0.11***<br>(0.01) | -0.11***<br>(0.01) | -0.11***<br>(0.01) | -0.10***<br>(0.01) | -0.03*<br>(0.02)   | -0.03*<br>(0.02)   | -0.04**<br>(0.02)  | -0.03<br>(0.02)    |
| frustrated demand<br>(only external choice)                 | -0.24***<br>(0.02) | -0.24***<br>(0.02) | -0.23***<br>(0.02) | -0.22***<br>(0.02) | -0.13***<br>(0.02) | -0.13***<br>(0.02) | -0.13***<br>(0.02) | -0.12***<br>(0.02) |
| realized demand, no support<br>(only external choice)       | 0.06<br>(0.06)     | 0.04<br>(0.06)     | 0.05<br>(0.07)     | 0.01<br>(0.07)     | -0.06<br>(0.06)    | -0.10*<br>(0.06)   | -0.10*<br>(0.05)   | -0.15**<br>(0.06)  |
| realized demand, positive support<br>(only external choice) | 0.29***<br>(0.06)  | 0.27***<br>(0.05)  | 0.27***<br>(0.06)  | 0.26***<br>(0.06)  | 0.17**<br>(0.07)   | 0.14**<br>(0.06)   | 0.13**<br>(0.06)   | 0.11*<br>(0.06)    |
| union-on-site:<br>no interest, no support                   | -0.09***<br>(0.03) | -0.09***<br>(0.03) | -0.14***<br>(0.03) | -0.16***<br>(0.03) | 0.06**<br>(0.03)   | 0.02<br>(0.03)     | -0.07**<br>(0.03)  | -0.09***<br>(0.03) |
| union-on-site:<br>no interest, positive support             | 0.32***<br>(0.03)  | 0.30***<br>(0.03)  | 0.22***<br>(0.03)  | 0.19***<br>(0.03)  | 0.36***<br>(0.03)  | 0.29***<br>(0.03)  | 0.17***<br>(0.03)  | 0.14***<br>(0.03)  |
| union-on-site:<br>frustrated demand                         | 0.31***<br>(0.04)  | 0.29***<br>(0.04)  | 0.23***<br>(0.04)  | 0.21***<br>(0.04)  | 0.29***<br>(0.03)  | 0.23***<br>(0.03)  | 0.14***<br>(0.04)  | 0.13***<br>(0.03)  |
| union-on-site:<br>realized demand, no support               | -0.33***<br>(0.06) | -0.32***<br>(0.07) | -0.32***<br>(0.07) | -0.28***<br>(0.07) | -0.05<br>(0.05)    | -0.05<br>(0.05)    | -0.07<br>(0.05)    | -0.03<br>(0.06)    |
| union-on-site:<br>realized demand, positive support         | -0.16**<br>(0.06)  | -0.16***<br>(0.06) | -0.16***<br>(0.06) | -0.15**<br>(0.06)  | 0.01<br>(0.07)     | -0.01<br>(0.06)    | -0.03<br>(0.06)    | -0.02<br>(0.06)    |
| Constant                                                    | 3.03***<br>(0.01)  | 3.19***<br>(0.02)  | 3.25***<br>(0.02)  | 0.05<br>(0.30)     | 3.02***<br>(0.01)  | 3.29***<br>(0.02)  | 3.40***<br>(0.03)  | -1.05***<br>(0.28) |
| Observations                                                | 36,234             | 36,234             | 36,234             | 36,234             | 36,234             | 36,234             | 36,234             | 36,234             |
| R-squared                                                   | 0.02               | 0.03               | 0.04               | 0.05               | 0.02               | 0.05               | 0.06               | 0.08               |
| sample                                                      | standard           | standard           | standard           | standard           | standard           | standard           | standard           | standard           |
| worker attributes                                           | NO                 | YES                | YES                | YES                | NO                 | YES                | YES                | YES                |
| workplace chara.                                            | NO                 | NO                 | YES                | YES                | NO                 | NO                 | YES                | YES                |
| working conditions                                          | NO                 | NO                 | NO                 | YES                | NO                 | NO                 | NO                 | YES                |
| area and time                                               | YES                | YES                | YES                | YES                | YES                | YES                | YES                | YES                |
| free-riding DiD                                             | 0.40               | 0.39               | 0.36               | 0.35               | 0.30               | 0.27               | 0.25               | 0.23               |
| p free-riding                                               | 0.00               | 0.00               | 0.00               | 0.00               | 0.00               | 0.00               | 0.00               | 0.00               |
| oversupply DiD                                              | -0.17              | -0.16              | -0.16              | -0.13              | -0.06              | -0.04              | -0.04              | -0.01              |
| p oversupply                                                | 0.06               | 0.08               | 0.09               | 0.15               | 0.45               | 0.60               | 0.58               | 0.92               |

Notes: Same specification as Table 8, estimated for workers with standard job titles ( $N = 34,724$ ). \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

Appendix Table 11: Robustness Checks: Ordered Logit, Excluding External Members, Periods

| VARIABLES                                            | (1)<br>job sat.    | (2)<br>life sat.   | (3)<br>job sat.    | (4)<br>life sat.   | (5)<br>job sat.    | (6)<br>job sat.    | (7)<br>life sat.   | (8)<br>life sat.   |
|------------------------------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| realized demand<br>(vs no interest or frustrated)    | -0.02<br>(0.03)    | -0.08***<br>(0.03) | -0.03<br>(0.02)    | -0.03*<br>(0.02)   | -0.01<br>(0.02)    | -0.01<br>(0.03)    | -0.02<br>(0.02)    | -0.04<br>(0.03)    |
| frustrated demand<br>(vs no interest or realization) | -0.25***<br>(0.03) | -0.21***<br>(0.03) | -0.15***<br>(0.02) | -0.12***<br>(0.02) | -0.18***<br>(0.02) | -0.11***<br>(0.02) | -0.14***<br>(0.02) | -0.09***<br>(0.02) |
| on-site union<br>(vs only external choice)           | 0.10***<br>(0.03)  | 0.13***<br>(0.03)  | 0.07***<br>(0.02)  | 0.07***<br>(0.01)  | 0.05***<br>(0.01)  | 0.06*<br>(0.03)    | 0.07***<br>(0.01)  | 0.07**<br>(0.03)   |
| Constant                                             |                    |                    | 2.46***<br>(0.17)  | 1.46***<br>(0.15)  | 2.01***<br>(0.24)  | 2.86***<br>(0.16)  | 1.11***<br>(0.25)  | 1.84***<br>(0.15)  |
| Observations                                         | 54,614             | 54,614             | 54,098             | 54,098             | 27,313             | 27,301             | 27,313             | 27,301             |
| R-squared                                            |                    |                    | 0.04               | 0.07               | 0.04               | 0.03               | 0.08               | 0.06               |
| model                                                | ologit             | ologit             | OLS                | OLS                | OLS                | OLS                | OLS                | OLS                |
| period                                               | all                | all                | all                | all                | by 2017            | since 2018         | by 2017            | since 2018         |
| external member                                      | YES                | YES                | NO                 | NO                 | YES                | YES                | YES                | YES                |

Notes: Specification as in Table 4, column (12), and the corresponding specification for life satisfaction (Appendix Table 7).

(1) and (2): ordered logit estimates for job and life satisfaction, respectively. (3) and (4): OLS estimates excluding members of external unions in workplaces without an on-site union. (5) and (6): job satisfaction, estimated for the first half (2011–2017) and second half (2018–2024), respectively. (7) and (8): life satisfaction, estimated for the first and second halves, respectively. Standard errors clustered by survey wave are reported in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

Appendix Table 12: Subsample Analysis (1): Gender

| VARIABLES                                   | (1)<br>job sat.    | (2)<br>job sat.    | (3)<br>life sat.   | (4)<br>life sat.   | (5)<br>job sat.    | (6)<br>job sat.    | (7)<br>life sat.   | (8)<br>life sat.   |
|---------------------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| frustrated demand<br>(only external choice) | -0.17***<br>(0.02) | -0.17***<br>(0.02) | -0.09***<br>(0.02) | -0.12***<br>(0.02) | -0.18***<br>(0.02) | -0.17***<br>(0.02) | -0.11***<br>(0.02) | -0.12***<br>(0.01) |
| realized demand<br>(only external choice)   | -0.00<br>(0.06)    | -0.02<br>(0.06)    | -0.05<br>(0.05)    | -0.14***<br>(0.04) | 0.25***<br>(0.04)  | 0.20***<br>(0.05)  | 0.13*<br>(0.07)    | 0.04<br>(0.07)     |
| union-on-site:<br>no interest               | 0.04<br>(0.02)     | 0.03<br>(0.03)     | 0.10***<br>(0.03)  | 0.06**<br>(0.03)   | 0.15***<br>(0.02)  | 0.02<br>(0.02)     | 0.29***<br>(0.02)  | 0.05***<br>(0.02)  |
| union-on-site:<br>frustrated demand         | 0.22***<br>(0.05)  | 0.18***<br>(0.05)  | 0.08*<br>(0.04)    | 0.05<br>(0.05)     | 0.32***<br>(0.04)  | 0.20***<br>(0.04)  | 0.30***<br>(0.03)  | 0.15***<br>(0.03)  |
| union-on-site:<br>realized demand           | -0.02<br>(0.06)    | 0.03<br>(0.06)     | 0.15***<br>(0.05)  | 0.15***<br>(0.05)  | -0.17***<br>(0.04) | -0.16***<br>(0.05) | 0.06<br>(0.07)     | 0.01<br>(0.07)     |
| Constant                                    | 3.18***<br>(0.01)  | 3.23***<br>(0.14)  | 3.08***<br>(0.01)  | 2.43***<br>(0.16)  | 2.96***<br>(0.01)  | 0.79***<br>(0.26)  | 2.86***<br>(0.01)  | -0.33<br>(0.30)    |
| Observations                                | 24,284             | 24,284             | 24,284             | 24,284             | 30,330             | 30,330             | 30,330             | 30,330             |
| R-squared                                   | 0.01               | 0.03               | 0.01               | 0.05               | 0.01               | 0.04               | 0.02               | 0.09               |
| gender                                      | female             | female             | female             | female             | male               | male               | male               | male               |
| worker attributes                           | NO                 | YES                | NO                 | YES                | NO                 | YES                | NO                 | YES                |
| workplace chara.                            | NO                 | YES                | NO                 | YES                | NO                 | YES                | NO                 | YES                |
| working conditions                          | NO                 | YES                | NO                 | YES                | NO                 | YES                | NO                 | YES                |
| area and time                               | YES                | YES                | YES                | YES                | YES                | YES                | YES                | YES                |
| on-site: frustrated vs no interest          | 0.00               | -0.01              | -0.11              | -0.13              | -0.02              | 0.01               | -0.10              | -0.02              |
| p frustrated                                | 0.94               | 0.82               | 0.05               | 0.04               | 0.69               | 0.76               | 0.03               | 0.54               |
| on-site: realized vs no interest            | -0.06              | -0.01              | -0.01              | -0.05              | -0.08              | 0.02               | -0.10              | 0.00               |
| p realized                                  | 0.05               | 0.72               | 0.81               | 0.08               | 0.00               | 0.44               | 0.00               | 0.87               |

Notes: Same specification as Table 5, estimated separately for female and male workers. Columns report no-control and full-control specifications for job satisfaction (columns (1)–(2) female, (5)–(6) male) and life satisfaction (columns (3)–(4) female, (7)–(8) male). \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

Appendix Table 13: Subsample Analysis (2): Educational Attainment

| VARIABLES                                   | (1)<br>job sat.    | (2)<br>job sat.    | (3)<br>life sat.   | (4)<br>life sat.   | (5)<br>job sat.    | (6)<br>job sat.    | (7)<br>life sat.   | (8)<br>life sat.   |
|---------------------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| frustrated demand<br>(only external choice) | -0.20***<br>(0.02) | -0.17***<br>(0.02) | -0.13***<br>(0.02) | -0.13***<br>(0.02) | -0.19***<br>(0.02) | -0.17***<br>(0.02) | -0.12***<br>(0.02) | -0.11***<br>(0.02) |
| realized demand<br>(only external choice)   | 0.05<br>(0.06)     | 0.05<br>(0.06)     | 0.07<br>(0.07)     | 0.00<br>(0.07)     | 0.17***<br>(0.04)  | 0.17***<br>(0.04)  | -0.02<br>(0.05)    | -0.06<br>(0.05)    |
| union-on-site:<br>no interest               | 0.06**<br>(0.02)   | 0.03<br>(0.03)     | 0.10***<br>(0.02)  | 0.05**<br>(0.02)   | 0.09***<br>(0.02)  | 0.03<br>(0.02)     | 0.21***<br>(0.02)  | 0.06***<br>(0.02)  |
| union-on-site:<br>frustrated demand         | 0.28***<br>(0.06)  | 0.21***<br>(0.06)  | 0.16***<br>(0.06)  | 0.13**<br>(0.06)   | 0.27***<br>(0.03)  | 0.19***<br>(0.03)  | 0.22***<br>(0.03)  | 0.10***<br>(0.03)  |
| union-on-site:<br>realized demand           | -0.07<br>(0.06)    | -0.02<br>(0.06)    | -0.01<br>(0.07)    | 0.00<br>(0.06)     | -0.15***<br>(0.04) | -0.13***<br>(0.04) | 0.15**<br>(0.06)   | 0.11*<br>(0.06)    |
| Constant                                    | 3.11***<br>(0.01)  | 2.96***<br>(0.24)  | 2.92***<br>(0.01)  | 1.68***<br>(0.21)  | 3.03***<br>(0.01)  | 1.81***<br>(0.16)  | 3.02***<br>(0.01)  | 1.11***<br>(0.23)  |
| Observations                                | 25,638             | 25,638             | 25,638             | 25,638             | 28,976             | 28,976             | 28,976             | 28,976             |
| R-squared                                   | 0.01               | 0.04               | 0.01               | 0.06               | 0.01               | 0.04               | 0.01               | 0.07               |
| education                                   | non-univ           | non-univ           | non-univ           | non-univ           | univ               | univ               | univ               | univ               |
| worker attributes                           | NO                 | YES                | NO                 | YES                | NO                 | YES                | NO                 | YES                |
| workplace chara.                            | NO                 | YES                | NO                 | YES                | NO                 | YES                | NO                 | YES                |
| working conditions                          | NO                 | YES                | NO                 | YES                | NO                 | YES                | NO                 | YES                |
| area and time                               | YES                | YES                | YES                | YES                | YES                | YES                | YES                | YES                |
| on-site: frustrated vs no interest          | 0.02               | 0.01               | -0.07              | -0.05              | -0.01              | -0.01              | -0.11              | -0.07              |
| p frustrated                                | 0.80               | 0.86               | 0.32               | 0.43               | 0.71               | 0.88               | 0.01               | 0.09               |
| on-site: realized vs no interest            | -0.07              | -0.01              | -0.03              | -0.04              | -0.07              | 0.01               | -0.08              | -0.01              |
| p realized                                  | 0.02               | 0.83               | 0.32               | 0.16               | 0.01               | 0.79               | 0.00               | 0.58               |

Notes: Same specification as Table 5, estimated separately for non-university and university-educated workers. Columns report no-control and full-control specifications for job satisfaction (columns (1)–(2) non-university, (5)–(6) university) and life satisfaction (columns (3)–(4) non-university, (7)–(8) university). \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

Appendix Table 14: Subsample Analysis (3): Age

| VARIABLES                                   | (1)<br>job sat.    | (2)<br>job sat.    | (3)<br>life sat.  | (4)<br>life sat.   | (5)<br>job sat.    | (6)<br>job sat.    | (7)<br>life sat.   | (8)<br>life sat.   |
|---------------------------------------------|--------------------|--------------------|-------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| frustrated demand<br>(only external choice) | -0.13***<br>(0.02) | -0.12***<br>(0.02) | -0.04*<br>(0.02)  | -0.07***<br>(0.02) | -0.27***<br>(0.02) | -0.23***<br>(0.02) | -0.21***<br>(0.02) | -0.18***<br>(0.02) |
| realized demand<br>(only external choice)   | 0.17***<br>(0.05)  | 0.15***<br>(0.05)  | 0.11**<br>(0.05)  | 0.03<br>(0.05)     | 0.05<br>(0.07)     | 0.06<br>(0.07)     | -0.10<br>(0.07)    | -0.16**<br>(0.07)  |
| union-on-site:<br>no interest               | 0.10***<br>(0.02)  | 0.06*<br>(0.03)    | 0.16***<br>(0.03) | 0.09***<br>(0.03)  | 0.06***<br>(0.02)  | -0.01<br>(0.02)    | 0.20***<br>(0.02)  | 0.02<br>(0.02)     |
| union-on-site:<br>frustrated demand         | 0.29***<br>(0.04)  | 0.23***<br>(0.04)  | 0.10**<br>(0.04)  | 0.10**<br>(0.04)   | 0.28***<br>(0.05)  | 0.18***<br>(0.05)  | 0.32***<br>(0.05)  | 0.14**<br>(0.05)   |
| union-on-site:<br>realized demand           | -0.08<br>(0.05)    | -0.07<br>(0.05)    | 0.11**<br>(0.05)  | 0.05<br>(0.04)     | -0.15**<br>(0.07)  | -0.10<br>(0.07)    | 0.10<br>(0.07)     | 0.12<br>(0.07)     |
| Constant                                    | 3.00***<br>(0.01)  | 2.54***<br>(0.21)  | 2.96***<br>(0.01) | 1.42***<br>(0.20)  | 3.15***<br>(0.01)  | 1.97***<br>(0.19)  | 2.97***<br>(0.01)  | 0.90***<br>(0.17)  |
| Observations                                | 28,431             | 28,431             | 28,431            | 28,431             | 26,183             | 26,183             | 26,183             | 26,183             |
| R-squared                                   | 0.01               | 0.03               | 0.01              | 0.07               | 0.01               | 0.05               | 0.01               | 0.08               |
| age                                         | 42 or younger      | 42 or younger      | 42 or younger     | 42 or younger      | over 42            | over 42            | over 42            | over 42            |
| worker attributes                           | NO                 | YES                | NO                | YES                | NO                 | YES                | NO                 | YES                |
| workplace chara.                            | NO                 | YES                | NO                | YES                | NO                 | YES                | NO                 | YES                |
| working conditions                          | NO                 | YES                | NO                | YES                | NO                 | YES                | NO                 | YES                |
| area and time                               | YES                | YES                | YES               | YES                | YES                | YES                | YES                | YES                |
| on-site: frustrated vs no interest          | 0.06               | 0.05               | -0.10             | -0.06              | -0.05              | -0.04              | -0.10              | -0.06              |
| p frustrated                                | 0.21               | 0.32               | 0.05              | 0.17               | 0.34               | 0.47               | 0.13               | 0.31               |
| on-site: realized vs no interest            | -0.01              | 0.02               | 0.05              | 0.00               | -0.16              | -0.04              | -0.20              | -0.06              |
| p realized                                  | 0.75               | 0.49               | 0.05              | 0.93               | 0.00               | 0.15               | 0.00               | 0.01               |

Notes: Same specification as Table 5, estimated separately for workers aged 42 or younger and over 42. Columns report no-control and full-control specifications for job satisfaction (columns (1)–(2) and (5)–(6)) and life satisfaction (columns (3)–(4) and (7)–(8)). \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

Appendix Table 15: Subsample Analysis (4): Birth Cohort

| VARIABLES                                   | (1)<br>job sat.    | (2)<br>job sat.    | (3)<br>life sat.  | (4)<br>life sat.   | (5)<br>job sat.    | (6)<br>job sat.    | (7)<br>life sat.   | (8)<br>life sat.   |
|---------------------------------------------|--------------------|--------------------|-------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| frustrated demand<br>(only external choice) | -0.12***<br>(0.02) | -0.11***<br>(0.02) | -0.02<br>(0.02)   | -0.06***<br>(0.02) | -0.26***<br>(0.02) | -0.22***<br>(0.02) | -0.21***<br>(0.02) | -0.18***<br>(0.02) |
| realized demand<br>(only external choice)   | 0.18***<br>(0.04)  | 0.16***<br>(0.04)  | 0.12**<br>(0.05)  | 0.05<br>(0.04)     | 0.03<br>(0.07)     | 0.03<br>(0.07)     | -0.11<br>(0.07)    | -0.17**<br>(0.07)  |
| union-on-site:<br>no interest               | 0.05**<br>(0.02)   | 0.02<br>(0.03)     | 0.14***<br>(0.03) | 0.06*<br>(0.04)    | 0.08***<br>(0.02)  | 0.01<br>(0.02)     | 0.21***<br>(0.02)  | 0.03<br>(0.02)     |
| union-on-site:<br>frustrated demand         | 0.30***<br>(0.04)  | 0.24***<br>(0.04)  | 0.12***<br>(0.04) | 0.12**<br>(0.04)   | 0.26***<br>(0.04)  | 0.16***<br>(0.04)  | 0.29***<br>(0.05)  | 0.12**<br>(0.05)   |
| union-on-site:<br>realized demand           | -0.09**<br>(0.04)  | -0.07*<br>(0.04)   | 0.10**<br>(0.05)  | 0.05<br>(0.04)     | -0.11<br>(0.07)    | -0.07<br>(0.07)    | 0.13*<br>(0.07)    | 0.13*<br>(0.08)    |
| Constant                                    | 2.99***<br>(0.01)  | 2.65***<br>(0.20)  | 2.96***<br>(0.01) | 1.67***<br>(0.19)  | 3.12***<br>(0.01)  | 1.94***<br>(0.19)  | 2.99***<br>(0.01)  | 0.82***<br>(0.18)  |
| Observations                                | 25,961             | 25,961             | 25,961            | 25,961             | 28,653             | 28,653             | 28,653             | 28,653             |
| R-squared                                   | 0.01               | 0.03               | 0.01              | 0.07               | 0.01               | 0.05               | 0.01               | 0.08               |
| birth year                                  | post-1976          | post-1976          | post-1976         | post-1976          | 1976 or earlier    | 1976 or earlier    | 1976 or earlier    | 1976 or earlier    |
| worker attributes                           | NO                 | YES                | NO                | YES                | NO                 | YES                | NO                 | YES                |
| workplace chara.                            | NO                 | YES                | NO                | YES                | NO                 | YES                | NO                 | YES                |
| working conditions                          | NO                 | YES                | NO                | YES                | NO                 | YES                | NO                 | YES                |
| area and time                               | YES                | YES                | YES               | YES                | YES                | YES                | YES                | YES                |
| on-site: frustrated vs no interest          | 0.13               | 0.11               | -0.03             | 0.00               | -0.08              | -0.07              | -0.13              | -0.10              |
| p frustrated                                | 0.00               | 0.02               | 0.59              | 0.95               | 0.13               | 0.22               | 0.03               | 0.09               |
| on-site: realized vs no interest            | 0.04               | 0.07               | 0.09              | 0.03               | -0.16              | -0.05              | -0.19              | -0.07              |
| p realized                                  | 0.22               | 0.05               | 0.01              | 0.38               | 0.00               | 0.04               | 0.00               | 0.00               |

Notes: Same specification as Table 5, estimated separately for workers born after 1976 and in 1976 or earlier. Columns report no-control and full-control specifications for job satisfaction (columns (1)–(2) and (5)–(6)) and life satisfaction (columns (3)–(4) and (7)–(8)). \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .