Show Me the Amenity: Are Higher-Paying Firms Better All Around?

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Abstract

Do firms that pay more offer better amenities, or does the greater pay compensate for worse amenities? Using matched U.S. employee-employer data, this paper estimates the joint distribution of wages, amenities, and job satisfaction across firms. Fifty amenities are captured applying topic modeling to workers' free-response descriptions of their jobs. Three main findings emerge. First, higher-paying firms offer better amenities. Second, employees value amenities: one-third have a more pronounced effect on satisfaction than pay. Third, since workers are willing to pay for satisfaction and because the covariance between amenities and wages is sufficiently high, amenities widen compensation dispersion across firms.

JEL-Codes: J010, J320, M500.

Keywords: job amenities, job satisfaction, inequality.

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1   Introduction

Innumerable studies of the labor market have furthered our understanding of wages and wage growth, helping to illuminate wage gaps, wage floors, wage schedules, wage subsidies, wage rigidity, and wage inequality. Jobs, however, are inherently complex, reflecting "many margins" beyond just a wage (Clemens, 2021). Whether these many margins, i.e. amenities, complement or substitute for wages remains empirically unanswered, despite the consensus that workers value non-pecuniary aspects of work (Akerlof et al., 1988; Mas and Pallais, 2017; Maestas et al., 2018). Do firms that pay more offer better amenities, or does the greater pay compensate for worse amenities? Since either is theoretically possible (Sorkin, 2018), data on firm-level amenities should offer the best opportunity to settle this debate.[1] Obtaining such data though has proven difficult. While current wage levels are easily observed and abundantly available, non-wage attributes are not. It is not obvious what attributes would even be considered or how one would go about measuring them. In addition, workers may have heterogeneous experiences with amenities, meaning objective measures alone may not fully capture amenity quality.[2] Determining how firms' amenities correlate with wages would require new data on amenities for workers and firms over time. With the advent of online employer reviews, such an exercise is now feasible.

This paper estimates which job amenities workers value, which firms offer more favorable amenities, and the aggregate importance of amenities as compared with wages. The building block for this analysis is workers' free response descriptions of the positive and negative aspects of their jobs on the website Glassdoor. To extract nuanced amenities from these unstructured but meaningful texts, I apply the semi-supervised topic modeling approach of Gallagher et al. (2017). Topic modeling allows researchers to capture hard-to-define themes in text that humans may be unable to detect themselves. A semi-supervised approach further guides such a model to help ensure the outputted themes are interpretable. Applying this model to reviews on Glassdoor, I summarize the quality of fifty amenities that appear in workers' characterizations of their employers. They capture the multidimensional nature of

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[1]On one hand, according to Rosen (1986), wages and job attributes move inversely depending upon firms' marginal costs of amenity provision: Among firms of similar productivity levels, those with a comparative advantage in amenity provision provide better amenities but lower wages. On the other hand, Mortensen (2003) argues that wages and job attributes co-move since amenities are an alternative medium by which to compensate workers: More-productive firms can afford to offer greater wages and more amenity value than less-productive firms. While some have presented evidence that the labor market operates within a compensating differential framework (Eriksson and Kristensen, 2014; Sorkin, 2018; Jäger et al., 2021), others have documented the absence of such differentials (Bonhomme and Jolivet, 2009; Maestas et al., 2018).

[2]Suppose, for instance, coworker quality has value to workers (Jäger et al., 2021) and is a function of both ability and friendliness. While the former can be proxied for using coworkers' wages, the latter reflects a degree of sentiment that requires individuals' own perceptions of their workplaces.

work, including pecuniary traits related to pay and fringe benefits, as well as non-pecuniary traits related to working conditions, human capital investments, and interpersonal relationships. Since each review constitutes an employee-employer match where I can identify the worker and the firm, by using data on job switchers who leave multiple reviews, I can capture firm-level differences in job satisfaction and the quality of each amenity vis-à-vis the firm fixed effects from the canonical two-way fixed effects model of Abowd et al. (1999), hereafter AKM.

This first main contribution of this paper is to develop firm-specific measures of amenities and job satisfaction. Previous empirical work has established differences in amenity evaluations (Maestas et al., 2018) and job satisfaction (Jäger et al., 2021) between differently-paid workers, but has not been able to speak to the effects attributable directly to firms. Estimating each firm's relative premium for wages and for satisfaction, I find that higher-paying firms provide greater job satisfaction: a one-standard-deviation increase in the wage premium a firm offers (compared with other firms) is associated with 0.10 standard deviations improved job satisfaction. As such, workers who transition to a higher-paying firm tend to enjoy not only greater wage growth on average, but also an associated increase in satisfaction. This increase in satisfaction is broad-based, with workers reporting improved sentiment along dimensions not directly related to wages, including career opportunities, culture and values, senior management, and work-life balance. This pattern is evident within and across industries, suggesting that inter-industry wage differentials do not fundamentally reflect equalizing compensation for unfavorable work (Krueger and Summers, 1988).

In capturing job amenities directly, my analysis does not rely upon the commonly used assumption that workers' moves to lower-paying firms can be rationalized by unobserved, positive changes in amenities (Bonhomme and Jolivet, 2009; Sullivan and To, 2014; Sorkin, 2018; Lamadon et al., 2019; Taber and Vejlin, 2020). In fact, I find little empirical evidence validating this assumption: pay cuts in my data are more frequent for workers moving to lower-satisfaction firms, not higher-satisfaction ones. Rather, most job amenities are positively correlated with pay. While high-paying firms offer worse job security, they provide better interpersonal relationships, invest more in human capital, supply more favorable fringe benefits, and offer superior working conditions. This finding runs counter to the notion that firms' wage premia compensate for unfavorable job characteristics (Rosen, 1986; Sorkin, 2018) and instead supports more-productive firms offering improved amenities (Mortensen, 2003; Lamadon et al., 2019).

The second main contribution is to estimate how workers value satisfaction and amenities. Non-wage amenities, e.g., one's coworkers, managers, autonomy, and respect, are non-pecuniary in nature and as such, are not explicitly priced. In the spirit of Gronberg and

Reed (1994), I estimate how long workers remain with an employer, i.e. firm tenure, as a function of both wages and job satisfaction, accounting for differences across employers, locations, gender and time to account for heterogeneity in outside offers and over the business cycle.[3] If the utility a worker derives from their employment rises with their wage and their job satisfaction, then both should positively influence whether they remain longer in the match. The resulting estimates can be used to provide a dollar-equivalent of job satisfaction in terms of its ability to attract and retain workers. Looking at workers' completed job spells, because greater wages and improved satisfaction each elongate firm tenure, workers exhibit a positive willingness to pay for job satisfaction. Even after narrowing in on the portion of satisfaction attributable to non-pay-related amenities, there are stark disparities in amenity value between firms: Workers gain in amenity value 45-55 percent of the average wage moving from the worst to the best amenity firms, i.e., a five-standard deviation improvement. Decomposing job satisfaction into these fifty amenities reveals that firm-level differences in wages and pay satisfaction explain only 1.1 percent of the variation in job satisfaction across firms. Non-wage amenities, on the other hand, explain 31.5 percent of the variation in job satisfaction — in part reflecting how more than one-third of amenities, including respect/abuse, culture, leadership, and coworkers, have a more pronounced effect on job satisfaction than does pay.

The third main contribution is to illuminate whether amenities exacerbate or attenuate wage dispersion across firms. Settling this debate remains an ongoing issue: While Lamadon et al. (2019) find that more-productive firms offer better amenities, Sorkin (2018) concludes that three-quarters of the wage premia firms offer reflect compensating differentials. If high-wage firms offer less favorable non-wage amenities, then the disparity in total compensation will be thinner than the disparity in wages. The reverse is true if high-wage firms offer more favorable amenities. Since relating firms' total compensation premia to their wage premia reveals an elasticity above one, amenities amplify inequality across firms. Incorporating non-wage amenities raises compensation variance across firms by 19–72 percent and widens the compensation gap between the tenth and ninetieth percentiles of firms by 7–15 log points. Job satisfaction data thus reveal that wages understate inequality between firms in the U.S. labor market. Improved amenities may therefore also help explain the high degree to which high-wage workers sort into high-paying firms (Card et al., 2013; Song et al., 2019; Bonhomme et al., 2020)

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[3]I also consider an alternative approach to estimating the willingness to pay for job satisfaction by studying workers' application behavior for online job postings, the details for which are available in Appendix G. Given that this methodology is an ex-ante valuation of the satisfaction jobseekers may expect to experience with a job, rather than the ex-post realization of satisfaction on the job underpinning the tenure-based analysis, this alternative is not the benchmark. The results are qualitatively similar but quantitatively smaller.

The rest of this paper is organized as follows: Section 2 discusses the relevant literature, Section 3 describes and validates the Glassdoor data, Section 4 investigates the relation between wages and job satisfaction across firms, Section 5 introduces the fifty amenities, Section 6 quantifies how much workers are willing to pay for job satisfaction, Section 7 estimates firm-level dispersion when amenity value is considered alongside wages, Section 8 investigates the robustness of these results to alternative modeling decisions, Section 9 highlights implications of the results while mentioning limitations, and Section 10 concludes.

2   Relevant Literature

In uncovering disparities in amenity quality across firms, this work relates to a number of important strands of the literature. First is a budding literature on the importance of the non-wage aspect(s) of jobs for understanding labor market dynamics. Non-wage job characteristics have been found to be valued enough to affect workers' preferences for jobs and labor market sorting (Sullivan and To, 2014; Hall and Mueller, 2018).[4] Examples include occupational fatality risk (DeLeire and Levy, 2004), the degree of social interaction (Krueger and Schkade, 2008), and flexibility with respect to time and location (He et al., 2021). Non-wage attributes have also been found to be especially important in understanding differences in jobseeker behavior by gender.[5]

Since non-wage amenities vary between jobs, there is dispersion that wages alone may fail to capture. Taber and Vejlin (2020) estimate that the variance of wages plus non-pecuniary aspects is more than twice as large as the variance of wages alone — through the lens of a Roy model with compensating differentials (i.e., omitting the Mortensen (2003) channel), search frictions, and human capital. From omitting job characteristics, such as workplace safety (Park et al., 2021), working at convenient times of the day (Hamermesh, 1999), fringe benefits (Piketty et al., 2017), sexual harassment (Folke and Rickne, 2020), or labor rights violations (Marinescu et al., 2020), we may understate total inequality between workers of different education levels (Duncan, 1976) or wages (Maestas et al., 2018).

Second is a literature characterizing workers' willingness to pay for non-wage attributes. Workers will accept lower wages to avoid bad working conditions and frequent physical activity (Gronberg and Reed, 1994), enjoy reduced workplace hazards and a flexible work

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[4]Improved signals of employer quality that reflect the non-wage aspects work have been shown to increase labor supply: Turban and Cable (2003) using "the best companies to work for" lists published by various media outlets and Sockin and Sojourner (2020) using Glassdoor employer ratings.

[5]Examples include the provision of parental leave benefits (Liu et al., 2019; Fluchtmann et al., 2020), commuting length (Herzog and Schlottmann, 1990; Le Barbanchon et al., 2020), competition (Sockin and Sockin, 2019b), and workplace flexibility (Bender et al., 2005; Goldin and Katz, 2011).

schedule (Felfe, 2012), have job security (Bonhomme and Jolivet, 2009), avoid unanticipated work schedules (Mas and Pallais, 2017), receive faster earnings growth (Wiswall and Zafar, 2017), have a flexible work arrangement (Chen et al., 2019), conduct more meaningful work, experience less work-related stress and have job autonomy, teamwork, job training, and paid time off (Maestas et al., 2018). Willingness-to-pay estimates can also be quite large: Maestas et al. (2018) estimate that transitioning from the worst-amenity job to the best (as characterized by their set of nine amenities) would be valued at a 56 percent wage increase.

Third is a literature related to the determinants and implications of job satisfaction. Locke (1969) theorizes that job satisfaction captures every element of which a job is comprised, and reflects not only the objective quality of each aspect, but individuals' subjective perceptions and value rankings as well. Although greater pay is associated with more pay satisfaction (Bryson et al., 2012), overall job satisfaction has been found to predominantly reflect non-pecuniary rather than pecuniary aspects of work (Akerlof et al., 1988; Clark, 1998) — though disparities in pay among peers, which could arguably reflect non-wage characteristics such as fairness and respect, can stunt job satisfaction (Card et al., 2012). Consistent with other work that has found job satisfaction to be an important predictor for why workers voluntarily quit (Freeman, 1978; Bartel, 1982; Akerlof et al., 1988; Clark, 2001; Card et al., 2012), I find that more-satisfied workers exhibit longer firm tenure. And since job satisfaction predominantly reflects non-wage characteristics, job amenities constitute meaningful drivers for worker turnover.[6] To borrow a quote from Akerlof et al. (1988), "As man does not live by bread alone, people do not quit only for wages."

Last is a literature on the role of firms in explaining worker compensation. The AKM model quantifies the role of firms by regressing workers' wages on fixed effects for the worker and the firm, a linearly additive view validated by Bonhomme et al. (2019). Estimates for the share of the variance in wages attributable to firms typically ranges from 15–25 percent (see Bonhomme et al. (2020) for a summary of the literature). That range falls to 5–13 percent and the contribution from the sorting of workers into firms rises after accounting for limited mobility, i.e. firms on average having few job switchers in the data (Andrews et al., 2008; Kline et al., 2020; Bonhomme et al., 2020). To account for limited mobility, I consider more connected sets of firms with many job switchers in the data. While there is some nascent work examining non-wage attributes across firms, empirical measures for amenities are almost entirely absent, likely reflecting the unavailability of such data.[7] As a result,

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[6]Jäger et al. (2021) find that in a survey where workers were asked their reasons for not switching to new employers, the primary reasons given pertained to non-wage components such as job security, work atmosphere, work schedule, and colleagues rather than difficulty in finding a better-paying job.

[7]One notable exception is the work of Lagos (2019) who captures amenities across Brazilian firms using a textual-based analysis of collective bargaining agreements between unions and employers. Whereas I use

amenity value has to be inferred from wages and job transitions. The positive correlation I document between wages and non-wage attributes (without having to impute amenity value from wage data) lends empirical support to the findings of Lamadon et al. (2019), while at the same time, is in line with workers at higher-paying firms participating more in social insurance programs (Bana et al., 2018; Lachowska et al., 2021) and job satisfaction improving with coworkers' wages (Clark et al., 2009).

3   Data Description

3.1   Sources

The data come primarily from the online platform Glassdoor, where jobseekers can go to obtain labor market information about prospective employers provided by current and former employees of each firm. Workers are incentivized to volunteer their own experiences through a "give-to-get" policy whereby contributors gain access to the information others have provided. To satisfy the give-to-get policy, current and former employees can submit either an employer review, a pay report, or a benefits rating.[8] After one year, access expires and workers must complete another survey, again either of the three, to maintain access. To ensure some degree of accountability, contributors to the website are required to have a verified email address or social network account. Despite this verification process, firms may incent workers to leave disingenuously positive reviews and recently-fired employees may disingenuously leave retaliatory negative reviews. Reassuringly however, the main results hold when excluding suspect reviews for such manipulation by firms (Table 8: row 9) or excluding reviews left by former employees (Table 8: row 13).

While the incentive this give-to-get policy induces can assist in mitigating bias that arises from voluntary reporting (Marinescu et al., 2021), it is possible that workers strategically decide which type(s) of information to report to meet the requirement. While 23 percent of workers provide just an employer review and another 23 percent provide both an employer review and a pay report, 48 percent contribute only a pay report (see Table J1). If workers from higher-paying firms that have negative experiences to share systematically choose to disclose their wages rather than their sentiment, possibly out of fear of employer retaliation

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within-worker differences in job satisfaction to identify firm-level amenities and allow for vertical differentiation in amenities across firms, Lagos (2019) estimates firm-level amenities based on how collective bargaining agreements with the firm change over time, where amenity value is estimated conditional on wage growth vis-à-vis compensating differentials, capturing instead horizontal differentiation in amenities, i.e. analyzing how the wage-amenity bundle evolves holding productivity constant.

[8]Jobseekers can alternatively provide an interview review to satisfy the give-to-get policy. We make use of these data to assess differences in competition for firms' vacancies in Table J10.

([Sockin and Sojourner, 2020](#)), then higher-paying firms may exhibit elevated levels of satisfaction not because of improved amenities, but rather omission in reporting. This concern is formally addressed in Table J2: While a greater share of workers providing only a pay report is associated with higher-paying firms, and such firms on average report greater levels of satisfaction, the potential bias induced from workers choosing which information to supply does not alter the main findings.

When submitting an employer review, each worker is first asked which firm they would like to review and whether they are a current or former employee of the firm. If they are a former employee, they are then prompted for the last year they were employed at the firm. The worker can then rate the employer overall on a one-to-five-stars integral scale, with more stars indicating greater satisfaction, and provide free-text responses describing the 'Pros' (i.e., positive characteristics) and the 'Cons' (i.e., negative characteristics) of working for the firm.[9] Although I assume throughout that this five-star measure is a linear representation of job satisfaction, relaxing this assumption and allowing for non-linearity between stars produces similar results (Table 8: row 10). In addition, the worker can rate the employer along five sub-dimensions (career opportunities, compensation and benefits, culture and values, senior management, and work-life balance) on the same one-to-five-stars scale. Each worker can also provide the location of their employment, their job title, and their years of tenure with the firm.[10] For an in-depth description of the Glassdoor reviews data, which span 2008–2021, see [Green et al. (2019)](#).

When submitting a wage report, each worker is first asked for their job title and whether they are a current or former employee of the firm. Again, if they are a former employee, they are prompted for the last year employed with the firm. The worker then provides their base income, pay frequency (annually, hourly, or monthly), variable pay (cash bonuses, stock bonuses, profit sharing, sales commissions, and tips or gratuities), years of experience, employment status (e.g., full-time or part-time), employer name, and location. Given that hours are not observed, I restrict the sample to only full-time workers. From here on, a worker's wage refers to their total earnings, i.e, the sum of their base and variable compensation.[11] For consistency across workers, I annualize wages assuming hourly employees work 2,000 hours per year and monthly employees work for twelve months. For a thorough discussion

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[9]Respondents are not prompted to report their wage when submitting an employer review. As such, the concern that workers will not discuss pay when completing the free-response text because they provide wage information elsewhere in the submission form is not present.

[10]Disclosing one's job title and one's location is not required to submit a review.

[11]Since more profitable firms increasingly offer variable earnings ([Sockin and Sockin, 2021](#)), omitting variable pay may understate the degree of dispersion in firms' wage premia. To account for possible measurement error though from misreporting, the 2.8 percent of observations in which workers detail a non-annual pay frequency for variable pay are excluded from the sample.

of the Glassdoor wage data, which span 2008–2021, see Sockin and Sockin (2019a).

3.2   External Validity

In order to make broad statements about the U.S. labor market, it is important to first show that Glassdoor ratings accurately capture labor market patterns observed in other datasets. Given the subjective nature of the main measure of interest, job satisfaction, possible datasets that can be used for comparison are necessarily restricted to worker surveys. Though measures of job satisfaction in publicly available surveys are scant, the National Longitudinal Survey of Youth 1997 (NLSY97) asks respondents whether they are satisfied with their jobs on a 1–5 integral ranking, the same as Glassdoor. Workers in the NLSY97 sample are more positive in their job assessments than workers in Glassdoor. In the NLSY97, the average satisfaction level is 3.85, and only 10.7 percent of workers report either of the two lowest satisfaction levels. For comparison, the average overall rating in Glassdoor is 3.47 and 25.4 percent of workers submit ratings of one or two stars.

Though the average and shape of the ratings distributions may be dissimilar, for our purposes, the validity of using Glassdoor ratings rests in whether the sample accurately reflects disparities observed between different job opportunities. To that end, I compare the average job satisfaction level between the two datasets by two-digit NAICS industry and two-digit SOC occupation, the scatterplots for which are displayed in panels (a) and (b) of Figure 1, respectively.[12] Across seventeen industries, we observe a robust correlation (0.51, p-value = 0.037), meaning industries with high levels of satisfaction in the NLSY97 also have relatively high ratings in Glassdoor. The result is similar across twenty-one occupations (correlation of 0.47, p-value = 0.031).

Glassdoor wage data also capture broad trends in the U.S. labor market. Karabarbounis and Pinto (2019) find that, conditional on industry or region, the wage distribution in Glassdoor captures the respective distributions obtained from the Quarterly Census for Employment and Wages (QCEW) and the Panel Study of Income Dynamics (PSID); though Karabarbounis and Pinto (2019) note the distribution of employment by industry is not representative — an issue less relevant for this work given the focus on individual firms. Martellini et al. (2021) compare the average earnings of graduates by college within Glassdoor with averages produced by the U.S. Department of Education's College Scorecard from tax data, and conclude that Glassdoor provides an unbiased sample. Additionally, Glassdoor wages have been used to validate results from other data (Derenoncourt et al., 2021). I add to this by showing that Glassdoor wages reflect differences observed in the Annual Social

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[12]Across 309 NAICS industry x two-digit SOC occupation pairs, the correlation is 0.35 (p-value < 0.000).

Figure 1: Comparison of Glassdoor and NLSY97 Satisfaction Levels

(a) By industry   (b) By occupation
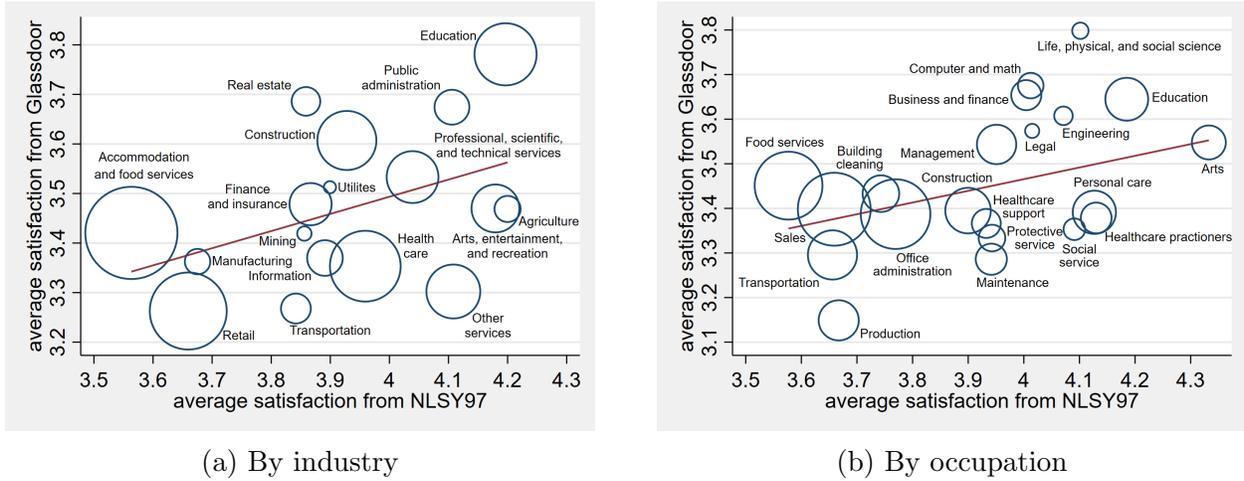
Notes: This figure plots the relation between the average job satisfaction in the National Longitudinal Survey of Youth 1997 and average overall rating in Glassdoor by industry or occupation. Solid line indicates linear line of best fit. Industries and occupations are weighted by the total representative weight for each grouping from the NLSY97.

and Economic Supplement of the Current Population Survey (ASEC) between industries and occupations (Table 1). Glassdoor data capture the first moment of wages well, exhibiting a correlation of 0.93 with ASEC and an elasticity of 1.3, highlighting that Glassdoor somewhat overestimates earnings for high-wage jobs. With regards to the dispersion of labor earnings, the semblance between the two is noticeably weaker albeit still appreciably positive. For the standard deviation and interquartile range, we observe correlations of 0.48–0.52. There-fore, conditional on industry and occupation, Glassdoor data reflect meaningful differences in labor income observed in other data sources.

3.3   Capturing Amenities with Semi-Supervised Topic Modeling

While workers provide ratings along five broad sub-dimensions when submitting an employer review, these broad subcategories reflect how workers perceive amalgamations of different work aspects. To isolate specific job amenities, I make use of the free-text responses that workers submit for the 'pros' and 'cons' sections of their reviews. This has the advantage of, unlike other surveys where it is explicit what attributes are being captured, allowing workers to tell us (the researchers) what amenities matter to them. Further, because workers partition their sentiment into the positive ('pros') and negative ('cons') features, I can measure an amenity's quality based on whether it is discussed in the former or the latter. While workers do not mention every amenity, I interpret the worker choosing to mention an amenity as signaling that the quality is especially above or below average or expectation.

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Table 1: Earnings in Glassdoor and the Annual Social and Economic Supplement (ASEC)

	ASEC earnings statistic			
	Mean log earnings	Median log earnings	Standard deviation log earnings	Interquartile range log earnings
Glassdoor wage statistic	1.272***	1.198***	0.390***	0.555***
	(0.025)	(0.026)	(0.035)	(0.046)
Industry-occupations	408	408	408	408
R^2	0.86	0.84	0.23	0.26
Mean ASEC weight	18818	18818	18818	18818
Correlation	0.930	0.917	0.481	0.515

Notes: This table reflects coefficients from regressions of moments in ASEC-level earnings data on the same moments for Glassdoor wage data at the Glassdoor industry x two-digit SOC occupation. Earnings in ASEC reflect inflation-adjusted total pre-tax wage and salary income for full-time workers. Regressions are weighted according to representative ASEC weights. Industry-occupations restricted to those with at least fifty observations in Glassdoor. Significance levels: * 10%, ** 5%, *** 1%.

To extract amenities from review text, I borrow a topic-modeling machine learning algorithm from the computer science literature. I implement the Anchored Correlation Explanation (CorEx) model of Gallagher et al. (2017) — a semi-supervised approach that allows the researcher to specify topic-specific "anchor words" that guide topics to convergence.[13] The model is semi-supervised in that the researcher identifies part of a topic (the anchor words) while the machine fills in the rest according to the objective. A semi-supervised approach is used to ensure the topics can be interpreted as specific amenities.[14] The Anchored CorEx model is particularly well-suited for this task since compared with other topic modeling methods, it has been found to more readily produce coherent topics that are less overtly discussed and may not naturally emerge (Gallagher et al., 2017). The 20 highest-incidence words (or most-weighted in the case of anchor words) for each of the fifty amenities captured are presented in Tables I1–I5.

I first calibrate the CorEx model using the full review text (stacked 'pros' and 'cons') for a sample of 3 million reviews. Applying the model to a segment of text outputs a vector $\{p_a \in [0,1]\}_{a=1...50}$ of probabilities that amenity a is discussed. After training the model on this sub-sample, I apply the model to each of the 8.5 million reviews, separately scoring the 'pros' and 'cons' sections for each review r to obtain the vectors $\{p_{r,a}^{pro}\}$ and $\{p_{r,a}^{con}\}$. Taking

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[13]For details on how the CorEx model successfully identifies latent topics, see Steeg and Galstyan (2014) who first introduced the algorithm. When implementing the model in Python, I search for fifty topics with seed set at two and anchor strength set at nine.

[14]An alternative topic-modeling algorithm that is more common — the Latent Dirichlet Allocation (LDA) model — was considered and even implemented using a semi-supervised, anchored approach; however, the topics that were produced with LDA were more amorphous and less interpretable than those produced with CorEx, even under the same assignment of anchor words.

the weighted difference between the two — where the weight (ω_r) is the share of review text in the pros section — I gauge the quality of amenity a from review r according to $q_r^a = \omega_r p_{r,a}^{pro} - (1 - \omega_r) p_{r,a}^{con} \in [-1, 1]$.

If the amenity is not mentioned in the review, its quality is assumed to be neutral $q_r^a = 0$. Even after dropping reviews that mention zero amenities, reviews admittedly mention few amenities. The average review mentions about four amenities, meaning the other forty-six are not assessed (Table J3). Reassuringly, the positive associations between firms' wage and amenity offerings remain if, instead of assuming neutral quality, amenity quality is imputed from similar workers' evaluations (see footnote 35). Though each worker only provides a vignette of each firm, detailing few attributes in few reviews, the collection of experiences provided by the set of workers who have transitioned into or out of each firm should ideally provide a more complete picture of firms' amenity bundles.

4 Relation Between Wages and Job Satisfaction

Despite the overwhelming growth in new data available to researchers, the question of whether wages and job amenities move inversely or in tandem remains an open debate. For attributes that are unambiguously undesirable ex ante, such as increased risk of fatality, the answer is fairly definitive.[15] However, to what extent job characteristics that are harder to observe and harder to measure vary with wages remains unclear. While some empirical work has touched upon this question, as jobs are complex and amenities numerous, more work is needed.[16] Starting with job satisfaction, I show in this section that high wages command greater levels of satisfaction, first presenting suggestive cross-sectional evidence and then estimating two-way fixed effects models.

4.1 Job Satisfaction as a Reflection of the Amenity Bundle

The sheer breadth of possible amenities makes the task of estimating the degree to which job quality differs across firms especially daunting. To quote Clemens (2021), there is a "'many margins' problem, in which the relevance of various attributes may vary substantially across settings." Some firms may offer better fringe benefits but offset those benefits with worse working conditions such as requiring more tasks and imposing more rigid work

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[15] As Smith (1979) framed it then, the evidence of compensating differentials — in which wages trade-off with dis-amenities — has been ambiguous with regards to job attributes except for fatality risk.

[16] For instance, Pierce (2001) shows that high-income workers receive more voluntary non-wage compensation vis-à-vis fringe benefits, Dey and Flinn (2005) that jobs offering health insurance pay higher wages, and Maestas et al. (2018) that working conditions appear to broadly improve with wages.

schedules. Some firms may invest more in on-the-job training while promoting a competitive environment with worse job security. Comparing any single amenity will inherently overlook its correlation with other amenities provided by the firm. To quantify the full scope of job amenities, especially non-pecuniary ones, ideally one would use an aggregation mechanism that incorporates how workers value the collective bundle. To this end, I rely on job satisfaction, channeling the view of Hamermesh (2001) that "Only one measure, the satisfaction that workers derive from their jobs, might be viewed as reflecting how they react to the entire panoply of job characteristics."

Whether workers are satisfied with their jobs depends not only on pecuniary rewards, but also non-pecuniary aspects. Just because a worker is highly-paid does not necessarily mean they will be more satisfied with their job, though high-wage workers tend to report greater job satisfaction (Figure J2: panel a).[17] Akerlof et al. (1988) finds that more than 80 percent of workers cite a non-pecuniary attribute as the primary reason for their satisfaction if they like their jobs. In other words, job satisfaction reflects total compensation inclusive of amenities, $(w, \vec{a})$ and depends upon how the worker subjectively weights w and each amenity a. If wages rise, we might expect job satisfaction to improve if workers become more satisfied with their pay. That high-wage workers report greater levels of both job satisfaction and pay satisfaction (panel b) is consistent with this narrative; however, that high-wage workers also report greater levels of satisfaction with aspects of work at best tangentially related to pay, e.g., career opportunities, culture and values, senior leadership, and work-life balance (panels c–f) suggests they also enjoy higher quality amenities.

4.2 Estimating Firm-Specific Wage and Job Satisfaction Premia

The theory of compensating differentials reflects the wage premia required to equalize the advantages and disadvantages that arise between different work opportunities (Rosen, 1986). Given the utility-based nature of compensating differentials — necessitated by the fact that some aspects of work are non-pecuniary in nature — empirical researchers often estimate workers' willingness to pay for job attributes to understand the trade-offs workers face (e.g., Stern, 2004; Maestas et al., 2018; Wiswall and Zafar, 2017; Chen et al., 2019). To the extent that firms have control over both the wages they offer and the bundle of amenities (and their quality) that they produce, then the trade-offs workers face should arise from looking at supply-side differences across firms.

Given that Glassdoor wages and ratings data are comprised of employee-employer matches, I follow the two-way fixed effects literature to estimate firm-specific premia for wages and for

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[17]This positive correlation between wages and job satisfaction is evident in other survey data, such as the NLSY97 (Figure J1), and is well-documented in the literature (Judge et al., 2010).

job satisfaction. Employee-employer matched data have been seldom used in the compensating differentials literature, and when they have, the research question typically centers on understanding workers' willingness to pay for safety and reduced fatality risk (Lalive, 2003; Dale-Olsen, 2006; Lavetti and Schmutte, 2018). Whereas the fixed effects in these analyses act as nuisance parameters to abstract from unobserved differences across workers and firms, this work uses the firm fixed effects as objects of study for understanding the causal effect from moving between firms, as in Bana et al. (2018) and Lachowska et al. (2021).

For log wages and overall job satisfaction ratings — the distributions for which are presented in Figure J3 — I estimate AKM models of the form,

$$Y_{ikt} = \lambda_i + \lambda_k + \lambda_t + \gamma X_{it} + \varepsilon_{ikt} \tag{1}$$

where Y_{ikt} is log annual wage or overall star rating for worker i employed at firm k in year t, λ_i, λ_k, and λ_t are worker, firm, and year fixed effects, respectively, and X_{it} is a vector of workers observables (i.e., for wages, a fourth-order polynomial in work experience for wages, and for overall ratings, indicators for current or former employee and employment status).[18] Alternative specifications that incorporate further controls such as one's job title, location, and tenure are considered in Section 8. In this model, the firm fixed effects λ_k are identified from job switchers who report their wage or satisfaction for different firms, thereby capturing the extent to which the same worker receives more or less pay and higher or lower satisfaction at firm k compared with the other firms at which the individual has been employed.[19] From workers' wages, I obtain firm-specific pay premia $\hat{\lambda}_k^w$ — the traditional AKM application — and from workers' overall ratings, I obtain firm-specific satisfaction premia $\hat{\lambda}_k^R$ — the novel AKM application intended to holistically capture dispersion in non-wage amenities.

To assess the importance of firms, I first decompose the variance of workers' wages and overall ratings in Table 2 into components attributable to the workers, the firms, the covariance between the two, and the left-unexplained error term. I consider two samples. The "Full" sample reflects any firm for which a fixed effect is obtainable, i.e. there exists at least two movers in our sample who transition into or out of the firm either from or to a firm which also has at least two such movers. Among the set of firms represented in both datasets, 16 percent, or 67,679 firms, have estimable wage and rating premia, 8 percent only a wage

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[18]A firm represents the collection of establishments across the United States rather than each establishment separately, though treating establishments separately does not alter the findings (Table 8: row 22).

[19]The firm fixed effects for wages are estimated using a mostly different sample of workers than that used to estimate the firm fixed effects for job satisfaction. Roughly three-quarters of the workers in each sample are not represented in the other. In turn, because most workers contribute to either the wage premia or the ratings premia but not both, this sidesteps the concern that the wage-satisfaction relation I observe across firms is driven by selection related to workers' own wage-satisfaction preferences. The takeaway is unchanged though when only workers who are included in both panels are considered (Table 8: row 23).

premium, another 8 percent only a rating premium, and 68 percent neither. Firms with estimable premia, i.e., connected by multiple movers, tend to be larger employers.[20] The "Many-movers" sample restricts the set of firms to those with at least fifteen such movers, in the spirit of Bonhomme et al. (2020) to address the issue of limited mobility bias in two-way fixed effects models (Abowd et al., 2003).[21]

Firms account for about 9 percent of the variance in log wages in the Full sample and 7 percent in the Many-movers sample. While below the roughly 20 percent consensus found in the literature (Card et al., 2018), these estimates are consistent with those from a more-connected set where limited mobility bias is of less consequence and positive sorting between workers and firms plays an increasingly important role (Bonhomme et al., 2020). For job satisfaction, firms play a more substantive role. Firms account for 22 percent and 11 percent of the variance in ratings for the Full and Many-movers samples, respectively — a multiple of roughly 1.5–2.5 the contribution of firms to wages. That firms are relatively more predictive of job satisfaction would suggest that firms play a more substantive role in setting amenities, and that there is greater dispersion across firms in amenities than in wages. While 8 percent of the variance in wages is unexplained by workers, firms, and observable characteristics, 23–26 percent of the variance in ratings is left unexplained. The unexplained variance in satisfaction could reflect myriad factors, such as match-specific effects, occupation, location, time-varying preferences, or measurement error induced by a discrete metric.

Further details regarding the panel of movers' wages and ratings used in estimating these two-way fixed effects models are provided in Table J3. Although I observe more than one wage or overall rating for many workers — allowing for the identification of firm-specific premia — each worker records on average only 2.2 observations in the wages panel and 2.4 observations in the ratings panel. As such, one limitation of this analysis is the inability to conduct robustness exercises for these AKM models, such as controlling for match-specific differences that may endogenously determine mobility decisions (Lavetti and Schmutte, 2018), e.g., through learning about ability or match quality over time (Gibbons et al., 2005; Menzio and Shi, 2011), or estimating event studies of dynamic wage or ratings changes around job transitions between firms of varying premia to confirm exogenous growth

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[20]The distribution by employment size for firms with estimable premia and those without for both the wages and ratings panels are presented in Figure J4.

[21]Limited mobility bias refers to how the precision with which the firm fixed effects in an AKM framework are estimated relies upon how many movers there are to represent each firm. The fewer movers there are, the more important firms are in explaining the variance across workers (Andrews et al., 2008). Since the job transitions of movers identify the firm-specific constants, using a more-connected set of firms with many movers can correct this bias. Bonhomme et al. (2020) argue this point by re-estimating their AKM model using iteratively smaller fractions of the total movers present for each firm. I implement a similar exercise for the Many-movers set of firms using the wages and ratings data in Figure J6 and find similar patterns.

Table 2: Decomposition of Variance for Wages and Ratings

	Log wages		Overall ratings	
Variance	All	Many-movers	All	Many-movers
Total	0.306	0.310	2.284	2.124
Worker	0.208	0.213	1.376	1.199
	[68]	[69]	[60]	[56]
Firm	0.029	0.022	0.499	0.234
	[9]	[7]	[22]	[11]
Cov(Worker, Firm)	0.014	0.017	-0.191	-0.034
	[5]	[5]	[-8]	[-2]
Residual	0.024	0.025	0.527	0.562
	[8]	[8]	[23]	[26]
Number of Firms	107,592	13,174	99,167	9,841
Number of Workers	960,250	649,060	565,704	312,149
Number of Observations	2,070,161	1,403,236	1,263,222	703,147

Notes: This table displays the variance decomposition for log wages and overall ratings for the sample of all firms ("All") and the sample of firms represented by at least fifteen movers ("Many-movers"). The percent of total variance explained by each component is listed in brackets.

at transitions (Card et al., 2013). However, estimating the gains and losses from transitioning to a firm of a higher or lower decile of firm premium for wages (Table J4) and ratings (Table J5) reveals that the changes are roughly symmetric, supporting the linearly additive AKM framework. The average duration between a workers' pair of observations is 2.5 years for wages and 2.0 years for ratings, 78–80 percent of pairs in each panel represent the worker switching firms, and both current and former employees are observed frequently in each sample, highlighting that the samples do not appear negatively selected on representing low productivity workers who have left the firm and are searching off the job.

4.3 When Workers Transition Between Firms

In this subsection, I examine how workers' individual outcomes change when transitioning to firms of different wage premia $\hat{\lambda}_k^w$ or job satisfaction premia $\hat{\lambda}_k^R$. Under the AKM framework, how workers' earnings or satisfaction levels co-move with these firm-level measures can be interpreted as the causal effect of the firm.

Consider a worker i who was employed with firm k in year t and decides to transition to a new firm k' where they are observed in year t'. If the worker leaves an employer review for both firms, then I observe the pair of ratings $(R_{ikt}, R_{ik't'})$. Having experienced the wage-amenity bundles offered by each firm, the worker reports their overall satisfaction with each. How does the difference in wages offered by each translate into differences in satisfaction? On

one hand, if higher-paying firms pull back on amenities to offset their wage bill, then moving to a higher-paying firm may result in a non-positive change in job satisfaction, depending upon how workers subjectively value wages and amenities. Inversely, if higher-paying firms supplement high wages with better amenities, then moving to a higher-paying firm should directly boost job satisfaction, as the compensation bundle improves along both dimensions.

I relate firm-level wage and satisfaction premia to individual outcomes by considering first-difference models of the form

$$\mathbb{1}\{R_{ik't'} < R_{ikt}\} = \beta_R(\hat{\lambda}_{k'}^w - \hat{\lambda}_k^w) + \xi_t + \xi_t' + \varepsilon_{iktk't'} \tag{2}$$

$$\mathbb{1}\{w_{ik't'} < w_{ikt}\} = \beta_w(\hat{\lambda}_{k'}^R - \hat{\lambda}_k^R) + \xi_t + \xi_t' + \varepsilon_{iktk't'}. \tag{3}$$

Motivated by the common assumption that pay cuts are compensated for by improvements in non-wage aspects of work, the outcome of interest is the probability of a decline in the worker's job satisfaction or their real wage.[22] The first coefficient of interest, β_R, captures the difference in the probability of a worker experiencing a job satisfaction decline from working for a firm offering one percent greater wages. Panel a of Figure 2 depicts this relation within bins according to $\hat{\lambda}_{k'}^w - \hat{\lambda}_k^w$ and reveals a clear *negative* effect. As workers move to increasingly lower-paying firms, outside the upper tail of the distribution, the probability of experiencing a job satisfaction decline rises steadily.[23]

The second coefficient of interest, β_w, captures the difference in the probability of a worker experiencing a real wage decline working for a firm that offers one star greater job satisfaction. Panel b of Figure 2 depicts this relationship within bins according to $\hat{\lambda}_{k'}^R - \hat{\lambda}_k^R$ and reveals a clear negative effect, i.e., pay cuts are increasingly *more* likely to occur when workers transition to lower-satisfaction firms. A worker accepting a wage decline is not an infrequent occurrence in the U.S. labor market, with estimates in the range of 23–43 percent of job transitions (Jolivet et al., 2006; Tjaden and Wellschmied, 2014; Sorkin, 2018). In Glassdoor wage data, 29 percent of job transitions are characterized by a real wage cut. Because workers accept lower wages at their new firms, the literature typically rationalizes these observed flows by arguing that there must be a compensating differential through improved amenities (Bonhomme and Jolivet, 2009; Sorkin, 2018; Taber and Vejlin, 2020). If this were the case, we would expect wage declines to be more frequent when moving to higher-satisfaction firms, not lower-satisfaction ones. In documenting the opposite, I find

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[22]Alternative models using the change in the individual's overall rating or real wage as the outcome of interest are presented in Figure J5. The takeaway is similar: On average, transitions to higher-paying firms are associated with larger increases in job satisfaction and transitions to higher-rated firms faster rates of wage growth.

[23]Using a survey of German workers, Jäger et al. (2021) find a similar pattern: individuals report higher levels of job satisfaction with work when moving to higher-paying firms.

Figure 2: Probability of Job Satisfaction or Wage Decline by Change in Firm Premia

(a) P(rating decline)
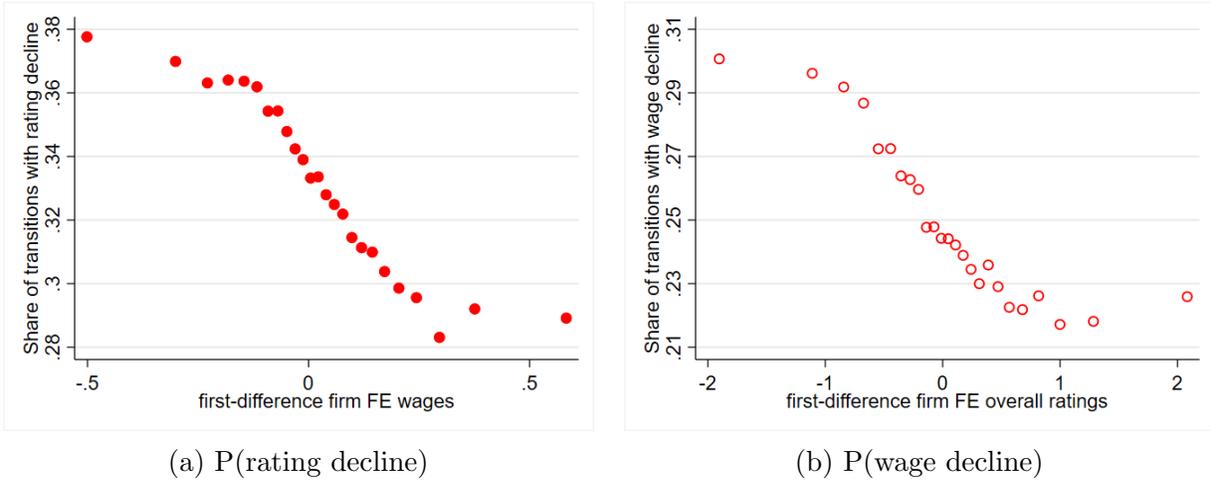
(b) P(wage decline)

Notes: This figure depicts the probability of a worker experiencing a decline in overall rating (panel a) and the probability of a worker experiencing a (real) wage decline (panel b) when transitioning between firms that differ in their wage and ratings premia, respectively (x-axis). Observations are partitioned into twenty-five bins according to the measure on the x-axis.

scant evidence supporting the assumption that pay cuts are offset by amenities. It could of course be the case that higher-paying firms offer worse amenities yet still provide higher levels of job satisfaction, if for instance, job satisfaction primarily reflects pay satisfaction. Section 5 however presents direct evidence that pay satisfaction plays a limited role in explaining job satisfaction and that non-wage amenities are better quality at higher-paying firms.

One limitation to studying how the likelihood of a job satisfaction decline relates to firms' wage premia within this sample is that why each worker switches jobs is unobserved. If workers in this panel only transition to lower-paying firms when they are fired or laid off, then the negative slopes observed in Figure 2 may not apply more broadly. In other words, voluntary job transitions may experience the inverse pattern if they are under-represented in the data. To address this concern, I confirm that this negative relation, i.e. a greater likelihood of a job satisfaction decline among lower-paying employers, is observed robustly across different types of job transitions that likely span both voluntary and involuntary moves (Table J6). These transitions include workers who exited short or long spells, workers who kept the same job title or transitioned to a managerial role, and workers who changed their employment status to full-time or part-time when switching firms.

Further evidence that non-wage amenities improve when moving to higher-paying firms can be seen in studying how workers' satisfaction changes for different sub-categories. Replacing the the left-hand side of equation 2 with the first difference in the five sub-dimension ratings reveals that seemingly every aspect of the job improves (Table J7). Perhaps not

surprisingly, satisfaction with compensation and benefits rises the most, 0.15 standard deviations per one-standard-deviation increase in firm wage premia. But satisfaction with non-pecuniary dimensions, such as career opportunities, culture and values, senior management, and work-life balance, improve as well, each rising on average 0.03–0.07 standard deviations per one-standard-deviation increase between firms' wage premia.

4.4   Are High-Paying Firms High-Satisfaction Firms?

Given that workers experience fewer wage declines moving to higher-satisfaction firms and fewer satisfaction declines moving to higher-paying firms, the question arises where this can be attributed to firms themselves. Since I observe the wage premium $\hat{\lambda}_k^w$ and satisfaction premium $\hat{\lambda}_k^R$ for the same employer k, I can directly relate the two, $\hat{\lambda}_k^R = \rho^{w,R}\hat{\lambda}_k^w + \upsilon_k$. The coefficient $\rho^{w,R}$ then captures the extent to which greater wages translate into more satisfaction across firms. This relation is summarized in Figure 3, where a strikingly positive correlation is observed. Formally estimating this model reveals a coefficient of $\rho^{w,R} = 0.463$ (standard error = 0.022) for the Full set of firms.[24] Given standard deviations of 0.23 and 1.02 in the wage and rating premia, respectively, a one standard deviation increase in firm-level wages is associated with 0.10 standard deviations greater job satisfaction. For the Many-movers set of firms, the estimate is even larger at 0.19 standard deviations.[25]

Figure 3: Relation between Firms' Pay and Job Satisfaction Premia
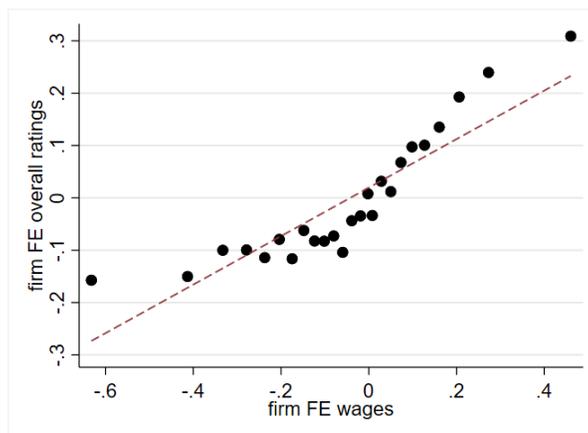
Notes: This figure depicts the firm fixed effects for wages $\hat{\lambda}_k^w$ (x-axis) against the firm fixed effect for job satisfaction $\hat{\lambda}_k^R$ (y-axis). The set of firms included reflects the Full sample. Observations are partitioned into twenty-five bins according to the measure on the x-axis.

Within the AKM framework, the effect from the firm by assumption is constant over time. However, firm fundamentals or outlooks may shift over time and spillover into changes

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[24]Table J8 presents estimates with and without industry fixed effects for the Full and Many-movers sets.

[25]For within and across industry discussions, see Appendices E and D, respectively.

in worker compensation. In the spirit of Lachowska et al. (2020), I re-estimate a time-varying version of equation 1 where the firm fixed effects are allowed to drift over time, λ_{kt}. For the same firm, I relate the growth in relative wage premium offered over time to the growth in relative job satisfaction provided over time, incorporating firm and year fixed effects. The former account for inherent differences across firms (e.g., industry, size, and location), the latter trends over time that may reflect sample composition or the business cycle. The results including and excluding these controls (Table J9) reveal that $\rho^{w,R}$ remains significantly positive even looking within firms over time, consistent with widening wage inequality exacerbating satisfaction inequality (Hamermesh, 2001).

One potential explanation for observing improved satisfaction at higher-paying firms that would be orthogonal to the quality of non-wage attributes is a warm glow effect, whereby the stature of being employed with a higher-paying firm elevates one's satisfaction with their job. This could reflect, for instance, a heightened sense of accomplishment from achieving employment with a high-paying firm, especially if such a feat is considered difficult or rare. One way to proxy for this warm glow effect would be to capture disparities in interview practices, such as the level of difficulty or success rate, across firms. On Glassdoor, workers can separately detail their experiences interviewing with firms, including how challenging they perceived the interview to be and whether they received an offer.[26] Estimating an AKM model for each of these two interview metrics and relating the resultant firm fixed effects to those for log wages and job satisfaction (Table J10) reveals that a warm glow is not driving this positive relation. While higher-paying firms carry out more difficult interviews and are more selective in extending offers (column 1), accounting for differences in the interview process across firms attenuates the slope between firms' wage and ratings premia by roughly 9 percent — suggesting warm glow effects play a limited role.

5   Relation Between Wages and Amenities

How does one capture the 'many margins' of job amenities? Doing so would involve not only gauging the quality and/or availability of each amenity, but determining an exhaustive set to measure. Labor market surveys have measured non-wage job characteristics to varying degrees.[27] Unlike Glassdoor though, the nature of these surveys precludes firm-level analysis.

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[26]Each observation in the Glassdoor interviews data is an employee-employer match that includes an assessment for the interview's difficulty level on a one-to-five ordinal scale (corresponding in increasing order to very easy, easy, average, difficult, and very difficult, respectively) and an indicator for whether the worker received a job offer. There are roughly 180,000 observations covering 14,000 employers for the panel of workers with multiple interviews. For further discussion of the data, see Sockin and Zhao (2020).

[27]In the ASEC, respondents are asked whether they receive health insurance or a pension from their employers — measures analyzed by Simon and Kaestner (2004) and Clemens et al. (2018) — as well as usual

5.1 Introducing Job Amenities

There are fifty amenities in total extracted from the reviews that workers write about their jobs. Some are obvious, others motivated by the literature, and the rest identified after implementing unsupervised topic modeling to learn what latent attributes arise naturally. They span six main categories.

The first concerns pay and consists of pay, pay growth, bonuses and commissions.[28] The second reflects fringe benefits and includes paid time off, health insurance, retirement contributions, employee discounts, and free food.[29] The third and most extensive is working conditions, which includes work-life balance, hours, work schedule, short breaks, office space, commuting, teleworking, location, autonomy/responsibility, respect/abuse, communication, support, difficulty, requirements, stress, pace, safety, recognition, morale, fun, culture, diversity/inclusion, leadership, office politics, change, and job security.[30] The fourth is human capital, which includes career concerns, promotions, experience, skill development, on-the-job training, mentoring, recruiting, contracting, and industry.[31] The fifth pertains to interpersonal relationships and covers managers, coworkers, teams, and customers.[32] The sixth is a residual comprised of two un-anchored topics meant to freely capture the remaining text.

The frequency with which each amenity is discussed within the panel of reviews is pre-

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hours of work per week on the job. In the NLSY97, respondents are asked about work schedules, available fringe benefits, and in the most recent wave of the survey, required job tasks. More recently, the American Working Conditions Survey (AWCS), administered by RAND and studied in Maestas et al. (2018), captures differences along a range of workplace conditions (see Appendix C).

[28]Wiswall and Zafar (2017) estimate willingness to pay for earnings growth and bonuses; Sockin and Sockin (2019b) relate jobseeker activity to the intensity with which a role incorporates sales commissions.

[29]Maestas et al. (2018) examine paid time off and Simon and Kaestner (2004) evaluate health insurance and retirement plans. Employee discounts and free food were included in surveys of workers by Glassdoor (2015), and Fractl (2020) shows that 15–30 percent of workers surveyed would consider accepting these fringe benefits over higher pay. Tuition assistance received a similar valuation in these surveys, but is not included as an amenity because I could not produce an interpretable topic.

[30]Maestas et al. (2018) consider work schedule, teleworking, stress, pace, and autonomy/responsibility; Le Barbanchon et al. (2020) commuting; Hersch (2011) sexual harassment (respect/abuse); Bradler et al. (2016) recognition; Wiswall and Zafar (2017) hours; Wasmer and Zenou (2002) location; Autor and Handel (2013) job tasks (requirements), Morrison (2011) employee voice (communication); Gadgil and Sockin (2020) culture and leadership; Gronberg and Reed (1994) fun; Quinn (1974) the challenge of the job (difficulty), help (support), and physical surroundings (office space); and Park et al. (2021) workplace safety. Pollak (2019) finds workers value workplace diversity/inclusion; Carpenter et al. (2010) find office politics can hamper labor productivity; Breza et al. (2017) relate morale to the opacity of coworker productivity; and Hamermesh (1990) examines the marginal return to short breaks.

[31]Acemoglu and Pischke (1999) examine on-the-job training; Tambe et al. (2020) skill development among information technology workers; Johnston and Lee (2013) promotions; Gibbons and Murphy (1992) career concerns; Starr et al. (2021) non-compete and Sockin et al. (2021) non-disclosure agreements (contracts); Dustmann and Meghir (2005) experience; Quinn (1974) job security; Athey et al. (2000) model the interaction of mentoring and diversity; and Faberman and Menzio (2018) relate recruiting intensity to starting wages.

[32]Maestas et al. (2018) consider teamwork; Stinebrickner et al. (2019) the beauty wage premium in jobs that rely upon interpersonal interaction (customers); and Quinn (1974) coworkers and supervisors (managers).

sented in the first column of Table 3. Amenities that are frequently discussed pertain to characteristics that are important predictors for overall job satisfaction but would be difficult to discern about the firm ex ante such as respect/abuse (26 percent), coworkers (18 percent) and leadership (17 percent). Importantly, it is not uncommon for workers to highlight satisfaction with pay (15 percent) or pay growth (3 percent), implying that one could capture the pass-through of pay satisfaction to overall satisfaction through these text-based amenities, as is done in Section 5.2.

Crucially, using the output from this topic modeling approach rests on the interpretability of the topics, i.e., that the label assigned to each amenity is accurate. For reassurance, I first show that within Glassdoor reviews, the amenities are consistent with other measures of sentiment that respondents provide. Recall each worker evaluates their employer on a one-to-five stars scale along five sub-categories: career opportunities, compensation and benefits, culture and values, senior leadership, and work-life balance. Amenities that relate more to a given sub-category should play an outsize role in predicting an employee's satisfaction along that dimension. Within the panel of workers' reviews, I relate the change in satisfaction within each of these sub-categories to the change in quality of each job amenity according to

$$Y_{ikt} = \sum_{a=1}^{50} \beta_a q_{ikt}^a + \lambda_i + \lambda_k + \lambda_t + \varepsilon_{ikt}, \tag{4}$$

where Y_{ikt} is the star rating and λ_i, λ_k, and λ_t represent worker, firm and year fixed effects, respectively. The coefficients β_a capture the degree to which amenity a predicts satisfaction *conditional* on the quality of the rest of the amenity bundle. While job satisfaction is positively correlated with every amenity individually (Table 3: column 8), the estimates from equation 4 isolate the relative contribution of each amenity. The coefficients on overall rating and the five sub-categories are presented in columns 2–7. More-positive values of β_a signify more import while more-negative signify less.

The second column reveals which amenities workers value the most when determining overall satisfaction. A few takeaways are worth highlighting. First, the most desirable amenities are those which are hard to observe from outside the firm. In other words, job satisfaction appears driven by attributes that are learned through experience, such as employee respect/abuse, leadership and management, work-life balance, culture, and morale. Second, aspects related to compensation and benefits are considerably less influential in determining employer quality. While improved pay, pay growth, health insurance, retirement contributions, and bonuses have a significant effect on workers' overall satisfaction, they are second-order compared with the harder-to-observe intangibles such as culture and leadership. Third, workers value when employers address social issues, as evidenced by the strongly pos-

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Table 3: Relative Importance and Validation of Amenities

Amenity	Review incidence (percent)	Bundled						Separate
		Overall rating	Career opp.	Comp. and benefits	Culture and values	Senior mgmt.	Work life balance	Overall rating
Respect/abuse	25.7	0.61†	0.43†	0.25†	0.68†	0.51†	0.47†	1.53†
Residual I	34.8	0.44†	0.44†	0.25†	0.42†	0.50†	0.26†	1.32†
Leadership	17.2	0.42†	0.34†	0.19†	0.41†	0.54†	0.29†	0.96†
Residual II	29.6	0.38†	0.29†	0.24†	0.31†	0.31†	0.28†	1.30†
Work-life balance	4.3	0.38†	0.22†	0.16†	0.36†	0.36†	1.14†	0.83†
Culture	11.6	0.33†	0.25†	0.13†	0.48†	0.32†	0.24†	0.92†
Managers	14.2	0.29†	0.22†	0.15†	0.27†	0.33†	0.20†	0.97†
Morale	2.5	0.27†	0.19†	0.13†	0.34†	0.28†	0.20†	0.84†
Diversity/inclusion	2.2	0.21†	0.20†	0.11†	0.32†	0.21†	0.11†	0.87†
Support	9.5	0.21†	0.18†	0.12†	0.21†	0.22†	0.17†	0.87†
Mentoring	2.2	0.20†	0.20†	0.14†	0.16†	0.19†	0.10†	0.74†
Job security	3.2	0.19†	0.21†	0.04†	0.19†	0.23†	0.03	0.79†
Fun	3.4	0.17†	0.14†	0.09†	0.18†	0.13†	0.10†	0.67†
Office politics	2.4	0.17†	0.12†	-0.02	0.21†	0.26†	0.04	0.62†
Teams	8.2	0.16†	0.14†	0.07†	0.16†	0.17†	0.12†	0.87†
On-the-job training	6.1	0.16†	0.11†	0.07†	0.14†	0.13†	0.09†	0.73†
Coworkers	18.0	0.15†	0.11†	0.07†	0.17†	0.13†	0.12†	0.81†
Career concerns	8.6	0.14†	0.25†	0.10†	0.11†	0.15†	0.06†	0.75†
Pay	15.3	0.14†	0.12†	0.38†	0.07†	0.09†	0.07†	0.69†
Commissions	4.9	0.12†	0.11†	0.17†	0.08†	0.10†	0.06†	0.76†
Industry	19.2	0.12†	0.12†	0.07†	0.08†	0.12†	0.03†	0.73†
Safety	2.3	0.11†	0.06†	0.05†	0.15†	0.09†	0.11†	0.78†
Health insurance	3.3	0.10†	0.08†	0.25†	0.07†	0.08†	0.00	0.62†
Autonomy/responsibility	2.3	0.10†	0.08†	0.05†	0.07†	0.10†	0.07†	0.73†
Pay growth	3.0	0.09†	0.17†	0.33†	0.04†	0.09†	-0.06†	0.62†
Recognition	4.3	0.09†	0.11†	0.09†	0.08†	0.09†	0.04†	0.75†
Bonuses	4.2	0.08†	0.09†	0.19†	0.06†	0.06†	0.02	0.73†
Retirement contributions	1.9	0.08†	0.05†	0.21†	0.05†	0.03	-0.03	0.62†
Customers	9.2	0.07†	0.06†	0.03†	0.08†	0.06†	0.06†	0.71†
Work schedule	8.1	0.07†	0.01	-0.02	0.04†	0.05†	0.32†	0.57†
Stress	2.6	0.07†	-0.04†	-0.05†	0.07†	0.05†	0.32†	0.68†
Recruiting	8.6	0.06†	0.09†	0.04†	0.03†	0.03†	0.00	0.77†
Skill development	2.7	0.06†	0.09†	0.00	0.01	0.02	-0.04	0.72†
Pace	2.3	0.05†	0.03	0.03	0.01	0.03	-0.01	0.44†
Contracting	4.9	0.05†	0.07†	0.11†	0.02	0.01	0.01	0.72†
Promotions	4.2	0.04†	0.23†	0.05†	0.02	0.09†	-0.04†	0.72†
Employee discounts	3.4	0.03	0.03	0.14†	0.05†	0.02	0.01	0.50†
Teleworking	2.6	0.03	-0.01	0.02	0.05†	0.04	0.17†	0.61†
Paid time off	5.2	0.03†	0.01	0.12†	0.02	-0.01	0.13†	0.72†
Experience	6.0	0.03†	0.04†	0.00	0.01	0.02	0.00	0.74†
Communication	8.6	0.02	-0.03†	-0.06†	0.03†	0.04†	0.00	0.75†
Hours	5.5	0.00	0.02	0.09†	-0.02	-0.04†	0.02	0.55†
Short breaks	4.1	-0.01	-0.04†	-0.01	-0.02	-0.04†	0.05†	0.70†
Office space	8.5	-0.02†	-0.01	0.00	0.01	-0.02	0.00	0.69†
Free food	4.9	-0.02	-0.02	0.04†	0.01	-0.01	0.01	0.61†
Commuting	3.7	-0.06†	-0.08†	-0.06†	-0.05†	-0.07†	-0.04†	0.52†
Change	4.6	-0.07†	-0.06†	-0.07†	-0.06†	-0.02	-0.07†	0.55†
Location	3.7	-0.09†	-0.07†	-0.04†	-0.10†	-0.09†	-0.06†	0.38†
Requirements	3.1	-0.11†	-0.14†	-0.08†	-0.12†	-0.14†	0.02	0.53†
Difficulty	7.3	-0.19†	-0.16†	-0.15†	-0.21†	-0.21†	-0.14†	0.28†

Notes: This table displays the coefficients from regressing the amenities on the stars-based rating listed in the header of each column with worker, firm, and year fixed effects. Amenities are listed in ascending order according to the coefficient for overall rating bundled. An amenity is considered mentioned in a review if $|q_r^a| \geq 0.01$, and not mentioned otherwise. $\dagger$ indicates significance at the 1% level.

itive coefficient on diversity/inclusion — perhaps reflecting why employers are increasingly choosing to make investments in environmental, social, and governance (ESG) and diversity, equity, and inclusion (DEI) initiatives.[33] Last, workers seem to prefer work arrangements that are increasingly difficult or involve heightened responsibility through more requirements — possibly reflecting the importance workers place on building human capital.

Comparing the coefficients for overall rating with those for each of the sub-categories offers reassuring evidence that these amenities in fact reflect their labels. For instance, the promotions amenity is more important for career opportunities than overall rating (0.23 vs. 0.04), as is the amenity for career concerns (0.25 vs. 0.14) and pay growth (0.17 vs. 0.09) — though not the amenity for pay, lending credence to the pay growth amenity capturing a separate and unique characteristic. For compensation and benefits, the coefficient on the pay amenity is more salient (0.38 vs. 0.14), as is that of pay growth (0.33 vs. 0.09), health insurance (0.25 vs. 0.10), retirement contributions (0.21 vs. 0.08), bonuses (0.19 vs. 0.08), employee discounts (0.14 vs. 0.03), paid time off (0.12 vs. 0.03), hours (0.09 vs. 0.00), and free food (0.04 vs. –0.02). For culture and values, encouragingly culture plays a more important role (0.48 vs. 0.33), as does diversity/inclusion (0.32 vs. 0.21). For senior leadership, the estimates are highly similar to those obtained from predicting overall rating — signifying the importance of management for overall satisfaction — though the coefficient on office politics is greater (0.26 vs. 0.17). And for work-life balance, we observe that the work-life balance amenity is by far the largest driver (1.14 vs. 0.38), but other amenities play an outsize role as well, including stress (0.32 vs. 0.07), work schedule (0.32 vs. 0.07), teleworking (0.17 vs. 0.03), paid time off (0.13 vs. 0.03), short breaks (0.05 vs. –0.01), and requirements (0.02 vs. –0.11). In all, the amenities appear internally consistent.

The amenities also capture meaningful variation in other labor market data. Appendix B shows how 7 amenities — diversity/inclusion, health insurance, hours, job security, paid time off, retirement contributions, and work-life balance — trace relevant patterns observed across industries and occupations in ASEC. Moreover, Appendix C highlights how 10 amenities mostly pertaining to working conditions — autonomy/responsibility, communication, on-the-job training, pay, recognition, safety, short breaks, support, work schedule, and work-life balance — align with the AWCS across industries and occupations. Given that both of these surveys are representative, I take this as evidence that inferences using these Glassdoor amenities are valid for the U.S. labor market more broadly.

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[33] The three largest institutional investors in 2017 successfully campaigned to increase female representation on corporate boards (Gormley et al., 2021) and 53 percent of S&P 500 companies now employ a chief diversity officer (Green, 2021). Moreover, in a 2019 survey of institutional investors and asset managers querying why they incorporate ESG in investment decisions, 47 percent cited brand image and reputation while 27 percent cited attracting new talent (Boffo and Patalano, 2020).

5.2 Wages, Amenities, and Job Satisfaction

One concern with using job satisfaction to argue non-wage amenities are improved at higher-paying firms is that the increased job satisfaction may simply reflect improved pay satisfaction. If this is the case, then wages or pay-related amenities should play outsize roles in determining job satisfaction. With empirically-derived measures of wages, amenities, and job satisfaction in hand, by comparing the variation in job satisfaction explained by regressing firm's wage and amenity premia on their job satisfaction premia, i.e. the R^2, one can gauge the relative contribution of wages and amenities to determining job satisfaction.

Evidently, as shown in Table 4, neither wages nor pay satisfaction can explain the increased satisfaction workers enjoy at higher-paying firms. Firms' wage premia alone can explain only 1.1 percent of the variation in job satisfaction premia across firms. Once the fifty amenities are incorporated, the share of the variation in job satisfaction that is explained jumps to 32.3 percent. When the wage premia are excluded and just the fifty amenities are used, the share drops only slightly to 31.8 percent — emphasizing that disparities in firms' wages play an even narrower role in explaining job satisfaction. Dropping the four pay-related amenities (pay, pay growth, bonuses and commissions) in column 4 reveals that pay satisfaction also exhibits a limited capacity for explaining job satisfaction. Ultimately, the firm premia for the forty-six non-pay-related amenities can explain 31.5 percent of the variation in overall job satisfaction ratings across firms. For determining firm-specific amenity value, I interpret this estimate, $R^2_{a=5\ldots50} = 0.315$, as the share of job satisfaction attributable to non-wage amenities. The contribution of each individual amenity is detailed in Table 5.[34] The most important non-wage attributes for explaining job satisfaction reflect hard-to-observe aspects, such as working conditions (e.g., respect/abuse, leadership, and culture) and interpersonal relationships (e.g., managers and coworkers) rather than ones related to pay and fringe benefits — consistent with results that arise from analyzing workers' fringe benefits ratings directly (Appendix F).

I next turn to how wages relate to each non-wage amenity across firms. As with overall ratings, I estimate firm-specific premia for each amenity a by re-estimating equation 1 but substituting q^a_{ikt}, the quality of amenity a reported by worker i at firm k in year t, on the left-hand side. Then, taking the correlation between the firm premium for each amenity $\hat{\lambda}^a_k$ and the corresponding firm's wage premium $\hat{\lambda}^w_k$ captures the degree to which the quality of amenity a varies with firms' wage offerings. The relations for the Full and Many-movers sets

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[34]To estimate the partial R^2 attributable to each amenity, I calculate the incremental increase each amenity adds to the model's R^2. Since the incremental contribution varies depending upon the order in which amenities are incorporated into the model, the partial R^2 reported reflects the average across 50 iterations, where each iteration n corresponds to the amenity being added in the nth position.

Table 4: Contribution of Amenities to Job Satisfaction Across Firms

	Regression on Overall Rating FE			
R^2	0.011	0.323	0.318	0.315
Wage FE	✓	✓		
Pay amenities FE		✓	✓	
Non-pay amenities FE		✓	✓	✓

Notes: This table reports the share of the variation (R^2) in firms' overall rating premia that is explained by firms' wage and amenities premia.

are recorded in Table 5.[35]

I emphasize three key takeaways. First, the pay and pay growth amenities elicit particularly positive relations with the wage premia, highlighting that workers not only recognize the receipt of greater wages, but that increased satisfaction with pay contributes to the improved perception of overall satisfaction. Second, workers report improved quality with most amenities at higher-paying firms. In particular, the full set of fringe benefits (free food, paid time off, health insurance, retirement contributions, and employee discounts) along with amenities related to flexible labor supply (e.g., short breaks, teleworking, and commuting), working conditions (e.g., respect/abuse, culture, safety, autonomy/responsibility, support, and office space), interpersonal relationships (e.g., managers, coworkers, and teams), and human capital development (e.g., career concerns and mentoring) exhibit improved quality at higher-paying firms.[36] Third, there are few dis-amenities that come with working for higher-paying firms. The standout trade-off workers appear to face is worsened job security, though stress and skill development may worsen as well.

6 Workers' Willingness to Pay for Job Satisfaction

The extent to which disparities in non-wage amenities contribute to inequality depends on how much value workers place on them. If workers are indifferent to the (dis-)amenities of work, then workplace amenities will matter little for welfare. Researchers have utilized dif-

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[35]That a majority of amenities are positively correlated with firms' wage premia, and few are negatively correlated, remains true when amenity quality is calculated without weighting by the share of the review text in each section (Table J11: column 3) or if missing amenity quality, rather than assuming a neutral value of zero, is imputed using the average observed among workers with the same industry and gender (column 4) or same job title (column 5).

[36]One drawback is that amenity quality is assigned based on workers' satisfaction with each amenity, but fringe benefits are inherently pecuniary in nature, e.g., the number of paid leave days or an employer's contribution to a retirement account. Improved satisfaction with fringe benefits may not necessarily translate into increased spending by the firm, though in practice, the two are likely to be correlated.

Table 5: Correlations between Wages and Amenities Across Firms

| | Baseline | | Many-movers | |
Amenity	Correlation	Partial R^2	Correlation	Partial R^2
Pay	0.069***	0.4	0.181***	0.6
Residual I	0.055***	4.3	0.123***	6.1
Residual II	0.039***	2.0	0.072***	2.6
Pay growth	0.035***	0.1	0.072***	0.3
Industry	0.034***	1.6	0.086***	3.0
Respect/abuse	0.033***	6.7	0.056***	6.8
Managers	0.032***	2.5	0.053***	2.4
Short breaks	0.032***	0.2	0.070***	0.5
Culture	0.032***	1.7	0.044***	2.9
Teleworking	0.030***	0.1	0.050***	0.2
Free food	0.028***	0.2	0.091***	0.7
Leadership	0.025***	2.8	0.029***	3.3
Office politics	0.025***	0.1	0.041***	0.0
Teams	0.024***	0.6	0.041***	0.6
Safety	0.023***	0.2	0.043***	0.3
Support	0.023***	0.8	0.032***	1.0
Office space	0.022***	0.4	0.055***	0.9
Health insurance	0.020***	0.1	0.045***	0.3
Coworkers	0.020***	1.3	0.048***	2.7
Career concerns	0.017***	0.5	0.021**	0.6
Employee discounts	0.016***	0.0	0.035***	0.2
Autonomy/responsibility	0.016***	0.2	0.032***	0.2
Location	0.015***	0.0	0.022**	0.1
Paid time off	0.015***	0.1	0.032***	0.4
Commuting	0.015***	0.1	0.068***	0.2
Recognition	0.014***	0.2	0.038***	0.3
Customers	0.010***	0.4	0.006	0.5
Retirement contributions	0.009**	0.1	0.051***	0.2
Diversity/inclusion	0.009**	0.1	0.014	0.1
Mentoring	0.008**	0.1	0.022**	0.1
Promotions	0.008**	0.1	-0.003	0.1
Requirements	0.007*	0.0	0.041***	0.1
Experience	0.007*	0.2	0.008	0.2
Recruiting	0.007*	0.5	-0.009	0.5
Commissions	0.006	0.1	0.011	0.1
Communication	0.005	0.2	-0.014	0.2
Fun	0.005	0.3	0.045***	0.8
Pace	0.005	0.0	0.026***	0.0
Work schedule	0.004	0.1	0.053***	0.2
Contracting	0.004	0.3	0.022**	0.5
Morale	0.003	0.3	-0.010	0.2
Hours	0.003	0.1	0.045***	0.2
Bonuses	0.002	0.1	0.018**	0.2
On-the-job training	0.002	0.5	-0.012	1.0
Work-life balance	0.001	0.5	0.027***	0.8
Difficulty	-0.002	0.1	-0.011	0.2
Skill development	-0.002	0.1	-0.028***	0.1
Change	-0.003	0.1	0.002	0.2
Stress	-0.007*	0.1	-0.007	0.1
Job security	-0.018***	0.1	-0.064***	0.5

Notes: This table reflects pairwise correlations between the firm fixed effects for wages and the firm fixed effects for each amenity. Partial R^2 reflects the incremental increase each amenity adds to the R^2 of a regression of the firm fixed effects for job satisfaction on the firms' amenity fixed effects, and is calculated as the average across 50 iterations, where each iteration n corresponds to the amenity being added in the nth position. Partial R^2 values have been magnified by 100. Significance levels: * 10%, ** 5%, *** 1%.

ferent methodologies for calculating workers' willingness to pay for job attributes. The most common historically has been a hedonic approach, in which characteristics are considered implicitly priced into the accepted wage. A (usually unfavorable) amenity is added as a predictor for wages and the coefficient captures the additional wage needed to undertake the burden of the dis-amenity (Thaler and Rosen, 1976; Herzog and Schlottmann, 1990; Hwang et al., 1992; Lavetti and Schmutte, 2018). A more recent contingent valuation approach presents workers with a menu of hypothetical alternatives and from their choices, infers a willingness to pay (Mas and Pallais, 2017; Wiswall and Zafar, 2017; Maestas et al., 2018). There is also a revealed preference approach where willingness to pay is estimated using workers' employment decisions, e.g., the length of job spells (Gronberg and Reed, 1994), the length of non-employment spells after childbirth (Felfe, 2012), or the timing of labor supply provision in a flexible work arrangement (Chen et al., 2019).

To estimate how much workers would be willing to pay for an additional star of job satisfaction, hereafter referred to as marginal willingness to pay or MWP, I examine the length of workers' job spells, in the spirit of Gronberg and Reed (1994).[37] If utility is increasing in both wages and amenities, then workers will remain at their firms longer if they receive greater wages, improved amenities, or both.[38] To this end, I estimate a linear probability model using workers' completed job spells to predict worker tenure with a firm as a function of both their wage and job satisfaction.[39] In Section G, I consider an alternative approach for estimating MWP that examines jobseekers' application rates to posted vacancies on Glassdoor. The takeaways are similar albeit to a lesser magnitude if these jobseeker-based estimates are incorporated in lieu of tenure-based ones (Table 8: row 24).

Since firm tenure is recorded in discrete intervals (less than 1, 1–2, 3–4, 5–7, 8–10, and more than 10 years), I define the indicator variable $LongTenure_{ijkmt}$ that is equal to 1 if worker i with job title j was employed three or more years with firm k in Metropolitan Statistical Area (MSA) m as of year-month t, and 0 otherwise.[40] About 37 percent of reviews correspond to firm tenure of three or more years. Since workers do not provide a wage when submitting an employer review, I impute a wage for each worker using the median among workers with the same job title and employer from the wage data.[41] Using each worker's

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[37]In practice, one could directly estimate MWP by regressing a worker's wage on their satisfaction level to determine how many dollars in income it would require to raise the worker's satisfaction by one additional star. I do not incorporate this approach, however, because it produces implausibly large estimates of more than $230,000 per star (Table J12)—likely a reflection of how wages exhibit considerable weak explanatory power for predicting job satisfaction.

[38]Identifying whether a worker exits because of a forced separation or voluntary quit is infeasible. Only whether the worker is a current or former employee when providing their review is known.

[39]I exclude workers who are still employed with the firm since their job spells are ongoing.

[40]Excluded are the roughly 30 percent of workers who do not report their tenure at the firm.

[41]Marinescu and Wolthoff (2020) find that job titles explain upwards of 90 percent of the variance in (the

individual job satisfaction rating, I estimate

$$LongTenure_{ijkmt} = \beta_w \bar{w}_{jk} + \beta_R R_{ijkmt} + \gamma X_i + \lambda_k + \lambda_m + \lambda_t + \varepsilon_{ijkmt}. \tag{5}$$

Employer and MSA fixed effects are incorporated to account for heterogeneity in workers' employment opportunities, as is allowed for in the model of Gronberg and Reed (1994).[42] To account for differences in job satisfaction between men and women (Clark, 1997), the vector of worker observables X_i is comprised of gender fixed effects. Further, year-month fixed effects account for time-varying factors, such as business cycle dynamics and possible changes in sample composition. Here, β_R captures the effect that a one-star increase in a worker's overall job satisfaction has on the probability they spend more than two years employed with the firm. If $\beta_R > 0$, then this would confirm that workers value non-wage aspects of work when making employment and mobility decisions. Otherwise, this would suggest that conditional on their wage, workers do not factor the quality of job amenities into their separation decisions. Because workers may value job amenities differently depending upon their wage (Maestas et al., 2018), I implement equation 5 within wage quintiles. The results are presented in Table 6.

Consistent with Akerlof et al. (1988), the first row confirms that greater job satisfaction translates into longer employment spells (since β_R is robustly positive). This is true for workers of all wage levels, though the effect increases monotonically with one's wage. The second row reveals, perhaps unsurprisingly, that greater wages also lead to workers staying longer with their employers. Unlike with job satisfaction, the effect wages have on tenure is largest for workers in the lower half of the wage distribution. Because wages and job satisfaction meaningfully affect firm tenure, comparing their contributions provides a means by which to convert stars of satisfaction into dollars. The MWP for a one-star increase in job satisfaction can be approximated by $\frac{\beta_R}{\beta_w} \times \bar{w}$, the estimates for which are presented in Table 6. For the lower two quintiles, because the ratio of the coefficients is approximately half that of the upper two quintiles, the MWP is noticeably less at below $1,000. For the upper two quintiles, increased coefficient ratios combined with greater average wages produces large estimates for MWP of $5,700–$25,100 per star. The value of job satisfaction,

midpoints of) posted wages on an online job board, while Sockin and Sockin (2019a) find that 90 percent of base wages are explained by the average among peers (same job title and firm). One alternative would be to instead use reported earnings from a worker's wage report, but this requires a worker to submit both an employer review and wage report, more than halving the sample. Nonetheless, a similar albeit even steeper slope in MWP is observed for the upper-tail of the wage distribution (Table J13).

[42]One could further account for differences in job opportunities by controlling for occupation; however, occupation, which is obtained from Glassdoor's mapping of job titles to occupations, is unavailable for two-thirds of full-time workers' completed job spells. Nevertheless, adding occupational controls reveals similar estimates albeit with a slightly more pronounced MWP for high-wage workers (Table J14).

and thus amenities, appears to rise monotonically with wages and increasingly so along the upper-half of the wage distribution.

Table 6: Willingness-to-Pay for Improved Job Satisfaction by Wage Quintile

	1st Wage Quintile	2nd Wage Quintile	3rd Wage Quintile	4th Wage Quintile	5th Wage Quintile
Overall rating	0.009***	0.011***	0.020***	0.027***	0.036***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Log wage	0.480***	0.488***	0.325***	0.318***	0.179***
	(0.034)	(0.033)	(0.033)	(0.027)	(0.009)
Observations	74425	70046	69709	71220	77068
Ratio of coefficients	.019	.023	.06	.084	.203
Mean wage	24225	34682	47658	67788	123824
MWP one additional star	451	815	2879	5663	25101
R^2	0.20	0.28	0.30	0.28	0.27

Notes: This table reflects linear probability models of wages and overall ratings on an indicator for the worker's tenure with the firm lasted longer than two years, where the wage reflects the median among workers with the same job title and firm that year. Sample is partitioned into quintiles by the worker's wage and restricted to completed job spells for full-time workers. Each regression includes fixed effects for employer, metro, year-month, and gender. Standard errors are clustered by employer. Significance levels: * 10%, ** 5%, *** 1%.

Since workers across the wage distribution value job amenities differently, then the amenity value each firm offers its workforce will differ as well because each firm's average MWP will vary depending on the composition of the firms' employees. Low-paying firms employ more low-wage workers with low MWP compared with high-paying firms that employ more high-wage workers with high MWP. To account for this heterogeneity in MWP for job satisfaction across firms, define ϕ_k^l as the share of firm k's workers that receive a wage in the l quintile. Then, the average MWP for firm k can be calculated as $MWP_k = \sum_{l=1}^{5} \phi_k^l MWP^l$. For the Full and Many-movers sets, the distributions of MWP_k are plotted in Figure 4.[43] Because high-wage workers exhibit a greater willingness to pay for job satisfaction, then firms that increasingly employ high-wage workers offer markedly greater amenity value. In turn, a firm-specific MWP can range from \$500 to \$25,000 per star.

Section 5.2 documented a robust positive relation across firms between the wage premia offered and the job satisfaction experienced by employees. With firm-specific measures for the dollar-value workers place on an additional star of job satisfaction as well as an estimate for the share of job satisfaction that can be attributed to non-wage amenities, I can quantify

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[43]The two distributions are highly similar in shape though the Many-movers sample's is shifted slightly to the right, highlighting how the Many-movers set is comprised of higher-paying firms (which employ more workers in the upper two wage quintiles and so exhibit greater MWP).

Figure 4: Distribution of Firm-Specific Wage-Based MWP for Job Satisfaction
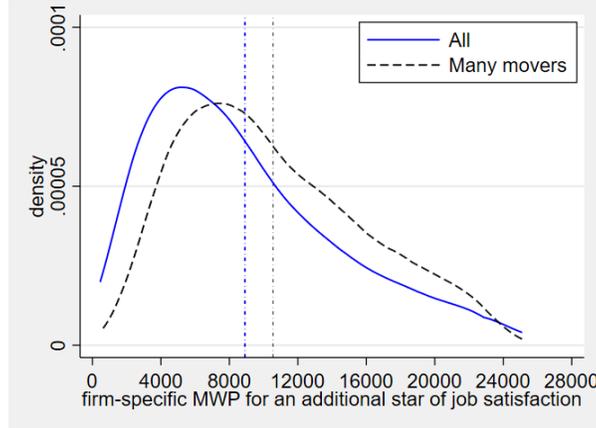
Notes: This figure plots the distribution for the MWP for a star of job satisfaction across firms. Solid blue line reflects the Full set of firms, the dashed black line the Many-movers set. The thick and thin dotted vertical lines reflect the means for the Full and Many-movers sets of $9,400 and $10,500, respectively.

the firm-specific amenity value in dollars firm k offers its workers, A_k, according to

$$A_k = \underbrace{R^2_{a=5\ldots50}}_{\substack{\text{non-pay amenity share} \\ \text{of job satisfaction}}} \times \underbrace{MWP_k}_{\substack{\text{dollar-equivalent} \\ \text{of job satisfaction}}} \times \underbrace{(\bar{R} + \hat{\lambda}^R_k)}_{\substack{\text{firm premia} \\ \text{of job satisfaction}}} . \qquad (6)$$

The difference in firms' wage offerings W_k can be captured by converting the log wage premia $\hat{\lambda}^w_k$ into dollars through multiplying by the sample average $\bar{w}$, i.e. $W_k = \bar{w} \times e^{\hat{\lambda}^w_k}$. The firm's total compensation (relative to other firms) is then summarized by $W_k + A_k$.

7   Firm-Level Dispersion Accounting for Amenities

Just how important are firms for explaining the distribution of worker compensation (wages plus amenities)? Recent work has emphasized a more limited role for the firms themselves, documenting instead an increased role for labor market sorting of high-wage workers into high-paying firms (Card et al., 2013; Song et al., 2019; Bonhomme et al., 2020). Other work has attributed a sizable fraction of what differences there are in pay between firms to compensating differentials for less-favorable workplace attributes (Sorkin, 2018; Morchio and Moser, 2019). However, because I find instead that higher-paying firms offer workers more amenity value, wages alone in fact *understate* the degree to which firms explain the distribution of worker compensation.

Ignoring job amenities, the dispersion across firms is captured by the distribution of W_k. Incorporating amenities, the dispersion across firms reflects the distribution of $W_k + A_k$.

Using both the Full and Many-movers sets, three measures of dispersion — the variance, the log difference between the 50th and 10th percentiles, and the log difference between the 90th and 50th percentiles — for W_k and $W_k + A_k$ are presented in Table 7. For wages alone, the variance across the Full sample is 5.3 log points. When the value of firms' amenities are included, the variance across firms rises to 6.3 log points, a 19 percent increase. This would imply that the high wages enjoyed at higher-paying firms do not primarily reflect equalizing differences for worse fringe benefits, unfavorable working conditions, stunted human capital development, or poor interpersonal relationships. Rather, workers at these firms enjoy better amenities. When looking instead across the Many-movers set, the jump in compensation variance across firms is markedly steeper at 72 percent, rising from 2.5 to 4.3 log points.

Table 7: Dispersion Across Firms Adjusting for Amenity Quality

Dispersion measure	Full sample		Many-movers	
	Only wages	Include amenities	Only wages	Include amenities
Variance	0.053	0.063	0.025	0.043
p50 - p10	0.293	0.309	0.202	0.255
p90 - p50	0.245	0.303	0.184	0.279

Notes: This table summarizes how three measures of dispersion differ when the firm amenity value is incorporated into the compensation offered across firms.

A similar takeaway of increased dispersion across firms can be observed using distributional comparisons such as the log difference between the 50th and 10th percentiles (50–10 ratio) or between the 90th and 50th percentiles (90–50 ratio). Comparing wages alone, 29 log points separate the median and 10th percentile while 25 log points separate the 90th percentile and the median. Incorporating amenity value, the 90–50 ratio widens 6 log points — reflecting the steep rise in MWP at the upper-tail of the wage distribution — while the 50–10 ratio lengthens by about 2 log points. Taken together, the gap between the 90th and 10th percentiles (90–10 ratio) widens more than 7 log points, equivalent to a 14 percent increase. For the Many-movers sample, a similar pattern arises: Accounting for amenities raises the 90–10 ratio nearly 15 log points, equivalent to a 38 percent increase and primarily driven by a jump in compensation along the upper tail of the distribution.

Taken holistically, the bundle of job amenities is inequality exacerbating rather than attenuating. Employees at higher-paying firms benefit from higher-quality amenities, and in turn, higher-paying firms are even higher compensating than wages alone report. Although two-way fixed effects models have found a growing role for working sorting and a more limited role for firms (Song et al., 2019; Kline et al., 2020), differences in amenity

offerings between firms and a non-zero willingness to pay for improved amenities translates into missing dispersion across firms.

8 Sensitivity Analysis

This section investigates the robustness of these findings to alternative specifications. For each alternative, Table 8 includes: the number of firms for which wage and rating premia are estimable; the slope between firms' wage and rating premia; the share of the variance in wages and overall ratings explained by firms; the share of job satisfaction attributable to non-pay amenities; one standard deviation in amenity value across firms as a percent of the average wage; the elasticity of firms' total compensation inclusive of amenity value to wages; and the increase in compensation dispersion across firms (variance and ninety-ten ratio) compared with wages alone. Rows 1 and 2 present these measures for the Full and Many-movers sets, respectively. For these two sets, the difference between the bottom and top firms by offered amenity value can be noticeable; for instance, a five-standard-deviation difference translates into 45–55 percent of the average wage, in line with the 56 percent estimate of Maestas et al. (2018) for moving from the worst to the best quality jobs. The results are unaltered if, to account for limited mobility bias in row 3, the sample of firms included in the AKM estimation is instead restricted to the "leave-one-out" samples introduced by Kline et al. (2020).[44]

Under the baseline, workers' wages reflect annualized earnings. Consequently, salaried workers who report their wage at an annual frequency may have large incomes because they are paid high hourly wages, work more hours, or both. Firms' wage premia may thus reflect employees working more hours rather than receiving greater pay. Narrowing in on hourly workers for whom we observe hourly wages directly sidesteps this concern, though it introduces a separate issue in that hourly and salaried workers may have dissimilar amenity evaluations for the same employer. Nonetheless, as shown in row 4, the results follow through when the wage premia are estimated only using workers' hourly wage rates.

In the AKM framework, the identification for each firm-specific premium relies on the experiences of job switchers entering or exiting the firm. But not all job transitions are alike. Workers who experience a low-quality match, i.e., a job that lasts at most one year, will have different outside options and reasons for exiting compared with workers who experience a high-quality match, i.e., a job that lasts at least five years. To account for these factors related to firm tenure, I incorporate fixed effects for the length of the worker's job spell when

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[44]A leave-one-out sample reflects the largest connected of workers such that all firms remain connected if any single worker were to be excluded.

Table 8: Alternative Specifications

Specification	Firms	$\rho^{w,R}$	Firm variance Wages (%)	Ratings (%)	$R^2_{a=5,\dots,50}$	$sd(A_k)$ (% of $\bar{w}$)	Elasticity	Increase adding A_k Variance (%)	90-10 ratio (log points)
1. Baseline	67679	0.46	10	22	0.315	9	1.050	19	7
2. Many-movers	10426	0.67	7	11	0.431	11	1.245	70	15
3. Leave-one-out	56486	0.55	9	20	0.334	9	1.071	25	8
4. Only hourly wages†	17366	0.32	18	22	0.280	11	1.001	17	6
5. Include length of spell FE^	67907	0.45	10	22	0.315	9	1.049	19	7
6. Completed 0-1 years spell ^	27235	0.42	10	32	0.264	7	1.055	18	6
7. Completed 5+ years spell^	27187	0.41	10	34	0.298	8	1.072	25	8
8. Reviews from full-time employees^	53148	0.60	10	28	0.315	9	1.061	23	8
9. Reviews mentioning 5+ amenities^	22209	0.75	10	35	0.491	14	1.139	52	15
10. Exclude possible sock puppetry^	40456	0.50	10	19	0.306	8	1.071	23	8
11. Relax assumption of linear ratings^	67907	–	10	–	0.315	9	1.024	8	5
12. Only female employees	27724	0.44	11	32	0.308	9	1.047	20	7
13. Only male employees	29270	0.45	12	28	0.299	8	1.026	12	6
14. Only current employees	28414	0.57	11	36	0.347	11	1.049	23	9
15. Only industry switchers	34269	0.37	12	22	0.325	9	1.037	15	6
16. Only low-paying jobs	15627	0.50	21	33	0.257	10	1.039	23	7
17. Only high-paying jobs	19153	0.62	10	34	0.346	9	1.041	22	8
18. Only job title stayers	9410	0.54	5	63	0.277	8	1.017	26	7
19. Include metro-year and job title FE	37785	0.64	7	31	0.297	9	1.063	26	9
20. Include order of observation FE	67907	0.47	9	22	0.315	9	1.050	19	8
21. Workers with 3+ observations	20321	0.41	11	28	0.325	8	1.030	13	6
22. Restrict sample to 2017–2019	13221	0.43	9	42	0.322	10	1.006	15	6
23. Establishment (firm-metro) premia	54293	0.49	19	44	0.298	9	1.031	13	6
24. Only workers in both panels	28812	0.58	12	29	0.308	8	1.016	10	5
25. Use subratings in lieu of amenities	67679	0.46	10	22	0.719	20	1.101	56	18
26. MWP from jobseeker application rates	67679	0.46	10	22	0.315	4	1.008	4	2

Notes: This table displays the coefficients from regressions of the firm fixed effects for job satisfaction on the firm fixed effects for wages under alternative specifications. Metros in Glassdoor correspond roughly to core-based statistical areas (CBSAs); there are 858 unique metros in Glassdoor and 929 CBSAs. Standard errors are bootstrapped. ^ indicates only the ratings panel is affected and the wages premia are unaltered. † indicates only the wages panel is affected and the ratings premia are unaltered. $\rho^{w,R}$ is statistically significant at the 1% level for all specifications.

estimating the ratings premia; as shown in row 5, the results are unchanged. Additionally, workers who have experienced a low- or high-quality match may be uniquely situated to speak to differences in amenity quality across firms from having salient benchmarks for comparison. In rows 6 and 7, I restrict the sample to only workers who have experienced a low-quality or high-quality match, respectively, when estimating the ratings premia, and find that the takeaway results hold.

Next, I address concerns that relate to sample composition with employer reviews. First, while the wage premia are captured using only full-time workers (because hours are unobserved), the ratings premia are estimated using employees of various work arrangements, including full-time, part-time, contract, and intern workers. Re-calibrating the ratings premia using only reviews from full-time employees in row 8 only strengthens the results. Second, workers differ in their willingness to discuss workplace amenities. Quantifying amenity value — and the relative import of non-pay amenities for overall satisfaction — could vary based

upon whether the ratings premia are gauged from workers who are increasingly willing to volunteer information. Restricting the sample to only reviews that detail at least 5 amenities in row 9 reveals even starker results, in large part due to the appreciable jump in $R^2_{a=5...50}$ from non-pay amenities accounting for a large share of variation in job satisfaction. Since the average reviewer discusses approximately four amenities, the benchmark $R^2_{a=5...50}$ appears comparatively low due to omission rather than amenities lacking explanatory power — implying that the baseline results likely correspond to conservative lower bounds. Third, employees may plant dishonest reviews if they are incentivized or threatened by firms to do so. Identifying potentially suspect reviews following the methodology of Sockin and Sojourner (2020) and excluding such reviews from the analysis in row 10 does not alter the results.

One key assumption under the baseline model is that workers interpret the five-stars scale for ratings linearly. This implies that workers value jumping from one star to two as equally as they would moving from four stars to five. However, if workers are risk averse, then avoiding poor outcomes would be increasingly desirable. To relax this assumption, I create binary indicators for each of the five star ratings, $1\{R = r\}$. Then, rather than estimating premia in overall ratings λ^R_k and a willingness-to-pay per additional star MWP_k, I calculate firm-specific premia under a linear probability model for the likelihood of each star rating λ^r_k, a willingness-to-pay for each individual star rating (relative to a one-star rating), MWP^r_k, and aggregate $\sum^5_{r=1} \lambda^r_k MWP^r_k$. As shown in row 11, the results are qualitatively similar.

Next, to address concerns related to sample selection into the wages and ratings panels, I investigate whether the results are driven by any particular category of worker or job transition. First, although male employees are over-sampled in the Glassdoor data (Sockin and Sockin, 2019b), restricting the samples in the two panels to only include female or male employees in rows 12 and 13, respectively, reveals that both on average receive greater amenity value at higher-paying firms. Second, because Glassdoor is a platform through which workers learn about employment opportunities, the concern may arise that the workers supplying their wages and reviews to the website are negatively selected on ability, disgruntled former employees that have been laid off, or both. As shown though in row 14, restricting the sample to only wages and employer reviews provided by still currently employed workers changes the takeaway results little. Third, the salience of non-wage amenities may differ depending on whether the worker chooses to remain in or exit an industry. Workers may decide to switch industries precisely to achieve improved amenities, especially if there are more salient differences across industries than within. Focusing only on industry switchers in row 15 however attenuates the results only slightly.

Additionally, workers' evaluations of job satisfaction and amenity quality could differ

depending upon their position with the firm. As workers ascend the job ladder, amenities could differ because they exhibit heterogeneous preferences, have heterogeneous experiences, or both. In fact, looking across workers within the same firm, low- and high-wage workers have markedly different evaluations of amenity quality (Table J15).[45] Consequently, a firm's overall rating premium could differ depending upon whether the Glassdoor sample is comprised of low- or high-wage workers from the firm. Restricting the panels however to only low-paying or high-paying job titles in rows 16 and 17, respectively, reveals similar results. In fact, focusing solely on job transitions in which workers retain their job title — and thereby minimizing differences between firms attributable to disparities in tasks or responsibilities — in row 18 while greatly reducing the sample of firms covered, reveals an even starker increase in dispersion when amenities are incorporated. And since amenities may vary between locations as well, I show in row 19 that the results are robust to incorporating metropolitan area by year and job title fixed effects into the AKM models.[46]

Further, the arrival of a new wage report or employer review may be non-random. For one, subsequent observations may be selected on whether match quality improves or worsens. Additionally, workers joining a firm may report systematically different sentiment than ones who are exiting. Addressing these concerns by including fixed effects for the arrival order of each workers' wage or review in the AKM models does not alter the results (row 20).[47] Most workers in the two panels are only observed twice, implying that the worker, and subsequently the firm, fixed effects may be imprecisely estimated. Restricting the sample however in row 21 to only workers in each panel who are observed at least three times produces similar results. These findings are also not driven by employers' differential responses to the COVID-19 pandemic, or by structural changes to the website and its users over time, as restricting both samples to the years 2017–2019 in row 22 offers similar takeaways. Treating individual firms' establishments as separate firms, as is typical in the AKM literature, offers the same findings as well (row 23). Since providing location in an employer review is optional, distinguishing between establishments is not the baseline approach.

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[45]There are two takeaways worth highlighting. First, forty-five of the fifty amenities exhibit a statistically significant slope with individuals' wages. Second, the amenities that are negatively related with individuals' wages include many pecuniary attributes, whereas the amenities that are positively related with individuals' wages pertain to working conditions and interpersonal relationships — though job security and office politics are notable exceptions. One possible explanation is that low-wage workers care primarily about pecuniary compensation beyond wages, while high-wage workers care more about intangibles. Another is that as workers climb the job ladder, workers benefit from improved attributes that were previously inaccessible at lower rungs. Examining these possibilities further I leave to future researchers.

[46]Since reporting one's location and job title in an employer review is optional and may reflect a strategic concealment decision (Sockin and Sojourner, 2020), the baseline approach conditions on neither.

[47]Subsequent wages are on average more positive, consistent with movement up the job ladder over the life cycle or positive selection on unobservables, and subsequent ratings are on average more negative, possibly reflecting an increased propensity for workers to voice their views when dissatisfied (Table J16).

The last set of sensitivity checks pertain to how job satisfaction translates into amenity value. Under the baseline, the share of job satisfaction attributable to non-wage amenities reflects the R^2 from a regression of the firm premia for job satisfaction on those for the forty-six non-pay amenities. If, in lieu of the text-based amenities, the four subratings pertaining to non-pay attributes (career opportunities, culture and values, senior leadership, and work-life balance) are used to determine the share of job satisfaction attributable to non-wage aspects, the results only redouble (row 25). Finally, rather than using worker tenure to capture MWP for an additional star of job satisfaction, one could study jobseekers' search behavior. When presented with job listings on Glassdoor, jobseekers are presented with the employer's overall star rating along with a wage estimate. Comparing the application behavior of jobseekers across listings that vary in rating and wage, the details for which are available in Appendix G, produces estimates for the dollar-equivalent of one star of job satisfaction. The results (row 26) are qualitatively similar, albeit quantitatively weaker, under this approach.

9 Discussion and Limitations

If firms do not set amenities according to a compensating differential framework, it raises the question how do firms choose the quality of amenities to supply? Why do some firms offer better quality amenities than others? One obvious possibility is that firms differ in their marginal costs of amenity provision (Rosen, 1986). However, to be consistent with the positive relation observed across firms between wages and amenities, this would imply that high-paying firms uniformly exhibit economies of scale in providing amenities compared with their lower-paying counterparts. One alternative is that more-productive firms compensate workers through greater wages and amenities because both are normal goods, as in the theoretical exposition of Appendix A (Mortensen, 2003; Lang and Majumdar, 2004). Relating the firm premia for wages and satisfaction with a measure of average labor productivity for public firms available through Compustat (Figure J7) lends support to this view.

There are alternative theories though that warrant further exploration. For one, amenity provision may reflect a strategic decision for targeting optimal tenure with the firm. Since more satisfied workers stay longer on the job, firms interested in fostering a low-turnover, high-retention workforce may offer improved amenities. While a dollar in wages is identical across firms, observing the quality of an employer's amenities may require direct inspection through on-the-job experience (Menzio and Shi, 2011), thereby rendering exiting a firm and relinquishing its amenities a risky decision. Second, improved amenities may cause productivity to increase and subsequently drive wage growth, though the evidence on this relation is mixed (Iaffaldano and Muchinsky, 1985; Böckerman and Ilmakunnas, 2012). If employees

who are more satisfied — a concept that predominantly reflects non-wage aspects of work — are more productive (Oswald et al., 2015; Bellet et al., 2019) or have improved complementarities with peers, then firms may become higher-paying through promoting amenity quality. Finally, the provision of high-quality amenities could reflect a means by which to attract top talent. Given that high-wage workers place more value on job satisfaction, higher-paying firms providing more-favorable non-wage amenities may help explain the high degree to which productive workers sort into productive firms (Card et al., 2013; Borovičková and Shimer, 2017; Hagedorn et al., 2017; Lopes de Melo, 2018).[48]

Although this work contributes to a budding literature on job amenities by making use of novel data on job switchers' satisfaction and amenity values at different jobs, there are a number of limitations that future work in this area may help address. For one, the analysis rests on the firm fixed effects being precisely estimated in the two-way fixed effects models for both wages and job satisfaction. However, workers in each of the two samples only have on average 2.2–2.4 observations (Table J3). The thinness of the two panels implies that the worker fixed effects will be noisily estimated, which can spillover into the firm fixed effects being imprecisely estimated if there are few identifying movers. This concern is somewhat alleviated by the fact that the main takeaways follow through when the sample is restricted to more connected sets of firms. However, the inability to observe the same workers' wages and amenities more frequently hampers the possibility of controlling for potential violations to the assumption of exogenous mobility, e.g. match-specific quality, on-the-job learning, peer effects, and labor demand shocks, as well as accounting for time-varying preferences in workers' valuations of firms' amenities throughout their tenure with the firm.

Additionally, since I observe each worker only at instances of employment, time between jobs is unobserved. The average duration between observations is 1.7–2.3 years (Table J3), suggesting workers' amenity preferences are unlikely to have changed much between observations. However, because workers are not observed consecutively — as is typical for administrative data often used in the AKM literature — determining whether the pair of matches observed for job switchers constitutes a job-to-job transition, a job-to-nonemployment-to-job transition, or even if there were unreported jobs in between. The absence of continuous employment histories hinders determining whether the jobs observed in the data are selected in some manner relative to jobs that are unobserved. Moreover, the reason for each job separation is unobserved. Although the job duration approach to estimate MWP of Gronberg and Reed (1994) incorporates voluntary and involuntary separations, the wage and satisfac-

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[48]Since amenities are unobserved in administrative employee-employer matched datasets of labor income, they are necessarily omitted. Analyses using wages alone may then understate the role of firms and overstate the role of sorting. While the variance between firms has risen in the United States since the late 1970s, that increase has been attributed to changes in the composition of workers within firms (Song et al., 2019).

tion declines observed in the data may reflect low bargaining power following involuntary turnover rather than a willingness to voluntarily separate.

Last, the empirical analysis is limited to coverage in Glassdoor. Only firms represented by job switchers are included. Unfortunately, I cannot test whether the results extend to all U.S. firms. In particular, if there is heterogeneity in the relation between wages and amenities by firm age or size, then the applicability of these results for younger or smaller firms that are more likely to be overlooked (Figure J4) may be limited. In addition, because the sample period extends only as far back as 2008, making conclusions about how non-wage amenities, their relation to wages, and their dispersion have changed over time is not feasible. While Pierce (2001) speaks to how dispersion in fringe benefits has evolved over time, research that could speak to how dispersion in non-pecuniary amenities has changed over time would uniquely contribute to the inequality literature.

10 Conclusion

Using matched employee-employer data on workers' wages and job satisfaction levels, I find that higher-paying firms offer their workers more in amenity value than lower-paying firms. In gauging a comprehensive set of hard-to-observe, hard-to-quantify amenities from workers' descriptions of their employers, I document how nearly the entire bundle of amenities is positively correlated with the wage premium a firm offers, including better working conditions, fringe benefits, interpersonal relationships, and human capital development. This evidence runs contrary to the boon in wages workers enjoy at a higher-paying firm primarily reflecting an equalizing difference for lower-quality amenities. That is not to say though that there is not a compensating differential whereby workers accept somewhat lower wages in exchange for better amenities (e.g., Stern, 2004).[49] However, when looking across vertically-differentiated firms, the higher-paying employer is more likely to offer better amenities.

Since high-paying firms are high-amenity firms, wages understate compensation inequality. In turn, if one were to account for job amenities, low-wage workers would have even lower lifetime compensation, the opportunity cost of work would be even greater for high-wage workers, and the returns to investing in human capital and climbing the firm ladder would be even more pronounced. Now that capturing hard-to-measure amenities is feasible given the advent of online job boards, linking such data to labor market interventions that may alter compensation packages, such as minimum wage laws (Clemens, 2021) and tax

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[49]Implementing a hedonic approach for estimating the willingness to pay for an additional star of job satisfaction reveals a positive MWP, but only after conditioning on the productivity of the match through worker fixed effects. More details are provided in Appendix H.

policies (Powell and Shan, 2012), as well as theories of job search, occupational sorting, educational attainment, worker bargaining, and firm dynamism, would be promising avenues for future research.

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A Positive and Negative Correlations Possible

In this appendix, I introduce a simple firm maximization problem which reveals through comparative statics that amenities can complement or substitute for wages. Suppose there is a continuum of firms of varying productivity z looking to hire a single worker for production. Each firm posts a compensation package (w, a) where w is the wage workers can then spend on consumption and a is the amenity bundle characterizing all of the job characteristics associated with working at the firm. The firm can produce amenities a at cost $c(a)$, where $c'(a) > 0$. There is a continuum of workers whose utility depends on both the wage and amenities consumed, $U(w, a)$, and is increasing in both arguments, i.e. $U_w(w, a) > 0$ and $U_a(w, a) > 0$. The objective function of the firm is to choose a compensation package that maximizes profits,

$$\max_{w, a \geq 0} z - w - c(a).$$

Under perfect competition with perfect information, firms make zero profits, so firms with productivity z will offer (w, a) such that $z = w + c(a)$.

Workers choose the employment opportunities that offer them the most utility. As such, they select the firm offering $(w = z - c(a), a)$ that solves

$$\max_{a \geq 0} U(z - c(a), a)$$

. The first order condition for the worker's maximization problem is given by $U_w(z - c(a), a)c'(a) = U_a(z - c(a), a)$. Rearranging slightly, we obtain the equation governing the equilibrium level of amenities provided by the firm:

$$c'(a) = \frac{U_a(z - c(a), a)}{U_w(z - c(a), a)}.$$

The left-hand side represents the marginal cost to the firm of providing more amenity a, while the right-hand side constitutes the marginal rate of substitution between amenities and wages for the worker, i.e. the added benefit the worker would gain from giving up part of their wage for more amenities.

Suppose that $U(w, a) = \log(w) + \beta \log(a)$, where β is a scaling parameter dictating to what extent workers prefer amenities compared with wages. Further, let us assume a linear cost function for amenity production $c(a) = \kappa a$. Under these functional forms, the wage and amenities offered by a firm with productivity z is

$$w = \frac{z}{1 + \beta} \text{ and } a = \frac{\beta z}{(1 + \beta)\kappa}.$$

Comparative statics reveal how the correlation between w and a can be positive or negative. Consider first the degree of firm productivity, z. In this case, $\frac{\partial w}{\partial z} > 0$ and $\frac{\partial a}{\partial z} > 0$, so $corr(w, a) > 0$ since both are positively correlated with firm output per worker. Second, consider the workers' preference for trading off amenities for wages, β. In this case, $\frac{\partial w}{\partial \beta} < 0$ and $\frac{\partial a}{\partial \beta} > 0$, so $corr(w, a) < 0$. Because workers with relatively high β increasingly prefer amenities to wages, firms will shift compensation for these workers away from wages toward amenities. Finally, with regards to the marginal cost of providing amenities κ, while the wage is unaffected, since $\frac{\partial a}{\partial \kappa} < 0$, the amenity value provided by the firm falls (Rosen, 1986). Therefore, the wage-amenity bundles we observe across firms will reflect differences in firms' productivity levels (z), employees' preferences for amenities (β), and costs of amenity provision (κ), which together, can induce a positive or negative relation between w and a.

B   Comparison: ASEC and Glassdoor Amenities

In this appendix, I detail how the measures used for externally validating the Glassdoor amenities against the Annual Social and Economic Supplement (ASEC) dataset are constructed. I first restrict attention to the thirteen survey waves from 2008–2020, for which the microdata are made available by Flood et al. (2020) through IPUMS-CPS. I then map workers from their industries in ASEC according to 1990 Census Bureau classifications into twenty-two Glassdoor industries.[50] I then map workers from their occupations in ASEC according to 2010 Census Bureau classifications into twenty-one two-digit standard occupational classification (SOC) occupations. Each of the measures used in Table B1 are then calculated by taking weighted averages (according to representative ASEC weights) by industry-occupation pairing for the following observables, where the relevant variables are included in parentheses.

- Offers pension: The worker responds that there is a pension plan at work, but they are not included or that they are included in a pension plan at work (*pension*).

- Offers insurance: The worker was included in an employer group health plan last year (*inclugh*).

- Using paid time off: The worker was absent from work last week or working part-time last week for a vacation or personal days (*whyabsnt, whyptlwk*) .

- Absent due to layoff: The worker was unemployed because they were on layoff or lost their job for other reasons (*whyunemp*).

- Employment white-male: The worker responds that is male and white (*sex, race*)

- Weekly time at work: The worker's usual hours worked per week at main job, conditional on the worker being employed at work (*uhrswork1,empstat*).

As shown in Table B1, Glassdoor amenities capture labor market patterns observed across metrics related to these variables. I first consider fringe benefit information contained in ASEC by calculating the share of workers for whom the firm offers a pension or group health insurance plan, as well as the share of workers who were absent from work or worked

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[50]The industries and corresponding Census Bureau mappings are: Accounting & Legal (841, 890); Arts, Entertainment & Recreation (800–810, 872); Biotech & Pharmaceuticals (891); Business Services (721–731, 740–741, 882, 891–893); Construction, Repair & Maintenance (60, 751–760); Finance (700–710); Health Care (812–840, 861–870); Information Technology (732); Insurance (711); Manufacturing (100–392); Media (440); Non-Profit (880–881); Oil, Gas, Energy & Utilities (450–472); Real Estate (712); Retail (580–640, 642–691); Telecommunications (441–442); Transportation & Logistics (400–432); and Travel & Tourism (762–770).

part-time last week because they were on vacation or using personal days. These three measures should each increase as the amenities for retirement contributions, health insurance, and paid time off, respectively, improve. Since the availability of (and thus likely satisfaction with) fringe benefits depends on hours worked, employment status controls are not included in the formal regressions. The first three columns confirm these patterns, with robustly positive and significant correlations of 0.39, 0.18, and 0.14, respectively, between the Glassdoor amenities and ASEC measures. Next, I consider whether actual increased risk of forced job separation by industry-occupation according to ASEC translates into an increasingly negative amenity for job security in Glassdoor reviews and find a robustly negative correlation of –0.18. Next, I use the gender and racial composition of employment to examine whether the amenity for diversity/inclusion captures differences in diversity across labor market opportunities. In industry-occupations with a greater share of workers who are white males, the diversity/inclusion amenity is increasingly more-negative, with a correlation of –0.08. In work arrangements where employees spend more hours on the job, we would anticipate workers to have less-favorable work-life balance, as they have less time for leisure. Column 6 confirms that jobs in which workers supply more hours on average have the dis-amenity of worse work-life balance, with a correlation of –0.19. Finally, we would anticipate jobs where workers spend more hours on the job to report greater satisfaction with hours — as they have access to more full-time labor — but conditional on employment status, e.g. full-time or part-time, workers that spend increasingly many hours on the job would be more dissatisfied with the increased hours they spend on the job. The final two columns confirm this pattern: In Glassdoor reviews, workers in industry-occupations with more work hours are significantly more positive about hours, but upon controlling for the distribution of workers by employment status, workers with longer work hours are significantly more negative about hours.

Table B1: Relating Glassdoor Amenities and Outcomes from the Annual Social and Economic Supplement (ASEC)

	Measure calculated from ASEC							
Standardized Glassdoor amenity	Share offers pension (%)	Share offers insurance (%)	Share using paid time off (%)	Share absent due to layoff (%)	Share employment white-male (%)	Mean weekly time at work (hours)		
Retirement contributions	0.098*** (0.011)							
Health insurance		0.040*** (0.010)						
Paid time off			0.003*** (0.001)					
Job security				-0.010*** (0.002)				
Diversity/inclusion					-0.069*** (0.017)			
Work-life balance						-0.821*** (0.175)		
Hours							1.348*** (0.172)	-0.916*** (0.167)
Employment status controls				✓	✓	✓		✓
Industry-occupations	439	439	439	439	439	439	439	439
Pairwise correlation	0.385	0.180	0.142	-0.184	-0.080	-0.185	0.352	0.352
R^2	0.15	0.03	0.02	0.18	0.22	0.59	0.12	0.60
Mean ASEC weight	17699	17699	17699	17699	17699	17699	17699	17699
Mean ASEC measure	0.480	0.430	0.033	0.030	0.452	38.80	38.80	38.80

Notes: This table reflects coefficients from regressions of ASEC-level measures on (standardized normal) Glassdoor amenities at the Glassdoor industry x two-digit SOC occupation. Regressions are weighted according to the representative ASEC weights. Employment status controls refers to the share of workers of each employment status in the Glassdoor reviews sample. Industry-occupation pairings restricted to those with at least fifty Glassdoor employer reviews. Significance levels: * 10%, ** 5%, *** 1%.

C Comparison: AWCS and Glassdoor Amenities

In this appendix, I detail how amenities from the American Working Conditions Survey (AWCS) are constructed for comparison with Glassdoor amenities. There is only one wave of the AWCS that was fielded in 2015, and had 3,131 respondents. I restrict attention to individuals who are employed, but not self-employed, trimming the sample to 2,117 respondents. We obtain the worker's two-digit North American Industry Classification System (NAICS) industry code (variable *q9_industrycode*) and two-digit standard occupational classification (SOC) occupation (variable *q3_occupationcode*). I then exclude any workers for whom industry or occupation is unavailable, trimming the sample further to 1,725 respondents. To compare with Glassdoor reviews, I map Glassdoor industries into NAICS codes.[51] Each amenity used in Table C1 is then measured by taking weighted averages (according to representative AWCS weights) by industry-occupation pairing, where the relevant variables are included in parentheses.

- Autonomy/responsibility: If the respondent is able to choose or change the order of tasks, the methods of work, and speed/rate of work. We sum these three indicators. (*q50a–q50c*)

- On-the-job training: If over the past twelve months, respondents had undergone training to improve their skills that was paid for or provided by their employer or on-the-job training. We sum these two indicators. (*q61a,q61d*)

- Work-life balance: In general, do your working hours fit, (1) very well, (2) well, (3) not very well, or (4) not at all well, in with your family or social commitments outside work? I create an indicator variable for the worker responds very well or well. (*q41*)

- Short breaks: Whether the respondent can (1) always, (2) most of the time, (3) sometimes, (4) rarely, or (5) never take breaks when wanted, where the integral value assigned to each option is included in parentheses. Inverting the scale, I obtain a metric that is increasing in the degree to which taking breaks when wanted is permissible. (*q51d*)

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[51]The seventeen industries and corresponding Glassdoor industries listed in parentheses are: 11 (Agriculture and Forestry); 21 (Mining and Metals); 22 (Oil, Gas, Energy and Utilities); 23 (Construction, Repair and Maintenance); 31 (Manufacturing, Aerospace and Defense); 44 (Retail); 48 (Transportation and Logistics); 51 (Media, Telecommunications); 52 (Finance, Insurance); 53 (Real Estate); 54 (Accounting and Legal, Business Services, Information Technology, Biotech and Pharmaceuticals); 61 (Education); 62 (Health Care); 71 (Arts, Entertainment and Recreation); 72 (Travel and Tourism, Restaurants, Bars and Food Services); 81 (Consumer Services); and 92 (Government).

- Work schedule: In response to whether changes to their work schedule occur often, respondents could say no or yes, with the latter further qualified by either on the same day, the day before, several days in advance, or several weeks in advance. We create an indicator variable for the worker responds no, so that this measure is inversely related to the frequency of scheduling changes. ($q40$)

- Safety: Whether the respondent is exposed to each of the following all of the time, almost all the of the time, around three-fourths of the time, around one-half of the time, around one-fourth of the time, almost never, or never: vibrations - hands tools/machinery, loud noise, high temperatures, low temperatures, breathe smoke/fumes/power/dust, breathe vapors, handling chemical products, breathe tobacco smoke, and handling infectious materials. We create an indicator for each that the worker is exposed at least one-half of the time or more. I then sum the nine indicators and multiply by -1 to obtain a metric that is increasing in the degree of workplace safety. ($q23a$-$q23i$)

- Support: Whether the worker agrees or disagrees with the statement that their immediate boss provides useful feedback and whether their immediate boss encourages and supports their development. I create an indicator variable for each and sum the two. ($q58f,q58g$)

- Recognition: With regards to their workplace, whether the respondent (1) strongly agrees, (2) agrees, (3) neither agrees nor disagrees, (4) disagrees, or (5) strongly disagrees employees are appreciated when done a good job, where the integral value assigned to each option is included in parentheses. Inverting the scale, I obtain a metric that is increasing in the degree to which the workplace offers employees recognition. ($q51d$)

- Communication: Whether the respondent would describe their work situation as one in which they (1) always , (2) most of the time, (3) sometimes, (4) rarely, or (5) never receive contradictory instructions, where the integral value assigned to each option is included in parentheses. ($q52e$)

- Pay: With regards to their job, whether the respondent (1) strongly agrees, (2) agrees, (3) neither agrees nor disagrees, (4) disagrees, or (5) strongly disagrees that they feel that they get paid appropriately, where the integral value assigned to each option is included in parentheses. Inverting the scale, I obtain a metric that is increasing in the degree to which the worker is satisfied with pay. ($q77b$)

I then test whether the Glassdoor amenities reflect patterns observed for these ten aspects of work in the AWCS. The relations, summarized in Table C1, confirm that Glassdoor amenities reflect differences in workplace conditions between industries and occupations. There are particularly strong correlations between the two datasets. A one-standard-deviation improvement in the Glassdoor amenity is associated with 0.44 and 0.34 standard deviations improved short breaks and safety in the AWCS, respectively. For work schedule, autonomy/responsibility, and on-the-job-training, we find robustly positive relations as well, with 0.24, 0.22, and 0.21 standard deviations increases in the AWCS per standard deviation in Glassdoor. Last, we find noticeably positive albeit weaker significant relations for support, work-life balance, pay, recognition, and communication between the two surveys with 0.09–0.13 standard deviations increases in the AWCS per standard deviation in Glassdoor. In all, this comparison offers further assurance that findings derived using Glassdoor amenities have real consequence for the U.S. labor market.

Table C1: Relating Glassdoor and American Working Conditions Survey (AWCS) Amenities

	Amenity in AWCS									
	Short breaks	Safety	Work schedule	Autonomy/ responsibility	On-the-job training	Support	Work-life balance	Pay	Recognition	Communication
Amenity in Glassdoor	0.442***	0.335***	0.241***	0.216***	0.208***	0.133***	0.131***	0.122**	0.111**	0.085**
	(0.047)	(0.057)	(0.040)	(0.053)	(0.053)	(0.041)	(0.044)	(0.047)	(0.046)	(0.043)
Industry-occupations	203	204	204	204	204	203	204	204	203	204
Pairwise correlation	0.552	0.385	0.395	0.275	0.266	0.224	0.203	0.177	0.167	0.139
R^2	0.30	0.15	0.16	0.08	0.07	0.05	0.04	0.03	0.03	0.02
Mean AWCS weight	7.589	7.588	7.588	7.588	7.588	7.620	7.588	7.588	7.620	7.588

Notes: This table reflects coefficients from regressions of (standardized normal) AWCS amenities on (standardized normal) Glassdoor amenities at the two-digit NAICS industry x two-digit SOC occupation. Regressions are weighted according to the representative AWCS weights. Industry-occupation pairings restricted to those with at least fifty Glassdoor employer reviews. Significance levels: * 10%, ** 5%, *** 1%.

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D Inter-Industry Wage-Satisfaction Relation

While greater wages corresponded to more job satisfaction across the 68,000 firms in the Full set, there may be heterogeneity between different types of firms. One particularly salient firm characteristic I observe is the industry in which the firm operates, of which there are seventeen NAICS categories. It is well-established that there are differences in pay between industries (Wachtel and Betsey, 1972; Krueger and Summers, 1988) and one posited theory for rationalizing these differences is that workers in higher-paying industries are compensated for worse working conditions (Holzer et al., 1991; Sorkin, 2018). If it were the case that inter-industry wage differences equalized inter-industry amenity differences, then we would anticipate an inverse relation across industries between the wage and satisfaction premia firms offer. Figure D1 plots for each industry ι, the average wage premium in the industry $\hat{\lambda}_\iota^w = \frac{1}{N_{k \in \iota}} \hat{\lambda}_k^w$ against the average satisfaction premium $\hat{\lambda}_\iota^R = \frac{1}{N_{k \in \iota}} \hat{\lambda}_k^R$. If such compensating differentials are evident, then low-paying industries would offer greater levels of job satisfaction, and vice-versa; however, the opposite is apparent. Relatively high-paying industries such as Professional, Scientific, and Technical Services and Finance and Insurance also provide more satisfaction than low-paying industries such as Accommodation and Food Services and Retail. Across industries, the weighted correlation between the wage and overall ratings premia is 0.43 (p-value=0.086). One industry where there may be strong compensating differentials is Educational Services, which offers relatively low wages but comparatively high levels of job satisfaction. Excluding Educational Services, the weighted correlation is 0.67 (p-value=0.005). Therefore, consistent with Krueger and Summers (1988), inter-industry wage differentials do not reflect compensation for disagreeable work characteristics.

Figure D1: Heterogeneity in Wage-Rating Premia Across Industries
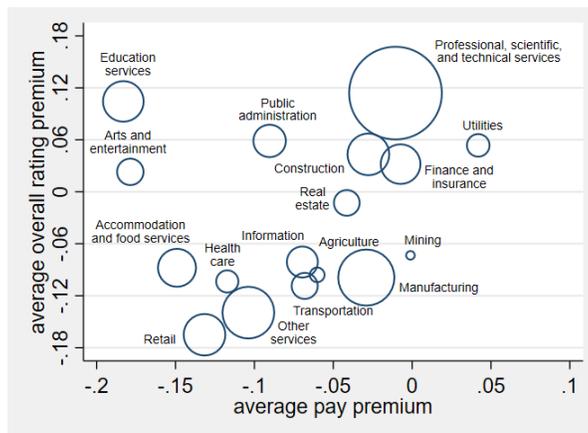
Notes: This figure plots the average wage premium against the average firm rating premium for each industry. Industries reflect two-digit NAICS and are weighted by firm count in the Full set.

E Intra-Industry Wage-Satisfaction Relation

In this appendix, I show that the positive relation observed between a firm's wage and its job satisfaction premia does not reflect across-industry differences but holds within industries as well. First, each firm is mapped a two-digit NAICS industry according to the mapping from Glassdoor industries to NAICS detailed in Footnote 51. Then, for the set of firms in each NAICS industry σ, I estimate $\hat{\lambda}_k^R = \rho_\sigma^{w,R} \hat{\lambda}_k^w + \upsilon_k$. The seventeen coefficients are presented in ascending order in Figure E1. For most industries, $\rho_\sigma^{w,R}$ is positive, with the most robust relations observed among high-skilled industries. The standalone exception is Educational Services, for which we instead observe a sharply negative relation.

Figure E1: Heterogeneity in Slope Between Wage and Rating Premia Within Industries
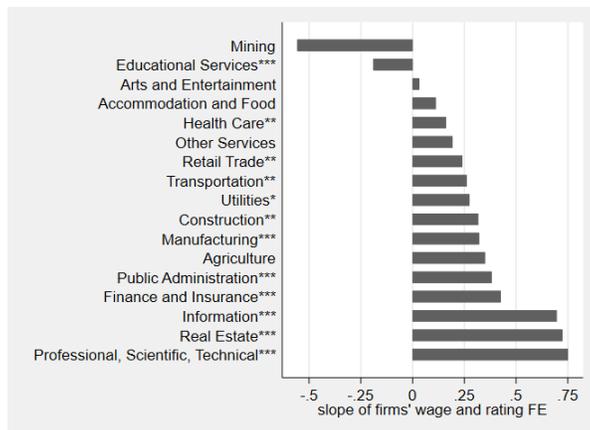
Notes: This figure shows the $\rho^{w,R}$ coefficient from estimating $\hat{\lambda}_k^R = \rho^{w,R} \hat{\lambda}_k^w + \upsilon_k$ separately within each industry for the firms in the Full set. Industries reflect two-digit NAICS, and are displayed in ascending order according to $\rho^{w,R}$. Significance levels: * 10%, ** 5%, *** 1%.

From a fixed employer look-up table Glassdoor maintains, I obtain a rich set of firm characteristics, including firm type, age, and size. With regards to type, firms are partitioned according to private companies, public companies, subsidiaries, non-profits, colleges, governments, hospitals, and schools. Partitioning firms by type allows for a deeper investigation into the negative relation observed within the Educational Services sector. Is this inverse pattern driven by particular firms operating within education, such as primary and secondary school systems? I partition the sample into colleges (46 percent of employers), schools (21 percent) and all other education-based firms, and re-estimate the wage-amenity relation $\hat{\lambda}_k^R = \rho^{w,R} \hat{\lambda}_k^w + \upsilon_k$ separately for all employers, only colleges, only primary and secondary schools, and all firms that are neither colleges nor schools. The results are recorded in Table E1. Column 1 confirms the stark inverse relation between wages and job satisfaction, but columns 2–4 reveal that schools and colleges drive this pattern. For non-college,

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non-school employers in fact, we observe the positive correlation between wages and job satis-faction observed elsewhere. Learning institutions appear unique in their offering of improved amenities with lower wages.

Table E1: Relation between Firms' Pay and Satisfaction Premia within Education Sector

| | Overall rating premia | | | |
	All	Colleges	Schools	Other
Wages premia	-0.190**	-0.191	-0.387**	0.342**
	(0.081)	(0.154)	(0.184)	(0.138)
Std. dev. rating premia	0.978	0.891	1.050	1.019
Std. dev. pay premia	0.224	0.209	0.208	0.228
Observations	3646	1682	759	1205

Notes: This table reflects regressions of firms' overall ratings premia on firms' wage premia within Educational Services by employer type. Standard errors are bootstrapped. Significance levels: * 10%, ** 5%, *** 1%.

F   Ratings of Firms' Benefits Packages Overall

In this appendix, I show further evidence that higher-paying firms are better-amenity firms by narrowing in explicitly on workers' satisfaction levels with their employers' fringe benefits. When contributing information to the website, a worker can choose to (separately) rate their employers' overall fringe benefits package.[52] Fringe benefits reviews begin in 2014, and are appreciably thinner in size compared with the wage and job satisfaction data. That said, the data constitute employee-employer matches and contain job switchers who rate the benefits overall for multiple firms, and so equation 1 can be re-estimated with worker i's benefits rating for firm k in year t, B_{ikt}, on the left-hand side to obtain firm-specific premia in fringe benefits satisfaction $\hat{\lambda}_k^B$ for almost 12,000 firms.

Before relating $\hat{\lambda}_k^B$ to the firms' wage premia $\hat{\lambda}_k^w$, I re-estimate the first differences specification of equation 2 to see how the change in a workers' fringe benefits satisfaction levels $(B_{ik't'} - B_{ikt})$ relates to the change in the firms' wage premia $\hat{\lambda}_{k'}^w - \hat{\lambda}_k^w$. Panel a of Figure F1 reveals a clear *positive* effect: Workers who move to lower-paying firms on average report worse satisfaction with fringe benefits, and vice-versa. Looking instead at whether the worker experiences a decline in benefits satisfaction, $1(B_{ik't'} < B_{ikt})$, panel b of Figure F1 reveals that the probability of experiencing a decline in the quality of fringe benefits rises as workers move to lower-paying firms. This is true because, as evidenced in column 1 of Table F1, firms that offer relatively greater wages also provide relatively better fringe benefits packages, consistent with Pierce (2001). That said, consistent with Table 4, differences in fringe benefits play a limited role in explaining firms' job satisfaction premia: Incorporating firms' benefits ratings premia attenuates the slope between the firms' wage and job satisfaction premia by only 6 percent (columns 3 and 4). That fringe benefits explain so little of the job satisfaction premia implies that accounting for pecuniary differences in fringe benefits across employers would even further widen firm-level dispersion in total compensation beyond that obtained through gauging job satisfaction levels.

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[52]For a further discussion of overall fringe benefits ratings from Glassdoor, see Gadgil and Sockin (2020).

Figure F1: Growth in Benefits Ratings by the Change in Firm Wage Premia

(a) Rating growth

(b) P(rating decline)
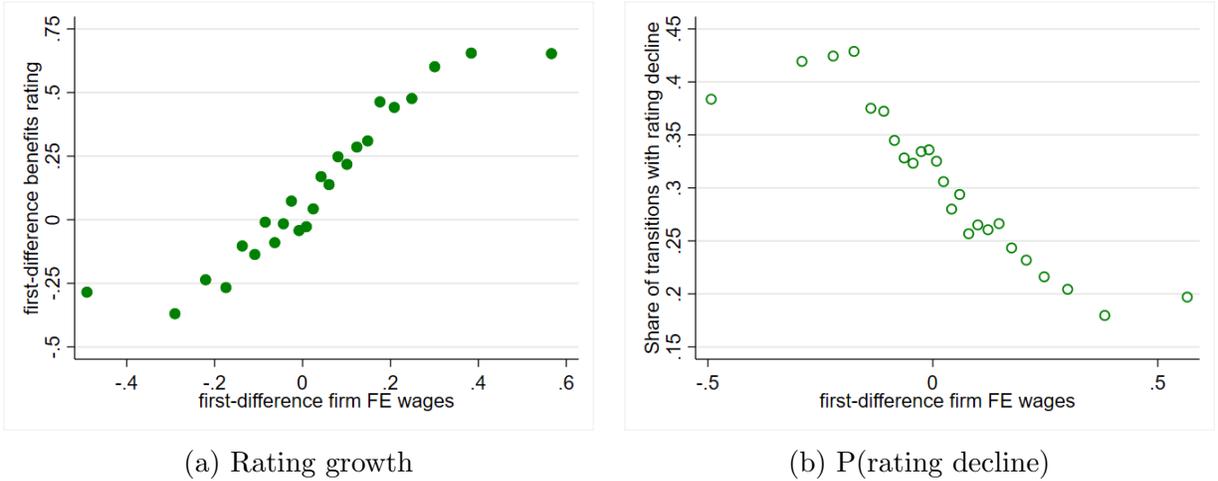
Notes: This figure depicts the average growth rate in workers' benefits ratings (panel a) and the probability of a worker experiencing a decline in fringe benefits rating (panel b) when transitioning between firms that differ in their wage premia (x-axis). Observations are partitioned into twenty-five bins according to the measure on the x-axis.

Table F1: Firms' Wage and Job Satisfaction Premia Accounting for Fringe Benefits

	Wage premia	Overall rating premia		
Benefits ratings premia	0.016***	0.077***		0.069***
	(0.002)	(0.006)		(0.005)
Wage premia			0.550***	0.518***
			(0.042)	(0.043)
Average movers from wages	97	97	97	97
Average movers from overall ratings	58	58	58	58
Average movers from benefits ratings	4	4	4	4
Std. dev. benefits ratings	1.017	1.017	1.017	1.017
Firms	11863	11863	11863	11863
Adjusted R^2	0.01	0.01	0.02	0.03

Notes: This table displays the coefficients from regressions of the firm fixed effects for job satisfaction on the firm fixed effects for wages incorporating firm-level differences in satisfaction with fringe benefits. Benefits ratings reflect a one-to-five stars rating scale, with more stars indicating a greater level of satisfaction. Benefits ratings premia reflect the firm fixed effects from a two-way fixed effects model (with worker fixed effects) on the rating the worker assigns to the firms' overall fringe benefits package. For further description of Glassdoor benefits data, see Gadgil and Sockin (2020). Standard errors are bootstrapped. Significance levels: * 10%, ** 5%, *** 1%.

G   Alternative Estimation of MWP: Job Applications

Beyond contributing employer reviews, wage reports, benefits ratings, and interview experiences to the website, workers can use Glassdoor to apply to job vacancies. Job postings on Glassdoor are aggregated from across the Internet and capture approximately four-fifths of total U.S. job openings (Chamberlain and Zhao, 2019). Based on their search parameters, e.g., location, employer, or job title, interested jobseekers are presented with a list of available postings on Glassdoor. Each job listing includes an "Apply Now" button whereby jobseekers can begin the process of submitting an application for the opening. A vacancy being displayed to the user constitutes an "impression" and if the jobseeker initiates an application, that constitutes an "apply." For each job listing posted on Glassdoor between January 2017 and August 2019, I aggregate the total impressions and applies recorded by registered users within a 72-hour window of the vacancy appearing on the website. To ensure that each jobseeker accounts for at most one impression and one application per listing, jobseekers must be logged into their Glassdoor accounts for their impressions and applies to be tallied. To gauge jobseeker interest in each job posting while accounting for differences in the propensities with which listings are presented to jobseekers, I calculate each posting's application rate, or appliers per 100 impressions. To reduce measurement error in application rates, I consider only postings that receive at least 5 impressions. A more in-depth discussion of how this dataset was constructed is presented in Sockin and Sojourner (2020).

Estimating the dollar value jobseekers place on an additional star of job satisfaction is feasible because each job listing is presented with the employer's overall star rating on Glassdoor as well as an estimated range for the vacancy's wage based on workers' wage reports on Glassdoor. For the estimate wage, when feasible, Glassdoor provides jobseekers with the 10th and 90th percentiles of the predicted wage distribution. For estimating MWP, I take the median of the wage distribution. For the employer's overall rating, Glassdoor maintains weekly data for companies that have accumulated at least 10 workers' reviews by that year-week. A new reading of the weekly data is produced on the Sunday of each week, so job listings are assigned the employer rating associated with the nearest Sunday. Since the 72-hour window for job listings posted on Tuesdays would be equally divided between Sundays, such listings are dropped from the sample. Further, job postings for which neither wage estimates, an employer overall rating, nor the metropolitan area in which the opening is located are available are excluded.

The assumption is that job satisfaction and wages are normal goods, so that greater job satisfaction and higher wages are both desirable characteristics of an employment opportunity. If workers prefer greater job satisfaction and a greater wage, then improvements in the

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two should boost jobseeker interest. The relative increase between the two offers a dollar summary for how much jobseekers value job satisfaction. The formal regression specification is given by

$$ApplyRate_{pjt} = \beta_R R_{k(p),t} + \beta_w w_{pt} + \lambda_{k(p)} + \lambda_j + \lambda_{m(p)} + \lambda_t + \varepsilon_{pjt}. \tag{G1}$$

where the dependent variable is applies per 100 impressions for each job posting p advertising job title j and listed on calendar day t. Included as controls are fixed effects for the employer $k(p)$, the job title, the metropolitan area $m(p)$, and calendar day. To allow for heterogeneity in MWP across the wage distribution, equation G1 is estimated separately on each quintile of the wage distribution across postings. Following Marinescu and Wolthoff (2020), job title fixed effects are included to induce a positive correlation between posted wages and application rates. Here, β_R captures the effect that a one-star increase in the signal of overall job satisfaction offered by the firm compared with its average over the period has on the rate at which jobseekers choose to apply to the firm's postings. The ratio $\frac{\beta_R}{\beta_w}$ summarizes jobseekers' MWP for job satisfaction. The estimates, presented in Table G1, produce a similar pattern of MWP increasing sharply with income — though with a noticeably depressed estimate for the top-wage quintile, possibly reflecting a meaningful disparity between ex-ante and ex-post evaluation of job satisfaction.

Table G1: Willingness-to-Pay for Improved Job Satisfaction from Job Listings

	1st Wage Quintile	2nd Wage Quintile	3rd Wage Quintile	4th Wage Quintile	5th Wage Quintile
Employer rating	0.011	0.056***	0.044***	0.038**	0.028**
	(0.015)	(0.014)	(0.014)	(0.015)	(0.014)
50th percentile wage estimate ($10000s)	0.246***	0.214***	0.142***	0.085***	0.025***
	(0.014)	(0.008)	(0.007)	(0.004)	(0.001)
Mean application rate	2.03	1.91	1.91	1.90	1.74
Observations	1478909	1467735	1462071	1462001	1469716
Mean wage	25935	38309	51524	68571	111912
MWP one additional star	432	2614	3106	4441	11521
R^2	0.08	0.14	0.19	0.22	0.23

Notes: This table reports the coefficients from a regression of a job listing's employer star rating and its median wage estimate on the rate at which jobseekers applied to the listing, i.e., applications per 100 impressions. Job listings are partitioned into quintiles by median wage estimate. Each regression weights job postings by their impression totals and includes fixed effects for employer, job title, metro, and listing date. Sample is restricted to job listings for which a metropolitan location of employment is available. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%.

H   Hedonic Estimation of MWP

In this appendix, I estimate workers' MWP for improved job satisfaction through a hedonic approach in which job satisfaction is an attribute priced into the wages workers are willing to accept following the two-way fixed effects methodology of Lavetti and Schmutte (2018) — though given the thinness of the wage panel, I do not first residualize workers' wages by a match fixed effect. The attribute of interest that should be priced into workers' accepted wages is $\bar{R}_{\iota\sigma t}$, which reflects the three-year rolling average of job satisfaction ratings at year t for each Glassdoor industry ι and two-digit SOC occupation σ. The hedonic specification is given by

$$w_{ikt} = \beta \bar{R}_{\iota\sigma t} + \gamma X_{it} + \lambda_i + \lambda_k + \lambda_\sigma + \lambda_t + \varepsilon_{ikt}. \tag{H1}$$

where X_{it} represents a fourth-order polynomial in years of work experience. Note that since workers are mapped to industries by the firm, then controlling for industry is redundant when firm fixed effects are included. The results are presented in Table H1.

If job satisfaction is an aspect of work that workers are willing to trade off with wages, then the coefficient β should be negative. Looking across the pooled cross-section of workers with multiple wage observations, absent controlling for the productivity of the worker, the *opposite* relation is observed (columns 1 and 2). The positive coefficients capture how high-wage workers on average also enjoy greater levels of job satisfaction, not less. When worker fixed effects are included, β now captures the trade-off the same worker would be willing to make between their wage and expected level of job satisfaction as captured through differences across industry-occupations over time. Now, a negative coefficient is observed, consistent with a compensating differential. After further accounting for time-invariant differences across firms (column 4), a significant compensating differential is observed, with the same worker willing to forego about \$3,000 ($\beta * \bar{w}$) in wages for each additional star of job satisfaction. Since Glassdoor ratings range from one to five stars, a worker would forego roughly \$12,000, or 15 percent of the average wage, to transition from a job with the lowest expected level of job satisfaction to one with the highest. Obtaining a hedonic estimate for MWP that is noticeably below estimates obtained from a tenure-based approach is not inconsistent with the literature (Dale-Olsen, 2006; Bonhomme and Jolivet, 2009; Lavetti and Schmutte, 2018). However, this could reflect asymmetry in timing: the measure of job satisfaction used in the hedonic specification is an ex ante expectation for a given labor market whereas the one used for the tenure-based approach is an ex-post realization of the match. The hedonic methodology reveals that, although there is a compensating differential for job satisfaction (and thus non-wage amenities), this trade-off is not observed broadly across workers and firms.

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Table H1: Willingness-to-pay for Improved Employer Quality, Hedonic Approach

| | Hedonic Specification | | | |
	Pooled	+Industry and Occupation	+Worker	+Firm
	(1)	(2)	(3)	(4)
Overall rating (3-Yr MA)	0.649***	0.159***	-0.064***	-0.038***
	(0.032)	(0.016)	(0.013)	(0.007)
Observations	1180512	1180512	1180512	1180512
R^2	0.25	0.44	0.90	0.93
Mean wage	79691	79691	79691	79691
MWP one additional star	51751	12658	-3506	-3016
95% MWP confidence interval	[46707,56795]	[10193,15122]	[-4739,-2273]	[-4120,-1913]

Notes: This table reflects coefficients from a regression of average overall rating within an industry-occupation pair on wages, where the column headers reflect the level of fixed effects added to the specification. Industry-occupation pairs with fewer than 50 ratings are excluded. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%.

I   Description for Each Amenity

In this appendix, I provide the input and output from the Anchored CorEx model for each of the fifty amenities, along with the categories to which they have been assigned.

Table I1: Input and Output from Anchored CorEx Model: Amenities 1–10

#	Category	Amenity	Anchor words	Top twenty words
1	Pay	Pay	pay, salary, base, base pay, money	pay, salary, money, base, base pay, pay pay, discrepancy, disparity, way market, low ball, ridiculously low, offer competitive, making much, quite low, make ton, peanuts, differential, incredibly low, one lowest, great place work
2	Pay	Pay growth	raise, annual raise, salary increase, pay raise, raise base	raise, pay raise, salary increase, annual raise, raise base, yearly review, annual pay, infrequent, get cent, years without, room advancement, hard come, keep inflation, room growth, eyebrow, miniscule, minimal pay, chance advancement, little room growth, room promotion
3	Pay	Bonuses	bonus, performance, cash, stock option	bonus, performance, cash, stock option, bonus base, payouts, cow, make extra, appraisal, rsu, cows, low raise, bonus good, advancement base, eoy, hard achieve, quartly, quaterly, recognition job, sti
4	Pay	Commissions	sales, commission, quota	sales, commission, quota, selling, sale, sales rep, territory, sales job, sales people, salesperson, base salary, cold calling, commission structure, sales manager, sales goal, make sales, cold call, sales training, sales position, sales person
5	Fringe benefits	Paid time off	vacation, pto, sick days, leave, pay time off	leave, pto, vacation, pay time off, sick days, bereavement, pto sick, benefit unlimited, good amount, must use, paternal, lot desire, generous amount, benefit pay, accumulation, hard take, maternal, benefit generous, vto, pay time off sick
6	Fringe benefits	Health insurance	insurance, health insurance, dental, vision	insurance, health insurance, vision, dental, offer health, health vision, pricey, medical vision, cost health, affordable health, tunnel, pto health, poor health, heath, excellent health, could better, insurance dental, good medical, dental health, unaffordable
7	Fringe benefits	Retirement contributions	retirement, 401k, pension, contribution	401k, contribution, retirement, pension, year, include, plan, benefit, state, increase, le, cover, high, area, policy, 401k match, average, option, match, holiday
8	Fringe benefits	Employee discounts	employee discount, discount, perk	discount, perk, employee discount, merchandise, clothes, clothing, coupon, gratis, credit cards, accessory, concession, merch, apparel, full price, jewelry, sale item, retail job, free movie, phone plan, cute clothes
9	Fringe benefits	Free food	lunch, food, free, cater lunch	free, food, lunch, cater lunch, tip, eating, massage, breakfast, occasional free, cook, delicious, free food, half off, get free, free breakfast, donut, salad, sandwich, menu, free drink
10	Working conditions	Work-life balance	work life balance, work life	work life balance, work life, balance ability, maintain healthy, promote healthy, balance none, balance limited, hard balance, imbalance, difficult maintain, culture good, hard maintain, good balance, culture benefit, balence, long hours little, balace, benefit culture, flexibility good, ballance

Notes: This table details the anchor words and resulting topics from the Anchored CorEx model.

Table I2: Input and Output from Anchored CorEx Model: Amenities 11–20

#	Category	Amenity	Anchor words	Top twenty words
11	Working conditions	Hours	hours, full time, part time	hours, full time, part time, work full time, part timer, part time employee, college student, get hours, seasonal, get full time, cut hours, position available, full time position, hours cut, require long, normal business, part time job, work part time, hours hours, benefit flexible
12	Working conditions	Work schedule	hours, shift, schedule, flex time	hours, schedule, shift, flex time, scheduling, availability, hour shift, early morning, pick extra, swap, pay flexible, monday friday, late night, inflexible, super flexible, offer flexible, night shift, extremely flexible, schedule change, week advance
13	Working conditions	Short breaks	break, rest, bathroom, lunch	break, lunch, rest, bathroom, take lunch, minute break, two minute, half hour, one hour, min lunch, laurels, hour long, min break, get break, pay lunch, break time, minute lunch, long lunch, 30min, unpaid lunch
14	Working conditions	Office space	office, desk, cubicle, cramp, building	office, building, desk, cubicle, cramp, quiet, windows, amenities, renovate, spacious, elevator, dallas, cube, remodel, natural light, beautiful new, renovation, noisy, layout, open floor plan
15	Working conditions	Commuting	commute, parking, bus, drive	drive, parking, commute, bus, traffic, downtown, shuttle, throw people, garage, public transportation, distance, depend live, long distance, valet, rush hour, parking spot, location free, locate downtown, meter, underground
16	Working conditions	Teleworking	telecommute, telework, work home, home office, remote	work home, remote, home office, telework, telecommute, one day week, flexible work, schedule ability, set hours, flexible work schedule, option available, flex schedule, days per week, hours ability, make schedule, equipment provide, flexibility ability, provide equipment, remote position, benefit ability
17	Working conditions	Location	city, location, metro	location, city, metro, rural, location location, salt lake, twin, suburb, geographic, culver, small town, jersey, inner, midtown, redwood, suburban, geographical, one location, satellite, philadelphia
18	Working conditions	Autonomy/ responsibility	autonomy, independence, responsibility	responsibility, autonomy, independence, given lot, take additional, give lot, shirk, lots flexibility, shirking, variety task, lots freedom, many responsibility, deal flow, minimal supervision, kind coworkers, variety job, work pace, schedule lots, supportive coworkers, atmosphere lots
19	Working conditions	Respect/ abuse	respect, dignity, abuse, harass, hostile	respect, abuse, hostile, harass, reason, lie, joke, upper management, write, literally, dignity, quit, unless, promise, woman, speak, blame, absolutely, claim, ignore
20	Working conditions	Communication	communication, issue, concern, meeting	issue, communication, meeting, concern, resolve, voicing, open line, meeting meeting, management listen, sometimes lack, get resolve, resolving, unresolved, many meeting, poor internal, inter department, inter departmental, need improvement, townhall, need improve

Notes: This table details the anchor words and resulting topics from the Anchored CorEx model.

Table I3: Input and Output from Anchored CorEx Model: Amenities 21–30

#	Category	Amenity	Anchor words	Top twenty words
21	Working conditions	Support	help, support, supportive, encourage	help, support, encourage, supportive, always available, always ready, always happy, nice willing, student need, worker willing, manager willing, available need, wiling, pay school, further education, class size, support teacher, assist need, lots training, administrative support
22	Working conditions	Difficulty	challenge, growing pains, difficult, easy	challenge, easy, difficult, growing pains, job fairly, application process, peasy, getting time off, work life balance sometimes, communication sometimes, simple job, balancing work, job simple, mindless work, simple work, everyday different, decal, breezy, quick money, working public
23	Working conditions	Requirements	require, requirement, mandatory, optional	require, requirement, mandatory, optional, weekend work, five words, time commitment, weekend hours, pay low amount work, physical labor, heavy lift, extensive travel, low pay amount work, billables, lot travel, high productivity, memorization, lot paperwork, weekend require, exertion
24	Working conditions	Stress	stress, pressure, high stress, high pressure	stress, pressure, high stress, high pressure, undue, cooker, environment high, environment low, unneeded, environment little, reliever, lot unnecessary, stress high, heavy workload, much pressure, lots pressure, schedule low, high pressure environment, lots stress, heavy work
25	Working conditions	Pace	pace, fast pace, speed	fast pace, pace, speed, super fast, busy fast, snail, challenge fast, excite fast, breakneck, really fast, working fast, growing rapid, environment always, glacial, never boring, environment lots, dynamic fast, environment challenge, environment lot, learn fast
26	Working conditions	Safety	injury, dangerous, safety, conditions, workplace	workplace, safety, conditions, dangerous, injury, unsafe working, hazard, precaution, hazardous, chemical, ppe, safety employee, employee safety, safety culture, number one priority, weather conditions, safety first, extremely hot, safe work, fatality
27	Working conditions	Recognition	hard work, effort, reward	reward, hard work, effort, unnoticed, recognize reward, put forth, get reward, go unnoticed, make every, unrecognized, get recognize, recognize appreciate, always recognize, reward recognize, challenge yet, duplication, handsomely, management recognize, little recognition, working child
28	Working conditions	Morale	morale, atmosphere	atmosphere, morale, family type, upbeat, easy going, good working, booster, family friendly, relax work, positive work, family orient, good team, friendly family, friendly work, low staff, turnover low, family style, casual work, friendly fun, friendly relax
29	Working conditions	Fun	fun, boring, mundane, tedious	fun, boring, tedious, mundane, repetitive, lively, monotonous, interactive, chill, make coming work, fun fun, numbingly, lay back, company activity, summer job, get bit, work repetitive, repetitive work, get repetitive, interact customer
30	Working conditions	Culture	culture, values, environment, society, mission	culture, environment, mission, values, society, strong core, unsafe work, noble, cutthroat, fun office, pace work, comfortable working, amaze work, fantastic work, work fast pace, dog eat dog, relax office, highly political, like fast pace, great workplace

Notes: This table details the anchor words and resulting topics from the Anchored CorEx model.

Table I4: Input and Output from Anchored CorEx Model: Amenities 31–40

#	Category	Amenity	Anchor words	Top twenty words
31	Working conditions	Diversity/ inclusion	diversity, ethnic, multicultural, inclusive, lgbtq, inclusion, equality, diverse	diversity, diverse, inclusive, inclusion, equality, lgbtq, multicultural, ethnic, gender, diversity equity, lack diversity, ethnicity, inclusivity, focus diversity, commitment diversity, race gender, patient population, inclusiveness, nationality, student body
32	Working conditions	Leadership	leadership, management	management, leadership, hands off, ceo upper, change upper, poor senior, overbear, upper middle, transparency upper, access senior, access upper, many level, lack strong, lack direction, exposure senior, support senior, lack true, direction upper, communication senior, poor middle
33	Working conditions	Office politics	politics, bureaucracy, red tape, office politics	politics, bureaucracy, office politics, red tape, get way, big company, politics politics, lots internal, lot internal, slow move, typical corporate, many layer, inter office, mire, typical large, interoffice, difficult navigate, lots red tape, lot bureaucracy, lots bureaucracy
34	Working conditions	Change	change	change, slow make, enact, resist, many change, lots change, averse, adverse, slow adapt, nothing would, slow implement, management change, schedule always, always change, abrupt, much change, scenery, chump, structure change, student life
35	Working conditions	Job security	layoff, lay off, turnover	turnover, layoff, lay off, severance, furlough, severance package, due covid, get lay off, result high, lead high, high rate, people lay off, reorgs, super high, lay off people, instability, downsizing, lay off employee, company lay off, layoff happen
36	Human capital	Career concerns	career, grow, improve, growth	growth, career, grow, improve, always room, tons room, personal career, due rapid, benefit room, room professional, communication could, ton room, real room, opportunity personal, great company, help advance, absolutely room, enough room, good place, place build
37	Human capital	Promotions	promotion, promote, job title	promote, promotion, job title, merit base, base merit, much room, internal candidate, promotion process, base know, hike, promote quickly, limited opportunity, tough get, come promotion, take long time get, promotion system, quick promotion, salary hike, promotion hard, lack promotion
38	Human capital	Experience	experience	experience, opportunity gain, lots hands, looking gain, make break, learn gain, memorable, none great, gain lots, really depend, able gain, place gain, gain much, lot hands, improve customer, help gain, highly dependent, unforgettable, without prior, courtroom
39	Human capital	Skill development	develop, skill	skill, develop, sharpen, help develop, develop new, hone, learn valuable, marketable, gain new, critical thinking, learn many, learn develop, opportunity develop, public speaking, transferrable, communication skill, develop professional, improve communication, transferable, lots opportunity learn new
40	Human capital	On-the-job training	train, training	training, train, trainer, sink swim, pay training, opportunity cross, throw wolf, shadowing, online training, training training, intensive, cpr, expect know everything, informative, management need, lack formal, cdl, provide adequate, provide proper, training do

Notes: This table details the anchor words and resulting topics from the Anchored CorEx model.

Table I5: Input and Output from Anchored CorEx Model: Amenities 41–50

#	Category	Amenity	Anchor words	Top twenty words
41	Human capital	Mentoring	intern, internship, mentor	intern, internship, mentor, internship program, learn lot, intern program, intern get, internship experience, intern work, great experience, intern event, hands experience, busy work, intern given, summer internship, even intern, unpaid internship, internship unpaid, end internship, intern project
42	Human capital	Recruiting	hire, recruit, interview, learn	hire, learn, interview, recruit, always something new, interviewer, phone interview, almost anyone, spree, recruit process, without experience, program new, lot information, lots things, multitask, informational, useful skill, service skill, quick hire, req
43	Human capital	Contracting	contract, offer, sign	offer, contract, sign, renew, non compete, contracting, contract end, contract work, clause, rescind, new contract, contract employee, contract company, month contract, contract position, contract hire, year contract, nda, contract sign, perm
44	Human capital	Industry	industry, market, startup, organization, project, product, technology, strategy, design	industry, product, project, organization, technology, market, design, startup, strategy, exposure, beauty, best product, bench, cannabis, manufacture, really interest, volatile, aerospace, bleeding edge, saturate
45	Relationships	Managers	boss, manager, ceo, owner	manager, ceo, owner, boss, micromanager, franchise, great guy, good manager, manager assistant, assistant store, good guy, absentee, difficult work, manager district, asst, manager need, need training, district regional, manager micro, manager good
46	Relationships	Coworkers	coworkers, people, friend, family, colleague	people, family, coworkers, colleague, friend, coworkers become, become close, make feel like part, get meet, meet best, mostly good, working smart, meet wonderful, good hard working, need hire, meet awesome, worker become, meet great, hire enough, generally nice
47	Relationships	Teams	team, teamwork, collaborative	team, teamwork, collaborative, depend team, immigration, feel part, value member, happy part, orientate, supportive leadership, interdisciplinary, great support, amaze leadership, experience depend, multidisciplinary, cooperative, excellent leadership, excellent management, work life balance depend, approachable management
48	Relationships	Customers	customer, client	customer, client, servicing, many client, client want, client client, working client, care client, one client, dealing angry, customer get, building relationship, impatient, client staff, many customer, deal rude, deal angry, customer customer, every client, caregiver
49	Residual	Residual I	–	work, make, like, tell, say, time, know, job, come, working, want, way, day, place, use, start, ask, month, expect, things
50	Residual	Residual II	–	company, employee, business, role, create, new, result, process, focus, provide, level, truly, idea, individual, opportunity, continue, success, bring, allow, means

Notes: This table details the anchor words and resulting topics from the Anchored CorEx model.

J   Additional Figures and Tables

Figure J1: Job Satisfaction and Hourly Wage from NLSY97
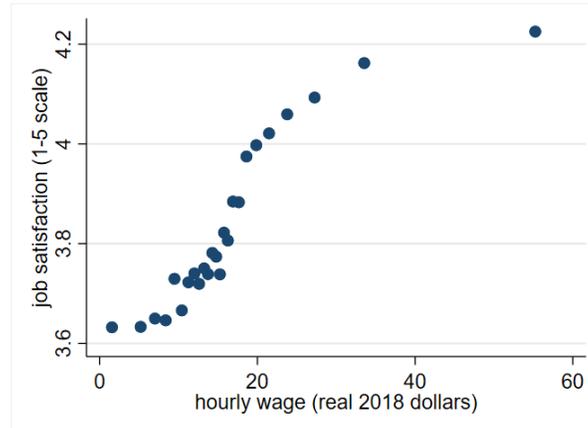
Notes: This figure depicts the average job satisfaction for each job held by respondents in the National Longitudinal Survey of Youth 1997 against the workers' log hourly wage.

Figure J2: Workers' Overall and Subcategory Ratings by Wage Level

(a) Overall

(b) Compensation and benefits

(c) Career opportunities

(d) Culture and values

(e) Senior leadership

(f) Work-life balance
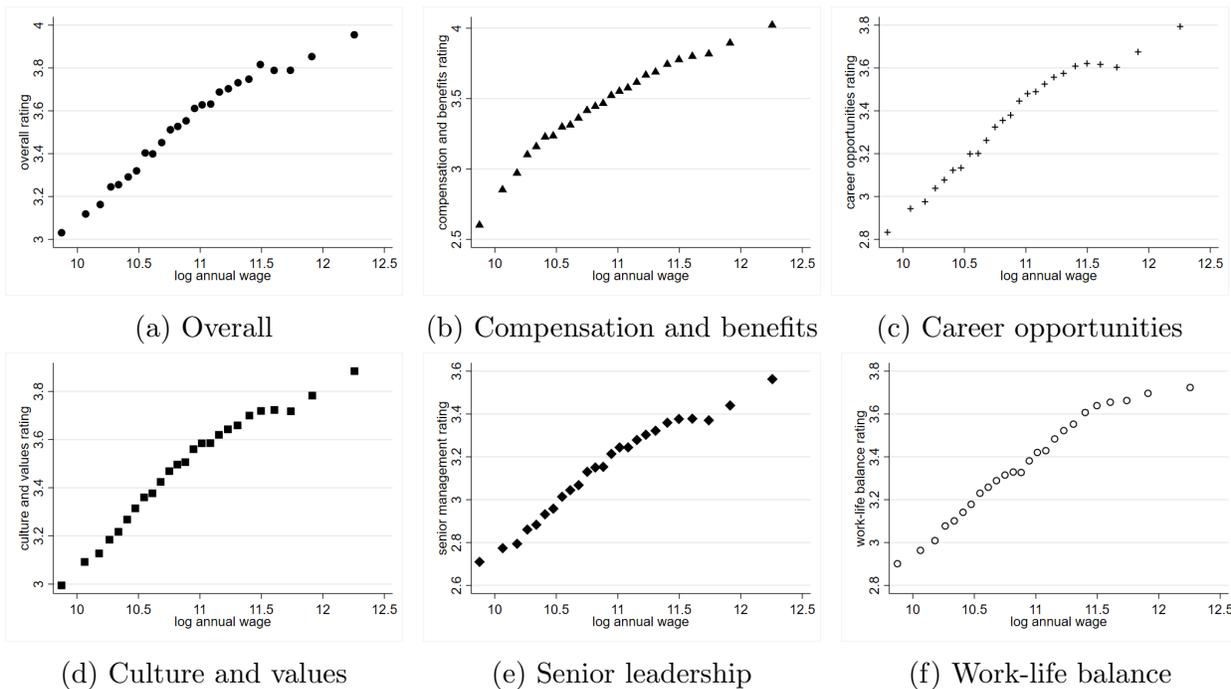
Notes: This figure plots the average rating among Glassdoor reviews for overall ratings and the five subcategories against workers' log wages.

Figure J3: Log Wages and Overall Ratings Distributions
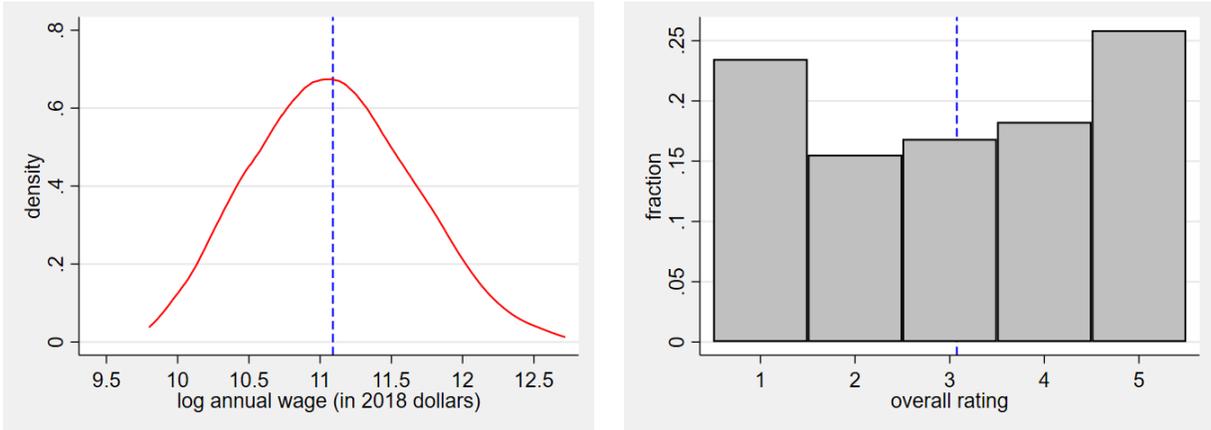
(a) Log wages

(b) Overall ratings

Notes: The figure plots the distribution of log wages (panel a) and overall ratings (panel b). Samples are restricted to the panel of workers with multiple wages or multiple reviews, respectively. Dashed blue vertical lines reflect the sample means of 11.042 and 3.053 for log wages and overall ratings, respectively.

Figure J4: Distribution of Employers With or Without Firm Premia by Firm Size
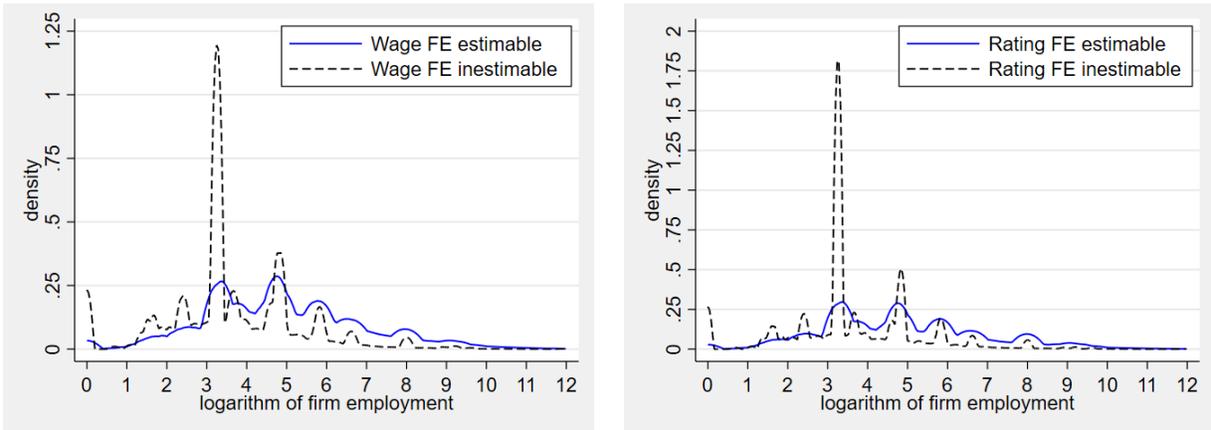
(a) Wages panel

(b) Overall ratings panel

Notes: This figure depicts the distribution by the logarithm of firm employment within the wages (panel a) and ratings (panel b) datasets between two sets of firms, those for which a fixed effect under the AKM framework is obtainable and those for which it is not.

Figure J5: Growth in Job Satisfaction and Wages by Change in Firm Premia
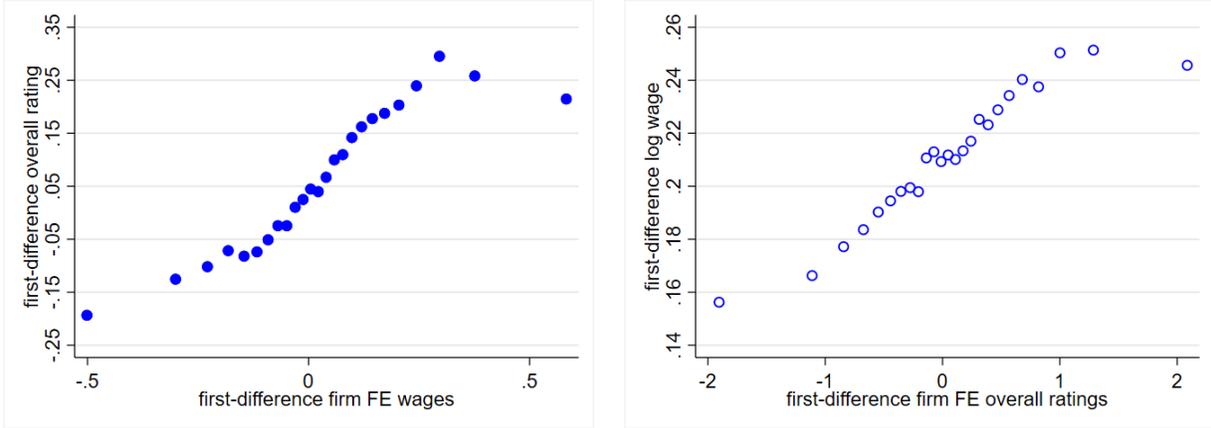
(a) Job satisfaction growth

(b) Wage growth

Notes: This figure depicts the average change in overall rating (panel a) and change in real wage (panel b) when transitioning between firms that differ in their wage and ratings premia, respectively (x-axis). Observations are partitioned into twenty-five bins according to the measure on the x-axis.

Figure J6: Firm FE for Overall Rating with Sample Truncation
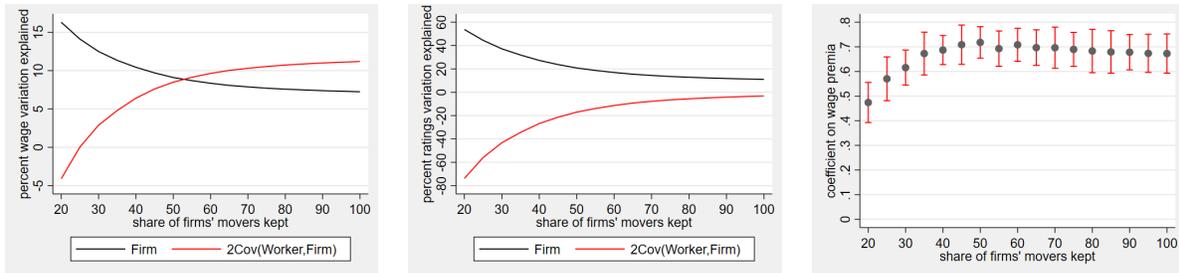
(a) Wage variance

(b) Ratings variance

(c) Wage-satisfaction relation

Notes: This figure depicts the share of the variance explained in wages (panel a), the share of the variance explained in overall ratings (panel b), and the coefficient $\rho^{w,R}$ from estimating $\hat{\lambda}_k^R = \rho^{w,R}\hat{\lambda}_k^w + v_k$ (panel c) when the share of movers for each firm varies from 20 percent of the movers in the full sample to 100 percent. The sample of firms is restricted to those in the Many-movers sample. For each percentile of firm's movers kept, a random sample of movers is drawn fifty times and for each draw, the two-way fixed effects model of equation 1 is re-estimated. The firm fixed effects are then averaged across the fifty draws.

Figure J7: Firm Premia and Average Labor Productivity from Compustat

(a) Wages FE

(b) Overall ratings FE
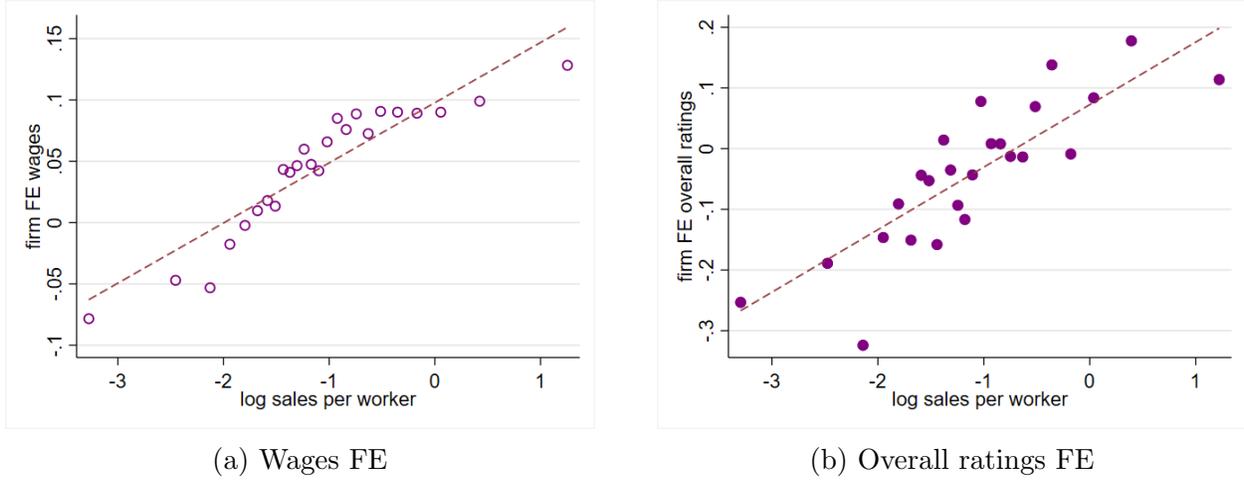
Notes: This figure plots the firm fixed effects for wages (panel a) and job satisfaction (panel b) against the firms' average labor productivity (log sales per worker). Log sales per worker available for public firms in Compustat, and so the sample of firms is restricted to public firms that can be matched from Glassdoor to Compustat. Observations are partitioned into twenty-five bins according to the measure on the x-axis.

Table J1: Incidence of Workers' Choices to Submit Wage Reports (W), Employer Reviews (R), and Benefits Ratings (B) on Glassdoor

Worker-Firm Pairs	Share of workers providing information bundle (%)						
	Only W	Only R	Only B	Both W&R	Both W&B	Both R&B	All W&R&B
21,961,870	47.5	23.0	3.0	22.8	0.5	0.8	2.3

Notes: This table displays the incidence rates at which workers choose to provide a wage report, an employer review, or a benefits rating for their employer, conditional on providing at least one of the three. Providing any of the three types satisfies the give-to-get mechanism for obtaining access to the information that other volunteers provide on Glassdoor.

Table J2: Firms' Wage and Job Satisfaction Premia Accounting for Workers' Choices in Survey Submission Type

	Wage premia	Overall rating premia		
Share of respondents volunteer wage only	0.075*** (0.002)	0.241*** (0.026)		0.365*** (0.036)
Wage premia			0.463*** (0.020)	0.450*** (0.023)
Average share wage only	0.455	0.313	0.356	0.356
Std. dev. share wage only	0.240	0.151	0.123	0.123
Mean respondents per firm	157	156	229	229
Firms	117346	103054	67679	67679
Adjusted R^2	0.01	0.00	0.01	0.01

Notes: This table displays the coefficients from regressions of the firm fixed effects for job satisfaction on the firm fixed effects for wages incorporating the rates at which firms' workers submit only wage reports on Glassdoor. Workers can provide a wage report, an employer review, or a benefits rating to obtain access to the information that other volunteers provide on Glassdoor. Standard errors are bootstrapped. Significance levels: * 10%, ** 5%, *** 1%.

Table J3: Summary Measures for Wages and Ratings Samples in AKM Framework

	Log wages			Overall ratings		
Panel measure	N	mean	std. dev.	N	mean	std. dev.
Worker-year observations	2.49	2.24	0.62	1.44	2.38	0.85
Years between observations	1.33	2.48	1.91	0.79	2.02	1.78
Growth between observations	1.24	0.16	0.36	0.79	-0.03	1.72
Experiences negative growth	1.27	0.28	0.45	0.79	0.32	0.47
Worker switches firm	1.33	0.78	0.42	0.79	0.79	0.41
Is current employee	2.49	0.68	0.47	0.79	0.50	0.50
Years of experience	2.49	6.05	6.25	–	–	–
Is long tenure	–	–	–	1.02	0.37	0.48
Is full time	–	–	–	1.23	0.81	0.39
Amenities mentioned	–	–	–	1.44	3.78	3.09

Notes: This table displays the summary statistics for the wages and ratings panels. Calculations regarding tenure and employment status for employer reviews are conditional on workers for whom the information is available. Sample sizes (N) are listed in millions.

Table J4: Wage Growth Among Job Transitions by Firms' Rankings

Destination Firm Decile	Origin Firm Decile									
	1	2	3	4	5	6	7	8	9	10
1	-0.07	-0.11	-0.20	-0.29	-0.35	-0.41	-0.46	-0.57	-0.68	-0.88
2	0.08	-0.08	-0.10	-0.15	-0.19	-0.23	-0.27	-0.33	-0.42	-0.61
3	0.17	0.03	-0.06	-0.09	-0.12	-0.15	-0.18	-0.24	-0.31	-0.49
4	0.25	0.09	0.02	-0.05	-0.07	-0.10	-0.11	-0.15	-0.22	-0.38
5	0.35	0.16	0.08	0.01	-0.05	-0.05	-0.07	-0.11	-0.15	-0.29
6	0.40	0.22	0.12	0.06	0.01	-0.07	-0.04	-0.08	-0.12	-0.25
7	0.46	0.26	0.17	0.10	0.05	0.01	-0.05	-0.05	-0.09	-0.21
8	0.59	0.35	0.25	0.17	0.12	0.07	0.03	-0.03	-0.03	-0.13
9	0.71	0.47	0.35	0.26	0.19	0.13	0.11	0.06	-0.02	-0.08
10	0.97	0.67	0.53	0.41	0.34	0.28	0.24	0.19	0.12	0.00

Notes: This table presents the mean wage growth for job transitions based on the rankings of the origin (initial) firm and destination (terminal) firm, where the firm rankings reflect deciles based on the firm fixed effects for wages obtained from equation 1. Deciles are numbered in ascending order. Sample wage growth is demeaned and residualized by the first difference in experience and years between observations.

Table J5: Change in Overall Rating Among Job Transitions by Firms' Rankings

Destination Firm Decile	Origin Firm Decile									
	1	2	3	4	5	6	7	8	9	10
1	-0.2	-0.8	-1.2	-1.5	-1.8	-2.1	-2.2	-2.6	-2.8	-3.4
2	0.8	-0.3	-0.4	-0.7	-0.9	-1.1	-1.3	-1.7	-2.2	-3.1
3	1.3	0.4	-0.2	-0.2	-0.5	-0.7	-0.9	-1.2	-1.7	-2.6
4	1.7	0.7	0.3	-0.2	-0.2	-0.4	-0.6	-0.9	-1.3	-2.3
5	1.9	1.0	0.6	0.2	-0.2	-0.2	-0.3	-0.7	-1.1	-2.1
6	2.0	1.2	0.8	0.4	0.2	-0.2	-0.2	-0.5	-0.9	-1.9
7	2.4	1.4	1.0	0.7	0.4	0.3	-0.2	-0.2	-0.7	-1.6
8	2.7	1.8	1.4	1.0	0.8	0.6	0.4	-0.2	-0.3	-1.3
9	3.1	2.4	1.8	1.5	1.2	1.1	0.8	0.5	-0.2	-0.8
10	3.6	3.1	2.6	2.4	2.1	1.9	1.7	1.3	0.9	-0.2

Notes: This table presents the mean growth in job satisfaction rating for job transitions based on the rankings of the origin (initial) firm and destination (terminal) firm, where the firm rankings reflect deciles based on the firm fixed effects for overall rating obtained from equation 1. Deciles are numbered in ascending order. Sample ratings growth is demeaned and residualized by the first difference of years between observations.

Table J6: Relation between Firms' Wage Premia and Probability of Rating Decline

	Full sample	Tenure at former job 0–1 years	Tenure at former job 5+ years	Job title stayer	Becomes a manager	Switched full-time to part-time	Switched part-time to full-time
First-difference firm FE wages	-0.111***	-0.137***	-0.121***	-0.130***	-0.124***	-0.048**	-0.075***
	(0.003)	(0.007)	(0.010)	(0.021)	(0.011)	(0.019)	(0.013)
Mean probability rating decline	0.327	0.337	0.311	0.274	0.294	0.309	0.406
Std. dev. pay premia	0.196	0.209	0.163	0.118	0.182	0.219	0.237
Observations	600244	112116	84897	47064	52775	12590	30444

Notes: This table records the point estimate from equation 2 for different types of job transitions in the ratings panel. A managerial role refers to job titles that pertain to managers, presidents, directors, chiefs, supervisors, and principals. Standard errors are bootstrapped. Significance levels: * 10%, ** 5%, *** 1%.

Table J7: Relation between Change in Firms' Pay Premia and Workers' Sub-Ratings

	Career opportunities	Compensation and benefits	Culture and values	Senior management	Work-life balance
First-difference firm FE wages	0.853***	1.555***	0.573***	0.600***	0.358***
	(0.012)	(0.014)	(0.018)	(0.013)	(0.013)
Std. dev. rating	1.551	1.406	1.636	1.626	1.519
Std. dev. pay premia	0.133	0.133	0.133	0.133	0.133
Observations	468490	468490	468490	468490	468490

Notes: This table displays coefficients from regressions of the first-difference in the ratings workers leave for their employers along five sub-dimensions and the first-difference in the firm fixed effects for wages. The first difference in the number of years between observations included as a control. Standard errors are bootstrapped. Significance levels: * 10%, ** 5%, *** 1%.

Table J8: Relation between Firms' Wage and Job Satisfaction Premia

	Overall rating premia			
Wage premia	0.463***	0.421***	0.667***	0.784***
	(0.022)	(0.020)	(0.038)	(0.040)
Sample	Full	Full	Many-movers	Many-movers
Industry FE		✓		✓
Average movers from wages	25	27	110	112
Average movers from reviews	17	18	63	64
Std. dev. rating premia	1.022	1.007	0.569	0.568
Std. dev. wage premia	0.230	0.227	0.159	0.160
Firms	67679	60494	10426	10036
Adjusted R^2	0.01	0.03	0.03	0.08

Notes: This table displays the coefficients from regressions of the firm fixed effects for job satisfaction on the firm fixed effects for wages. Standard errors are bootstrapped. Significance levels: * 10%, ** 5%, *** 1%.

Table J9: Relation between Firms' Pay and Satisfaction Premia Over Time

	Overall rating premia	
Wage premia	0.353***	0.085***
	(0.024)	(0.026)
Year FE	✓	✓
Firm FE		✓
Firm-years	77556	77556
Adjusted R²	0.01	0.31

Notes: This table reflects regressions of the firm-year fixed effects for job satisfaction on the firm-year fixed effects for wages. Standard errors are clustered by firm. Significance levels: * 10%, ** 5%, *** 1%.

Table J10: Firms' Wage and Job Satisfaction Premia Accounting for Interview Process

	Wage premia	Overall rating premia		
Probability of offer premia	-0.055***	-0.122***		-0.083***
	(0.005)	(0.018)		(0.019)
Interview difficulty premia	0.049***	0.116***		0.081***
	(0.002)	(0.008)		(0.010)
Wage premia			0.786***	0.714***
			(0.036)	(0.036)
Average movers from wages	92	92	92	92
Average movers from overall ratings	57	57	57	57
Average movers from interviews	9	9	9	9
Std. dev. probability of offer	0.324	0.324	0.324	0.324
Std. dev. interview difficulty	0.693	0.693	0.693	0.693
Firms	13847	13847	13847	13847
Adjusted R²	0.04	0.02	0.04	0.05

Notes: This table displays the coefficients from regressions of the firm fixed effects for job satisfaction on the firm fixed effects for wages incorporating firm-level differences in the interview process. Interview difficulty reflects a one-to-five stars rating scale, with more stars indicating a greater level of difficulty. Interview difficulty premia reflect the firm fixed effects from a two-way fixed effects model (with worker fixed effects) on the difficulty rating the jobseeker assigns to interviewing with the firm. Probability of offer premia reflect the firm fixed effects from a two-way fixed effects model (with worker fixed effects) on a dummy variable for the jobseeker received an offer from the firm. For both two-way fixed effects models, the logarithm of months between the date of the interview and the date submitted to Glassdoor is included as a control variable. For further description of Glassdoor interviews data, see Sockin and Zhao (2020). Standard errors are bootstrapped. Significance levels: * 10%, ** 5%, *** 1%.

Table J11: Correlations between Wages and Amenities Across Firms, Alternatives

Amenity	Full	Many-movers	Unweighted	Impute by industry-gender	Impute by job title
Pay	0.069***	0.181***	0.066***	0.112***	0.084***
Residual I	0.055***	0.123***	0.057***	0.085***	0.068***
Residual II	0.039***	0.072***	0.036***	0.084***	0.067***
Pay growth	0.035***	0.072***	0.034***	0.005	0.015
Industry	0.034***	0.086***	0.022***	0.089***	0.072***
Respect/abuse	0.033***	0.056***	0.029***	0.027***	0.021***
Managers	0.032***	0.053***	0.028***	0.081***	0.060***
Short breaks	0.032***	0.070***	0.028***	0.174***	0.098***
Culture	0.032***	0.044***	0.022***	0.045***	0.032***
Teleworking	0.030***	0.050***	0.023***	0.107***	0.056***
Free food	0.028***	0.091***	0.024***	0.152***	0.081***
Leadership	0.025***	0.029***	0.020***	0.082***	0.055***
Office politics	0.025***	0.041***	0.021***	0.152***	0.043***
Teams	0.024***	0.041***	0.017***	0.047***	0.023***
Safety	0.023***	0.043***	0.021***	0.196***	0.090***
Support	0.023***	0.032***	0.020***	0.072***	0.046***
Office space	0.022***	0.055***	0.013***	0.116***	0.075***
Health insurance	0.020***	0.045***	0.016***	0.061***	0.046***
Coworkers	0.020***	0.048***	0.015***	0.046***	0.047***
Career concerns	0.017***	0.021**	0.009***	0.052***	0.018***
Employee discounts	0.016***	0.035***	0.010***	0.000	0.023**
Autonomy/responsibility	0.016***	0.032***	0.010***	0.151***	0.071***
Location	0.015***	0.022**	0.008**	0.088***	0.025***
Paid time off	0.015***	0.032***	0.008**	0.034***	0.045***
Commuting	0.015***	0.068***	0.008**	0.160***	0.093***
Recognition	0.014***	0.038***	0.011***	0.029***	0.012
Customers	0.010***	0.006	0.001	0.078***	0.050***
Retirement contributions	0.009**	0.051***	0.007*	0.013	0.004
Diversity/inclusion	0.009**	0.014	0.008**	0.047***	0.018*
Mentoring	0.008**	0.022**	0.011***	0.072***	0.004
Promotions	0.008**	-0.003	0.009***	0.020***	0.004
Requirements	0.007*	0.041***	0.003	0.087***	0.026***
Experience	0.007*	0.008	0.003	0.026***	0.015**
Recruiting	0.007*	-0.009	0.000	0.046***	0.024***
Commissions	0.006	0.011	0.005	0.044***	0.036***
Communication	0.005	-0.014	0.000	0.054***	0.032***
Fun	0.005	0.045***	0.001	0.056***	0.027***
Pace	0.005	0.026***	-0.006	0.045***	0.000
Work schedule	0.004	0.053***	-0.001	0.031***	0.014**
Contracting	0.004	0.022**	0.003	0.048***	0.041***
Morale	0.003	-0.010	0.002	-0.086***	-0.024**
Hours	0.003	0.045***	0.001	0.047***	0.017**
Bonuses	0.002	0.018**	0.009**	0.016**	0.001
On-the-job training	0.002	-0.012	0.005	0.022***	0.024***
Work-life balance	0.001	0.027***	-0.003	0.134***	0.070***
Difficulty	-0.002	-0.011	-0.018***	0.021***	0.009
Skill development	-0.002	-0.028***	-0.005	-0.073***	-0.045***
Change	-0.003	0.002	-0.003	0.089***	0.020**
Stress	-0.007*	-0.007	-0.006*	0.114***	0.034***
Job security	-0.018***	-0.064***	-0.017***	0.016**	0.002

Notes: This table reflects pairwise correlations between the firm fixed effects for wages and for each amenity under alternative specifications. For the "Unweighted" approach, amenities for each review among the Full set of firms are calculated without the review-based weights ω_r. For imputing by industry-gender, the average amenity value is calculated among workers with the same gender and industry for whom that amenity is not missing. Workers for whom the amenity value is missing are assigned their respective imputed average. The sample is then restricted to firms for which at least one worker reports a non-missing value for that amenity. Imputation by job title is completed analogously. Significance levels: * 10%, ** 5%, *** 1%.

Table J12: Willingness-to-Pay Estimated Directly off Reported Wages

	Overall rating	
Wage ($10000s)	0.031***	0.043***
	(0.001)	(0.003)
Worker FE		✓
Observations	1826323	67734
Mean wage	67110	78019
MWP one additional star	325018	231379

Notes: This table reflects OLS regressions of a workers' wage on their overall job satisfaction rating, where the wage comes from a separate pay report submitted by the worker. Sample is restricted to full-time workers. Each regression includes fixed effects for employer and year. Standard errors are clustered by employer. Significance levels: * 10%, ** 5%, *** 1%.

Table J13: Willingness-to-Pay Linear Probability Model Using Reported Wages

	1st Wage Quintile	2nd Wage Quintile	3rd Wage Quintile	4th Wage Quintile	5th Wage Quintile
Overall rating	0.000	0.010***	0.019***	0.027***	0.043***
	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
Log wage	0.346***	0.524***	0.440***	0.290***	0.138***
	(0.033)	(0.052)	(0.050)	(0.038)	(0.013)
Observations	19267	17338	17148	18341	21684
Ratio of coefficients	.001	.019	.044	.092	.311
Mean wage	27842	36638	49851	69200	122034
MWP one additional star	17	695	2185	6343	37963
R^2	0.29	0.38	0.38	0.35	0.34

Notes: This table reflects linear probability models of wages and overall job satisfaction ratings on an indicator for the worker's tenure with the firm lasted longer than two years by the worker's wage quintile, where the wage comes from a separate pay report submitted by the worker. Sample is restricted to completed job spells for full-time workers. Each regression includes fixed effects for employer, metro, year-month, and gender. Standard errors are clustered by employer. Significance levels: * 10%, ** 5%, *** 1%.

Table J14: Willingness-to-Pay Linear Probability Model Controlling for Occupation

	1st Wage Quintile	2nd Wage Quintile	3rd Wage Quintile	4th Wage Quintile	5th Wage Quintile
Overall rating	0.008**	0.014***	0.026***	0.029***	0.038***
	(0.003)	(0.003)	(0.004)	(0.004)	(0.003)
Log wage	0.347***	0.544***	0.356***	0.379***	0.162***
	(0.044)	(0.070)	(0.072)	(0.054)	(0.019)
Observations	14754	13241	13263	14173	16412
Ratio of coefficients	.024	.025	.074	.077	.235
Mean wage	24896	35826	49009	68689	121754
MWP one additional star	604	890	3637	5294	28663
R^2	0.30	0.38	0.37	0.36	0.33

Notes: This table reflects linear probability models of wages and overall job satisfaction ratings on an indicator for the worker's tenure with the firm lasted longer than two years by the worker's wage quintile, where the wage comes from a separate pay report submitted by the worker. Sample is restricted to completed job spells for full-time workers for whom their job title can be matched to a two-digit SOC occupation. Each regression includes fixed effects for employer, metro, occupation, year-month, and gender. Standard errors are clustered by employer. Significance levels: * 10%, ** 5%, *** 1%.

Table J15: Relation between Wages and Amenities Across Jobs Within Firms

Standardized amenity	Log wage coefficient	Standardized amenity	Log wage coefficient
Respect/abuse	0.104***	Location	0.022***
Residual II	0.103***	Stress	0.021***
Customers	0.098***	Culture	0.019***
Pay	0.096***	Fun	0.018***
Pay growth	0.084***	Communication	0.017***
On-the-job training	0.075***	Experience	0.016***
Coworkers	0.069***	Requirements	0.015***
Residual I	0.058***	Commuting	0.013***
Autonomy/responsibility	0.056***	Mentoring	0.011***
Commissions	0.054***	Industry	0.009***
Leadership	0.051***	Skill development	0.007***
Work schedule	0.051***	Pace	0.004
Short breaks	0.050***	Bonuses	0.001
Support	0.042***	Work-life balance	0.001
Recognition	0.037***	Retirement contributions	-0.002
Safety	0.037***	Paid time off	-0.005
Managers	0.035***	Free food	-0.012***
Career concerns	0.033***	Morale	-0.012***
Contracting	0.033***	Change	-0.013***
Promotions	0.032***	Teleworking	-0.018***
Office space	0.030***	Health insurance	-0.021***
Hours	0.028***	Job security	-0.030***
Recruiting	0.028***	Employee discounts	-0.036***
Diversity/inclusion	0.027***	Difficulty	-0.048***
Teams	0.025***	Office politics	-0.079***

Notes: This table reflects coefficients from a regression of worker's log wages on each amenity's quality (standardized normal) separately. Sample is the pooled cross-section of workers with both an employer review and a wage. Sample is restricted to full-time employees. Each regression includes firm and year fixed effects along with an indicator for is a current employee. Standard errors are clustered by employer. Significance levels: * 10%, ** 5%, *** 1%.

Table J16: Coefficients for the Order of Each Observation, Wages and Overall Ratings

	Arrival order of workers' observations								
	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Log wages	0.038***	0.085***	0.129***	0.163***	0.171***	0.181***	0.194***	0.181***	0.206***
	(0.001)	(0.002)	(0.003)	(0.005)	(0.009)	(0.014)	(0.024)	(0.045)	(0.067)
	[46.6]	[5.4]	[1.0]	[0.3]	[0.1]	[0.0]	[0.0]	[0.0]	[0.0]
Overall ratings	-0.103***	-0.124***	-0.158***	-0.195***	-0.178***	-0.199***	-0.217***	-0.252***	-0.438***
	(0.004)	(0.007)	(0.012)	(0.019)	(0.030)	(0.045)	(0.066)	(0.096)	(0.160)
	[45.1]	[7.2]	[1.8]	[0.6]	[0.2]	[0.1]	[0.0]	[0.0]	[0.0]

Notes: This table displays the coefficients on indicators for the order in which the observation is observed when added to equation 1 for log wages and overall ratings. Point estimates are relative to the first observation. Numbers in brackets refer to the percent of the sample attributable to each order position. Standard errors are bootstrapped. Significance levels: * 10%, ** 5%, *** 1%.