The Effect of Non-Wage Competition on Corporate Profits*

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Abstract

We document that a majority of S&P 500 corporations report in their 10-K filings that their profitability critically depends on non-wage competition for worker talent, through the provision of amenities such as work-life balance. While worker preferences for amenities are known to affect wages, their impact on corporate profits is less well studied. To address this, we develop a matching model in which amenities emerge endogenously based on firms' comparative advantage in providing them. We calibrate the model using Glassdoor survey data, where employees at larger firms report not only higher wages but also greater satisfaction with workplace amenities. Our model estimates indicate that large firms benefit substantially more from non-wage competition than smaller firms.

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1. Introduction

Using information extracted from firms' 10-K filings, we document that around 50% of S&P 500 corporations state – within their General Business and Risk Factor disclosures – that competition for employee talent through workplace amenities, such as work-life balance, is crucial. That is, firms report that non-wage competition for talent is a critical component of their profitability. While COVID-19 put a spotlight on this form of competition, it predates the pandemic and extends beyond work-life balance to include other workplace amenities, such as corporate sustainability.[1]

In this paper, we seek to quantify the effect of this non-wage competition on corporate profits. Intuitively, this effect ought to depend on two factors. The first is naturally the extent of workers' non-pecuniary preferences. A large literature on compensating differentials establishes that much of the variation in wages reflects workplace amenities (e.g., see Lavetti 2023 for a review). The second factor is firms' comparative advantage in supplying workplace amenities that workers demand. Firms with such an advantage are expected to perform better than they would in a world where workers care only about wages.

We begin by documenting the importance of firms' competition for talent through non-pecuniary amenities, using a contextual analysis of the 10-K forms they file with the SEC. In particular, flexible or hybrid work arrangements, stress relief opportunities, and other work-life balance features are frequently highlighted by firms as means to attract, retain, and motivate talented employees.

We next draw employee survey data from Glassdoor to provide reduced-form evidence on the relationship between wages, workers' ratings of workplace amenities, and the book asset size of publicly traded firms. Glassdoor wage surveys are most extensive for high-paying occupations, such as software engineers in the Information Technology industry or analysts

[1] E.g., see the Forbes article "Attracting Talent Through Corporate Social Responsibility: 3 Myths Debunked" by Tess Taylor, published on February 24, 2016 at https://www.forbes.com/sites/adp/2016/02/24/attracting-talent-through-corporate-social-responsibility-3-myths-debunked/?sh=12697551f21d.

in the Financials industry. Hence, we focus on these high paying occupations in each industry and use them to construct a representative wage for talented workers at each firm. We find that time series variation in firm size is an important driver of changes in both wages and workers' ratings of workplace amenities over time. Specifically, larger or more productive firms are associated with higher wages, as well as greater worker satisfaction with workplace amenities.

Next, to interpret these stylized facts, we present an extension of the standard assignment model for the talented labor market (such as the one used by Tervio 2008 and Gabaix and Landier 2008 for CEOs) where workers, in addition to preferences for wages, can also have non-pecuniary preferences. We develop our model with an eye toward deriving tractable tests to quantify the effect of firms' comparative advantage in supplying amenities on corporate profits. In particular, workers have a Cobb-Douglas utility function. Larger or more productive firms have a higher demand for employees, and can potentially supply amenities at different costs compared to smaller firms.

Wages and amenities then emerge endogenously due to competition for worker talent. The equilibrium compensation or surplus sharing between the matched firm and workers is determined competitively, given the surplus arrangement between the smallest or least productive firm and the least talented workers. This result is typical in one-to-one assignment models of firms to not only CEOs, but also underwriters, venture capital firms, and banks (e.g., Sørensen 2007, Chang and Hong 2019, and Chang, Gomez, and Hong 2023.

There are two forces driving the distribution of firm profits. The first is positive assortative matching, whereby more talented workers work for larger or more productive firms due to production complementary. For instance, the largest or most productive firm hires only the most talented workers to fill its positions, and so on and so forth. In our model, sorting is isomorphic to a one-to-one matching of a firm and a worker, except that the firm productivity distribution is effectively more dispersed.

The second force is firms' comparative advantage in supplying workplace amenities. If

larger or more productive firms have an advantage, this accentuates the unequal profit distribution in favor of larger firms. In contrast, if smaller or less productive firms have an advantage, the unequal profit distribution in favor of larger firms is mitigated. In fact, if the smaller firms have an advantage that is large enough, that might even affect the sorting, so that the most talented workers would counterfactually be matched with the smallest firms.

To evaluate whether large or small firms have a comparative advantage, we show that our model generates regression specifications that are consistent with our reduced form evidence. The coefficients of these regressions are functions of structural parameters from our model, which can be recovered through a two-stage estimation procedure. In the first stage, we estimate an equation that is similar to that of Gabaix and Landier 2008. Specifically, it exploits the time-series variation in the panel data on firm wages and size to retrieve the key parameters of (i) the complementary between firm productivity and worker talent, and (ii) the cross-sectional dispersion of firm productivity versus worker talent.

Whereas in the second stage, we follow Sockin 2024 in interpreting workers' ratings of workplace amenities as a monotonic transformation of the utilities they have from their matched firm. To the extent large firms have a comparative advantage in providing non-pecuniary amenities, the utility of workers – and therefore the overall rating for their firm – rises with firm assets more quickly than the wages. The counterfactual implied by our calibration suggests that a 1% increase in workers' preferences for non-pecuniary amenities yields a 0.6% decrease in firms' expenditures. In other words, large firms have a significant advantage over small firms.

Another notable property of the model is that a larger workers' preference weight on non-pecuniary amenities yields a more compressed wage (versus firm-profit) distribution, since workers are also being paid with amenities. Indeed, positive assortative matching implies that firm profits and firm wages are positively correlated. That is, knowing that a firm pays higher wages compared to other firms is informative about its relative profits. Hence, as workers place more weight on non-pecuniary amenities (and therefore less weight on wages),

even small differences in wages are nonetheless indicative of relative firm profits.

Thus, we introduce a third stage in our model estimation procedure, where we use the parameters from the first and second stages to generate a predicted relationship between firm profits and wages (appropriately scaled by assets), under the assumption that non-pecuniary preferences are zero. The deviation of the actual relationship from this predicted one pins down worker's preferences for wage versus non-pecuniary amenities. We estimate workers' preference weight on wages to be around 80%, and so their non-pecuniary amenities' preference weight is about 20%, thereby rejecting a purely pecuniary compensation model.

Related literature. Using the list of the "100 Best Companies to Work For in America" published by *Fortune* magazine, Edmans 2011 documents a positive relationship between employee satisfaction at a firm and its long-term stock market performance. In an extension, Fauver, McDonald, and Taboada 2018 use an international dataset to estimate a positive effect of a firm's employee-friendly culture on its market value and financial performance, as measured by Tobin's Q, return on assets, and return on equity. Edmans et al. 2024 further show that the positive relationship between a firm's employee satisfaction and its stock market returns is stronger in countries with greater labor market flexibility. Like us, Chen et al. 2024 use data from Glassdoor for U.S.-listed firms to show that those that are more family-friendly and exhibit smaller differences in work-life balance ratings across genders are associated with higher employee productivity, operating performance, and Tobin's Q.

The aforementioned papers employ reduced-form approaches that emphasize tests of good governance theories versus agency theories, rather than firms' competition for talented employees through non-pecuniary amenities and its implications for corporate profitability. Furthermore, in terms of accounting for talented employees' preferences for non-pecuniary amenities, our approach does not rely on using actual measures of these amenities to back out worker preferences. While surveys and scores on employment sustainability exist, using them in structural estimation is generally challenging, since the actual firm expenditures

associated with providing these amenities are typically unobservable.

Overall, our approach complements other methods in the literature on how to measure compensating differentials (Hwang, Mortensen, and Reed 1998, Hwang, Reed, and Hubbard 1992).[2] For instance, Mas and Pallais 2017) use a field experiment to show that work hour flexibility is an amenity that is particularly valued by workers operating a call center. Sorkin 2018 develops a linear programming approach that exploits job separations from administrative data on job flows, to show that compensating differentials account for a large part of variance in wage earnings. Maestas et al. 2023 conduct stated-preference experiments to assess non-monetary job benefits. Currently, the paper closest to ours is Colonnelli et al. 2024, who estimate a model using a field experiment in Brazil. Their findings suggest that skilled workers' valuation of ESG practices is equivalent to approximately 10% of their average wages and about 60% of the value they place on work-from-home arrangements.

2. Data

The universe of firms in our study consists of U.S.-headquartered, publicly traded firms that were members of the S&P 500 Index for at least one year between 2006 and 2023. We use three types of datasets. The first is a dataset we constructed from the 10-K filings of these firms, in order to detect how important the competition for talent through non-pecuniary amenities is for them. The second consists of data from Glassdoor on employees' wages and workplace satisfaction ratings for their firms. The third includes firm financial data.

2.1. Detecting workplace amenities in 10-K filings

For each historical member of the S&P 500 Index during the period 2006–2023, we extract human capital-related text from the *General Business* and *Risk Factors* sections of their 10-K filings. Prior to the SEC's modernization of Regulation S-K Items 101, 103, and 105 in the

[2]See Rosen 1986 for a review of earlier literature on job amenities.

second half of 2020, such disclosures were relatively scarce. Nonetheless, for completeness, we extract any relevant information available for these firms over the most recent eight years of our sample period (i.e., the subperiod 2016–2023).

In more detail, prior to 2020, firms disclosed in Item 101(c) of their 10-K filings only the number of employees, occasionally breaking it down by full- versus part-time status, or by department or division. Additionally, these disclosures often included brief statements about the quality of employee relations, such as whether they were deemed satisfactory or good. However, from 2020 onward, firms have included a dedicated human capital section in their 10-K filings, typically titled *Human Capital*, *Human Resources*, *Workforce*, or *Our People*. This section offers an overview of the firm's human capital management practices, including the workplace amenities provided to employees. The rationale behind these disclosures is that human capital is considered a material resource and a key driver of performance, making it valuable information for investors.

Moreover, the SEC currently requires firms to expand and present more effectively – e.g., with summaries and headings – the disclosure of all material risk factors in Item 105. Accordingly, we extract the sections in which firms describe their human capital-related risks, typically by emphasizing the repercussions associated with the "failure to attract, hire, and retain key talent", or "qualified", "skilled", or "critical" personnel.

After extracting text from the *Human Capital* and *Risk Factors* sections, we develop a contextual analysis dictionary of terms and phrases (listed in Online Appendix A) that allows us to detect references to competition for talented or general employees, compensation and benefits, and work-life balance amenities in firms' 10-K filings. The goal is to identify whether firms compete for workers – particularly talented ones – using not only wages but also non-wage amenities related to work-life balance. For the latter, we follow Maestas et al. 2023 and focus on flexible hours, telecommuting, relax or stress relief activities, and paid time off. Using our dictionary, we generate indicator variables for each firm and and year that equal one if the aforementioned references are present. The most frequent terms associated

with each indicator variable are depicted in the word clouds shown in Figure 1.

2.2. Firm wages

Our data on firm wages are based on salary reports extracted from Glassdoor, a prominent online labor market platform where employees can anonymously disclose reviews about their firms and salaries. A salary review contains information about the name of the employer firm, the type of employment, the job title, the base pay, and the bonuses. An employee's total pay is readily obtained by adding the last two items together.

We consider only full-time employees working at those companies who report their job titles. The latter are classified into 1,245 occupation categories based on Glassdoor's proprietary machine learning algorithm. If users declare that they are former employees of the firm they rate, we assume that they report their pay from the last year of their employment. For current employees, we attribute the reported salary to the year when the review is provided. Our sample spans from the year 2006 to the end of 2022.

To capture the salaries of talented employees, we drop reviews with reported salaries below \$30,000, which was approximately the median annual wage in the U.S. at the start of our sample period in 2006 and represents the bottom 10% of the original data distribution. In order to remove outliers, we also omit reviews with reported salaries higher than \$500,000, which corresponds to the top 1% of the original data distribution. These filters lead us to a sample of 2,477,126 salary reviews.

To obtain an estimate for the wage of a typical talented employee at a given firm in a specific year, we implement a multi-step aggregation process. Although Glassdoor reviews are considered representative (e.g., Karabarbounis and Pinto 2018, Dehaan, Li, and Zhou 2023), they are voluntary and less frequently updated at the firm level. This might result in some occupations being over- or under-represented at the firm level. But such an issue is expected to be less pressing at the industry level. Thus, in order to calculate the firm-level wages of talented employees, we use only the salaries of the top occupations in each industry.

Specifically, we first measure the relative frequency of occupations within each industry according to the two-digit Global Industry Classification Standard (GICS). In particular, we calculate the ratio of the number of reviews that each occupation in a given industry receives during the entire sample period to the total number of reviews in that industry. Occupations that make up less than 1% are dropped, since there is only sparse information about them and they are likely to be unimportant for that industry. The relative frequencies of the selected top occupations in each industry are subsequently re-scaled, so that they add up to one. In that way, every industry ends up being represented by its most descriptive occupations.

For example, as displayed in online Appendix Table B1, the total number of reviews in the Information Technology sector is 498,741. Software engineers fill out most of these reviews (i.e., 72,385 or approximately 14.5% of the total). Consultants, other types of engineers (e.g., systems engineers, design engineers, application engineers, process engineers, and hardware engineers), managers (e.g., project managers, product managers, account managers, and directors), analysts (e.g., systems analysts and business analysts), and sales representatives each contribute about 1% to 3% of the total. Overall, there are 22 job titles that contribute more than 1% of the reviews in this industry. All together, these top job titles account for approximately 50% of the industry's total reviews. More broadly (as shown in Online Appendix Tables B2 - B11), each industry has around 20 top occupations, representing 37% to 52% of their total salary reviews.

We then calculate the average salary for each industry's selected top occupation in a given firm-year. If an occupation within a specific firm-year pair has more than three reviews, we use the average salary for that occupation in that firm-year. Whereas if an occupation within a specific firm-year pair has fewer than three (or no) reviews (but is still considered to be descriptive of the firm's industry, since it belongs to the industry's selected top occupations), we impute its salary from the industry-year average salary for that occupation.

Lastly, we derive the wage of the representative talented employee in a given firm-year

by computing the weighted average of the firm's occupations' average salaries in that year, with weights equal to the frequencies of the selected top occupations in the firm's industry. All in all, our aggregation accounts for the fact that the importance (and therefore the wage) of different occupations varies across industries. For instance, firms in the Information Technology industry hire more and pay more software engineers, as do firms in the Consumer Staples industry for store managers.

The summary statistics for the obtained firm wages are presented in the first row of Panel A of Table 1. On average, the representative talented employee received approximately \$89K. The standard deviation was around \$19K, while the median was slightly over \$85K.

2.3. Firms ratings

In addition to writing salary reviews on Glassdoor, employees are asked to provide an overall rating of their employer, as well as separate ratings for compensation and benefits, and work-life balance their firm. We use these ratings, which range from one to five stars, to assess the relative importance of wage and work-life balance amenities to workers at their firms. Following Sockin 2024, we interpret an employee's overall rating of her firms as a noisy proxy for the total utility she derives from wages and other non-pecuniary amenities.

We again restrict our sample to full-time employees who report a job title in their reviews. This yields a sample of 931,274 rating reviews during the period 2012–2022. We then estimate the representative talented employee's overall rating, compensation and benefits rating, and work-life balance rating at the firm-year level, in the same manner that we obtain an estimate for her wage. That is, the aggregation process of Section 2.2 is repeated to identify the top occupations in each industry. Subsequently, for each firm in each year, we calculate the weighted average of its occupation-level overall ratings, using again the frequencies of the selected top occupations in the firm's industry as weights. We follow the same procedure for employees' ratings of their firms' compensation and benefits, as well as work-life balance.

The summary statistics of the derived variables are also presented in Panel A of Table 1.

The average overall rating assigned by the representative talented employee to her firm was slightly over 3.3 stars, as was the median. The average and median ratings for compensation and benefits were around 3.5 stars, whereas the average and median work-life balance ratings were both approximately 3.2 stars.

2.4. Firm assets and profits

We draw annual data on firms' assets, number of employees, income before extraordinary items, and net income from Compustat. In particular, income before extraordinary items and net income constitute two alternative ways of measuring a firm's profit. Since the estimation of workers' non-pecuniary preferences that we present below requires data on firms' profits per worker, we divide each of these variables by the number of employees. The corresponding summary statistics are presented in Panel B of Table 1. Ultimately, our dataset is an unbalanced panel of 730 distinct firms spanning from the year 2006 to 2022, and containing in total 8,534 firm-year observations.

3. Stylized Facts

In this section, we provide evidence on the importance firms place on work-life balance amenities when competing for talent, as well as on how a firm's wages and workplace ratings vary with its size.

3.1. The importance of work-life balance amenities in firms' competition for talent

As shown by the black line in Subfigure 2a, nearly 60% of firms referenced terms and phrases related to competition for talented workers in their 10-K filings over the last three years. The rise in such references after 2020 aligns with the SEC's modernization of Regulation S-K Items 101, 103, and 105, as well as the contemporaneous impact of the COVID-19 pandemic.

The steady annual increase in these references reflects the growing emphasis firms place on attracting and retaining talented employees. Mentions of general labor market competition also exhibit a consistent upward trend, increasing to over 30%, as indicated by the grey line. Overall, whether referring to talent specifically or labor more broadly, more than 60% of firms disclose competition in the labor market in recent years, as shown by the blue line that refers to the union of the two categories.

Furthermore, the blue line Subfigure 2b shows a dramatic increase in the percentage of firms referencing work-life balance amenities in 10-K filings, rising from under 10% in 2019 to nearly 80% in 2020. At the same time, the grey line shows a contemporaneous increase in the percentage of firms referencing compensation and benefits, rising from less than 20% to almost 60%. These sharp shifts also align with the SEC's 2020 disclosure reform and the impact of the COVID-19 pandemic. Notably, work-life balance is now mentioned more frequently than compensation and benefits, which suggests the growing importance of non-wage amenities in firms' human capital narratives.

More analytically, Subfigure 2c breaks down the substantial increase in the percentage of firms referencing specific work-life balance amenities in 10-K filings, beginning in 2020, by amenity type. As indicated by the blue line, the percentage of firms referencing relaxation or stress relief activities exhibits the strongest and most sustained growth, reaching a percentage slightly below 80% over the last three years, thereby suggesting heightened corporate attention to employee mental health and well-being. The percentage of firms referencing paid time off, depicted by the orange line, also increases and appears to stabilize at around 40%. For telecommuting, shown by the green line, the percentage of firms rises to nearly 50% in 2021 and then declines to slightly above 30% by 2023. The percentage of firms referencing flexible hours, shown in red, follows a similar pattern – rising to about 30% in 2021 and then declining to nearly 20% in 2023. Essentially, the trends for telecommuting and flexible hours align with the timing of firms' work-from-home and return-to-office guidelines. All in all, these trends highlight a shift in how firms articulate non-pecuniary amenities in response to

evolving workplace expectations.

Lastly, the blue line in Subfigure 2d shows that, conditional on referencing competition for talented workers, the percentage of firms also referencing work-life balance amenities has surged from at most 10% in 2019 to over 80% in 2020. This percentage has remained consistently high – at nearly 85% – over the last three years. This pattern suggests that work-life balance considerations have become a critical component of how firms compete to attract and retain talented employees.

To examine cross-industry variation in the above trends in firms' references to work-life balance amenities and competition for talent in their 10-K filings, the full set of figures is reproduced separately for each of the 11 GICS sectors in Online Appendix Fig. 1 to 11. In most industries, the percentage of firms displaying these patterns is very similar – particularly in sectors with substantial weight in the composition of the S&P 500 Index, such as Information Technology, Financials, and Consumer Discretionary. In other words, the trends observed for the overall S&P 500 Index are robust across industries.

3.2. Firm workers' wages and workplace ratings versus asset size

Next, we turn to providing reduced-form evidence on the relationship between workers' wages and workplace ratings at publicly traded firms and the book asset size of those firms.

3.2.1. Graphical Evidence

We begin by plotting these relationships, binning firms into asset size groups to facilitate visualization. Specifically, we sort firms within each two-digit GICS industry into three asset groups each year – low, median, and high asset firms within each industry. For each industry-group-year, we then calculate the log median wage and the log median asset size. To capture within-group variation, we regress each of these two variables on industry-group fixed effects and obtain the residuals. This approach is analogous to controlling for firm fixed effects in firm-level regressions.

In Subfigure 3a, we plot the residualized log wage against residualized log assets, along with a fitted line. The scatter plot shows a clear positive relationship, indicating that larger firms (within their industry–group) tend to pay higher wages. As a validation exercise, we repeat this analysis using firms' compensation and benefits ratings, which can be viewed as an alternative measure of workers' pecuniary satisfaction. In Subfigure 3b, we plot the residualized log compensation and benefits rating against residualized log assets. The fitted line in this scatter plot is also positively sloped and similar in magnitude to that in the wage plot, reinforcing the link between firm size and workers' utility from wages.

However, as highlighted in the previous subsection, workers also derive utility from non-pecuniary amenities, particularly those related to work-life balance. To this end, we next turn to workers' total rating, which reflects both pecuniary and non-pecuniary aspects of the workplace. In Subfigure 3c, we plot the residualized total ratings against the residualized asset size. The fitted line has a steeper positive slope compared to the earlier plots of wage and compensation and benefits rating, suggesting that larger firms are associated with higher total worker utility. That is, the steeper slope indicates that firm size is positively associated not only with pay, but also with non-pecuniary workplace features.

To explore this further, we isolate the work-life balance aspect, which captures a key non-pecuniary amenity. In particular, in Subfigure 3d, we repeat the analysis for work-life balance ratings. The fitted line is again positively sloped – steeper than in the salary and compensation plots, though not as steep as in the total rating plot. Taken together, all the above patterns suggest that larger firms offer more favorable outcomes across both dimensions of utility, with non-pecuniary amenities playing an increasingly important role as firm size grows.

3.2.2. Panel Regressions

After presenting the stylized facts above, we now examine the relationship between a firm's wages and workplace ratings and its asset size using regression analysis. Gabaix and Landier

2008 show that CEO compensation can be explained by both a firm's own size and the sizes of other firms in its industry. Adapting their specification to our setup – which focuses on talented employees rather than CEOs – we estimate the following regression model:

$$\ln(Wage_{i,t}) = b_1^{Wage} \ln(Assets_{i,t}) + b_2^{Wage} \ln(IndustryMedianAssets_{i,t}) + \eta_i^{Wage} + \epsilon_{i,t}^{Wage}, \tag{1}$$

where $\ln(Wage_{it})$ is the natural log of firm i's wage in year t, $\ln(Assets_{i,t})$ is the natural log of firm i's assets in year t, $\ln(IndustryMedianAssets_{i,t})$ is the natural log of the median firm's assets in firm i's industry in year t, η_i^{Wage} is firm i's fixed effect, and $\epsilon_{i,t}^{Wage}$ is the error.

The results are presented in Panel A of Table 2. In Column 1, there are no firm fixed effects, so the coefficients are estimated by combining firms' time-series variation with their variation in the cross-section. In Column 2, we include industry fixed effects, which control for the time-invariant unobserved heterogeneity in employees' skills within a given industry. Whereas in Column 3, we show the coefficient estimates from our preferred specification with firm fixed effects. In all columns, the coefficient of $\ln(Assets_{i,t})$ is estimated to be positive and statistically significant at levels below 5%. Moreover, with either industry or firm fixed effects, the estimated coefficient of $\ln(IndustryMedianAssets_{i,t})$ is also positive and statistically significant at levels below 1%. In fact, in these cases, the estimated coefficient of $\ln(IndustryMedianAssets_{i,t})$ exceeds the estimated coefficient of $\ln(Assets_{i,t})$ in magnitude, indicating that the assets of the median firm in a firm's industry are a stronger determinant of that firm's employee wage than its own assets.

The above finding is similar to the result by Gabaix and Landier 2008, who show that the assets of the median firm in a firm's industry have a larger impact on that firm's CEO wage than its own assets. However, there, the estimated values of the respective coefficients are much higher. In principle, this difference is expected, since a firm's CEO compensation ought to be more sensitive to its size and industry than the compensation of even its talented employees. In more detail, in Column 3, the estimated coefficient of $\ln(Assets_{i,t})$ is 0.045,

with a t-statistic of 5.63, while the estimated coefficient of $\ln(IndustryMedianAssets_{i,t})$ is 0.100 with a t-statistics of is 5.88. In other words, the latter coefficient is about 2 times higher than the former. This proportion is about half of the corresponding proportion in the aforementioned study of the wages of CEOs of firms in the S&P 500 Index, when firm fixed effects are included.

Next, we adjust the above regression setup to study the relationship between a firm's workplace ratings and its assets. In particular, we run the following regression:

$$\ln(Rating_{i,t}) = b_1^{Rating} \ln(Assets_{i,t}) + b_2^{Rating} \ln(IndustryMedianAssets_{i,t}) + \eta_i^{TotRating} + \epsilon_{i,t}^{TotRating}, \tag{2}$$

where $\ln(Rating_{i,t})$ denotes the natural logarithm of either firm i's compensation and benefits rating ($\ln(CB_{i,t})$), overall rating ($\ln(TotRating_{i,t})$), or work-life balance rating ($\ln(WL_{i,t})$) in year t.

Panel B presents the regression results for a firm's compensation and benefits rating. In all columns, the estimated coefficient of $\ln(Assets_{i,t})$ is positive and statistically significant at the 1% level. The estimated coefficient of $\ln(IndustryMedianAssets_{i,t})$ is also positive and statistical significant at the 1% level in Column 2 and 3, which include industry and firm fixed effects, respectively. In particular, in Column 3, which reports the results of our preferred specification, the estimated coefficient of $\ln(Assets_{i,t})$ is 0.048 with a t-statistic of 8. This estimate is very similar to the corresponding coefficient in the firm wage regression in Column 3 of Panel A, which is consistent with the pecuniary aspect embedded in the compensation and benefits rating. Moreover, the estimated coefficient of $\ln(IndustryMedianAssets_{i,t})$ is 0.043 with a t-statistic of 4.78. These results suggest that both a firm's own size and the median size of firms in its industry can explain its compensation and benefits rating, with the role of a firm's own size being here at least as important – if not more – than that of its industry peers.

In the same spirit, Panel C presents the regression results for a firm's total rating rating. The conclusions are similar. One notable distinction – consistent with the steeper slope

observed in the Subfigure 3c – is that, in Column 3, which includes firm fixed effect, the estimated coefficients of $\ln(Assets_{i,t})$ is higher than before, i.e., 0.079 with a t-statistic of 9.9. The estimated coefficient of $\ln(IndustryMedianAssets_{i,t})$ is also positive and statistically significant at the 1% level, i.e., it is found to be be 0.071 with a t-statistic of 4.2. Hence, once again, a firm's own size appears to matter at least as much as the median size of firms in its industry.

Lastly, Panel D presents the results for a firm's work-life balance rating. The results are again similar. In Column 3, which includes firm fixed effects, the estimated coefficient of $\ln(Assets_{i,t})$ is 0.056 with a t-statistic of 11.2 – a value that lies between the corresponding estimates in the firm wage and overall rating regressions. The estimated coefficient of $\ln(IndustryMedianAssets_{i,t})$ is 0.048 with a t-statistic of 4.4. The findings suggest that both firm-level and industry-level size effects play an important role in shaping perceptions of work-life balance, consistent with the broader patterns observed across rating dimensions.

In sum, our regression results suggest that size matters at both the firm and industry levels. This motivates us to develop a structural sorting model, that will allow us to estimate the effect of non-pecuniary amenities on firm profits when workers care about them.

4. Assignment model for talented employees with non-pecuniary preferences

In this section, we extend the standard assignment model for the labor market (drawing primarily on the version developed for the CEO market by Tervio 2008 and Gabaix and Landier 2008) to allow workers to directly care about workplace amenities as an additional form of compensation distinct from wages and to endogenize the supply of these amenities by firms. The model's objective is twofold. First, it establishes the connection between a firm's size (or productivity) and the wage and overall rating by its workers, thereby laying the micro-foundation of our empirical specifications. In particular, it allows us to link the estimated coefficients in conventional regressions to the underlying distribution of workers and firms, as well as to workers' non-pecuniary preferences and firms' advantages in providing workplace amenities. The second objective is to establish how the aforementioned parameters affect firm profits, which in turn allows us to answer how firm profits might change in a counterfactual environment where non-pecuniary preferences are absent.

4.1. Environment

We consider an environment where heterogeneous firms and workers are matched in a competitive equilibrium each period. As in Gabaix and Landier 2008, the parameters defined below are assumed to be time-invariant, except for the one referring to the productivity or size of the lowest-ranked firm in the economy, which acts as firms' scale. Moreover, we assume that the matching is frictionless in every period, so that the matching decisions are effectively static. Based on this and for ease of notation, we omit the period subscript t in what follows.

Firms. There is a continuum of firms of mass 1. We use the terms of 'firm productivity' and 'firm size' (measured by assets) interchangeably. Firms are heterogeneous in their productiv-

ity or size. In particular, we assume that the firm size distribution is Pareto, with a tail index $\pi > 0$. Hence, the productivity of a firm with ranking k is given by $a[k] = a_L (1-k)^{-\frac{1}{\pi}}$. The time-varying scale of firms can be captured by changes in the parameter a_L over time. In other words, the equilibrium outcome should be interpreted given the value that a_L takes in a given period.

Workers. There is also a continuum of workers of mass 1. Workers are indexed by their skill s, with $F_w(s)$ denoting the measure of workers with skills below s. The distribution of worker talent is time invariant, and its ranking in the upper tail satisfies $s'[i] = B(1-i)^{-\beta-1}$. As discussed by Gabaix and Landier 2008, there exist constants β and B such that this expression holds. Indeed, we can define:

$$s[i] = \begin{cases} s_L(1-i)^{-\beta} & \text{if } \beta > 0 \\ s_H - \left(\frac{1-i}{\widetilde{B}}\right)^{-\beta} & \text{if } \beta < 0 \end{cases} \tag{3}$$

The magnitude of β, which can be either positive or negative, captures the heterogeneity in talent. If $\beta > 0$, the worker talent distribution is Pareto with a tail index $1/\beta$. On the other hand, if $\beta < 0$, the distribution has an upper bound, denoted by s_H.

Non-pecuniary preferences. To capture the concept that workers derive satisfaction directly from the amenities provided by their employers (on top of any wages), we assume that their utility is a Cobb-Douglas function of wages (denoted by x_0) and N different amenities (whose respective quantities are in the list $\{x_n\}_{n=1}^N$). Putting all the arguments in a vector $\boldsymbol{x}$, we have that:

$$u(\boldsymbol{x}) = \prod_{n=0}^{N} x_n^{\alpha_n}. \tag{4}$$

For instance, x_1 can represent the number of flexible hours, and x_2 the number of hours of remote work. The corresponding parameter of amenity n's relative importance is $\alpha_n \in [0,1]$

and, as usual, it holds that $\sum_{n=0}^{N} \alpha_n = 1$.

Job positions. Depending on its productivity or size (a), a firm may have a different number of job positions to fill, denoted by $L(a)$, which is exogenously given. The latter function, together with the Pareto distribution of firm size, determines the productivity of job positions. Conveniently, we assume that:

$$L(a) = \left(\frac{\pi - m}{\pi}\right)\left(\frac{a}{a_L}\right)^m, \tag{5}$$

where $0 < m < \pi$ (i.e., m is a positive constant with a value lower than the tail index of the Pareto distribution of firm size).

It then follows that the total measure of jobs is one and that the productivity of a firm's position is also Pareto with a tail index of $\pi - m$, i.e., the productivity of a job position with ranking j can be expressed as $a[j] = a_L (1-j)^{-\gamma}$, where $\gamma \equiv \frac{1}{\pi - m} > 0$. A higher m implies a greater dispersion in the top ranks, in the sense that more productive job positions become more probable at the top. Implicitly, we also assume that there is no shortage in the supply of skilled workers for any available position at a firm, so that the latter can always be filled.

Production function. We assume complementarity between a firm's asset size (a) and its workers' skills (s). Moreover, we assume that a firm's production function is additively separable across its workers' types as well as multiplicatively separable within their types. Consequently, the firm's productivity factor applies multiplicatively to the the aggregate skill of the workers it hires (to fill its positions $L(a)$). That is, if $\theta > 0$ is the complementarity parameter, the production function of firm a that hires $l(s)$ number of workers of type s is:

$$Q(a, s) = a^{\theta}\left(\int sl(s)\, ds\right). \tag{6}$$

Cost of supplying amenities. We assume that the cost that firms incur when they provide amenity n is proportional to amenity n's quantity x_n. Given that a firm with size a hires multiple workers to fill its $L(a)$ positions, what is relevant for its profit maximization problem is amenity n's marginal cost *per* position. The latter is assumed to also depend on the firm's size, being equal to $c_n a^{-\kappa_n}$. Hence, the total cost of providing a quantity x_n of amenity n for that firm is:

$$C_n(x_n, a) = x_n \left(c_n a^{-\kappa_n}\right) L(a). \tag{7}$$

In the special case where amenity n's marginal cost per position is constant, it holds that $\kappa_n = 0$. This is true for a firm's wage (denoted by x_0), where additionally $c_0 = 1$, so that the firm's wage bill is $x_0 L(a)$.

Moreover, it could instead be that the total cost of amenity n is independent of firm size, so that a quantity x_n amounts to the same expense across all firms. In that case, $\kappa_n = m$, in line with Eq. (5). But then, expectedly, larger firms incur a lower marginal cost of amenity n per position, analogously to an environmental with economies of scale, thus having an advantage over smaller firms.

In fact, the above holds whenever $\kappa_n > 0$. Whereas if $\kappa_n < 0$, it is the smaller firms that have the advantage, indicating an environment with diseconomies of scale (e.g., due to potential lack of coordination within a firm's network as its size increases). In general, the value of κ_n may differ across the N amenities.

4.2. Equilibrium

The separability of workers' skills in a firm's production function (leading to Eq. (6) above) implies that, in a competitive equilibrium, a firm with productivity or size a (also referred to as firm a) fills its positions by hiring only workers of a particular type s. This implication simplifies to a great extent the competitive equilibrium's characterization. In particular, firm

a's profit maximization problem can be written as:

$$V(a) = L(a) \max_{s,\boldsymbol{x}} \left\{ a^{\theta} s - \sum_{n=0}^{N} x_n c_n a^{-\kappa_n} \mid u(\boldsymbol{x}) \geq U(s) \right\}. \tag{8}$$

$U(s)$ indicates the equilibrium utility of workers of type s, and is assumed to be twice differentiable and convex (consistent with the notion that as workers' skills rise, the additional utility they require to work for a firm increases more than proportionally due to higher opportunity costs (e.g., Rosen 1981)). The former problem is thus equivalent to the problem of maximizing firm a's profit per position (i.e., its average profit), denoted by $\overline{V}(a) \equiv \frac{V(a)}{L(a)}$, by hiring workers of type s and providing them with the amenities they require.

Definition of equilibrium. Given any lower bound of firms' productivity (a_L) and any lower or upper bound of workers' skills (s_L or s_H), a competitive labor market equilibrium consists of (i) a correspondence $\boldsymbol{\chi}(s)$ specifying the optimal compensation bundle $\boldsymbol{x}^*$ of workers with skills s, together with their equilibrium utility $U(s)$, and (ii) an assignment function $\sigma(a)$ specifying the optimal type of workers (i.e., the index of their skills) s^* hired by a firm with productivity or size a, such that (iii) every firm maximizes its profit per position (so that Equation (8)'s optimality conditions hold), and (iv) the market-clearing condition is satisfied for the labor market. To economize notation, we refer to the equilibrium compensation bundle as $\boldsymbol{x}^*(a) = \boldsymbol{\chi}(\sigma(a))$ and firm a's equilibrium type of workers as $s^*(a)$.

Isomorphism to one-to-one matching. While each firm has multiple positions to fill, the matching is effectively one-to-one, just as if the firm had only one position to fill by one worker. In other words, a sorting model where each firm has multiple positions with a Pareto productivity distribution is isomorphic to a sorting model where each firm has only one position with a Pareto productivity distribution. Nothing essential is different, since the tail index of the latter distribution is π, whereas the tail index of the former is $1/\gamma = \pi - m$ (i.e., only smaller by m).

The equilibrium determines jointly a firm's wage and amenities, as well as the type of its workers. We proceed by first solving for the compensation bundle $\boldsymbol{x} = (x_0, x_1, ..x_N)$ given any match between firm a and worker s, and then solving for the actual sorting outcome.

Wage and amenities. From Eq. (8), it follows that firm a chooses to provide the compensation bundle $\boldsymbol{x} = (x_0, x_1, ..x_m)$ such that it minimizes its expenditure per position subject to the participation constraint of worker s. The solution can be interpreted as a Hicksian demand function given the amenities' marginal costs per position that firm a incurs and the equilibrium utility $U(s)$ of worker s. Specifically, recalling that $\kappa_0 = 0$ and $c_0 = 1$, the wage that firm a offers to worker s is:

$$x_0(a,s) = \alpha_0 \left(\psi \, a^{-\sum_{n=1}^{N} (\kappa_n \alpha_n)} U(s) \right), \tag{9}$$

where, for convenience, we define the constant $\psi \equiv \prod_{n=0}^{N} \left(\frac{c_n}{\alpha_n} \right)^{\alpha_n}$. Whereas the quantity of amenity n, for any $n = 1, ..., N$, that firm a offers to worker s is given by:

$$x_n(a,s) = \frac{\alpha_n}{c_n a^{-\kappa_n}} \left(\psi \, a^{-\sum_{n=1}^{N} (\kappa_n \alpha_n)} U(s) \right). \tag{10}$$

Sorting. Let $v(a,s)$ denote the average profit per position of firm a if it hires worker s. Then, given the equilibrium utility $U(s)$ of worker s, firm a chooses the worker s^* that solves:

$$\overline{V}(a) = \max_{s} \left\{ \underbrace{a^{\theta} s - \psi \, a^{-\sum_{n=1}^{N} (\kappa_n \alpha_n)} U(s)}_{v(a,s)} \right\}, \tag{11}$$

where the second term, $\psi \, a^{-\sum_{n=1}^{N} (\kappa_n \alpha_n)} U(s)$, represents the average expenditure per position that firm a incurs to hire worker s. Since ψ is constant across firms, it can be read as a uniform cost factor, whereas $a^{-\sum_{n=1}^{N} (\kappa_n \alpha_n)}$ is the firm-specific cost factor conditional on the worker's equilibrium utility. In line with what was discussed above about the cost of supplying

amenity n based on the sign of κ_n, the latter decreases with firm size if $\sum_{n=1}^{N}(\kappa_n\alpha_n) > 0$, and increases with firm size if $\sum_{n=1}^{N}(\kappa_n\alpha_n) < 0$.

The sorting outcome is then determined by which type of firm pays more for talent. More precisely, there are two forces in our model. First, as is standard in assignment models, the complementarity between firm size and worker skill (captured by the production term $a^\theta s$), implies that, all else being equal, larger firms benefit more from hiring more skilled workers. Second, if workers care about non-wage amenities (i.e., if $\alpha_0 < 1$), then they require them to be included in their compensation. Hence, firms with lower costs in providing amenities (as per the cost factor $a^{-\sum_{n=1}^{N}(\kappa_n\alpha_n)}$) have an advantage in attracting more skilled workers.

Lemma 1. *If $\theta + \sum_{n=1}^{N}(\kappa_n\alpha_n) > 0$, the larger the size of a firm, the higher the skill of the workers it hires, i.e., there is positive assortative matching (PAM). Otherwise, a firm with smaller size hires more skilled workers, i.e., there is negative assortative matching (NAM).*

The classic assignment model, which features only wages, can be presented here as a special nested case where $\alpha_0 = 1$, $\alpha_n = 0$ for any $n = 1, ..., N$, and $\kappa_0 = 0$. In such a setup, PAM always holds, since $\theta > 0$. But with the introduction of non-pecuniary amenities in our model, sorting depends also on which firms have an advantage in their provision. In particular, if larger firms provide all the amenities by incurring a lower marginal cost, then $\kappa_n \geq 0$ for any $n = 1, ..., N$, and therefore the condition for PAM in Lemma 1 is automatically satisfied.

4.3. Characterization

Throughout the rest of the paper, we characterize the equilibrium under the assumption that the condition for PAM in Lemma 1 holds. This assumption is later supported by empirical evidence, and we also use several results from the derived characterization to calibrate our model in Section 5. Under PAM, a worker whose skill s^* has ranking i is matched to a firm position whose productivity a has also ranking i. That is, if the ranking of that firm position's

productivity is j^*, then we can write that $j^*(i) = i$. Naturally, in a competitive matching equilibrium, the equilibrium utility $U(s)$ of a worker with skill s and the equilibrium profit $V(a)$ of a firm position with productivity a are uniquely determined by those ranked below them, given a provided initial value $U(s_L)$ (and consequently $V(a_L)$) for the bottom-ranked worker-firm position pair.

4.3.1. Workers' equilibrium utilities

A more skilled worker receives a higher level of utility. The first-order condition of Eq. (11) implies that if firm a fills its positions by hiring workers with skill $s^*(a)$, then it must hold that:

$$U'(s^*(a)) = \left(\frac{1}{\psi}\right) a^{\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n)}. \tag{12}$$

That is, the marginal utility of workers with skill s depends on the marginal value they offer to their matched firm a^θ as well as that firm's specific cost of providing amenities $a^{-\sum_{n=1}^{N} (\kappa_n \alpha_n)}$. In the special cases where workers care only about wages (i.e., $\alpha_n = 0$ for any $n = 1, ..., N$) or firms do not have any comparative in providing amenities (i.e., $\kappa_n = 0$ for any $n = 1, ..., N$), the slope of $U(s)$ reduces to that of a standard assignment model, namely, $U'(s^*(a)) = a^\theta$.

It is informative to look at the utility of a worker whose skill has ranking i, defined as $U[i] \equiv U(s[i])$. Given that a more skilled worker is matched to a more productive position (in line with $j^*(i) = i$ above), we have that:

$$U[i] = \int_0^i \left(\frac{1}{\psi}\right) \left(a\left[\tilde{i}\right]\right)^{\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n)} s'\left[\tilde{i}\right] d\tilde{i} + U[0]. \tag{13}$$

According to Eq. (13), a worker's equilibrium utility is uniquely determined up to a constant, specifically the initial value of $U[0]$ that we set below.

Proposition 1. *If* $\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) > 0$ *and* $U[0] = \frac{B}{\gamma\left(\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) + \frac{\beta}{\gamma}\right)} \left(\frac{1}{\psi}\right) (a_L)^{\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n)}$, *then*

the equilibrium utility for a worker whose skill has ranking i is:

$$\begin{aligned} U[i] &= \left(\frac{B}{\gamma \left(\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) + \frac{\beta}{\gamma} \right)} \left(\frac{1}{a_L} \right)^{\frac{\beta}{\gamma}} \right) \left(\frac{1}{\psi} \right) (a[i])^{\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) + \frac{\beta}{\gamma}} \\ &= U[0] (1-i)^{-\gamma \left(\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) + \frac{\beta}{\gamma} \right)}, \end{aligned} \tag{14}$$

i.e., the quantile function of equilibrium utilities is Pareto with a tail index $\frac{1}{\gamma \left(\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) + \frac{\beta}{\gamma} \right)}$.

Proposition 1 formalizes how the ranking of workers' utilities depends on the underlying parameters in a competitive labor market equilibrium. In particular, the tail index of the obtained Pareto quantile function depends on parameters that govern the complementarity in production (θ), the dispersion of worker talent relative to firm position productivity ($\frac{\beta}{\gamma}$), and, notably, firms' advantage in catering to workers' non-pecuniary preference by providing the relevant amenities ($\sum_{n=1}^{N} (\kappa_n \alpha_n)$).

The empirical prediction of Eq. (14) can be interpreted by considering a position in a reference firm (e.g., the median firm), whose ranking is denoted by i^*. As for any i, it holds that $a[i^*] = a_L (1-i^*)^{-\gamma}$, so that we can replace a_L with $a[i^*](1-i^*)^{\gamma}$ in the first line of Eq. (14) above. The following corollary establishes the first regression equation for the inference of the model's parameters, given data on workers' overall ratings of the firms they work for.

Corollary 1. *Suppose that a workers' overall rating of their firms is a noisy proxy for their utilities, given by the expression* $TotRating[i] = \exp(\epsilon)(U[i])^{\lambda}$, *where* $\lambda > 0$ *is a constant and* ϵ *the error term. Proposition 1 implies that:*

$$\ln(TotRating[i]) = \zeta - \lambda \left(\frac{\beta}{\gamma} \right) \ln(a[i^*]) + \lambda \left(\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) + \frac{\beta}{\gamma} \right) \ln(a[i]) + \epsilon, \tag{15}$$

where $\zeta \equiv \lambda \left(\ln \left(\frac{B}{\gamma \left(\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) + \frac{\beta}{\gamma} \right)} (1-i^*)^{-\beta} \right) + \ln \left(\frac{1}{\psi} \right) \right)$ *is a newly defined constant.*

Since $\lambda > 0$, it follows that $\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) + \frac{\beta}{\gamma} > 0$ predicts the positive relationship between firms' overall ratings and size documented in the data.

4.3.2. Workers' equilibrium compensation bundles

The characterization of worker's equilibrium bundles comes readily from the characterization workers' equilibrium utility. By substituting Eq. (14) into Eqs. (9) and (10), we obtain the following proposition.

Proposition 2. *If* $\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) > 0$ *and* $U[0] = \frac{B}{\gamma\left(\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) + \frac{\beta}{\gamma}\right)} \left(\frac{1}{\psi}\right) (a_L)^{\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n)}$, *then the equilibrium wage of a worker whose skill has ranking* i *is:*

$$\begin{aligned} x_0[i] &= \left(\frac{B}{\gamma\left(\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) + \frac{\beta}{\gamma}\right)} \left(\frac{1}{a_L}\right)^{\frac{\beta}{\gamma}} \right) \alpha_0 \ (a[i])^{\theta + \frac{\beta}{\gamma}} \\ &= x_0[0] (1-i)^{-\gamma\left(\theta + \frac{\beta}{\gamma}\right)}, \end{aligned} \tag{16}$$

whereas the equilibrium quantity of amenity n*, for any* $n = 1, ..., N$*, is:*

$$\begin{aligned} x_n[i] &= \left(\frac{B}{\gamma\left(\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) + \frac{\beta}{\gamma}\right)} \left(\frac{1}{a_L}\right)^{\frac{\beta}{\gamma}} \right) \frac{\alpha_n}{c_n} \ (a[i])^{\theta + \frac{\beta}{\gamma} + \kappa_n} \\ &= x_n[0] (1-i)^{-\gamma\left(\theta + \kappa_n + \frac{\beta}{\gamma}\right)}, \end{aligned} \tag{17}$$

i.e, the quantile function of equilibrium wages is Pareto with a tail index $\frac{1}{\gamma\left(\theta + \frac{\beta}{\gamma}\right)}$*, whereas the quantile function of amenity* n*'s equilibrium quantities is Pareto with a tail index* $\frac{1}{\gamma\left(\theta + \kappa_n + \frac{\beta}{\gamma}\right)}$.

Eqs. (16) and (17) can also be empirically interpreted based on a reference firm's position with ranking i^*. The corollary below provides the regression equation from Gabaix and Landier 2008 for a worker's wage, as well as variant of it for the quantity of a given amenity.

Corollary 2. *Denoting the wage explicitly as* $w[i] \equiv x_0[i]$*, Proposition 2 implies that:*

$$\ln(w[i]) = \delta - \frac{\beta}{\gamma}\ln(a[i^*]) + \left(\theta + \frac{\beta}{\gamma}\right)\ln(a[i]), \tag{18}$$

where $\delta \equiv \ln\left(\frac{B}{\gamma\left(\theta + \sum_{n=1}^{N}(\kappa_n\alpha_n) + \frac{\beta}{\gamma}\right)}(1-i^*)^{-\beta}\right) + \ln(\alpha_0)$ *is a newly defined constant.*

For the quantity of amenity n*, for any* $n = 1, ..., N$*, Proposition 2 also implies that:*

$$\ln(x_n[i]) = \eta - \frac{\beta}{\gamma}\ln(a[i^*]) + \left(\theta + \frac{\beta}{\gamma} + \kappa_n\right)\ln(a[i]), \tag{19}$$

where $\eta \equiv \ln\left(\frac{B}{\gamma\left(\theta + \sum_{n=1}^{N}(\kappa_n\alpha_n) + \frac{\beta}{\gamma}\right)}(1-i^*)^{-\beta}\right) + \ln\left(\frac{\alpha_n}{c_n}\right)$ *is another constant.*

According to Eq. (18), $\theta + \frac{\beta}{\gamma} > 0$ is consistent with the empirical evidence showing a positive relationship between firms' wages and their size, as in Gabaix and Landier 2008. Whereas, in Eq. (19), we see that $\theta + \kappa_n + \frac{\beta}{\gamma} > 0$ predicts that the quantities of amenities a worker receives increase with the productivity of the firm position to which she is matched. This pattern becomes stronger as a firm's advantage in providing a certain amenity increases (i.e., as κ_n becomes higher).

In more detail, notice that even when the costs of supplying amenities are homogeneous across firms (i.e., $\kappa_n = 0$), workers' compensation bundles increase with the productivity of their firm position if $\theta + \frac{\beta}{\gamma} > 0$, since larger firms attract better workers and therefore need to compensate them more. But if larger firms have an advantage in providing a given amenity (i.e., $\kappa_n > 0$), the quantity of that amenity rises with productivity faster than wages.

Of course, the systematic measurement of the quantities of the amenities firms provide to their workers is empirically challenging. First, not all types of amenities can be distinguished in the available data. Second, the quantities of the amenities that can be distinguished might be not explicitly described. For instance, the data might only indicate their presence or

absence, without referring to their exact quantity. Indicatively, in the same dataset as ours, Sockin 2024 uses topic modeling to identify fifty amenities mentioned in employees' reviews on Glassdoor, and extract the frequency with which these are discussed. Potentially, some of those frequencies can be assumed to be a monotonic transformation of the underlying quantities. But in general, it is hard to quantify all the $x_{n,t}[i]$-components of the (non-wage) compensation bundle, which means that one cannot estimate the associated κ_n's distinctively.

4.3.3. Firms' equilibrium expenditures

Next, we characterize the equilibrium expenditures (from wages and all amenities) of firm positions. This can be done in two ways: either by (i) substituting the components of the equilibrium compensation bundle from Eqs. (16) and (17) into the original expression of the expenditure per firm position inside the braces of Eq. (8), or (ii) substituting the equilibrium utility from Eq. (14) into the minimized expenditure per firm position in Eq. (11).

Proposition 3. *If* $\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)>0$ *and* $U[0]=\frac{B}{\gamma\left(\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}\right)}\left(\frac{1}{\psi}\right)(a_L)^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)}$, *then the equilibrium expenditure for a firm position whose productivity has ranking* i *is:*

$$\begin{aligned} e[i] &= \left(\frac{B}{\gamma\left(\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}\right)}\left(\frac{1}{a_L}\right)^{\frac{\beta}{\gamma}}\right)(a[i])^{\theta+\frac{\beta}{\gamma}} \\ &= e[0](1-i)^{-\gamma\left(\theta+\frac{\beta}{\gamma}\right)}, \end{aligned} \tag{20}$$

i.e., the quantile function of equilibrium expenditures is Pareto with a tail index $\frac{1}{\gamma\left(\theta+\frac{\beta}{\gamma}\right)}$.

We note that Proposition (3) should come as no surprise, since workers' Cobb-Douglas utility implies that wage constitutes an α_0-share of the expenditure for a firm position (i.e., $w[i]=\alpha_0 e[i]$). What is important here is that, according to Eq. (20), workers' non-pecuniary preferences (α_n) and firms' advantage in providing amenities (κ_n) affect the expenditure only through the term $\Sigma_n(\kappa_n\alpha_n)$ (in the denominator of the factor $\frac{B}{\gamma\left(\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}\right)}$).

In particular, the higher the value of $\Sigma_n(\kappa_n\alpha_n)$, the more valuable the firms' advantage in providing amenities, and thus the lower the expenditure.

Applying the same logic as before, Eq. (20) can also be empirically interpreted based on a reference firm's position with ranking i^*. The corollary below provides a regression equation for a firm position's expenditure that is similar to Eq. (18) for a firm's wage.

Corollary 3. *Proposition 3 implies that:*

$$\ln(e[i]) = \xi - \frac{\beta}{\gamma}\ln(a[i^*]) + \left(\theta + \frac{\beta}{\gamma}\right)\ln(a[i]), \tag{21}$$

where $\xi \equiv \ln\left(\frac{B}{\gamma\left(\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}\right)}(1-i^*)^{-\beta}\right)$ *is a newly defined constant.*

However, considering the lack of data on the expenditure that firms' amenities entail, and hence the lack of data on the total expenditure firms incur (based on wages and amenities) to attract skilled workers, running the regression in Eq. (21) is also an empirical challenge. For instance, even though we could draw data from Compustat on firms' selling, general, and administrative expenses (i.e., the XSGA item) or labor and related expenses (i.e., the XLR item), these do not capture the costs of all the amenities that firms provide to their workers. In other words, the lack of data on the quantities of firms' amenities translates to the lack of data on the expenditure of those amenities, that could have been used to calculate $e[i]$.

4.3.4. Firms' equilibrium profits

Finally, we characterize the equilibrium profits of firm positions. Specifically, we can either (i) substitute workers' equilibrium utilities from Eq. (14) into the objective function of Eq. (11), or (ii) combine firms' equilibrium expenditures from Eq. (20) with Eq. (11), given that $\overline{V}[i] = s(i)(a[i])^{\theta} - e[i]$.

Proposition 4. *If* $\theta + \sum_{n=1}^{N}(\kappa_n\alpha_n) > 0$ *and* $U[0] = \frac{B}{\gamma\left(\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}\right)}\left(\frac{1}{\psi}\right)(a_L)^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)}$, *then*

the equilibrium profit for a firm position whose productivity has ranking i is:

$$\begin{aligned}\overline{V}\left[i\right] &= s\left(i\right)\left(a\left[i\right]\right)^{\theta} - \left(\frac{B}{\gamma\left(\theta + \sum_{n=1}^{N}\left(\kappa_n\alpha_n\right) + \frac{\beta}{\gamma}\right)}\left(\frac{1}{a_L}\right)^{\frac{\beta}{\gamma}}\right)\left(a\left[i\right]\right)^{\theta+\frac{\beta}{\gamma}} \\ &= \begin{cases} \overline{V}\left[0\right]\left(1-i\right)^{-\gamma\left(\theta+\frac{\beta}{\gamma}\right)} & \text{if } \beta > 0 \\ \left(\overline{V}\left[0\right] + s_H\, a_L^{\theta}\left(\left(1-i\right)^{\beta} - 1\right)\right)\left(1-i\right)^{-\gamma\left(\theta+\frac{\beta}{\gamma}\right)} & \text{if } \beta < 0 \end{cases},\end{aligned} \tag{22}$$

i.e., the quantile function of equilibrium profits is Pareto with a tail index $\frac{1}{\gamma\left(\theta+\frac{\beta}{\gamma}\right)}$ *if* $\beta > 0$*, but it is modified by the non-linear term* $s_H\, a_L^{\theta}\left(\left(1-i\right)^{\beta} - 1\right) > 0$ *if* $\beta < 0$*.*

The second line of Eq. (22) follows from recalling Eq. (3) and its accompanying discussion. Independently of the sign of β, the quantile function of equilibrium profits is increasing with respect to the ranking index i. From the first line of Eq. (22), we can also write that:

$$\left(\frac{\frac{\overline{V}\left[i\right]}{\left(a\left[i\right]\right)^{\theta}} - s\left(i\right)}{\frac{\overline{V}\left[0\right]}{a_L^{\theta}} - s_L}\right)^{\frac{1}{\beta}} = \left(\frac{a\left[i\right]}{a_L}\right)^{\frac{1}{\gamma}} \tag{23}$$

Eq. (23) describes the mechanics of the competitive labor market equilibrium, according to which a worker's skill is transformed into productivity for the firm position she is filling. Recalling Eq. (6), the expression $\left(a\left[i\right]\right)^{\theta}$ measures firm i's output scaled by the total talent employed in its positions. Equivalently, due to the isomorphism to one-to-one matching, $\left(a\left[i\right]\right)^{\theta}$ indicates firm i's output per position relative to the skill of the worker filling that position. Consequently, $\frac{\overline{V}[i]}{\left(a[i]\right)^{\theta}}$ captures the ratio of the profit per position over the latter, thereby constituting the relevant profitability ratio of our model. Empirically, that expression can also be read as a modified version of a firm's return on assets, in which its net income (or income before extraordinary items) is divided by its assets raised to the power of the complementarity parameter θ.

So, in the LHS of Eq. (23), the profitability ratio of a firm position is contrasted with the skill of the worker in that position. Specifically, the difference between the two is scaled by that same difference evaluated at the bottom-ranked worker-firm position pair. On the other hand, the RHS of Eq. (23) involves the productivity of a firm position relative to the productivity of the bottom firm. The connection between the two sides of the equation involves the tail indices of the distributions of worker talent and firm position productivity, which are naturally inversely related to their dispersion at the top. An important takeaway from the above is that, when it comes to how workers' skill translates to firm position productivity, worker's preferences for amenities, as well as firms' advantage in providing those, play no direct role, except for determining the least productive firm position's profit (i.e., the α_n's and κ_n's affect $V[i]$ only through the lower bound of $V[0]$).

In what follows, we present two propositions that allow us to analyze in more detail the profitability of firm positions, particularly the rankings of their profitability ratios, as well as their associated expense ratios. Eventually, these two propositions will lead us to a corollary that will allow us to empirically assess workers' wage utility weight α_0, and therefore the magnitude of their non-pecuniary preferences $(1-\alpha_0)$. As discussed above, the total expenditure for wages and amenities is in principle unobservable. Yet, since wage comprises α_0 percent of the total expenditure, we can nevertheless estimate α_0 by quantifying the linear relationship between a firm position's profitability ratio and the ratio of its wage to its assets, when the latter are raised to the power of the complementarity parameter θ.

Proposition 5. *If* $\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)>0$ *and* $U[0]=\frac{B}{\gamma\left(\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}\right)}\left(\frac{1}{\psi}\right)(a_L)^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)}$, *then*

the equilibrium profitability ratio for a firm position whose productivity has ranking i is:

$$\frac{\overline{V}[i]}{(a[i])^{\theta}} = \begin{cases} s_L \left(\dfrac{\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n)}{\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) + \dfrac{\beta}{\gamma}} \right) (1-i)^{-\beta} & \text{if } \beta > 0 \\ s_H - \left(\dfrac{\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n)}{\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) + \dfrac{\beta}{\gamma}} \right) \left(\dfrac{1-i}{\widetilde{B}} \right)^{-\beta} & \text{if } \beta < 0 \end{cases} \tag{24}$$

$$= \begin{cases} \dfrac{\overline{V}[0]}{(a_L)^{\theta}} (1-i)^{-\beta} & \text{if } \beta > 0 \\ s_H - \left(s_H - \dfrac{\overline{V}[0]}{(a_L)^{\theta}} \right) (1-i)^{-\beta} & \text{if } \beta < 0 \end{cases}$$

i.e., the quantile function of the equilibrium profitability ratio resembles the quantile function of the workers' talent distribution in Eq. (3)*, being Pareto with a tail index* $\frac{1}{\beta}$ *if* $\beta > 0$*, or increasing with respect to the index* i *and having an upper bound of* s_H *if* $\beta < 0$*.*

In either case (i.e., regardless of whether $\beta > 0$ or $\beta < 0$), the equilibrium profitability ratio increases with respect to the ranking index i.[3]

Proposition 6. *If* $\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) > 0$ *and* $U[0] = \dfrac{B}{\gamma \left(\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) + \frac{\beta}{\gamma} \right)} \left(\frac{1}{\psi} \right) (a_L)^{\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n)}$*, then*

[3]From the second case in the second line of Eq. (24), we have $s_H - \frac{\overline{V}[i]}{(a[i])^{\theta}} = \left(s_H - \frac{\overline{V}[0]}{(a_L)^{\theta}} \right) (1-i)^{-\beta}$, which is in consistent with $s_H - s[i] = (s_H - s_L)(1-i)^{-\beta}$, as implied by the second line of Eq. (3). Here, although $a[i]$ (and hence $(a[i])^{\theta}$) and $\overline{V}[i]$ (provided that $\theta + \frac{\beta}{\gamma} > 0$) do not have an upper bound as $i \to 1$, the ratio converges, i.e., $\lim_{i \to 1} \frac{\overline{V}[i]}{(a[i])^{\theta}} = s_H$.

the equilibrium expense ratio for a firm position whose productivity has ranking i is:

$$\begin{aligned}\frac{e\left[i\right]}{\left(a\left[i\right]\right)^{\theta}} &= \left(\frac{B}{\gamma\left(\theta+\sum_{n=1}^{N}\left(\kappa_{n}\alpha_{n}\right)+\frac{\beta}{\gamma}\right)}\right)\left(1-i\right)^{-\beta} \\ &= \frac{e\left[0\right]}{\left(a_{L}\right)^{\theta}}\left(1-i\right)^{-\beta},\end{aligned} \tag{25}$$

i.e., the quantile function of the equilibrium expense ratio is Pareto with a tail index $\frac{1}{\beta}$ if $\beta > 0$, or decreases with respect to the index i and has an lower bound of 0 if $\beta < 0$.

More intuitively, recall that, if $\beta > 0$, then workers' talent distribution is Pareto, thereby implying that there is a good chance of having highly skilled workers at the top. In this case, $\frac{e[i]}{(a[i])^{\theta}}$ increases with respect to the ranking index i, to capture the notion that the expense ratios of firm positions become higher at the top in order to hire those highly skilled workers. On the other hand, if $\beta < 0$, workers' talent distribution has an upper bound of s_H, and thus becomes more alike at the top. In that case, $\frac{e[i]}{(a[i])^{\theta}}$ decreases with respect to i to capture the notion that it is relative inexpensive to hire skilled workers at the top. But in either case, the higher the absolute value of β, the larger the difference in the expenditure ratios across firm positions (i.e., $\frac{d}{di}\ln\left(\frac{e[i]}{(a[i])^{\theta}}\right) = \frac{\beta}{1-i}$).

Corollary 4. *Propositions 5 and 6 imply that:*

$$\frac{\overline{V}\left[i\right]}{\left(a\left[i\right]\right)^{\theta}} = \phi + \tau\,\frac{w\left[i\right]}{\left(a\left[i\right]\right)^{\theta}}, \tag{26}$$

where $\phi \equiv \begin{cases} 0 \text{ if } \beta > 0 \\ s_H \text{ if } \beta < 0 \end{cases}$ *and* $\tau \equiv \frac{1}{\alpha_0}\left(\frac{\theta+\sum_{n=1}^{N}\left(\kappa_{n}\alpha_{n}\right)}{\frac{\beta}{\gamma}}\right)$ *are two newly defined constants.*

According to the definition of τ, Eq. (26) implies that the correlation between firms' profitability ratios and expense ratios is positive if $\beta > 0$ and negative if $\beta < 0$. Intuitively, the less workers care about wages (i.e., the smaller the value of α_0), the more compressed

the distribution of firm positions' wage expense ratios relative to the distribution of their profitability ratios, thereby yielding a larger value of τ. The practicality of the above corollary is that, by using data on firms' net income (or income before extraordinary items), wages, assets, and the estimated value of the parameter θ (from the Gabaix and Landier 2008 wage regression), we can estimate workers' utility weight on wages (α_0), and thus infer the extent of their non-pecuniary preferences. Hence, it is possible to empirically test if workers have significant non-pecuniary preferences, by rejecting the null hypothesis $H_0 : \alpha_0 \geq 1$.

The three-stage estimation algorithm. In a nutshell, Corollaries 1, 2, and 4 entail the following three-stage estimation procedure. First, run the regression in Eq. (18) to estimate θ and $\frac{\beta}{\gamma}$. Second, run the regression Eq. (15) to estimate λ and $\sum_{n=1}^{N}(\kappa_n\alpha_n)$. Third, run the regression in Eq. (26) to estimate τ, and subsequently solve for $\alpha_0 = \frac{1}{\tau}\left(\frac{\theta + \sum_{n=1}^{N}(\kappa_n\alpha_n)}{\frac{\beta}{\gamma}}\right)$.

4.4. Equilibrium Robustness

The derivation of the aforementioned propositions is based on imposing the initial condition $U[0] = \frac{B}{\gamma\left(\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}\right)}\left(\frac{1}{\psi}\right)(a_L)^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)}$ in Eq. (13). However, instead of requiring this initial condition, we can alternatively follow Gabaix and Landier 2008 and consider the domain of very large firms. That is, we can take the limit of Eq. (13), and subsequently the limit of Eqs. (9), (10), and (11), as $i \to 1$. It then turns out that workers' equilibrium utilities and compensation bundles, along with firms' equilibrium expenditures and profits, can still be approximately expressed as power functions of the corresponding firm size.

Proposition 7. *If* $\theta + \sum_{n=1}^{N}(\kappa_n\alpha_n) > 0$ *and the focus is on the domain of very large firms (i.e., by taking the limit of Eqs.* (9), (10), (11) *and* (13) *as* $i \to 1$*), then the first lines of Eqs.* (14), (16), (17), (20), (22), (24), *and* (25) *in Propositions* (1), *2, 3, 4, 5, and 6, respectively, still hold as limit results.*

Corollary 5. *Proposition 7 implies that Corollaries 1, 2, 3, and 4 hold in the domain of very large firms.*

Consequently, when the emphasis is on large publicly traded firms, the empirical analysis can still be implemented using the same set of Eqs. (15), (18), and (26) derived above.

4.5. Comparative statics in firms' equilibrium profits

Given that $\overline{V}[i] = s(i)(a[i])^{\theta} - e[i]$, it follows that κ_n and α_n affect firms' equilibrium profits only through their equilibrium expenditures ($e[i]$). Therefore, below, we examine directly how the latter depends on model's key parameters.

Corollary 6. *Proposition 3 implies that:*

$$\frac{\partial \ln(e[i])}{\partial \ln(\alpha_n)} = \frac{\partial \ln(e[i])}{\partial \ln(\kappa_n)} = -\frac{\kappa_n \alpha_n}{\theta + \sum_{n=1}^{N}(\kappa_n \alpha_n) + \frac{\beta}{\gamma}}. \tag{27}$$

Moreover, if either (i) all workers' non-pecuniary preferences increase by $\varepsilon\%$ (thereby becoming $\hat{\alpha}_n = (1+\varepsilon\%)\alpha_n$ for any $n = 1, ..., N$), or (ii) all firms' advantages in the provision of amenities increase by $\varepsilon\%$ (thereby becoming $\hat{\kappa}_n = (1+\varepsilon\%)\kappa_n$ for any $n = 1, ..., N$), then the percentage change in firm i's equilibrium expenditure is:[4]

$$\%\Delta(e[i]) = -\frac{\varepsilon\% \sum_{n=1}^{N}(\kappa_n \alpha_n)}{\theta + (1+\varepsilon\%)\sum_{n=1}^{N}(\kappa_n \alpha_n) + \frac{\beta}{\gamma}}. \tag{28}$$

We note that, while the percentage change of firm i's equilibrium expenditure in Eq. 28

[4]Alternatively, one could consider the following approximation:

$$\%\Delta(e[i]) \approx \sum_{n=1}^{N}\left(\frac{\partial \ln(e[i])}{\partial \ln(\alpha_n)}\frac{d(\alpha_n)}{\alpha_n}\right) = \sum_{n=1}^{N}\left(\frac{-\kappa_n \alpha_n}{\theta + \sum_{n=1}^{N}(\kappa_n \alpha_n) + \frac{\beta}{\gamma}}\varepsilon\%\right) = -\frac{\varepsilon\% \sum_{n=1}^{N}(\kappa_n \alpha_n)}{\theta + \sum_{n=1}^{N}(\kappa_n \alpha_n) + \frac{\beta}{\gamma}},$$

which closely matches the right-hand side of Eq. (28) when ε is small.

is constant across the rankings, it implies that the change in profits in levels is greater for larger firms (i.e., $\Delta\overline{V}[i] = \hat{e}[i] - e[i] = \varphi\% \times e[i]$, where φ is the righ-hand side of Eq. (28)).

According to Corollary 6, if there is PAM and $\kappa_n > 0$, then profit-maximizing firms benefit from increases in workers' non-pecuniary preference for amenity n. Similarly, if there is PAM, firms also benefit from increases in the their cost advantage to provide amenity n. Such increases in $\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n)$ make firms become effectively more heterogeneous, thereby allowing them to receive higher surplus. On the other hand, if $\kappa_n < 0$ (i.e., smaller firms have the advantage in providing amenity n), a higher workers' utility weight α_n decreases firms' differences in their ranking, so that their profits decrease too.

Lastly, if there is no cost advantage in the provision of amenity n across firms based on their assets (i.e., $\kappa_n = 0$), then workers' non-pecuniary preferences become irrelevant to firms' profits. This is because, in this case, any change in α_n affects all firms equally, and therefore it does not affect the profits of firms in a competitive labor market equilibrium. In other words, although firms have to provide more amenity n to attract workers when the latter care about it more, their equilibrium expenditure remains the same, by simply decreasing other elements of workers' compensation bundle.

5. Calibration

5.1. The first stage

Following our three-step estimation algorithm, we begin by estimating the parameters of Eq. (18), which relates a firm's wage to its own assets and to the assets of a reference firm. The reference firm is defined as the firm with the median asset size in the same industry and year. As in Gabaix and Landier 2008, we include firm fixed effects in our preferred specification to control for time-invariant unobserved heterogeneity in employee skill, leveraging the panel structure of our data. Consequently, the model's parameters are identified from the within-firm time-series variation.

Recalling the regression results in Column 3 of Panel A of Table 2, the estimated coefficient of $\ln(Assets_{i,t})$ is 0.045, while the coefficient of $\ln(IndustryMedianAssets_{i,t})$ is 0.100. Hence, the implied parameters from the first stage are $\frac{\beta}{\gamma} = -0.100$ and $\theta = 0.145$. In particular, our estimate of $\frac{\beta}{\gamma}$ is negative, as in Gabaix and Landier 2008, thereby implying that the worker talent distribution has an upper bound. Moreover, the finding that $\theta < 1$ implies decreasing returns to scale in employee's wages. This differs from the finding in Gabaix and Landier 2008, according to which CEO wages exhibit constant returns to scale.

5.2. The second stage

In the same spirit, we next estimate the parameters in Eq. (15), which relates a firm's total rating to its own assets and to the assets of the reference firm. Focusing on Column 3 of Panel C of Table 2 (where firm fixed effects are included) the estimated coefficient of a firm's own assets is 0.079, while the estimated coefficient of the median industry asset size is 0.071. Since we have already estimated θ and β/γ, we can infer λ and $\sum_{n=1}^{N} \kappa_n \alpha_n$. Specifically, we infer the λ-parameter by dividing the estimated coefficient of $\ln(IndustryMedianAssets_{i,t})$ by our estimate of $\frac{\beta}{\gamma}$, yielding a value of $0.710 (\approx \frac{0.071}{0.100})$. The value of $\sum_{n=1}^{N} \kappa_n \alpha_n$ can be inferred by first dividing the estimated coefficient of $\ln(Assets_{i,t})$ by the inferred value of λ, and then subtracting the estimated value of $\theta + \frac{\beta}{\gamma}$. This yields a value of 0.066 ($\approx \frac{0.079}{0.710} - 0.045$).

5.3. Counterfactual

Given that our estimates imply that $\Sigma_n (\kappa_n \alpha_n) = 0.066$ and $\theta + \frac{\beta}{\gamma} = 0.045$, we use Eq. (28) to compute the counterfactual. According to our calculations, a 1% increases in the α_n's results in an approximate 0.6% decrease in firm expenditure (i.e., $\frac{\widehat{Exp[j]}}{Exp[j]} - 1 = -0.6\%$ when $\delta = 1.01$). This suggests that as workers non-pecuniary preferences increase, larger firms benefit significantly in terms of profits.

5.4. The third stage

We are now one step away from inferring the parameter that governs workers' preferences for wages, α_0. If workers value firms' amenities – rather than deriving utility solely from wages – then α_0 should be less than 1. In contrast, the model used by Gabaix and Landier 2008 imposes $\alpha_0 = 1$, which can be considered the null hypothesis. Bearing in mind Eq. (26), we run the following regression:

$$\frac{\frac{Profits_{i,t}}{EMP_{i,t}}}{Assets_{i,t}^{\hat{\theta}}} = \underbrace{\frac{1}{\alpha_0}\left(1 + \frac{\sum_{n=1}^{N}\kappa_n\alpha_n}{\theta}\right)}_{\equiv\tilde{\tau}}\frac{\hat{\theta}}{\widehat{\beta/\gamma}}\frac{Wage_{i,t}}{Assets_{i,t}^{\hat{\theta}}} + \eta_t^{\overline{V}/a^\theta} + \eta_i^{\overline{V}/a^\theta} + \epsilon_{i,t}^{\overline{V}/a^\theta}, \tag{29}$$

where $\frac{\frac{Profits_{i,t}}{EMP_{i,t}}}{Assets_{i,t}^{\theta}}$ is firm i's profit-per-worker relative to its adjusted assets (i.e., the output of its assets) in year t, while $\frac{\hat{\theta}}{\widehat{\beta/\gamma}}\frac{Wage_{i,t}}{Assets_{i,t}^{\theta}}$ is firm i's adjusted-wage-to-adjusted-assets ratio in year t. Both variables are generated using the inferred value of θ. As usual, $\eta_t^{\overline{V}/a^\theta}$ is year t's fixed effect, $\eta_i^{\overline{V}/a^\theta}$ is firm i's fixed effect, and $\epsilon_{i,t}^{\overline{V}/a^\theta}$ is the error term.

The estimation results are presented in Table 3. A firm's profit is measured by income before extraordinary items (IB) in Column 1, and by net income (NI) in Column 2. Regardless of the profit measure that is used to generate the dependent variable, the estimated coefficient of $\frac{\hat{\theta}}{\widehat{\beta/\gamma}}\frac{Wage_{i,t}}{Assets_{i,t}^{\hat{\theta}}}$ is close to 1.8 and statistically significant with a t-statistic greater than 3 (based on bootstrapped standard errors that account for the sampling error in the estimation of θ and $\frac{\beta}{\gamma}$, and the unbalancedness of our panel data).

To visualize this, we plot the residualized ratio of IB-per-worker relative to adjusted assets against the residualized adjusted-wage-to-assets ratio in Subfigure 4a, and the corresponding plot using NI-per-worker in Subfigure 4a. Each point in the two plots represents a firm-year observation, with all variables residualized with respect to firm and year fixed effects. The x-axis is grouped into 100 bins to aid visual clarity. In both subfigures, the slope of the fitted line is strongly positive and around 1.8, consistent with the above regression results. Invoking the analytical expression of $\tilde{\tau}$, we then obtain a value of 0.808 for α_0.

5.5. Estimating the model's auxiliary parameters

For completeness, we additionally provide estimates for the other parameters of our model.

5.5.1. Estimating π using firm assets

We begin by examining the distribution of firm size, focusing specifically on the Pareto fit of firm assets. Following the approach of Gabaix and Ibragimov 2011, we estimate the shape parameter π by running the following regression:

$$\ln(Assets_{i,t}) = -\pi \ln(IndustryRank_{i,t} - \frac{1}{2}) + \eta^{Assets}_{Industry_i} + \eta^{Assets}_{t} + \epsilon^{Assets}_{i,t}, \tag{30}$$

where $\ln(Assets_{i,t})$ is the natural log of firm i's assets in year t, $\ln(IndustryRank_{i,t} - \frac{1}{2})$ is the natural log of the rank of firm i's assets in its industry in year t minus the 1/2 term, $\eta^{Assets}_{Industry_i,t}$ is firm i's industry fixed effect, η^{Assets}_{t} is year t's fixed effect, and $\epsilon^{Assets}_{i,t}$ is the error term. Essentially, the parameter π is estimated from the cross-section of firm asset sizes after controlling for industry- and year-specific shocks through fixed effects.

The regression results are presented in Panel A of Table 4. The estimated coefficient of $\ln(IndustryRank_{i,t} - \frac{1}{2})$ implies that π equals 1.158, which is close to one – the value consistent with Zipf's law for firm size.

5.5.2. Estimating m using firm total number of employees' and assets

Next, we use the functional form of $L(a)$, where we assume that the total number of employees is a concave power function of firms' assets, to estimate m. In particular, we take logs of the functional form of $L(a)$ and obtain the following regression equation:

$$\ln(EMP_{i,t}) = m \ln(Assets_{i,t}) + \eta^{EMP}_{t} + \eta^{EMP}_{Industry_i} + \epsilon^{EMP}_{i,t}, \tag{31}$$

where $\ln(EMP)_{i,t}$ is the natural log of firm i's number of employees in year t, $\ln(Assets_{i,t})$ is the natural log of firm i's assets in year t, $\eta^{EMP}_{Industry_i,t}$ is firm i's industry fixed effect, η^{EMP}_{t} is

year t's fixed effect, and $\epsilon_{i,t}^{EMP}$ is the error term. That is once again, we control for industry- and year-specific shocks.

The output of this regression is presented in Panel B of Table 4. The coefficient of $\ln(Assets_{i,t})$ is found to be 0.662.

5.5.3. Estimating γ and β from the estimates of the other parameters

Having estimated the values of π and m, we can now estimate the value of γ. In particular, since $\gamma \equiv \pi - m$, it follows that it is equal to 0.496. Furthermore, since we have estimated the value of β/γ, we can subsequently estimate the value of $\beta = \gamma \cdot (\beta/\gamma)$. Specifically, our estimates imply that β is equal to -0.050. For exposition purposes, all the model calibration results are summarized together in Table 5.

6. Conclusion

Firms compete for talented employees by offering non-wage amenities, such as work-life balance. Glassdoor data indicate that larger firms provide both higher wages and more workplace amenities. Motivated by the above, we develop a competitive matching model for the labor market, that we can use to estimate the effect of the provision of those amenities on firm profits. We find that large firms benefit significantly more from non-wage competition than small firms. Moreover, as workers' preferences tilt towards non-pecuniary amenities, the distribution of wages becomes more compressed than the distribution of profits. Our calibration suggests that workers' preference weight for wages is about 80%, subsequently implying a 20% preference weight for non-pecuniary amenities.

Regarding future follow-up research directions, there appear to be at least three potential pathways. First, one could consider exploring additional dimensions of complementarity between employees and firms, beyond the current focus on firm size and employee talent – as in Pan 2017. For example, complementarities could be based on employees' education levels

and firms' R&D intensity, or on employees' conglomerate experience and firms' diversification strategies. Of course, the current emphasis on talented or qualified employees already implicitly captures some aspects of educational attainment.

Second, one could consider extending the model of workers' utility to incorporate potential risk aversion or dissatisfaction from exerting effort, as in Edmans and Gabaix 2011. Accounting for such factors is expected to change the conditions for a positive assortative matching. While the current emphasis of our paper is on non-pecuniary amenities such as work-life balance, these considerations may also interact with the utility workers derive from leisure, and even with the probability of successfully and efficiently implementing projects at the firm level – which might, in turn, affect workers' monetary compensation.

Finally, to the extent that firms in certain industries experience changes in the demand for their products and services over time, there could be unobservable factors that affect the sensitivity of wages and workplace amenity ratings to firm size. In such case, one could consider a model extension in the spirit of Baranchuk, MacDonald, and Yang 2011, where firms adjust their size based on the human capital they employ, rather than basing decisions about compensation and workplace amenities solely on firm size.

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Table 1
Summary statistics

This table summarizes the annually observed variables in our sample. Panel A refers to firms' wage and amenities' star ratings from Glassdoor. $Wage$ is the wage of a firm's representative employee. $TotRating$ is the overall rating of a firm's representative employee. CB is the compensation and benefit rating of a firm's representative employee. WL is the work-life balance rating of a firm's representative employee. Panel B refers to firms' employee numbers, assets, and profits from Compustat. EMP is a firm's employee number. $Assets$ is a firm's assets. IB is a firm's income before extraordinary items. NI is a firm's net income. $EBIT/EMP$, IB/EMP, and NI/EMP are the corresponding measures of a firm's profits per worker. The sample is an unbalanced panel of 730 U.S.-based firms that were members of the S&P 500 Index during the period 2006-2022.

	Mean	S.D.	Median	P5	P95
Panel A: Firms' salary and amenities' star ratings from Glassdoor					
$Wage$ ($)	88,972	19,252	85,301	65,799	127,164
$TotRating$	3.36	0.27	3.34	2.96	3.84
CB	3.50	0.26	3.48	3.10	3.92
WL	3.18	0.31	3.18	2.72	3.72
Panel B: Firms' number of employees, assets, and profits from Compustat					
EMP	48,233	122,443	17,483	1,800	191,000
$Assets$ (million $)	67,759	259,925	13,182	1,659	223,432
IB (million $)	1,678	5,163	603	-618	7,602
NI (million $)	1,694	5,180	611	-645	7,722
IB/EMP	63,821	442,256	33,557	-50,278	323,713
NI/EMP	66,099	449,409	34,083	-52,182	336,699

Table 2

Regressions of a firm's wage and workplace ratings on its own assets and the median firm's assets in its industry

This table presents the regressions of a firm's wage and workplace ratings on its own assets and the median firm's assets in its industry. In Panel A, the dependent variable is $\ln(Wage_{i,t})$, i.e., the log of firm i's wage in year t. In Panel B, the dependent variable is $\ln(CB_{i,t})$, i.e., the log of firm i's compensation and benefits rating in year t. In Panel C, the dependent variable is $\ln(TotRating_{i,t})$, i.e., the log of firm i's overall rating in year t. In Panel D, the dependent variable is $\ln(WL_{i,t})$, i.e., the log of firm i's work-life balance rating in year t. In all panels, the independent variables are $\ln(Assets_{i,t})$, i.e., the log of firm i's assets in year t, and $\ln(IndustryMedianAssets_{i,t})$, i.e., the log of the median firm's assets in firm i's industry in year t. The industries are the 11 two-digit GICS industries. The table reports the coefficient estimates and the two-way clustered standard errors at the firm and year level in parenthesis. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. See Table 1 for a detailed description of the sample.

	(1)	(2)	(3)
Panel A: Regressions of firms' wage			
$\ln(Assets)$	0.014**	0.007***	0.045***
	(0.005)	(0.002)	(0.008)
$\ln(IndustryMedianAssets)$	0.008	0.137***	0.100***
	(0.009)	(0.017)	(0.017)
Observations	8,534	8,534	8,534
R^2	0.016	0.235	0.332
Panel B: Regressions of firms' compensation and benefits rating			
$\ln(Assets)$	0.008***	0.007***	0.048***
	(0.002)	(0.002)	(0.006)
$\ln(IndustryMedianAssets)$	0.006	0.066***	0.043***
	(0.004)	(0.012)	(0.009)
Observations	4,713	4,713	4,713
R^2	0.038	0.093	0.224
Panel C: Regressions of firms' overall rating			
$\ln(Assets)$	0.007***	0.006***	0.079***
	(0.002)	(0.001)	(0.008)
$\ln(IndustryMedianAssets)$	-0.000	0.111***	0.071***
	(0.004)	(0.024)	(0.017)
Observations	4,747	4,747	4,747
R^2	0.015	0.128	0.298
Panel D: Regressions of firms' work-life balance rating			
$\ln(Assets)$	0.004*	0.003**	0.056***
	(0.003)	(0.001)	(0.005)
$\ln(IndustryMedianAssets)$	0.024***	0.076***	0.048***
	(0.005)	(0.016)	(0.011)
Observations	4,698	4,698	4,698
R^2	0.062	0.080	0.226
Panels A to D			
Industry FE	No	Yes	No
Firm FE	No	No	Yes

Table 3

Regressions of a firm's profit-per-worker to adjusted-assets ratio on its adjusted-wage-to-adjusted-assets ratio

This table presents regressions of a firm's profit-per-worker to adjusted-assets ratio on its adjusted-wage-to-adjusted-assets-ratio. The dependent variable is $\frac{Profits_{i,t}}{EMP_{i,t}}/Assets_{i,t}^{\hat{\theta}}$, i.e., firm i's profit-per-worker relative to adjusted assets in year t. In Column 1, it is constructed using firm i's income before extraordinary items (IB). In Column 2, it is constructed using firm i's net income (NI). In all columns, the independent variable is $\frac{\hat{\theta}}{\widehat{\beta/\gamma}}Wage_{i,t}/Assets_{i,t}^{\hat{\theta}}$, i.e., firm i's adjusted-wage-to-adjusted-assets ratio in year t. The table depicts the coefficient estimates and the bootstrapped standard errors clustered by firm and stratified by the number of years in a firm is observed (in parenthesis). *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. See Table 1 for a detailed description of the sample.

	(1)	(2)
Dependent variable based on	IB	NI
$\frac{\hat{\theta}}{\widehat{\beta/\gamma}}Wage_{i,t}/Assets_{i,t}^{\hat{\theta}}$	1.778***	1.842***
	(0.579)	(0.587)
Firm FE	Yes	Yes
Year FE	Yes	Yes
Observations	8,436	8,436
R^2	0.247	0.263

Table 4
Pareto fit of firms' assets

This table presents the regressions used to estimate the model's auxiliary parameters. Panel A presents the Pareto fit of firm assets. The dependent variable is $\ln(Assets_{i,t})$, i.e., the log of firm i's assets in year t. The independent variable is $\ln(IndustryRank_{i,t} - \frac{1}{2})$, i.e., the log of the rank of firm i's assets in its industry in year t minus the 1/2 term. Panel B presents the regression implied by the functional form of $L(a)$. The dependent variable is $\ln(EMP_{i,t})$, i.e., the log of firm i's number of employees in year t. The independent variable is $\ln(Assets_{i,t})$, i.e., the log of firm i's assets in year t. The industries are the 11 two-digit GICS industries. The table depicts the coefficient estimates and the two-way clustered standard errors at the firm and year level (in parenthesis). *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. See Table 1 for a detailed description of the sample.

Panel A: Pareto fit of firm assets	
$\ln(IndustryRank - \frac{1}{2})$	-1.158***
	(0.034)
Industry FE	Yes
Year FE	Yes
Observations	8,534
R^2	0.837
Panel B: Regression implied by the functional form of $L(a)$	
$\ln(Assets)$	0.662***
	(0.033)
Industry FE	Yes
Year FE	Yes
Observations	8,459
R^2	0.583

Table 5
Summary of the model's calibration

This table summarizes the calibration of the model. Column 1 shows the parameters. Column 2 shows their estimated value. Column 3 shows the data and equation based on which the parameters' estimation is performed. See Table 1 for a detailed description of the sample.

(1) Parameters	(2) Values	(3) Firm-level Data and Equations
α	0.818	IB per worker to model-adjusted $Assets$ & model-adjusted $Wage$ to assets ratio
	0.790	NI per worker to model-adjusted $Assets$ & model-adjusted $Wage$ to assets ratio
θ	0.145	Firm $Wage$ and $Assets$
λ	0.710	Firm $TotRating$ and $Assets$
$\sum_n \kappa_n \alpha_n$	0.066	Firm $TotRating$ and $Assets$
π	1.158	Firm $Assets$
m	0.662	Firm EMP and $Assets$
γ	0.496	$\hat{\gamma} = \hat{\pi} - \hat{m}$
β	-0.050	$\hat{\beta} = \hat{\gamma} \cdot \widehat{\beta/\gamma}$

Fig. 1. Word clouds of terms and phrases referencing competition for talented workers or general labor, compensation and benefits, and work-life balance amenities in firms' 10-K filings. The larger the font size of a term, the more frequently it appears in firms' 10-K filings. Subfigure 1a shows terms and phrases related to competition for talent. Subfigure 1b shows terms and phrases related to general labor market competition. Subfigure 1c shows terms and phrases related to compensation and benefits. Subfigures 1d, 1e, 1f, and 1g show terms and phrases related to flexible hours, telecommuting, relaxation or stress relief activities, and paid time off, respectively.

(a) Competition for talent

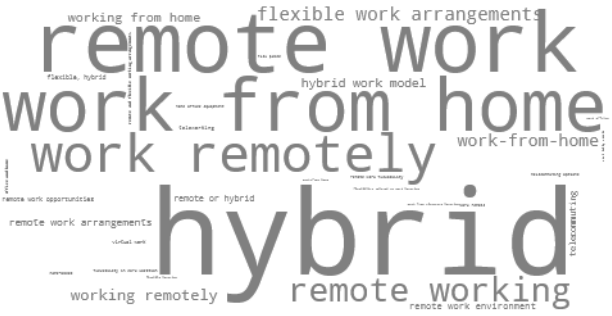
(b) General labor market competition

Fig. 1 cont'd

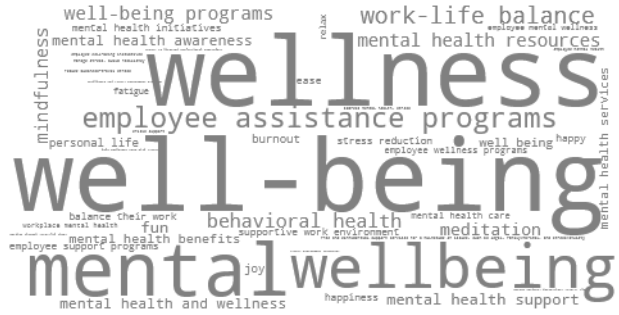
(c) Compensation and benefits

(d) Flexible hours

(e) Telecommuting



(f) Relaxation or stress relief activities



(g) Paid time off

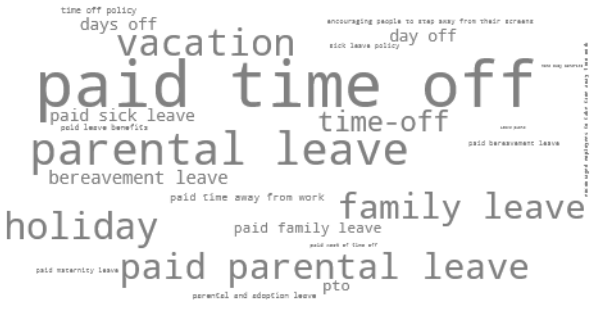
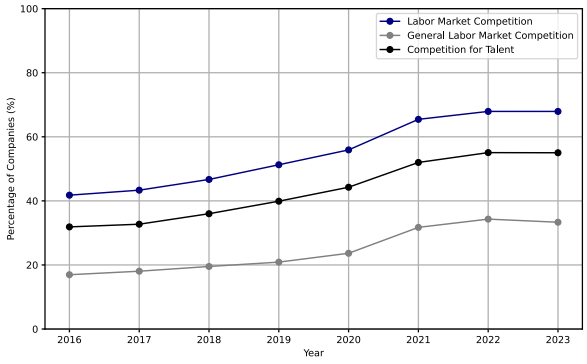
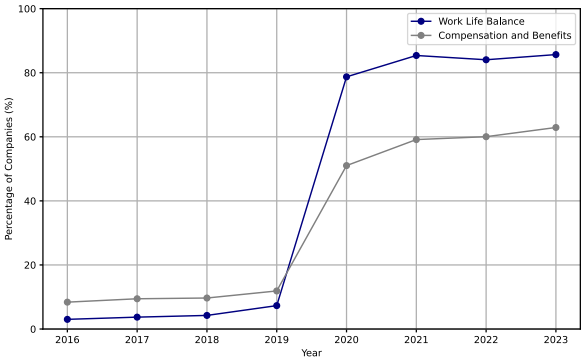


Fig. 2. The annual percentages of firms referencing competition for talented workers or general labor, compensation and benefits, and work-life balance amenities in their 10-K filings. Subfigure 2a shows, by year, the percentage of firms referencing competition for talent (in black), general labor market competition (in grey), and either type, i.e., the union of the two (in blue). Subfigure 2b shows, by year, the percentage of firms referencing work-life balance amenities (in blue) versus the compensation and benefits (in grey). Subfigure 2c shows, by year, the percentage of firms referencing flexible hours (in red), telecommuting (in green), relaxation or stress relief activities (in blue), and paid time off (in orange). Subfigure 2d shows, by year (in blue), the conditional percentage of firms that reference work-life balance amenities, given that they reference competition for talented workers.

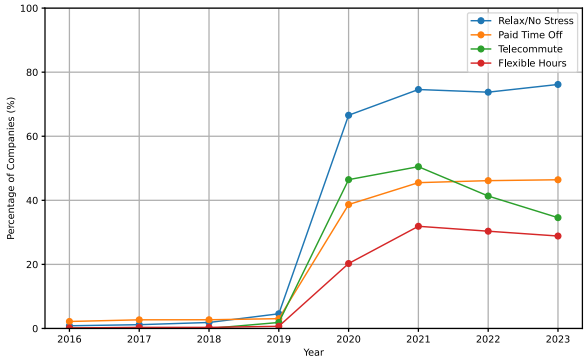
(a) The percentage of firms referencing competition for general or talented workers by year



(b) The percentage of firms referencing compensation and benefits versus work-life balance amenities over time



(c) The percentage of firms referencing specific work-life balance amenities by year



(d) The percentage of firms referencing work-life balance amenities, conditional on referencing competition for talented workers, by year

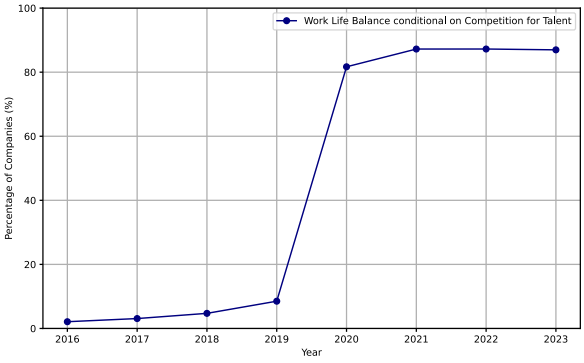
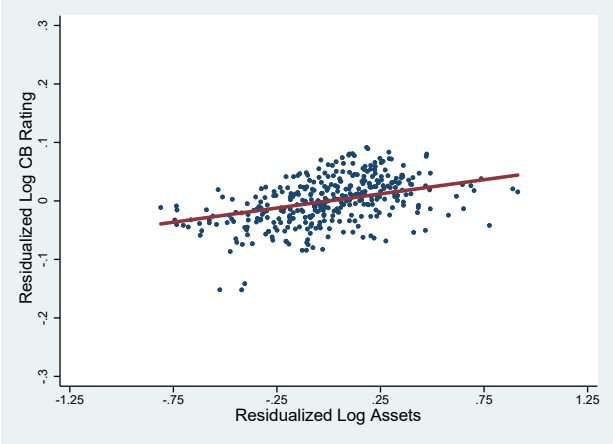


Fig. 3. Scatterplots of firm wages and ratings against firm assets, after binning firm observations into three groups by industry–year. Each subfigure plots the relationship between a residualized firm-level workplace variable (log wage or rating) against the residualized log asset size. Firms are grouped into three asset bins within each two-digit GICS industry and year. Residuals are obtained by regressing the calculated log median wage, compensation and benefits rating, total rating, work-life balance rating and asset size on industry-group fixed effects. Subfigure 3a shows the residualized log wage. Subfigure 3b shows the residualized compensation and benefits rating. Subfigure 3c shows the residualized total rating. Subfigure 3d shows the residualized work-life balance rating.

(a) Residualized wage against residualized assets

(b) Residualized compensation and benefits against residualized assets



(c) Residualized overall rating against residualized assets

(d) Residualized work-life balance rating against residualzed assets

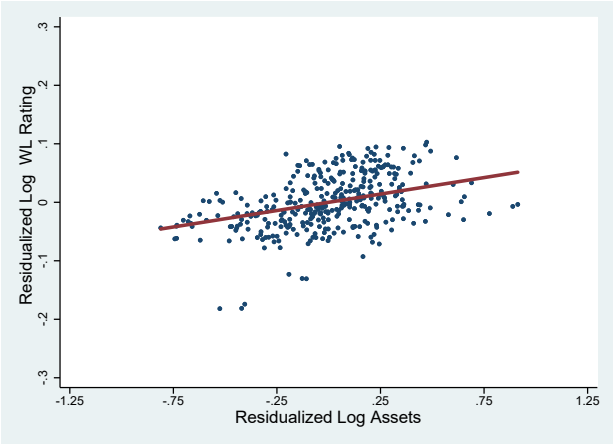
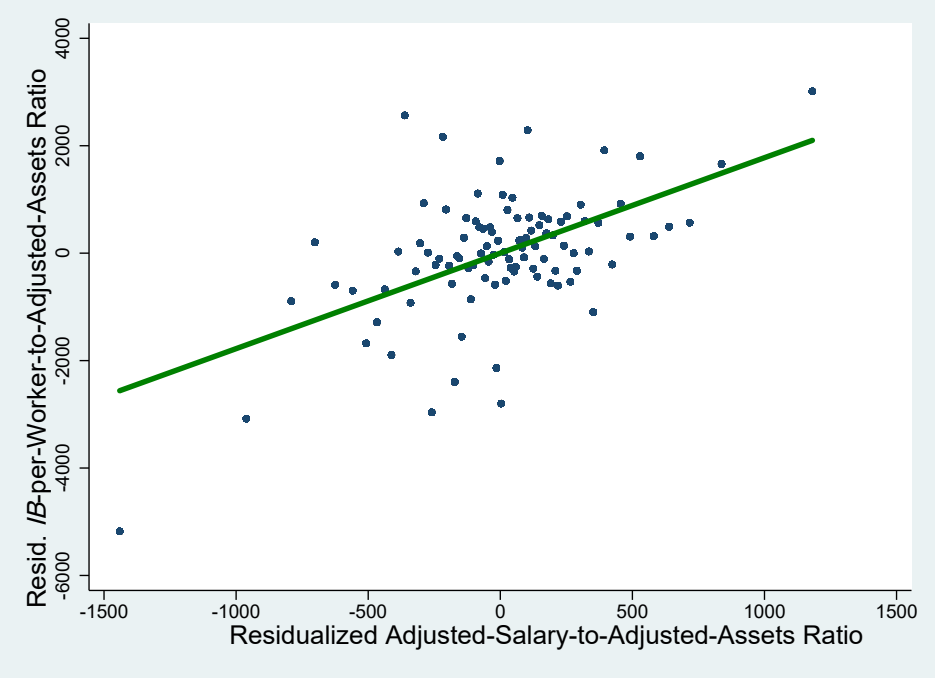


Fig. 4. Scatterplots of the firm's profit-per-worker to adjusted-assets ratio against the firm's adjusted wage-to-adjusted-assets ratio. Each subfigure plots the relationship between the residualized profit-per-worker to adjusted-assets ratio (based on either income before extraordinary items or net income) and the residualized adjusted-wage-to-adjusted-assets ratio. Residuals are obtained by regressing both variables on firm and year fixed effects. The y-axis shows the residualized value of $\frac{Profits_{i,t}}{EMP_{i,t}}/Assets_{i,t}^{\hat{\theta}}$, i.e., firm i's profit per worker relative to adjusted assets in year t. In Subfigure 4a, profits are measured using income before extraordinary items (IB). In Subfigure 4b, profits are measured using net income (NI). The x-axis shows 100 bins of the residualized $\frac{\hat{\theta}}{\hat{\beta}/\hat{\gamma}}Wage_{i,t}/Assets_{i,t}^{\hat{\theta}}$, i.e., firm i's adjusted-wage-to-adjusted-assets ratio in year t.

(a) IB-per-worker relative to adjusted assets against adjusted-wage-to-adjusted-assets ratio



(b) NI-per-worker relative to adjusted assets against adjusted-wage-to-adjusted-assets ratio

Online Appendix

A. Contextual analysis dictionary

This section lists the terms and phrases referencing competition for talented or general employees, compensation and benefits, and work-life balance amenities in firms' 10-K filings.

Competition for talent: associates with appropriate experience. our staffing needs are especially high during the holiday season. competition for these associates; attract key personnel or lose them to competitors; candidates in a competitive talent environment; compete and are generally able to select from the top talent; compete effectively for qualified professionals; compete effectively for talent; compete for a talented; compete for experienced; compete for increasingly scarce human capital; compete for talent; compete for the best talent; compete for the same skills; compete for top global talent; compete for trained, qualified personnel; compete to attract skilled; compete with commercial technology companies outside of the aerospace and defense industry for qualified technical; compete with commercial technology companies outside of the shipbuilding and defense industry for qualified technical positions; compete with for talent; compete with other companies both within and outside of our industry for talented; compete with other companies for the limited pool of talent; compete with other companies in the energy industry for this skilled workforce; compete with other companies, including with respect to recruiting and retaining key personnel; compete with other natural resource companies to attract and retain key executives, skilled labor; compete with several other companies for this limited pool of potential employees; compete with unregulated companies for talent; compete with us for talent; compete with various other companies in attracting and retaining qualified and skilled personnel; competes for talent; competing for qualified employees; competing for skill; competing for the same talent; competition among restaurant companies for qualified management and staff; competition and a tightening market for skilled employees; competition could cause us to lose talented; competition exists for the key employees; competition for a limited pool of qualified individuals; competition for a relatively small number of qualified employees; competition for acquiring top talent; competition for certain highly technical specialties; competition for critical talent; competition for diverse talent; competition for diverse, talented; competition for engineering talent; competition for engineers with high levels of experience; competition for experienced; competition for experienced personnel; competition for global talent; competition for highly qualified employees; competition for highly qualified individuals; competition for highly qualified personnel; competition for highly qualified technical personnel; competition for highly qualified workers; competition for highly qualified, specialized technical, managerial, and consulting personnel; competition for highly skilled; competition for highly-skilled; competition for high-quality executives; competition for key and other highly skilled personnel; competition for key executives; competition for key personnel; competition for leading brokers; competition for management and technical personnel; competition for management with experience; competition for management, engineering, and technical personnel; competition for our key employees; competition for people with the specialized technical skills; competition for people with the specific technical and other skills; competition for persons with these skills; competition for qualified and capable personnel; competition for qualified and diverse; competition for qualified candidates; competition for qualified employees; competition for qualified labor; competition for qualified personnel; competition for qualified plant personnel; competition for qualified professional drivers; competition for qualified software development, sales, and other personnel; competition for qualified talent; competition for qualified workers; competition for qualified, motivated, and highly-skilled; competition for quality personnel; competition for rare, high-demand talent; competition for scarce talent; competition for senior executives and key personnel; competition for senior executives and other key talent; competition for senior management and key employees; competition for senior management and key personnel; competition for senior management and key team members; competition for skilled; competition for such qualified individuals; competition for such senior leaders; competition for such skill; competition for such skilled; competition for such skillsets; competition for such talent; competition for such technical personnel; competition for suitable sales associates; competition for talent; competition for talented; competition for the available pool of skilled employees; competition for the best people; competition for the services of leading brokers; competition for their talent; competition for their talents; competition for these and other experienced personnel; competition for these skilled; competition for this talent; competition for top talent; competition for well-qualified employees; competition from within the financial services industry and from businesses outside the financial services industry, including the technology industry, for qualified employees; competition globally for experienced; competition globally to attract and retain a diverse workforce with these and other skills; competition in attracting and retaining key employees; competition in attracting and retaining talented; competition in our industry for key employees; competition in our industry for qualified employees; competition in our industry for qualified technical employees; competition in the biotechnology industry for qualified scientists; competition is high for skilled; competition is significant for people with the specific skills; competition over highly skilled; competition remains intense for well-qualified employees; competition to attract and retain highly skilled; competition to attract and retain skilled; competition we face for qualified employees; competition within and outside the insurance and financial services industry for qualified employees; competition within our industry for experienced technical personnel; competitive and can attract and retain the best talent; competitive environment - the ability to respond to shifts in market demand and the ability to attract and retain skilled talent; competitive environment for management talent; competitive environment

for marketing oilfield products and services and securing equipment and trained personnel; competitive environment for talent; competitive in our talent markets; competitive in retaining a skilled; competitive in the market for talent; competitive market for skilled; competitive market for talent; competitive pressures, and a dynamic market for talent; competitive program helps us attract, motivate and retain the key talent; competitive to attract and retain the best talent; competitive with our peers and continue to attract and retain talent; competitive, particularly for employees with specialized technical; competitors for talent; competitors for technical talent; competitors have targeted individuals in our organization that have desired skills; competitors may attract talent; competitors may seek to attract analyst talent; competitors may seek to attract talent; demand for qualified personnel exceeds supply; demand for skilled personnel exceeds supply; employees with the skills required to perform the services we offer and competition for these individuals; engineers, for whom the market is extremely competitive; experienced engineers. the competition for these employees; experienced staff to comply with increasingly complex international laws and regulations. we face intense competition for these professionals; experienced technical professionals and talented personnel. competition for such professionals; expertise and knowledge of our business and products. we compete for such personnel; face competition in attracting and retaining talent; highly qualified and diverse personnel at all levels, including management, technical, compliance, and sales personnel. competition for these individuals; highly qualified and diverse personnel. competition for such personnel; highly skilled managerial, sales and marketing, technical, financial and administrative personnel to operate and grow our business. competition for such personnel; if our compensation programs do not adequately engage our key employees or are not competitive; key employee particularly to a competitor; key employees in these competitive markets; key employees leave for a competitor; key employees, or the loss of a significant number of key revenue producers, if we are unable to quickly hire and integrate qualified replacements, could cause our business, financial condition and results of operations to materially suffer. competition for these personnel; key individuals, we can give no assurance that any or all of them will remain with us, or that we will not continue to make changes to the composition of, and the roles and responsibilities of, our management team. competition for these individuals; key team members are sought after by our competitors; labor market for these executives and other key personnel is nationwide in scope and intensely competitive; limited number of qualified engineers. competition for these individuals; limited pool of employees who have the skills and training needed to do our work, including with expertise in emerging technologies, such as AI. competition for these employees; loss of key management personnel to competitors; market for highly skilled workers and leaders in our industry is extremely competitive; market for highly skilled workers and leaders is extremely competitive; market for highly-skilled workers and leaders in our industry is extremely competitive; market for key personnel is competitive; market for key personnel is highly competitive; market for production, technical services, leadership and highly-skilled talent is increasingly competitive; market for qualified employees in the retail food industry is very competitive; market for qualified employees, with the right talent and competencies, is highly competitive; market for qualified executives, senior managers and other employees has become very competitive; market for qualified fund managers, investment analysts, technology and risk specialists and other professionals is highly competitive; market for qualified individuals is competitive; market for qualified individuals is highly competitive; market for qualified individuals with diverse perspectives and reflecting the diversity of our communities is highly competitive; market for qualified personnel in our business is highly competitive; market for qualified personnel in the company's business is highly competitive; market for qualified personnel is extremely competitive; market for qualified talent continues to be competitive; market for specialized skill-sets is highly competitive; market for the most qualified talent continues to be competitive; may be at a competitive disadvantage for retaining and hiring key management, staff and skilled employees; personnel with the requisite skills or clearances in this competitive market; qualified and experienced employees is essential to meet our current and future goals and objectives. there is no guarantee we will be able to attract and retain such employees; qualified employees in our industry is very competitive; qualified executive, managerial, and merchandising personnel and store and distribution center associates. competition for this type of personnel; qualified management and scientific personnel with other life science and technology companies, universities, and research institutions. competition for these individuals; qualified management, scientific, technical, marketing and support personnel. competition for such personnel; qualified management, technical, marketing and sales, and support personnel. competition for such personnel; qualified people in a very competitive market; qualified personnel. competition for these employees; qualified personnel. competition for these personnel; qualified personnel. the competition for these employees; result of this competition, we may be unable to hire or retain the qualified employees; retain a talented, competitive work force in our highly competitive industry; retain employees with the right skills, competencies and experiences to execute our strategy and support the growth of the business. the failure to attract and retain such employees; retain talent in a competitive market; retain technical personnel at a competitive cost; retaining skilled personnel is costly and highly competitive; retaining talented employees, including our perfumers and flavorists, is essential to the successful delivery of our products and success in the marketplace. competition for these employees; retention of executive and employee talent more competitive; skill sets can be highly competitive; skilled and experienced personnel in a highly competitive environment; however, competition for these personnel; skilled management personnel who are responsible for the day-to-day operations of the company. competitive pressures may require that we enhance our pay and benefits package to compete effectively for such personnel; skilled personnel for whom the market is highly competitive; skilled personnel, such as engineering, marketing and senior management professionals. competition for these employees; skilled sales, marketing, manufacturing engineering and scientific personnel. competition for these persons; skilled technical, managerial, sales, and marketing personnel. competition for such personnel; skilled technical, managerial, sales, and marketing personnel. competition for these personnel; skilled workforce in this competitive market; skills are in high demand among our competitors; skills in the competitive market; specialized expertise, such as technical positions (including with respect to cybersecurity, artificial intelligence, and machine learning). the market for such personnel is extremely competitive; talent from an ever-changing and competitive environment; talent internally, could significantly impact our future performance. competition for these individuals; talent retention rate of 96%, for 2020, is consistently higher than the markets in which we compete; talent rewards that are competitive in the marketplace; talented and diverse employees may significantly impact our future performance. competition for these individuals; talented

and diverse employees. we face significant competition for these employees; talented employees could significantly impact our future performance. competition for these individuals; talented, competitive workforce; technical expertise and knowledge of the industry. an inability to attract and retain such employees; technical expertise, such as agricultural and food manufacturing experience, as well as finance, marketing, and other senior management professionals. the loss of the services of these persons could deplete our institutional knowledge and could have a material adverse effect on our business, financial condition, and results of operations. the market for these employees is competitive; technical positions (including with respect to cybersecurity, artificial intelligence, and machine learning). the market for such personnel is extremely competitive; with certain cybersecurity specialties. because such employees are in high demand by our competitors.

General labor market competition: available labor pool of employees in each of the markets in which we operate to fill other necessary positions. if there is continued competition for these employees; compete against other major U.S. airlines for pilots, aircraft technicians and other labor; compete for entry-level employment; compete for labor; compete for limited management and labor; compete for our colleagues; compete for our employees; compete for our team members; compete for personnel; compete in the job market; compete to attract and hire; compete to hire new personnel; compete with many other businesses to attract and retain employees; compete with many other potential employers; compete with other companies in recruiting; compete with other financial services companies for personnel; compete with other healthcare providers in recruiting; compete with other healthcare providers to secure, and pay premiums above standard compensation for essential workers; compete with other potential employers; compete with other retail and non-retail businesses for these associates; compete with other retail and non-retail businesses for these employees; compete with other retail businesses for many of our associates; compete with other retailers for many of our sales associates and specialists; compete with system affiliated hospitals and healthcare companies, as well as health insurers and private equity companies, in recruiting; compete with these companies for equipment and personnel; competes to hire; competes with multinational firms for these employees; competing employers; competition among potential employers; competition and compensation expectations for existing and prospective personnel have increased; competition exists for sales associates and brokers; competition for all these types of employees; competition for available labor; competition for employee; competition for employees; competition for engineering and other technical personnel; competition for labor; competition for limited labor; competition for officers and employees; competition for our employees; competition for personnel; competition for sales executives, data scientists and operations personnel; competition for senior management ; competition for staffing; competition for team members; competition for the employment; competition for the hiring; competition for the labor; competition for the personnel; competition for workers; competition from other employers; competition in hiring; competition in the labor market; competition in the recruitment; competition is especially high for employees; competition to hire; competition to recruit; competition, both within and outside of our industry, in retaining and hiring individuals; competitive considerations in the relevant labor market; competitive global workforce; competitive hiring markets; competitive in the marketplace; competitive job market; competitive job markets; competitive labor market; competitive labor markets; competitive market for hiring; competitive market for production labor; competitive nature of the labor markets; competitive or successful in our recruiting efforts; competitive pressures we experience with respect to employees; competitor would attempt to hire; competitors have directly targeted our employees; competitors have targeted hiring our employees; competitors have targeted individuals; competitors may try to recruit; competitors may use aggressive tactics to recruit; competitors periodically target our employees; competitors who may seek to recruit; competitors, may be successful in recruiting; competitors' hiring; employee turnover rates due to such competition; employees accept positions with competitors; employees are attractive targets for new and existing competitors; employees in a competitive marketplace; employees who work for our competitors from joining us; hired by competitors; hiring by our competitors; hiring practices of our competitors; individuals we seek to hire are highly sought after by our competitors; intense competition for our personnel from our competitors; join a competitor; join an existing competitor; join competitors; joins a competitor; joins one of our competitors; labor in our industry remains highly competitive; labor market in the U.S. and globally is very competitive; labor market in the United States is very competitive; labor market is highly competitive; market-competitive employment; personnel for whom competition; personnel from competitors; personnel is extremely competitive; personnel will not leave or compete with us; recruited by competitors; recruited by our competitors; recruitment by competitors; result in such colleagues competing against us; retain personnel in a competitive marketplace; staff, which are broadly sought after by our competitors; work for a competitor; work for our competitors.

Compensation and benefits: benefit packages to be competitive in the marketplace; benefit programs are competitive for the markets in which we operate; benefits and workplace conditions to remain competitive; benefits package is designed to be competitive; benefits packages are competitive; benefits that are competitive; compensate our employees competitively; compensation against the market to ensure it remains competitive; compensation and benefits that we believe are competitive; compensation costs amid highly competitive; compensation is generally positioned within a competitive range of the market median; compensation package and benefits are competitive; compensation packages are competitive; compensation programs may not be competitive; compensation structures based on competitive market data; compensation that compare favorably with those of our principal competitors; compensation that is competitive; compensation that we believe is competitive; competitive 401(k) matching program; competitive 401(k) retirement plan; competitive and comprehensive benefit packages; competitive and equitable reward programs; competitive and equitable total rewards; competitive annual salaries; competitive approach to compensation; competitive base pay; competitive base salaries; competitive benefit packages; competitive benefits; competitive broad-based equity compensation; competitive compensation; competitive compensation and benefit; competitive compensation and benefits; competitive compensation and comprehensive benefits;

competitive compensation, benefits; competitive employee benefits; competitive equity incentive compensation to our key employees; competitive fellowship program; competitive financial benefits; competitive health and welfare benefits; competitive health and wellness benefits; competitive health care benefits; competitive holiday; competitive hourly rates; competitive levels of cash compensation; competitive levels of compensation; competitive market pay; competitive medical, dental, vision, life and long term disability programs; competitive medical, welfare and retirement programs; competitive monetary benefits, retirement benefits; competitive overall benefits; competitive pay and benefit programs; competitive pay and benefits; competitive pay and comprehensive benefits; competitive pay packages; competitive pay, benefits; competitive pay/benefits; competitive range of compensation and benefit; competitive retirement plans; competitive salaries; competitive salaries and benefits; competitive salaries/compensation; competitive salary; competitive salary and benefit; competitive total compensation; competitive total direct compensation; competitive total rewards; competitive total target compensation; competitive wage; competitive wages; competitive wages, benefits; competitive with our total rewards; competitive, and aligned to what is important for our employees; competitive, comprehensive benefits; competitive, customizable benefits; competitive, fair and transparent compensation; competitive, performance-based compensation; competitively compensate; competitiveness and fairness of our packages; competitiveness of compensation; competitiveness of our benefits programs; competitiveness of our compensation; competitiveness of our compensation and benefit package; competitiveness of our compensation and benefits; competitiveness of our employee value proposition; competitor salaries; competitors in compensation; competitors may be able to offer better compensation; competitors use equity incentives; competitors, including a generous benefits package; competitors' compensation; employees through competitive industry pay, benefits; employees with competitive and equitable pay; employment terms competitive with the rest of the market; employment terms that are competitive; healthcare options offer competitive; hiring remote working employees by our competitors; if our total compensation package is not viewed as being competitive; increasingly competitive wage; make competitive offers within the range to candidates; market competitiveness of our incentive programs; market-competitive benefits; market-competitive pay; market-competitive pay and benefits; market-competitive salary; offer competitive employee retirement and health care benefits; paid equitably and competitively for the work; pay is competitive; pay levels are competitive; pay that is competitive; paying competitively; rewards are designed to be market competitive; rewards are intended to be competitive; rewards that are market-competitive; salaries to ensure we are competitive; salary, which is competitively evaluated annually; wages paid by competing employers; wages that are competitive for the position; workplace culture cease to be viewed as competitive.

Flexible hours: employee flexible workweek; flexible hour policy; a flexible approach to help our employees manage their work; a flexible approach to how and where we work; adapting our approach to individual circumstances; adjustable work hours; adjusted shift schedules; adjusted work schedules; benefits, mobility and flexibility; compressed work weeks; compressed workweeks; custom work hours; customizable schedules; customizable work schedules; customizable working hours; employee flexible hours; employee flexible scheduling; employee schedule autonomy; employee scheduling flexibility; employee shift flexibility; employee time flexibility; employee work-life balance; flex program; flex their time; flex time; flexibility in assigning work; flexibility in scheduling; flexibility in work hours; flexibility policies and programs; flexibility related to work location, work site, and work hours; flexibility to balance their work; flexibility to design an in-office schedule; flexibility with respect to when and where work; flexible and adjustable workspace; flexible and remote working; flexible approach to help our employees manage their work and personal responsibilities; flexible approach to traditional office; flexible employee hours; flexible employment hours; flexible hour arrangements; flexible hours; flexible hybrid working arrangements; flexible job schedules; flexible programs that our global colleagues and their families can count on; flexible reduced work schedules; flexible schedule; flexible schedules; flexible scheduling; flexible scheduling options; flexible shift schedules; flexible shift work; flexible start times; flexible summer month; flexible time away; flexible time off; flexible time options; flexible way of work; flexible work; flexible work arrangements; flexible work environment; flexible work hours; flexible work policies; flexible work schedules; flexible work shifts; flexible workday options; flexible workday schedules; flexible working; flexible working arrangements; flexible working hours; flexible working models; flexible working policies; flexible work-life; flexible workplace; flexible workplaces; flexible workweek arrangements; flexible workweek hours; flexible, hybrid; flexible, virtual work; flextime; flex-time options; J&J Flex, a hybrid model that empowers our office-based employees to find the right productivity and balance; make adjustments to an employee's daily work hours; modified work schedules; new way of working is providing the flexibility they need; part-time work opportunities for new parents or team members transitioning to retirement; part-time work options; personalized work schedules; provide employees with more flexibility; provide flexibility at work, including modified work arrangements and schedules; provides employees with flexibility; shortened workweek; staggered hours; staggered shift times; staggered work schedules; staggered work shifts; staggered workdays; staggering shifts; staggering staff and shifts; staggering start and finish times; staggering work schedules; work and creating a flexible, agile model for roles; work flexibility; work flexibility options; work flexibly; work hour customization; work hour flexibility; work schedule autonomy; work schedule customization; work schedule flexibility; work schedule that better fits the diverse demands of today's work environment; work time flexibility; working model, thoughtfully balancing the demand for flexibility; work-life balance and flexibility; work-life flexibility; workplace flexibility.

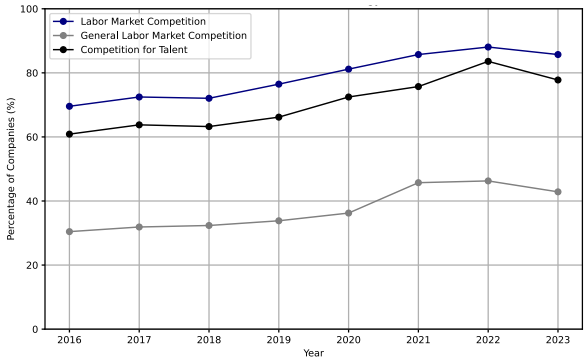
Telecommuting: adjusted our onsite work policy; anchor flex; benefits, mobility and flexibility; digital workspace solutions; employee remote access; employee remote support; flex place; flexibility in work location; flexibility related to work location; flexibility related to work site; flexibility with respect to when and where work; flexible location; flexible work arrangements; flexible work policies; flexible working policies; flexible, hybrid; home arrangements; home office equipment; home office setup; home-based; hybrid; hybrid first; hybrid first approach; hybrid model; hybrid remote/office; hybrid schedule; hybrid ways of working; hybrid work; hybrid work model; hybrid working; location flexibility; office and home; office-flexible; off-site work; onsite, hybrid and remote; onsite,remote or hybrid; remote access solutions; remote and flexible working arrangements; remote collaboration tools; remote office; remote or hybrid; remote setting; remote work; remote work arrangements; remote work benefits; remote work challenges; remote work environment; remote work flexibility; remote work guidelines; remote work infrastructure; remote work opportunities; remote work policy; remote work practices; remote work security; remote work strategy; remote work support; remote work technology; remote workdays; remote workforce management; remote working; support more virtual meetings; telecommuting; telecommuting opportunities; telecommuting options; telecommuting policies; telework policy updates; teleworking; virtual communication platforms; virtual meeting platforms; virtual team building; virtual team collaboration; virtual team meetings; virtual work; virtual work environment; work experience that was largely away from the office; work from a job-appropriate location of their choice; work from alternate locations; work from home; work fully remote; work offsite; work remote; work remotely; work-from home; work-from-home; work-from-home benefits; work-from-home guidelines; working from home; working remotely.

Relaxation or stress relief activities: access to licensed professional counselors; address mental health, stress; address the related anxiety and mental health stress; assistance with stress management, relationships; balance their work; balancing their personal life; behavioral health; burnout; cope with stress, anxiety; coping with stress, feelings of isolation, and anxiety; crisis support; dealing with stress and anxiety management through resiliency; de-stress; disconnect and recharge; ease; employee assistance programs; employee counseling services; employee mental care; employee mental health; employee mental support; employee mental wellness; employee mindfulness programs; employee relaxation spaces; employee resilience programs; employee stress reduction; employee well-being initiatives; employee well-being support; employee wellness programs; fatigue; free and confidential support services for a multitude of issues, such as legal, family/marital, and stress/anxiety; fun; happiness; happy; help employees and their dependents through times of stress and anxiety; help employees cope with stress; help our team members mitigate stressors; help with burnout, stress, depression, anxiety; help with stress management and resiliency; joy; manage anxiety, depression, stress, sleep; manage stress and encourage movement; manage stress, build resiliency; managing stress and well-being; managing stress and work/life balance; meditation; mental; mental health; mental health and wellness; mental health awareness; mental health benefits; mental health care; mental health care support; mental health days; mental health initiatives; mental health issues; mental health issues and stress; mental health policies; mental health resources; mental health services; mental health strategies; mental health support; mental health workshops; mental wellness resources; mindfulness; mindfulness at work; non-stressful work; personal life; prioritize themselves; protect against heightened stress; reduce business-travel stress; relax; relaxation and mindfulness; relaxation techniques; relaxed work environment; resilience and stress management programs; stress management programs; stress management resources; stress management workshops; stress reduction; stress reduction initiatives; stress reduction strategies; stress relief activities; stress/anxiety; stress-free work environment; supportive work environment; supportive workplace culture; take a break; take a break from work; therapists trained in journalist occupational culture, stressors and resilience factors; unplug; unwind; well being; wellbeing; well-being; well-being packages; well-being programs; wellness; wellness and relaxation; without personal stress; without worry of coming back; working through stressful times; work-life balance; workplace mental health; workplace mental wellness; workplace relaxation programs; workplace relaxation spaces; workplace stress management; workplace wellness initiatives.

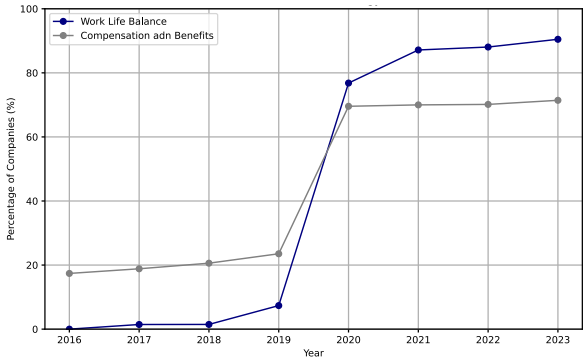
Paid time off: accrued paid time; accrued vacation time; bereavement leave; day off; days off; employee holiday leave; employee leave benefits; employee leave policy; employee paid time; employee pto balance; employee pto policy; employee time off; employee vacation days; encouraged employees to take time away from work; encouraging people to step away from their screens; family leave; holiday; holiday time off; leave of absence; leave plans; leave policy updates; paid bereavement leave; paid family leave; paid holiday leave; paid holiday time; paid leave benefits; paid leave entitlement; paid leave options; paid leave policy; paid leave requests; paid maternity leave; paid parental leave; paid personal days; paid personal time; paid sick days; paid sick leave; paid time accrual; paid time away from work; paid time benefits; paid time entitlement; paid time off; paid time off days; paid time policies; paid time policy; paid time-off; paid time-off policies; paid vacation days; paid vacation policy; paid week of time off; parental and adoption leave; parental leave; pto; pto accrual policy; pto accrual rates; pto balance check; pto leave requests; pto policy details; pto policy updates; sick leave policy; time away benefits; time off benefits; time off policy; time-off; vacation; vacation leave policy; vacation time; vacation time off; vacation/holiday.

Online Appendix Fig. 1. The annual percentages of firms referencing competition for talented workers or general labor, compensation and benefits, and work-life balance amenities in their 10-K filings in the **Information Technology industry**. Subfigure 1a shows, by year, the percentage of firms referencing competition for talent (in black), general labor market competition (in grey), and either type, i.e., the union of the two (in blue). Subfigure 1b shows, by year, the percentage of firms referencing work-life balance amenities (in blue) versus the compensation and benefits (in grey). Subfigure 1c shows, by year, the percentage of firms referencing flexible hours (in red), telecommuting (in green), relaxation or stress relief activities (in blue), and paid time off (in orange). Subfigure 1d shows, by year (in blue), the conditional percentage of firms that reference work-life balance amenities, given that they reference competition for talented workers.

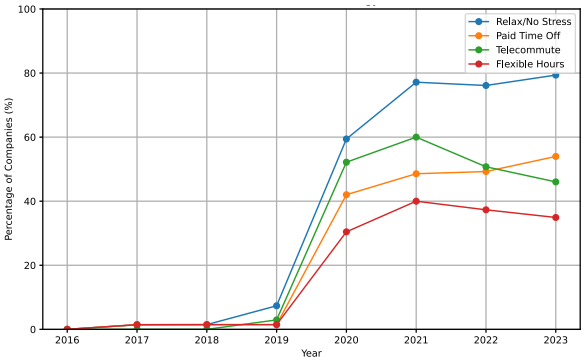
(a) The percentage of firms referencing competition for general or talented workers by year in the **Information Technology industry**



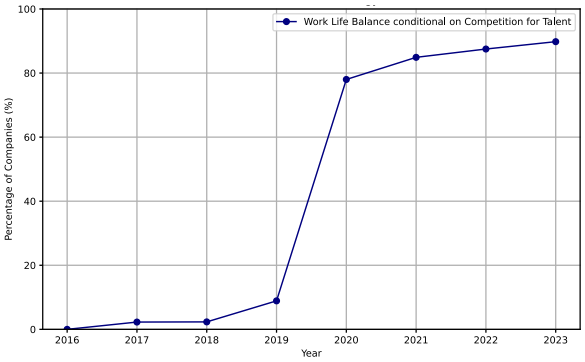
(b) The percentage of firms referencing compensation and benefits versus work-life balance amenities over time in the **Information Technology industry**



(c) The percentage of firms referencing specific work-life balance amenities by year in the **Information Technology industry**

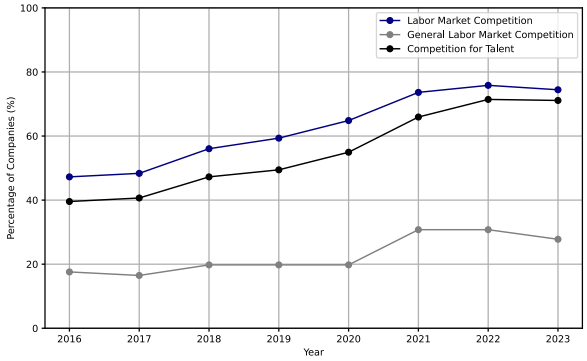


(d) The percentage of firms referencing work-life balance amenities, conditional on referencing competition for talented workers, by year in the **Information Technology industry**

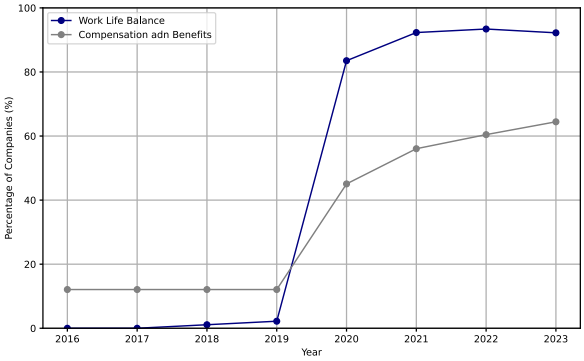


Online Appendix Fig. 2. The annual percentages of firms referencing competition for talented workers or general labor, compensation and benefits, and work-life balance amenities in their 10-K filings in the **Financials industry**. Subfigure 2a shows, by year, the percentage of firms referencing competition for talent (in black), general labor market competition (in grey), and either type, i.e., the union of the two (in blue). Subfigure 2b shows, by year, the percentage of firms referencing work-life balance amenities (in blue) versus the compensation and benefits (in grey). Subfigure 2c shows, by year, the percentage of firms referencing flexible hours (in red), telecommuting (in green), relaxation or stress relief activities (in blue), and paid time off (in orange). Subfigure 2d shows, by year (in blue), the conditional percentage of firms that reference work-life balance amenities, given that they reference competition for talented workers.

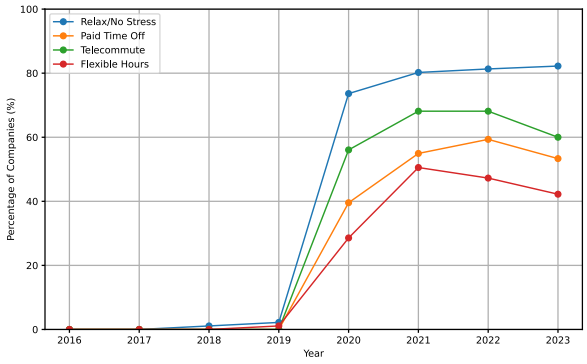
(a) The percentage of firms referencing competition for general or talented workers by year in the **Financials industry**



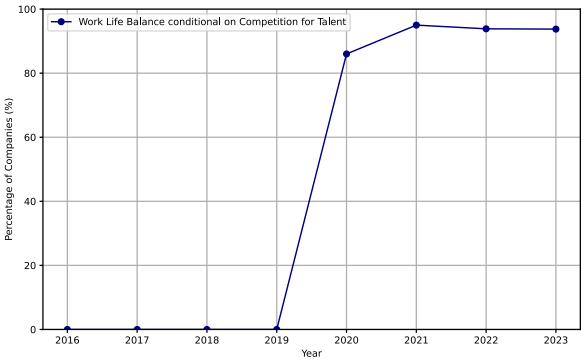
(b) The percentage of firms referencing compensation and benefits versus work-life balance amenities over time in the **Financials industry**



(c) The percentage of firms referencing specific work-life balance amenities by year in the **Financials industry**

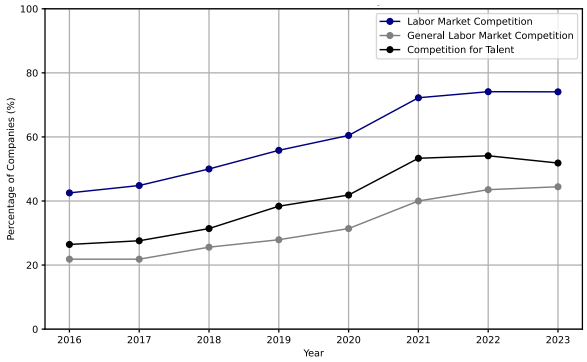


(d) The percentage of firms referencing work-life balance amenities, conditional on referencing competition for talented workers, by year in the **Financials industry**

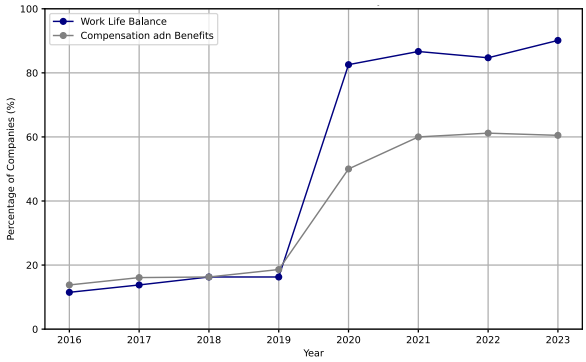


Online Appendix Fig. 3. The annual percentages of firms referencing competition for talented workers or general labor, compensation and benefits, and work-life balance amenities in their 10-K filings in the **Consumer Discretionary industry**. Subfigure 3a shows, by year, the percentage of firms referencing competition for talent (in black), general labor market competition (in grey), and either type, i.e., the union of the two (in blue). Subfigure 3b shows, by year, the percentage of firms referencing work-life balance amenities (in blue) versus the compensation and benefits (in grey). Subfigure 3c shows, by year, the percentage of firms referencing flexible hours (in red), telecommuting (in green), relaxation or stress relief activities (in blue), and paid time off (in orange). Subfigure 3d shows, by year (in blue), the conditional percentage of firms that reference work-life balance amenities, given that they reference competition for talented workers.

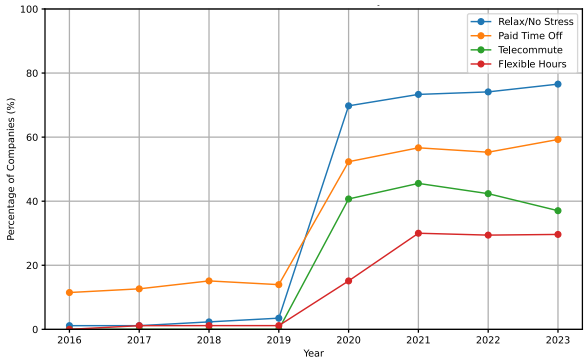
(a) The percentage of firms referencing competition for general or talented workers by year in the **Consumer Discretionary industry**



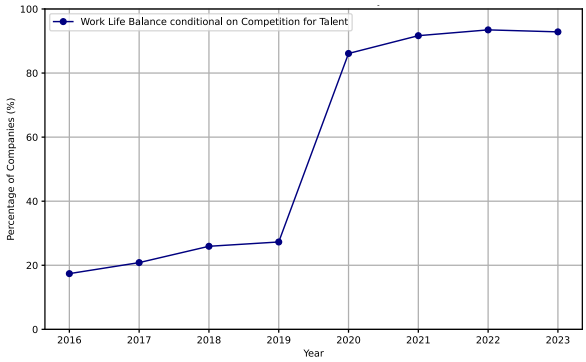
(b) The percentage of firms referencing compensation and benefits versus work-life balance amenities over time in the **Consumer Discretionary industry**



(c) The percentage of firms referencing specific work-life balance amenities by year in the **Consumer Discretionary industry**

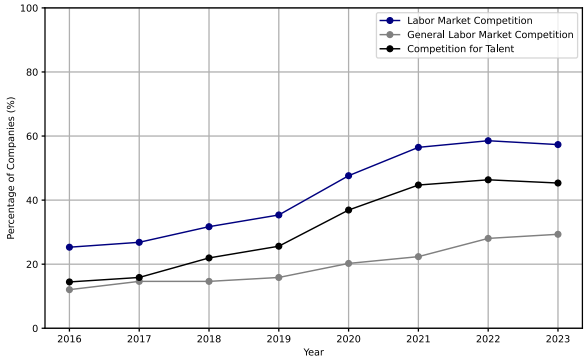


(d) The percentage of firms referencing work-life balance amenities, conditional on referencing competition for talented workers, by year in the **Consumer Discretionary industry**

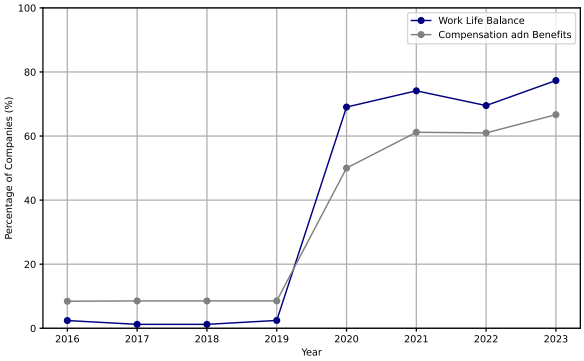


Online Appendix Fig. 4. The annual percentages of firms referencing competition for talented workers or general labor, compensation and benefits, and work-life balance amenities in their 10-K filings in the **Industrials industry**. Subfigure 4a shows, by year, the percentage of firms referencing competition for talent (in black), general labor market competition (in grey), and either type, i.e., the union of the two (in blue). Subfigure 4b shows, by year, the percentage of firms referencing work-life balance amenities (in blue) versus the compensation and benefits (in grey). Subfigure 4c shows, by year, the percentage of firms referencing flexible hours (in red), telecommuting (in green), relaxation or stress relief activities (in blue), and paid time off (in orange). Subfigure 4d shows, by year (in blue), the conditional percentage of firms that reference work-life balance amenities, given that they reference competition for talented workers.

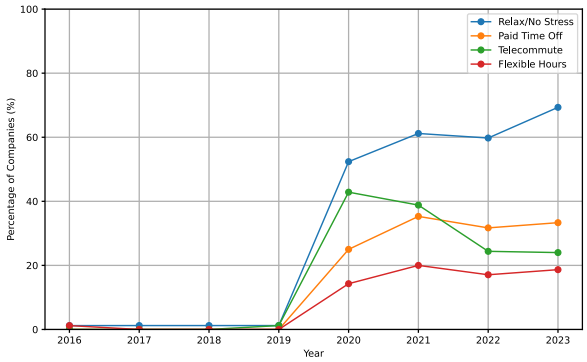
(a) The percentage of firms referencing competition for general or talented workers by year in the **Industrials industry**



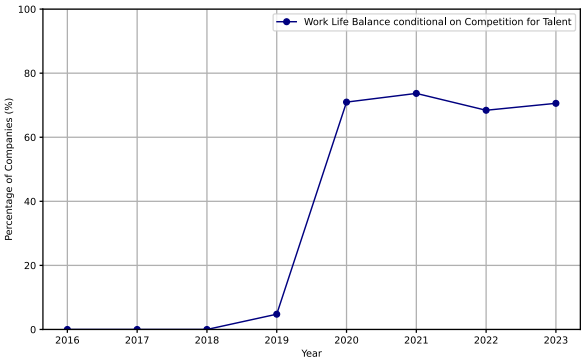
(b) The percentage of firms referencing compensation and benefits versus work-life balance amenities over time in the **Industrials industry**



(c) The percentage of firms referencing specific work-life balance amenities by year in the **Industrials industry**

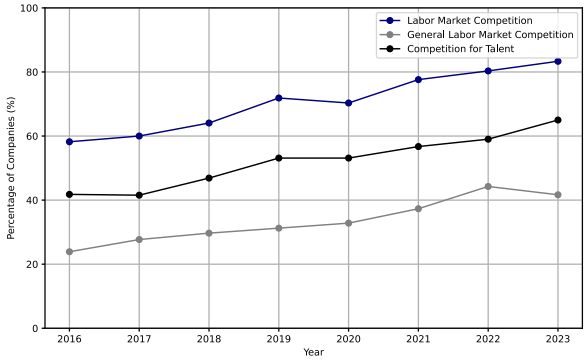


(d) The percentage of firms referencing work-life balance amenities, conditional on referencing competition for talented workers, by year in the **Industrials industry**

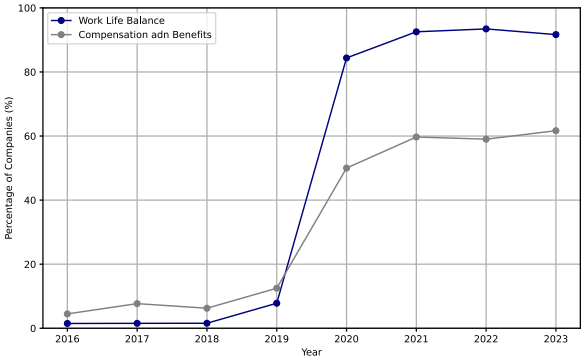


Online Appendix Fig. 5. The annual percentages of firms referencing competition for talented workers or general labor, compensation and benefits, and work-life balance amenities in their 10-K filings in the **Health Care industry**. Subfigure 5a shows, by year, the percentage of firms referencing competition for talent (in black), general labor market competition (in grey), and either type, i.e., the union of the two (in blue). Subfigure 5b shows, by year, the percentage of firms referencing work-life balance amenities (in blue) versus the compensation and benefits (in grey). Subfigure 5c shows, by year, the percentage of firms referencing flexible hours (in red), telecommuting (in green), relaxation or stress relief activities (in blue), and paid time off (in orange). Subfigure 5d shows, by year (in blue), the conditional percentage of firms that reference work-life balance amenities, given that they reference competition for talented workers.

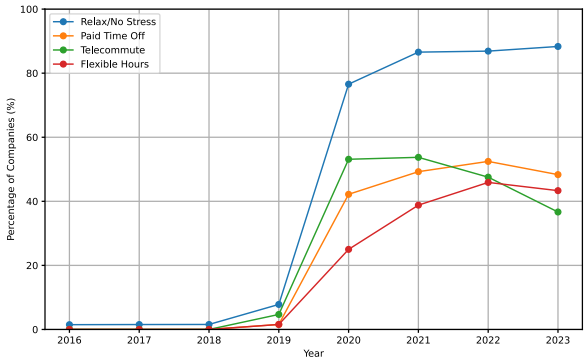
(a) The percentage of firms referencing competition for general or talented workers by year in the **Health Care industry**



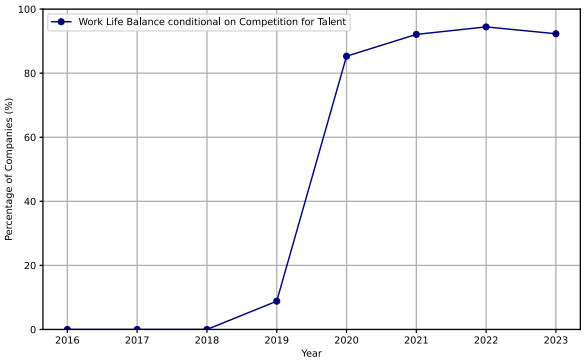
(b) The percentage of firms referencing compensation and benefits versus work-life balance amenities over time in the **Health Care industry**



(c) The percentage of firms referencing specific work-life balance amenities by year in the **Health Care industry**

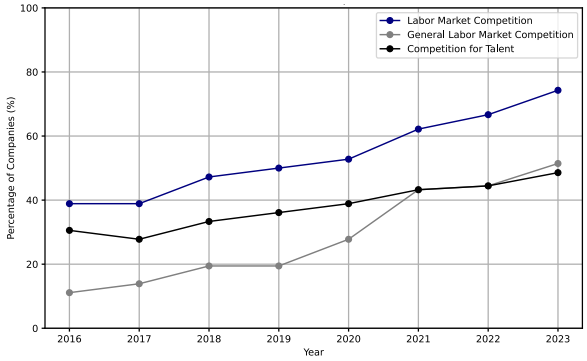


(d) The percentage of firms referencing work-life balance amenities, conditional on referencing competition for talented workers, by year in the **Health Care industry**

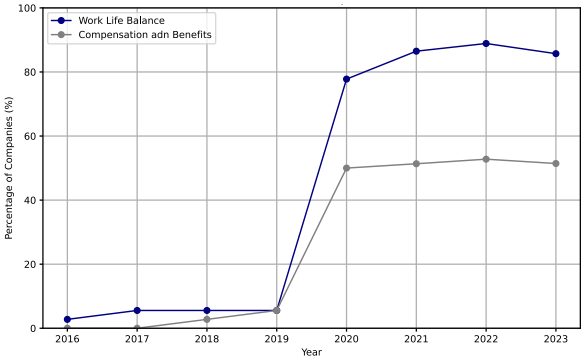


Online Appendix Fig. 6. The annual percentages of firms referencing competition for talented workers or general labor, compensation and benefits, and work-life balance amenities in their 10-K filings in the **Consumer Staples industry**. Subfigure 6a shows, by year, the percentage of firms referencing competition for talent (in black), general labor market competition (in grey), and either type, i.e., the union of the two (in blue). Subfigure 6b shows, by year, the percentage of firms referencing work-life balance amenities (in blue) versus the compensation and benefits (in grey). Subfigure 6c shows, by year, the percentage of firms referencing flexible hours (in red), telecommuting (in green), relaxation or stress relief activities (in blue), and paid time off (in orange). Subfigure 6d shows, by year (in blue), the conditional percentage of firms that reference work-life balance amenities, given that they reference competition for talented workers.

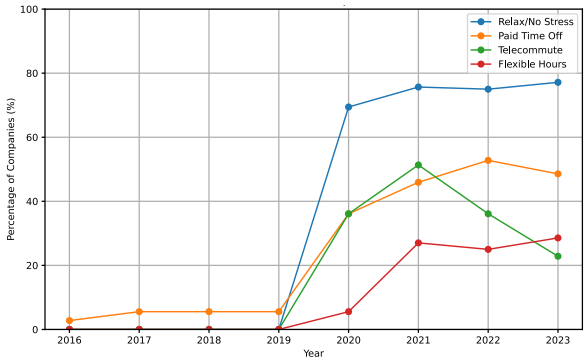
(a) The percentage of firms referencing competition for general or talented workers by year in the **Consumer Staples industry**



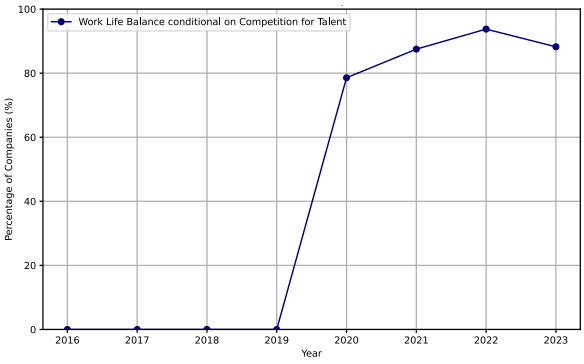
(b) The percentage of firms referencing compensation and benefits versus work-life balance amenities over time in the **Consumer Staples industry**



(c) The percentage of firms referencing specific work-life balance amenities by year in the **Consumer Staples industry**

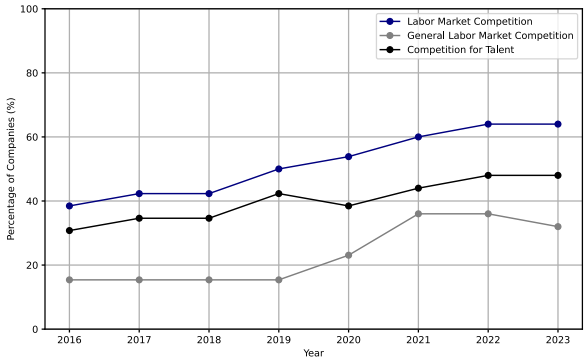


(d) The percentage of firms referencing work-life balance amenities, conditional on referencing competition for talented workers, by year in the **Consumer Staples industry**

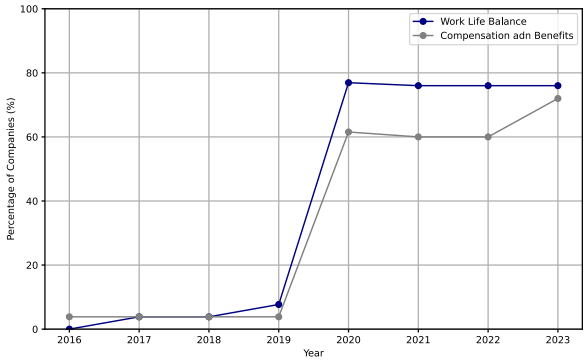


Online Appendix Fig. 7. The annual percentages of firms referencing competition for talented workers or general labor, compensation and benefits, and work-life balance amenities in their 10-K filings in the **Communication Services industry**. Subfigure 7a shows, by year, the percentage of firms referencing competition for talent (in black), general labor market competition (in grey), and either type, i.e., the union of the two (in blue). Subfigure 7b shows, by year, the percentage of firms referencing work-life balance amenities (in blue) versus the compensation and benefits (in grey). Subfigure 7c shows, by year, the percentage of firms referencing flexible hours (in red), telecommuting (in green), relaxation or stress relief activities (in blue), and paid time off (in orange). Subfigure 7d shows, by year (in blue), the conditional percentage of firms that reference work-life balance amenities, given that they reference competition for talented workers.

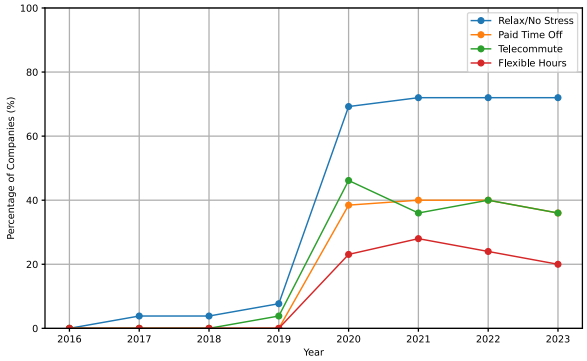
(a) The percentage of firms referencing competition for general or talented workers by year in the **Communication Services industry**



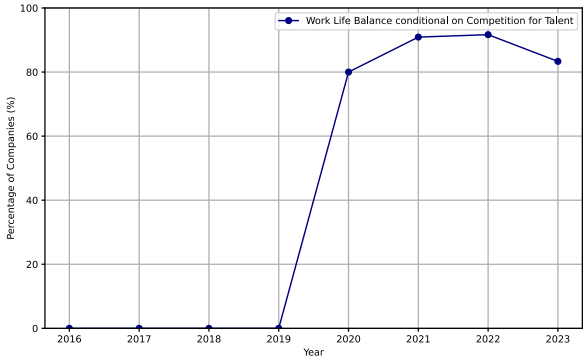
(b) The percentage of firms referencing compensation and benefits versus work-life balance amenities over time in the **Communication Services industry**



(c) The percentage of firms referencing specific work-life balance amenities by year in the **Communication Services industry**

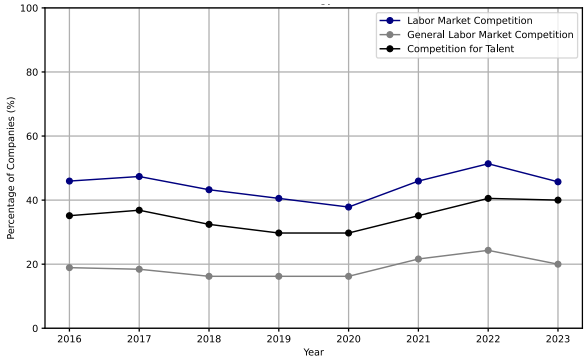


(d) The percentage of firms referencing work-life balance amenities, conditional on referencing competition for talented workers, by year in the **Communication Services industry**

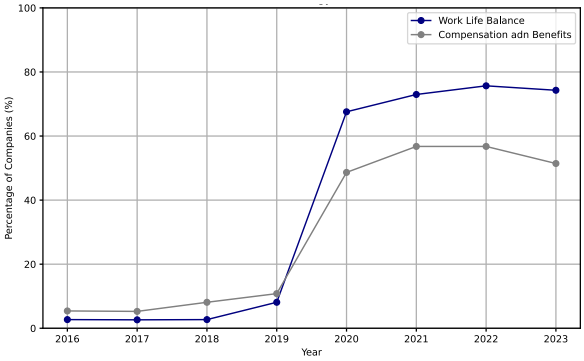


Online Appendix Fig. 8. The annual percentages of firms referencing competition for talented workers or general labor, compensation and benefits, and work-life balance amenities in their 10-K filings in the **Energy industry**. Subfigure 8a shows, by year, the percentage of firms referencing competition for talent (in black), general labor market competition (in grey), and either type, i.e., the union of the two (in blue). Subfigure 8b shows, by year, the percentage of firms referencing work-life balance amenities (in blue) versus the compensation and benefits (in grey). Subfigure 8c shows, by year, the percentage of firms referencing flexible hours (in red), telecommuting (in green), relaxation or stress relief activities (in blue), and paid time off (in orange). Subfigure 8d shows, by year (in blue), the conditional percentage of firms that reference work-life balance amenities, given that they reference competition for talented workers.

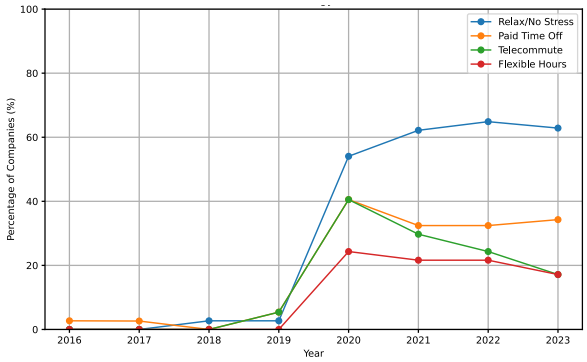
(a) The percentage of firms referencing competition for general or talented workers by year in the **Energy industry**



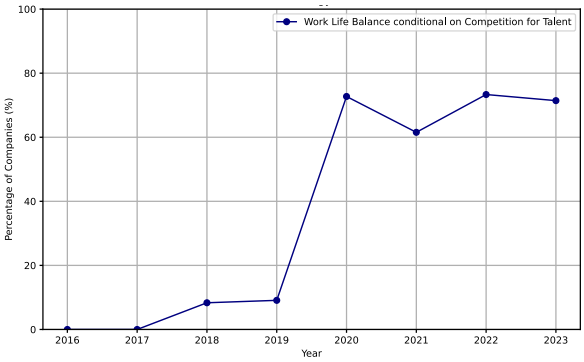
(b) The percentage of firms referencing compensation and benefits versus work-life balance amenities over time in the **Energy industry**



(c) The percentage of firms referencing specific work-life balance amenities by year in the **Energy industry**

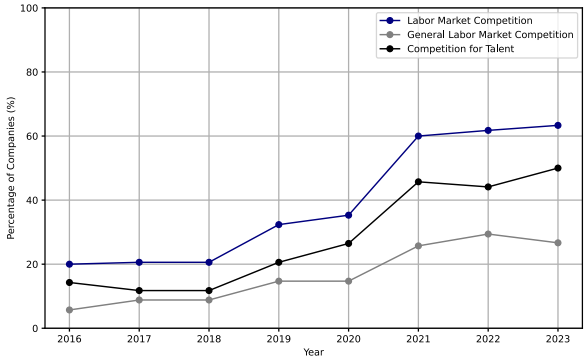


(d) The percentage of firms referencing work-life balance amenities, conditional on referencing competition for talented workers, by year in the **Energy industry**

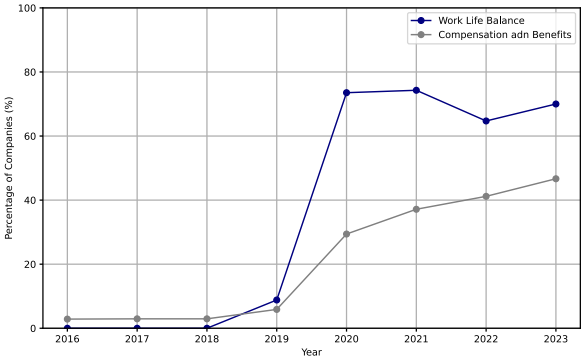


Online Appendix Fig. 9. The annual percentages of firms referencing competition for talented workers or general labor, compensation and benefits, and work-life balance amenities in their 10-K filings in the **Materials industry**. Subfigure 9a shows, by year, the percentage of firms referencing competition for talent (in black), general labor market competition (in grey), and either type, i.e., the union of the two (in blue). Subfigure 9b shows, by year, the percentage of firms referencing work-life balance amenities (in blue) versus the compensation and benefits (in grey). Subfigure 9c shows, by year, the percentage of firms referencing flexible hours (in red), telecommuting (in green), relaxation or stress relief activities (in blue), and paid time off (in orange). Subfigure 9d shows, by year (in blue), the conditional percentage of firms that reference work-life balance amenities, given that they reference competition for talented workers.

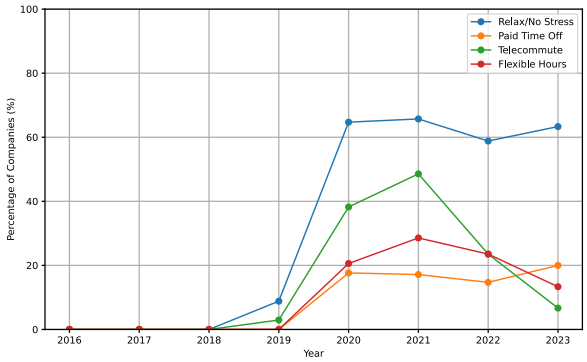
(a) The percentage of firms referencing competition for general or talented workers by year in the **Materials industry**



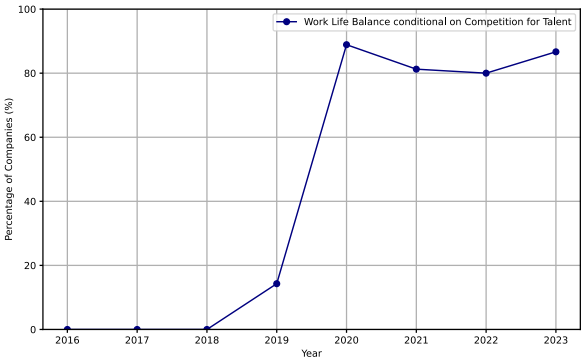
(b) The percentage of firms referencing compensation and benefits versus work-life balance amenities over time in the **Materials industry**



(c) The percentage of firms referencing specific work-life balance amenities by year in the **Materials industry**

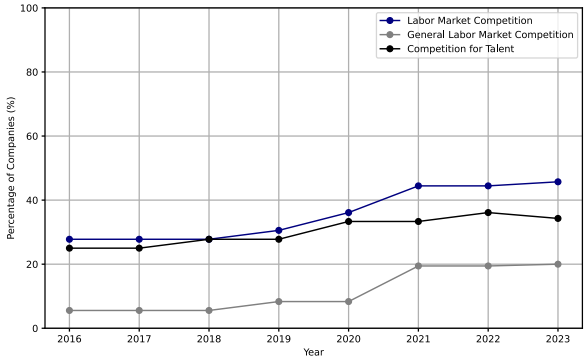


(d) The percentage of firms referencing work-life balance amenities, conditional on referencing competition for talented workers, by year in the **Materials industry**

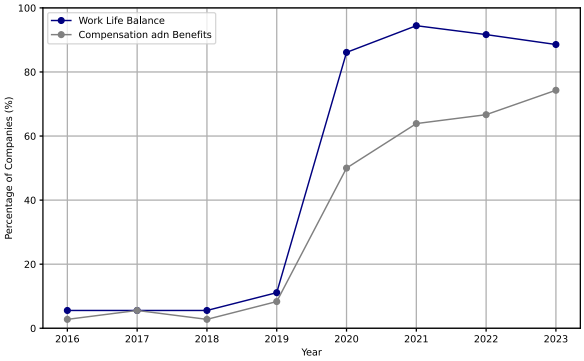


Online Appendix Fig. 10. The annual percentages of firms referencing competition for talented workers or general labor, compensation and benefits, and work-life balance amenities in their 10-K filings in the **Real Estate industry**. Subfigure 10a shows, by year, the percentage of firms referencing competition for talent (in black), general labor market competition (in grey), and either type, i.e., the union of the two (in blue). Subfigure 10b shows, by year, the percentage of firms referencing work-life balance amenities (in blue) versus the compensation and benefits (in grey). Subfigure 10c shows, by year, the percentage of firms referencing flexible hours (in red), telecommuting (in green), relaxation or stress relief activities (in blue), and paid time off (in orange). Subfigure 10d shows, by year (in blue), the conditional percentage of firms that reference work-life balance amenities, given that they reference competition for talented workers.

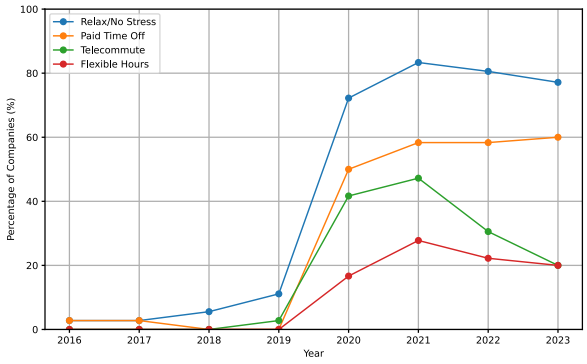
(a) The percentage of firms referencing competition for general or talented workers by year in the **Real Estate industry**



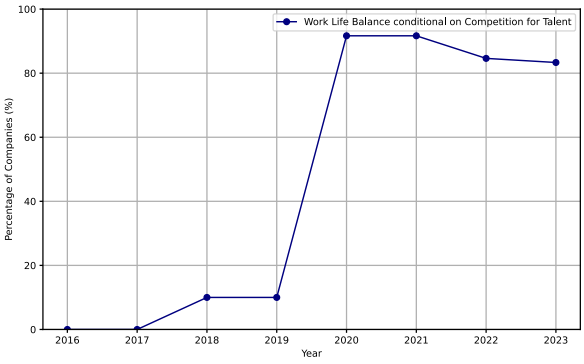
(b) The percentage of firms referencing compensation and benefits versus work-life balance amenities over time in the **Real Estate industry**



(c) The percentage of firms referencing specific work-life balance amenities by year in the **Real Estate industry**

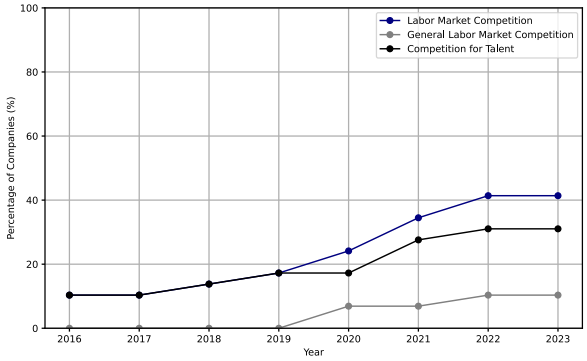


(d) The percentage of firms referencing work-life balance amenities, conditional on referencing competition for talented workers, by year in the **Real Estate industry**

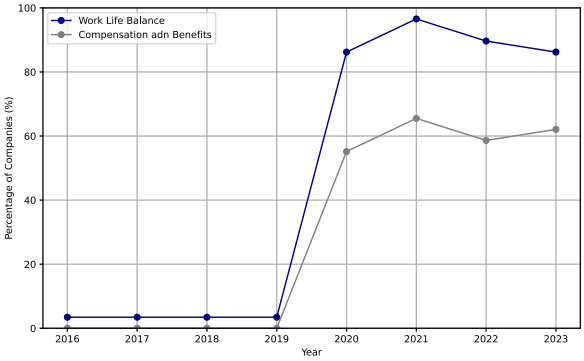


Online Appendix Fig. 11. The annual percentages of firms referencing competition for talented workers or general labor, compensation and benefits, and work-life balance amenities in their 10-K filings in the **Utilities industry**. Subfigure 11a shows, by year, the percentage of firms referencing competition for talent (in black), general labor market competition (in grey), and either type, i.e., the union of the two (in blue). Subfigure 11b shows, by year, the percentage of firms referencing work-life balance amenities (in blue) versus the compensation and benefits (in grey). Subfigure 11c shows, by year, the percentage of firms referencing flexible hours (in red), telecommuting (in green), relaxation or stress relief activities (in blue), and paid time off (in orange). Subfigure 11d shows, by year (in blue), the conditional percentage of firms that reference work-life balance amenities, given that they reference competition for talented workers.

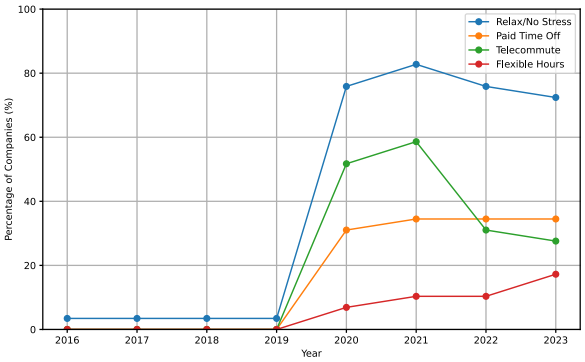
(a) The percentage of firms referencing competition for general or talented workers by year in the **Utilities industry**



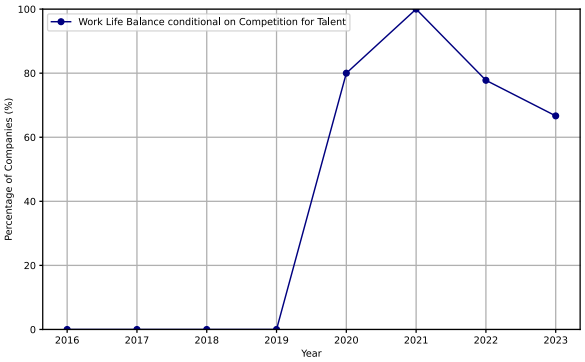
(b) The percentage of firms referencing compensation and benefits versus work-life balance amenities over time in the **Utilities industry**



(c) The percentage of firms referencing specific work-life balance amenities by year in the **Utilities industry**



(d) The percentage of firms referencing work-life balance amenities, conditional on referencing competition for talented workers, by year in the **Utilities industry**



Online Appendix Table B1

The selected top occupations in the Information Technology industry

This table depicts the selected top occupations in the Information Technology industry.

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rank	Title of Occupation	Number of Reviews	Relative Frequency (%)	Cumulative Relative Frequency (%)	Selected	Re-scaled Relative Frequency (%)
1	software engineer	72,385	14.5	14.5	✓	28.9
2	consultant	15,896	3.2	17.7	✓	6.4
3	engineer	14,316	2.9	20.6	✓	5.7
4	program manager	13,376	2.7	23.3	✓	5.3
5	manager	11,847	2.4	25.7	✓	4.7
6	project manager	11,123	2.2	27.9	✓	4.4
7	software developer	9,328	1.9	29.8	✓	3.7
8	product manager	8,529	1.7	31.5	✓	3.4
9	software engineer in test	7,794	1.6	33.1	✓	3.1
10	systems analyst	7,776	1.6	34.7	✓	3.1
11	systems engineer	7,564	1.5	36.2	✓	3
12	account executive	7,230	1.4	37.6	✓	2.9
13	business analyst	7,157	1.4	39	✓	2.9
14	sales representative	6,865	1.4	40.4	✓	2.7
15	design engineer	6,860	1.4	41.8	✓	2.7
16	applications engineer	6,836	1.4	43.2	✓	2.7
17	account manager	6,680	1.3	44.5	✓	2.7
18	management consultant	6,367	1.3	45.8	✓	2.5
19	analyst	5,898	1.2	47	✓	2.4
20	process engineer	5,782	1.2	48.2	✓	2.3
21	hardware engineer	5,334	1.1	49.3	✓	2.1
22	director	5,196	1	50.3	✓	2.1
23	associate	4,659	0.9	51.2		
24	financial analyst	4,482	0.9	52.1		
25	marketing manager	4,419	0.9	53		
26	enterprise architect	4,292	0.9	53.9		
27	sales engineer	3,884	0.8	54.7		
28	technical support engineer	3,857	0.8	55.5		
29	customer service representative	3,370	0.7	56.2		
30	business development associate	3,123	0.6	56.8		
31	programmer analyst	3,121	0.6	57.4		
32	product marketing manager	2,919	0.6	58		
33	sales manager	2,591	0.5	58.5		
34	data scientist	2,574	0.5	59		
35	business development manager	2,527	0.5	59.5		
...	...	...	...	...		
	Total	498,741	100	-		100

Online Appendix Table B2

The selected top occupations in the Financials industry

This table depicts the selected top occupations in the Financials industry.

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rank	Title of Occupation	Number of Reviews	Relative Frequency (%)	Cumulative Relative Frequency (%)	Selected	Re-scaled Relative Frequency (%)
1	software engineer	16,816	4	4	✓	9.3
2	analyst	15,928	3.7	7.7	✓	8.8
3	senior leader	15,068	3.5	11.2	✓	8.3
4	customer service representative	14,044	3.3	14.5	✓	7.7
5	personal banker	13,697	3.2	17.7	✓	7.5
6	business analyst	10,434	2.5	20.2	✓	5.7
7	associate	10,200	2.4	22.6	✓	5.6
8	financial analyst	8,015	1.9	24.5	✓	4.4
9	manager	7,355	1.7	26.2	✓	4
10	teller	7,164	1.7	27.9	✓	3.9
11	claims adjuster	7,016	1.6	29.5	✓	3.9
12	director	6,608	1.6	31.1	✓	3.6
13	project manager	6,594	1.6	32.7	✓	3.6
14	branch manager	6,025	1.4	34.1	✓	3.3
15	sales representative	5,909	1.4	35.5	✓	3.3
16	underwriter	5,586	1.3	36.8	✓	3.1
17	relationship banker	5,520	1.3	38.1	✓	3
18	product manager	5,473	1.3	39.4	✓	3
19	operations manager	5,123	1.2	40.6	✓	2.8
20	customer relationship manager	4,729	1.1	41.7	✓	2.6
21	financial advisor	4,459	1	42.7	✓	2.5
22	consultant	3,861	0.9	43.6		
23	account manager	3,819	0.9	44.5		
24	operations analyst	3,582	0.8	45.3		
25	risk manager	3,496	0.8	46.1		
26	data analyst	3,408	0.8	46.9		
27	finance manager	3,245	0.8	47.7		
28	credit analyst	3,193	0.8	48.5		
29	administrative assistant	3,180	0.7	49.2		
30	investment banking analyst	3,072	0.7	49.9		
31	software developer	2,959	0.7	50.6		
32	client representative	2,790	0.7	51.3		
33	banker	2,753	0.6	51.9		
34	accountant	2,723	0.6	52.5		
35	client services representative	2,608	0.6	53.1		
...	...	...	...	...		
	Total	425,411	100	-		100

Online Appendix Table B3

The selected top occupations in the Consumer Discretionary industry

This table depicts the selected top occupations in the Consumer Discretionary industry.

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rank	Title of Occupation	Number of Reviews	Relative Frequency (%)	Cumulative Relative Frequency (%)	Selected	Re-scaled Relative Frequency (%)
1	software engineer	29,962	7.1	7.1	✓	15.7
2	store manager	26,492	6.3	13.4	✓	13.9
3	warehouse worker	16,144	3.8	17.2	✓	8.4
4	customer service representative	13,582	3.2	20.4	✓	7.1
5	manager	12,075	2.9	23.3	✓	6.3
6	sales representative	10,268	2.4	25.7	✓	5.4
7	operations manager	9,227	2.2	27.9	✓	4.8
8	area manager	9,214	2.2	30.1	✓	4.8
9	department manager	8,914	2.1	32.2	✓	4.7
10	sales associate	7,901	1.9	34.1	✓	4.1
11	general manager	7,647	1.8	35.9	✓	4
12	sales manager	7,476	1.8	37.7	✓	3.9
13	assistant manager	6,321	1.5	39.2	✓	3.3
14	product manager	6,210	1.5	40.7	✓	3.2
15	associate	5,574	1.3	42	✓	2.9
16	shift manager	4,899	1.2	43.2	✓	2.6
17	program manager	4,777	1.1	44.3	✓	2.5
18	delivery driver	4,414	1	45.3	✓	2.3
19	project manager	3,904	0.9	46.2		
20	valet	3,887	0.9	47.1		
21	merchandiser	3,665	0.9	48		
22	buyer	3,566	0.8	48.8		
23	receiver	3,478	0.8	49.6		
24	financial analyst	3,331	0.8	50.4		
25	engineer	3,328	0.8	51.2		
26	packer	3,297	0.8	52		
27	business analyst	3,096	0.7	52.7		
28	marketing manager	2,862	0.7	53.4		
29	software developer	2,758	0.7	54.1		
30	administrative assistant	2,732	0.6	54.7		
31	analyst	2,721	0.6	55.3		
32	barista	2,508	0.6	55.9		
33	cashier	2,458	0.6	56.5		
34	director	2,389	0.6	57.1		
35	retail sales associate	2,368	0.6	57.7		
...	...	...	...	...		
	Total	422,050	100	-		100

Online Appendix Table B4

The selected top occupations in the Industrials industry

This table depicts the selected top occupations in the Industrials industry.

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rank	Title of Occupation	Number of Reviews	Relative Frequency (%)	Cumulative Relative Frequency (%)	Selected	Re-scaled Relative Frequency (%)
1	software engineer	16,592	5.1	5.1	✓	12.9
2	engineer	12,025	3.7	8.8	✓	9.4
3	systems engineer	10,260	3.2	12	✓	8
4	sales representative	9,261	2.9	14.9	✓	7.2
5	manager	6,669	2.1	17	✓	5.2
6	project manager	6,430	2	19	✓	5
7	customer service representative	6,099	1.9	20.9	✓	4.7
8	delivery driver	5,935	1.8	22.7	✓	4.6
9	flight attendant	5,648	1.7	24.4	✓	4.4
10	account manager	5,293	1.6	26	✓	4.1
11	operations manager	5,267	1.6	27.6	✓	4.1
12	mechanical engineer	5,113	1.6	29.2	✓	4
13	financial analyst	4,728	1.5	30.7	✓	3.7
14	driver	4,356	1.3	32	✓	3.4
15	package handler	4,102	1.3	33.3	✓	3.2
16	district manager	3,815	1.2	34.5	✓	3
17	analyst	3,695	1.1	35.6	✓	2.9
18	truck driver	3,662	1.1	36.7	✓	2.8
19	manufacturing engineer	3,357	1	37.7	✓	2.6
20	electrical engineer	3,157	1	38.7	✓	2.5
21	program manager	3,101	1	39.7	✓	2.4
22	business analyst	2,948	0.9	40.6		
23	recruiter	2,708	0.8	41.4		
24	warehouse worker	2,604	0.8	42.2		
25	project engineer	2,502	0.8	43		
26	account executive	2,399	0.7	43.7		
27	design engineer	2,374	0.7	44.4		
28	accountant	2,373	0.7	45.1		
29	other	2,322	0.7	45.8		
30	product manager	2,286	0.7	46.5		
31	sales manager	2,225	0.7	47.2		
32	software developer	2,197	0.7	47.9		
33	administrative assistant	2,181	0.7	48.6		
34	director	2,126	0.7	49.3		
35	applications engineer	2,051	0.6	49.9		
...	...	...	...	...		
	Total	324,272	100	-		100

Online Appendix Table B5

The selected top occupations in the Health Care industry

This table depicts the selected top occupations in the Health Care industry.

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rank	Title of Occupation	Number of Reviews	Relative Frequency (%)	Cumulative Relative Frequency (%)	Selected	Re-scaled Relative Frequency (%)
1	research scientist	11,896	4.5	4.5	✓	12.2
2	software engineer	7,298	2.8	7.3	✓	7.5
3	pharmacist	7,032	2.7	10	✓	7.2
4	customer service representative	6,684	2.5	12.5	✓	6.9
5	manager	6,330	2.4	14.9	✓	6.5
6	registered nurse	6,079	2.3	17.2	✓	6.2
7	sales representative	5,673	2.1	19.3	✓	5.8
8	project manager	5,316	2	21.3	✓	5.5
9	pharmacy technician	5,052	1.9	23.2	✓	5.2
10	director	4,672	1.8	25	✓	4.8
11	business analyst	4,585	1.7	26.7	✓	4.7
12	engineer	4,284	1.6	28.3	✓	4.4
13	analyst	3,572	1.4	29.7	✓	3.7
14	associate	3,397	1.3	31	✓	3.5
15	operations manager	3,389	1.3	32.3	✓	3.5
16	consultant	3,293	1.2	33.5	✓	3.4
17	financial analyst	3,203	1.2	34.7	✓	3.3
18	store manager	3,050	1.2	35.9	✓	3.1
19	product manager	2,695	1	36.9	✓	2.8
20	quality engineer	2,477	0.9	37.8		
21	phlebotomist	2,443	0.9	38.7		
22	program manager	2,384	0.9	39.6		
23	administrative assistant	2,344	0.9	40.5		
24	research assistant	2,259	0.9	41.4		
25	marketing manager	2,174	0.8	43		
26	account manager	2,174	0.8	42.2		
27	manufacturing engineer	2,063	0.8	43.8		
28	qa analyst	2,016	0.8	44.6		
29	finance manager	1,973	0.7	45.3		
30	clinical research associate	1,950	0.7	46		
31	systems engineer	1,844	0.7	46.7		
32	data analyst	1,826	0.7	47.4		
33	research engineer	1,738	0.7	48.1		
34	it manager	1,672	0.6	48.7		
35	technician	1,563	0.6	49.3		
...	...	...	...	...		
	Total	263,924	100	-		100

Online Appendix Table B6

The selected top occupations in the Consumer Staples industry

This table depicts the selected top occupations in the Consumer Staples industry.

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rank	Title of Occupation	Number of Reviews	Relative Frequency (%)	Cumulative Relative Frequency (%)	Selected	Re-scaled Relative Frequency (%)
1	store manager	12,418	6	6	✓	13.7
2	pharmacist	7,967	3.9	9.9	✓	8.8
3	pharmacy technician	6,596	3.2	13.1	✓	7.3
4	manager	6,573	3.2	16.3	✓	7.2
5	warehouse worker	5,497	2.7	19	✓	6.1
6	assistant manager	5,392	2.6	21.6	✓	5.9
7	sales representative	5,239	2.5	24.1	✓	5.8
8	stock clerk	3,429	1.7	25.8	✓	3.8
9	operations manager	3,130	1.5	27.3	✓	3.5
10	security officer	2,950	1.4	28.7	✓	3.3
11	sales associate	2,910	1.4	30.1	✓	3.2
12	team member	2,866	1.4	31.5	✓	3.2
13	sales manager	2,699	1.3	32.8	✓	3
14	customer service representative	2,619	1.3	34.1	✓	2.9
15	merchandiser	2,574	1.2	35.3	✓	2.8
16	cashier	2,560	1.2	36.5	✓	2.8
17	shift manager	2,397	1.2	37.7	✓	2.6
18	software engineer	2,292	1.1	38.8	✓	2.5
19	hr manager	2,261	1.1	39.9	✓	2.5
20	marketing manager	2,189	1.1	41	✓	2.4
21	executive	2,170	1.1	42.1	✓	2.4
22	guest services representative	1,999	1	43.1	✓	2.2
23	financial analyst	1,976	1	44.1	✓	2.2
24	department manager	1,962	0.9	45		
25	business analyst	1,762	0.9	45.9		
26	packer	1,752	0.8	46.7		
27	project manager	1,736	0.8	47.5		
28	brand manager	1,674	0.8	48.3		
29	finance manager	1,571	0.8	49.1		
30	account manager	1,562	0.8	49.9		
31	director	1,554	0.8	50.7		
32	engineer	1,551	0.8	51.5		
33	analyst	1,521	0.7	52.2		
34	category manager	1,465	0.7	52.9		
35	associate	1,431	0.7	53.6		
...	...	...	...	...		
	Total	206,651	100	-		100

Online Appendix Table B7

The selected top occupations in the Communication Services industry

This table depicts the selected top occupations in the Communication Services industry.

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rank	Title of Occupation	Number of Reviews	Relative Frequency (%)	Cumulative Relative Frequency (%)	Selected	Re-scaled Relative Frequency (%)
1	software engineer	26,800	13.4	13.4	✓	26.6
2	sales representative	14,300	7.1	20.5	✓	14.2
3	customer service representative	7,334	3.7	24.2	✓	7.3
4	account executive	4,768	2.4	26.6	✓	4.7
5	retail sales associate	4,309	2.1	28.7	✓	4.3
6	manager	4,019	2	30.7	✓	4
7	technician	3,919	2	32.7	✓	3.9
8	account manager	3,715	1.9	34.6	✓	3.7
9	project manager	3,506	1.7	36.3	✓	3.5
10	product manager	3,386	1.7	38	✓	3.4
11	store manager	3,103	1.5	39.5	✓	3.1
12	engineer	2,820	1.4	40.9	✓	2.8
13	solutions specialist	2,743	1.4	42.3	✓	2.7
14	program manager	2,740	1.4	43.7	✓	2.7
15	sales manager	2,486	1.2	44.9	✓	2.5
16	analyst	2,445	1.2	46.1	✓	2.4
17	network engineer	2,179	1.1	47.2	✓	2.2
18	marketing manager	2,084	1	48.2	✓	2.1
19	financial analyst	2,054	1	49.2	✓	2
20	operations manager	2,024	1	50.2	✓	2
21	director	1,693	0.8	51		
22	sales associate	1,651	0.8	51.8		
23	technical support specialist	1,623	0.8	52.6		
24	enterprise architect	1,544	0.8	53.4		
25	data scientist	1,496	0.7	54.1		
26	business analyst	1,453	0.7	54.8		
27	systems engineer	1,266	0.6	55.4		
28	data analyst	1,230	0.6	56		
29	software developer	1,187	0.6	56.6		
30	consultant	1,128	0.6	57.2		
31	solutions consultant	1,101	0.5	57.7		
32	service technician	1,069	0.5	58.2		
33	product marketing manager	1,066	0.5	58.7		
34	finance manager	1,065	0.5	59.2		
35	recruiter	977	0.5	59.7		
...	...	...	...	...		
	Total	200,449	100	-		100

Online Appendix Table B8

The selected top occupations in the Energy industry

This table depicts the selected top occupations in the Energy industry.

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rank	Title of Occupation	Number of Reviews	Relative Frequency (%)	Cumulative Relative Frequency (%)	Selected	Re-scaled Relative Frequency (%)
1	engineer	2,735	6.1	6.1	✓	14.9
2	field service engineer	1,891	4.2	10.3	✓	10.3
3	geologist	1,061	2.4	12.7	✓	5.8
4	mechanical engineer	1,037	2.3	15	✓	5.6
5	project manager	1,019	2.3	17.3	✓	5.5
6	accountant	951	2.1	19.4	✓	5.2
7	petroleum engineer	924	2.1	21.5	✓	5
8	process engineer	894	2	23.5	✓	4.9
9	financial analyst	841	1.9	25.4	✓	4.6
10	reservoir engineer	815	1.8	27.2	✓	4.4
11	analyst	791	1.8	29	✓	4.3
12	business analyst	726	1.6	30.6	✓	4
13	software engineer	724	1.6	32.2	✓	3.9
14	technical specialist	720	1.6	33.8	✓	3.9
15	project engineer	691	1.6	35.4	✓	3.8
16	manager	583	1.3	36.7	✓	3.2
17	operator	572	1.3	38	✓	3.1
18	administrative assistant	478	1.1	39.1	✓	2.6
19	maintenance engineer	466	1	40.1	✓	2.5
20	geophysicist	451	1	41.1	✓	2.5
21	landman	416	0.9	42		
22	operations manager	404	0.9	42.9		
23	technician	377	0.8	43.7		
24	electrical engineer	374	0.8	44.5		
25	production engineer	373	0.8	45.3		
26	procurement agent	331	0.7	46		
27	research scientist	318	0.7	46.7		
28	process operator	313	0.7	47.4		
29	manufacturing engineer	294	0.7	48.1		
30	advisor	269	0.6	48.7		
31	engineering technician	257	0.6	49.3		
32	ehs specialist	253	0.6	49.9		
33	lab technician	250	0.6	50.5		
34	software developer	248	0.6	51.1		
35	it analyst	246	0.6	51.7		
...	...	...	...	...		
	Total	44,546	100	-		100

Online Appendix Table B9

The selected top occupations in the Materials industry

This table depicts the selected top occupations in the Materials industry.

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rank	Title of Occupation	Number of Reviews	Relative Frequency (%)	Cumulative Relative Frequency (%)	Selected	Re-scaled Relative Frequency (%)
1	store manager	1,724	4.4	4.4	✓	11.4
2	sales representative	1,524	3.9	8.3	✓	10.1
3	engineer	1,123	2.9	11.2	✓	7.4
4	assistant manager	1,087	2.8	14	✓	7.2
5	manager	984	2.5	16.5	✓	6.5
6	process engineer	814	2.1	18.6	✓	5.4
7	machine operator	811	2.1	20.7	✓	5.4
8	chemist	733	1.9	22.6	✓	4.8
9	operator	644	1.7	24.3	✓	4.3
10	financial analyst	629	1.6	25.9	✓	4.2
11	customer service representative	623	1.6	27.5	✓	4.1
12	operations manager	608	1.6	29.1	✓	4
13	lab technician	591	1.5	30.6	✓	3.9
14	research scientist	547	1.4	32	✓	3.6
15	account manager	502	1.3	33.3	✓	3.3
16	business analyst	460	1.2	34.5	✓	3
17	territory manager	442	1.1	35.6	✓	2.9
18	maintenance technician	437	1.1	36.7	✓	2.9
19	project manager	428	1.1	37.8	✓	2.8
20	accountant	414	1.1	38.9	✓	2.7
21	sales manager	362	0.9	39.8		
22	marketing manager	356	0.9	40.7		
23	mechanical engineer	352	0.9	41.6		
24	administrative assistant	345	0.9	42.5		
25	technician	340	0.9	43.4		
26	finance manager	318	0.8	44.2		
27	chemical engineer	310	0.8	45		
28	district manager	296	0.8	45.8		
29	production manager	264	0.7	46.5		
30	electrician	262	0.7	47.2		
31	research assistant	261	0.7	47.9		
32	project engineer	251	0.6	48.5		
33	process operator	242	0.6	49.1		
34	metallurgical engineer	239	0.6	49.7		
35	research engineer	230	0.6	50.3		
...	...	...	...	...		
	Total	38,932	100	-		100

Online Appendix Table B10

The selected top occupations in the Real Estate industry

This table depicts the selected top occupations in the Real Estate industry.

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rank	Title of Occupation	Number of Reviews	Relative Frequency (%)	Cumulative Relative Frequency (%)	Selected	Re-scaled Relative Frequency (%)
1	leasing agent	1,621	5.5	5.5	✓	10.6
2	property manager	1,234	4.2	9.7	✓	8.1
3	project manager	1,085	3.7	13.4	✓	7.1
4	real estate manager	790	2.7	16.1	✓	5.2
5	maintenance technician	774	2.6	18.7	✓	5.1
6	community manager	748	2.5	21.2	✓	4.9
7	customer service representative	731	2.5	23.7	✓	4.8
8	accountant	729	2.5	26.2	✓	4.8
9	research assistant	727	2.5	28.7	✓	4.7
10	facilities manager	606	2	30.7	✓	4
11	financial analyst	594	2	32.7	✓	3.9
12	manager	509	1.7	34.4	✓	3.3
13	district manager	482	1.6	36	✓	3.1
14	software engineer	458	1.5	37.5	✓	3
15	assistant manager	443	1.5	39	✓	2.9
16	operations manager	437	1.5	40.5	✓	2.9
17	store manager	423	1.4	41.9	✓	2.8
18	sales representative	419	1.4	43.3	✓	2.7
19	director	392	1.3	44.6	✓	2.6
20	analyst	390	1.3	45.9	✓	2.5
21	administrative assistant	386	1.3	47.2	✓	2.5
22	business analyst	360	1.2	48.4	✓	2.4
23	maintenance manager	338	1.1	49.5	✓	2.2
24	building engineer	321	1.1	50.6	✓	2.1
25	consultant	313	1.1	51.7	✓	2
26	project coordinator	261	0.9	52.6		
27	engineer	247	0.8	53.4		
28	account executive	238	0.8	54.2		
29	marketing manager	235	0.8	55		
30	program manager	234	0.8	55.8		
31	finance manager	217	0.7	56.5		
32	marketing coordinator	201	0.7	57.2		
33	senior leader	195	0.7	57.9		
34	service coordinator	192	0.6	58.5		
35	technician	190	0.6	59.1		
...	...	...	...	...		
	Total	29,654	100	-		100

Online Appendix Table B11

The selected top occupations in the Utilities industry

This table depicts the selected top occupations in the Utilities industry.

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rank	Title of Occupation	Number of Reviews	Relative Frequency (%)	Cumulative Relative Frequency (%)	Selected	Re-scaled Relative Frequency (%)
1	engineer	2,264	10.1	10.1	✓	24
2	manager	877	3.9	14	✓	9.3
3	analyst	806	3.6	17.6	✓	8.5
4	customer service representative	770	3.4	21	✓	8.2
5	project manager	758	3.4	24.4	✓	8
6	financial analyst	704	3.1	27.5	✓	7.5
7	business analyst	679	3	30.5	✓	7.2
8	operator	410	1.8	32.3	✓	4.3
9	operations manager	409	1.8	34.1	✓	4.3
10	accountant	407	1.8	35.9	✓	4.3
11	electrical engineer	344	1.5	37.4	✓	3.6
12	director	294	1.3	38.7	✓	3.1
13	administrative assistant	268	1.2	39.9	✓	2.8
14	technician	232	1	40.9	✓	2.5
15	software engineer	222	1	41.9	✓	2.4
16	lineman	205	0.9	42.8		
17	program manager	204	0.9	43.7		
18	nuclear engineer	181	0.8	44.5		
19	it manager	170	0.8	45.3		
20	project engineer	151	0.7	46		
21	systems analyst	147	0.7	46.7		
22	security officer	139	0.6	47.3		
23	it analyst	138	0.6	47.9		
24	finance manager	130	0.6	48.5		
25	technical specialist	127	0.6	49.1		
26	maintenance technician	126	0.6	49.7		
27	compliance analyst	126	0.6	50.3		
28	designer	124	0.6	50.9		
29	mechanical engineer	121	0.5	51.4		
30	information security analyst	121	0.5	51.9		
31	programmer analyst	119	0.5	52.4		
32	gis analyst	118	0.5	52.9		
33	electrician	116	0.5	53.4		
34	production technician	115	0.5	54.4		
35	mechanic	115	0.5	53.9		
...	...	...	...	...		
	Total	22,496	100	-		100

C. Omitted proofs

C.1. Proof of Lemma 1

Proof. Given workers' equilibrium utility $U(s)$, Equation (11) can be rewritten as

$$\overline{V}(a) = a^{-\sum_{n=1}^{N}(\kappa_n\alpha_n)} \max_s \left\{ a^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)} s - \psi\, U(s) \right\}. \tag{32}$$

The first-order condition with respect to s is:

$$a^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)} - \psi\, U'(s) = 0. \tag{33}$$

Defining the function $F(a,s) = a^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)} - \psi\, U'(s)$, we see that $\frac{\partial F}{\partial s}(a,s) = -\psi\, U''(s) < 0$ (since $U(s)$ is convex) and $\frac{\partial F}{\partial a}(a,s) = \left(\theta + \sum_{n=1}^{N}(\kappa_n\alpha_n)\right) a^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)-1}$. Hence, by the Implicit Function Theorem, there exists $s^* = \sigma(a)$ (referred to also as $s^*(a)$ for convenience), which increases in a if and only if $\theta + \sum_{n=1}^{N}(\kappa_n\alpha_n) > 0$. □

C.2. Proof of Proposition 1

Proof. Since the ranking of worker talent in the upper tail satisfies $s'[i] = B(1-i)^{-\beta-1}$ and the productivity of a firm's job position with ranking j is $a[j] = a_L(1-j)^{-\gamma}$, we can substitute these expressions into Eq. (13). In particular, Lemma 1 implies that, if $\theta + \sum_{n=1}^{N}(\kappa_n\alpha_n) > 0$, PAM holds and $j^*(i) = i$, so that we can write that:

$$
\begin{aligned}
U[i] &= \int_0^i \left(\frac{1}{\psi}\right) \left(a_L \left(1-\tilde{i}\,\right)^{-\gamma}\right)^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)} B\left(1-\tilde{i}\,\right)^{-\beta-1} d\tilde{i} + U[0] \\
&= \left(\frac{1}{\psi}\right)(a_L)^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)} B \int_0^i \left(1-\tilde{i}\,\right)^{-\gamma\left(\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)\right)-\beta-1} d\tilde{i} + U[0] \\
&= \left(\frac{1}{\psi}\right)(a_L)^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)} B \left[\frac{-\left(1-\tilde{i}\,\right)^{-\gamma\left(\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)\right)-\beta}}{-\gamma\left(\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)\right)-\beta}\right]_0^i + U[0] \\
&= \left(\frac{1}{\psi}\right)\frac{(a_L)^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)} B}{\gamma\left(\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)\right)+\beta}\left((1-i)^{-\gamma\left(\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)\right)-\beta}-1\right) + U[0] \\
&= \left(\frac{1}{\psi}\right)\frac{(a_L)^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)} B}{\gamma\left(\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)\right)+\beta}\left(\left(\left(\frac{a[i]}{a_L}\right)^{-\frac{1}{\gamma}}\right)^{-\gamma\left(\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)\right)-\beta}-1\right) + U[0] \\
&= \frac{B}{\gamma\left(\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}\right)}\left(\frac{1}{\psi}\right)(a_L)^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)}\left(\left(\frac{a[i]}{a_L}\right)^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}}-1\right) + U[0]\,.
\end{aligned}
\tag{34}
$$

But the initial condition $U[0] = \frac{B}{\gamma\left(\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}\right)}\left(\frac{1}{\psi}\right)(a_L)^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)}$ implies that Eq. (34) can be simplified as follows:

$$
\begin{aligned}
U[i] &= \frac{B}{\gamma\left(\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}\right)}\left(\frac{1}{\psi}\right)(a_L)^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)}\left(\frac{a[i]}{a_L}\right)^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}} \\
&= \left(\frac{B}{\gamma\left(\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}\right)}\left(\frac{1}{a_L}\right)^{\frac{\beta}{\gamma}}\right)\left(\frac{1}{\psi}\right)(a[i])^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}}\,.
\end{aligned}
\tag{35}
$$

Dividing the above equation by the initial condition results in:

$$U[i] = U[0] \left(\frac{a[i]}{a_L} \right)^{\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) + \frac{\beta}{\gamma}} \tag{36}$$

Using the expression $a[j] = a_L (1-j)^{-\gamma}$ once more yields the second line of the proposition's equation □

C.3. Proof of Proposition 5

Proof. From the first line of Eq. (22), we have that:

$$\begin{aligned} \overline{V}[0] &= s_L (a_L)^{\theta} - \left(\frac{B}{\gamma \left(\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) + \frac{\beta}{\gamma} \right)} \left(\frac{1}{a_L} \right)^{\frac{\beta}{\gamma}} \right) (a_L)^{\theta + \frac{\gamma}{\beta}} \\ &= \left(s_L - \frac{B}{\gamma \left(\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) + \frac{\beta}{\gamma} \right)} \right) (a_L)^{\theta}. \end{aligned} \tag{37}$$

Case 1. If $\beta > 0$, then Eq. (37) can be rewritten as:

$$\begin{aligned} \overline{V}[0] &= \left(s_L - \frac{s_L \beta}{\gamma \left(\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) + \frac{\beta}{\gamma} \right)} \right) (a_L)^{\theta} \\ &= s_L \left(\frac{\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n)}{\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) + \frac{\beta}{\gamma}} \right) (a_L)^{\theta}. \end{aligned} \tag{38}$$

Substituting Eq. (38) into the first case of the second line of Eq. (22) (where $\beta > 0$) leads to:

$$\begin{aligned}\overline{V}[i] &= \overline{V}[0](1-i)^{-\gamma\left(\theta+\frac{\beta}{\gamma}\right)} \\ &= s_L\left(\frac{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)}{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}}\right)(a_L)^{\theta}\ (1-i)^{-\gamma\left(\theta+\frac{\beta}{\gamma}\right)}.\end{aligned} \tag{39}$$

Dividing both sides of Eq. (39) by $(a[i])^{\theta}$ and using the expression $a[i] = a_L(1-i)^{-\gamma}$ gives:

$$\begin{aligned}\frac{\overline{V}[i]}{(a[i])^{\theta}} &= s_L\left(\frac{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)}{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}}\right)(1-i)^{-\beta} \\ &= \frac{\overline{V}[0]}{(a_L)^{\theta}}\ (1-i)^{-\beta},\end{aligned} \tag{40}$$

where the last line follows from Eq. (38).

Case 2. If $\beta < 0$, then Eq. (37) can be rewritten as:

$$\begin{aligned}\overline{V}[0] &= \left(s_H - \left(\frac{1}{\widetilde{B}}\right)^{-\beta} - \frac{-\left(\frac{1}{\widetilde{B}}\right)^{-\beta}\beta}{\gamma\left(\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}\right)}\right)(a_L)^{\theta} \\ &= \left(s_H - \left(\frac{1}{\widetilde{B}}\right)^{-\beta}\left(\frac{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)}{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}}\right)\right)(a_L)^{\theta}.\end{aligned} \tag{41}$$

Substituting Eq. (41) into the second case of the second line of Eq. (22) (where $\beta < 0$) entails:

$$\begin{aligned}
\overline{V}[i] &= \left(\overline{V}[0] + s_H\, a_L^{\theta}\left((1-i)^{\beta}-1\right)\right)(1-i)^{-\gamma\left(\theta+\frac{\beta}{\gamma}\right)} \\
&= \left(\left(s_H - \left(\frac{1}{\widetilde{B}}\right)^{-\beta}\left(\frac{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)}{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}}\right)\right)(a_L)^{\theta} + s_H\, a_L^{\theta}\left((1-i)^{\beta}-1\right)\right)(1-i)^{-\gamma\left(\theta+\frac{\beta}{\gamma}\right)} \\
&= \left(s_H\,(1-i)^{\beta} - \left(\frac{1}{\widetilde{B}}\right)^{-\beta}\left(\frac{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)}{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}}\right)\right) a_L^{\theta}\,(1-i)^{-\gamma\left(\theta+\frac{\beta}{\gamma}\right)}.
\end{aligned} \tag{42}$$

Dividing both sides of Eq. (42) by $(a[i])^{\theta}$ and using the expression $a[i] = a_L(1-i)^{-\gamma}$ gives:

$$\begin{aligned}
\frac{\overline{V}[i]}{(a[i])^{\theta}} &= \left(s_H\,(1-i)^{\beta} - \left(\frac{1}{\widetilde{B}}\right)^{-\beta}\left(\frac{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)}{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}}\right)\right)(1-i)^{-\beta} \\
&= s_H - \left(\frac{1}{\widetilde{B}}\right)^{-\beta}\left(\frac{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)}{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}}\right)(1-i)^{-\beta} \\
&= s_H - \left(s_H - \frac{\overline{V}[0]}{(a_L)^{\theta}}\right)(1-i)^{-\beta},
\end{aligned} \tag{43}$$

where the last line follows from Eq. (41). □

C.4. Proof of Corollary 4

Proof. Since $w\left[i\right] = \alpha_0\, e\left[i\right]$, we can rearrange the first line of Eq. (25) as follows:

$$\frac{\left(1-i\right)^{-\beta}}{\theta + \sum\limits_{n=1}^{N}\left(\kappa_n \alpha_n\right) + \frac{\beta}{\gamma}} = \frac{\gamma}{\alpha_0\, B}\frac{w\left[i\right]}{\left(a\left[i\right]\right)^{\theta}} \tag{44}$$

Case 1. If $\beta > 0$, then $B = s_L\, \beta$, so that substituting Eq. (44) into the first case of the first line of Eq. (24) (or the first line of Eq. (40)) leads to:

$$\begin{aligned}\frac{\overline{V}\left[i\right]}{\left(a\left[i\right]\right)^{\theta}} &= s_L \left(\theta + \sum_{n=1}^{N}\left(\kappa_n \alpha_n\right)\right)\left(\frac{\gamma}{\alpha_0\ \left(s_L\, \beta\right)}\frac{w\left[i\right]}{\left(a\left[i\right]\right)^{\theta}}\right) \\ &= \frac{1}{\alpha_0}\left(\frac{\theta + \sum\limits_{n=1}^{N}\left(\kappa_n \alpha_n\right)}{\frac{\beta}{\gamma}}\right)\frac{w\left[i\right]}{\left(a\left[i\right]\right)^{\theta}}.\end{aligned} \tag{45}$$

Case 2. If $\beta < 0$, then $B = -\left(\frac{1}{\widetilde{B}}\right)^{-\beta}\beta$ (from the second line of Eq. (3)), so that substituting Eq. (44) into the second case of the first line of Eq. (24) (or the second line of Eq. (43)) leads to:

$$\begin{aligned}\frac{\overline{V}\left[i\right]}{\left(a\left[i\right]\right)^{\theta}} &= s_H - \left(\frac{1}{\widetilde{B}}\right)^{-\beta}\left(\theta + \sum_{n=1}^{N}\left(\kappa_n \alpha_n\right)\right)\left(\frac{\gamma}{\alpha_0\ \left(-\left(\frac{1}{\widetilde{B}}\right)^{-\beta}\beta\right)}\frac{w\left[i\right]}{\left(a\left[i\right]\right)^{\theta}}\right) \\ &= s_H + \frac{1}{\alpha_0}\left(\frac{\theta + \sum\limits_{n=1}^{N}\left(\kappa_n \alpha_n\right)}{\frac{\beta}{\gamma}}\right)\frac{w\left[i\right]}{\left(a\left[i\right]\right)^{\theta}}.\end{aligned} \tag{46}$$

□

C.5. Proof of Proposition 7

Proof. The last line of Eq. 34 can be rewritten as follows:

$$U[i] = \frac{B}{\gamma\left(\theta + \sum_{n=1}^{N}(\kappa_n\alpha_n) + \frac{\beta}{\gamma}\right)}\left(\frac{1}{\psi}\right)\left(\frac{1}{a_L}\right)^{\frac{\beta}{\gamma}}\left((a[i])^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}} - a_L^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}}\right) + U[0]. \tag{47}$$

As in Gabaix and Landier 2008, we consider the domain of very large firms by taking the limit of Eq. (47) as $i \to 1$. Then, $(a[i])^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}}$ becomes very large relative to $a_L^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}}$ and $U[0]$, so that:

$$U[i] = \frac{B}{\gamma\left(\theta + \sum_{n=1}^{N}(\kappa_n\alpha_n) + \frac{\beta}{\gamma}\right)}\left(\frac{1}{\psi}\right)\left(\frac{1}{a_L}\right)^{\frac{\beta}{\gamma}}(a[i])^{\theta+\sum_{n=1}^{N}(\kappa_n\alpha_n)+\frac{\beta}{\gamma}}. \tag{48}$$

which is the same expression as the one in the first line of Eq. (14). □

C.6. Proof of Corollary 6

Proof. Taking the partial derivative of Eq. (20) with respect to α_n yields that:

$$\begin{aligned}
\frac{\partial e[i]}{\partial \alpha_n} &= \left(B\left(\frac{1}{a_L}\right)^{\frac{\beta}{\gamma}}\right)(a[i])^{\theta+\frac{\beta}{\gamma}}\left(-\frac{\kappa_n}{\left(\gamma\left(\theta + \sum_{n=1}^{N}(\kappa_n\alpha_n) + \frac{\beta}{\gamma}\right)\right)^2}\right) \\
&= \underbrace{\left(\frac{B}{\gamma\left(\theta + \sum_{n=1}^{N}(\kappa_n\alpha_n) + \frac{\beta}{\gamma}\right)}\left(\frac{1}{a_L}\right)^{\frac{\beta}{\gamma}}\right)(a[i])^{\theta+\frac{\beta}{\gamma}}}_{e[i]}\left(-\frac{\kappa_n}{\gamma\left(\theta + \sum_{n=1}^{N}(\kappa_n\alpha_n) + \frac{\beta}{\gamma}\right)}\right) \\
&= e[i]\left(-\frac{\kappa_n}{\gamma\left(\theta + \sum_{n=1}^{N}(\kappa_n\alpha_n) + \frac{\beta}{\gamma}\right)}\right)
\end{aligned} \tag{49}$$

The partial elasticity of firm i's equilibrium expenditure with respect to workers' utility weight for amenity n is:

$$\frac{\partial \ln\left(e\left[i\right]\right)}{\partial \ln\left(\alpha_n\right)} = \frac{\partial e\left[i\right]}{\partial \alpha_n} \frac{\alpha_n}{e\left[i\right]} \tag{50}$$

Substituting Eq. (49) into Eq. (50) yields Eq. (6). The partial elasticity of firm i's equilibrium expenditure with respect to firms' advantage in the provision of amenity n is computed following the same logic. Lastly, to prove Eq. (28), suppose that either (i) all workers' non-pecuniary preferences increase by $\varepsilon\%$, or (ii) all firms' advantages in the provision of amenities increase by $\varepsilon\%$. In either case, we end up having $\sum_{n=1}^{N} \widehat{(\kappa_n \alpha_n)} = (1+\varepsilon) \sum_{n=1}^{N} (\kappa_n \alpha_n)$. Denote $\hat{e}\left[i\right]$ the resulting new equilibrium expenditure of firm i. According to Eq. (20), the ratio of firm i's new equilibrium expenditure relative to the one it had before the change is:

$$\frac{\hat{e}\left[i\right]}{e\left[i\right]} = -\frac{\theta + \sum_{n=1}^{N} (\kappa_n \alpha_n) + \frac{\beta}{\gamma}}{\theta + (1+\varepsilon) \sum_{n=1}^{N} (\kappa_n \alpha_n) + \frac{\beta}{\gamma}}. \tag{51}$$

Subtracting 1 from both sides of Eq. (51) yields Eq. (28). □