

Firms' Beliefs About Wage Setting

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Abstract

We provide new direct evidence on how firms perceive their pay relative to that of their competitors by linking administrative data to a large-scale survey of Danish firms. We show that firms' beliefs are informative about observed wage differences: Firms that think they pay higher wages than their competitors are substantially more likely to be higher in the objective wage distribution constructed from administrative data than firms that believe they pay lower wages. However, a majority of firms report that they pay about the same as their competitors, and these firms are widely dispersed across the objective wage distribution, suggesting that many firms hold relatively coarse or imprecise beliefs about their relative position. Firms' beliefs are more informative in labor markets where wage-setting decisions are more likely to be important, specifically markets with high turnover rates, low profit margins, and low capital intensity. Finally, survey responses reveal that the primary motive for setting high wages is to retain and attract employees.

JEL codes: J01; J31; J42; D83; M52

Keywords: Wage dispersion; firm information frictions; beliefs

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1. Introduction

Employers offer different wages for similar work. This holds across worker groups, over time, and across countries, making it one of the most robust recent findings in labor economics (Kline 2024). This evidence has driven a paradigm shift in the study of wage setting from “markets set wages” to “firms set wages” (Card 2022).

To document and quantify the role of firms in wage inequality, the empirical literature has increasingly used high-dimensional fixed effects methods.¹ However, this literature does not yet provide solid evidence on whether employers even perceive these differences in wages across firms or their motives for choosing specific wage policies. A priori, it is not obvious whether we would expect firms to have accurate beliefs about their relative wage levels. Recent studies find that many workers have inaccurate perceptions about market wages (Jäger, Roth, Roussille and Schoefer 2024), and that firms adjust their wages when provided with salary benchmarks (Cullen, Li and Perez-Truglia 2025), suggesting that information frictions are present on both sides of the labor market. Understanding whether firms have accurate beliefs about their relative wage levels and their motives for choosing them is important for several reasons. First, firms with inaccurate knowledge about market wages can be a source of wage dispersion (Cullen, Li and Perez-Truglia 2025). Comparing firms’ beliefs with their actual position in the wage distribution is one way to measure the extent of information frictions on the firm side as a factor contributing to wage inequality. Such frictions may be non-negligible in markets without extensive centralized wage bargaining, where wage information sharing between firms is legally restricted and posted wages on job search platforms are rare.² Second, it is useful to elicit firms’ motives for setting higher

¹See, among others, Lachowska, Mas, Saggio and Woodbury (2022, 2023); Di Addario, Kline, Saggio and Sølvsten (2023); Kline (2024).

²Batra, Michaud and Mongey (2023) document that 6 percent of online job posts in the U.S. contain a specific wage. Caldwell, Haegele and Heining (2025a) estimate that it is about 2 percent. Firm-specific wage information on job ads is also very rare in job posts in Denmark.

or lower wages, as this allows us to determine whether their subjective motivations align with the theoretical frameworks explaining wage dispersion across firms, such as search frictions, compensating differentials, and efficiency wages.

To our knowledge, we provide the first large-scale, direct evidence on how employers perceive their own wages and their motives for setting wages above or below those of competitors. We designed and implemented a representative survey of firms, conducted in the summer of 2021, and validated survey responses against administrative data. The sample includes wage beliefs elicited from approximately 2,900 firms.

The main question that we asked is: *"Do you think this firm offers lower or higher wages than competing firms in your industry? Competing firms are other employers that hire people with the same abilities in your region."* Firms respond on a five-point scale (from *"much lower"* to *"much higher"*). Crucially, we link these survey responses to administrative data that allows us to benchmark firms' beliefs against objective measures of their wage policy. Specifically, we compare how firms' position in the relevant wage distribution varies across survey responses. We measure belief informativeness as the difference in position in the objective wage distribution between firms that believe they pay higher wages and those that believe they pay lower wages. Our primary objective wage measure is the firm wage premium estimated using the Abowd-Kramarz-Margolis (AKM) approach (Abowd et al. 1999) and matched employer-employee data covering the universe of jobs. This measure captures the firm-specific wage component, isolating the relative premium each firm pays to its workers. To keep the objective benchmarks as close to the survey question as possible, our baseline results use the within industry-region distribution of the estimated firm wage effects. We show that our results hold across alternative measures of firm-level wages and labor market definitions. In addition to asking firms about their relative wages, we also ask them about their motives for choosing these wage levels. When firms report paying more or less than their competitors, we ask them why. The response options are designed to capture explanations aligned

with canonical models in labor economics, such as search frictions, efficiency wages, and compensating differentials.

Our first main finding is that firms' beliefs are informative about observed wage differences: A firm that thinks it pays higher wages than its competitors is on average 17.5 percentiles higher in the wage distribution, and close to 30 percentage points more likely to be in the top half, compared to a firm that thinks it pays lower wages. This corresponds to firms that believe they pay higher wages being almost twice as likely to be in the top half of the market wage distribution compared to firms that believe they pay lower wages. Firms that believe they pay higher wages are almost three times as likely to be in the top decile compared to firms that believe they pay lower wages, while firms that believe they pay lower wages are more than twice as likely to be in the bottom decile. However, a notable feature of the data is that 75 percent of firms report paying wages "about the same" as their competitors. These firms are not concentrated around the middle of the wage distribution; instead, they are widely dispersed across it. This suggests that many firms hold relatively coarse or imprecise beliefs about their relative wage position, though it may also partly reflect the limited granularity of the survey scale. We find that beliefs are more informative among firms in markets (industry-region) where wage-setting decisions are likely more consequential, specifically in markets with high labor turnover, low profit margins, and low capital intensity.

The second main finding is that the most common motives for paying high wages are in line with theories emphasizing search frictions, and only a minority do so to compensate for negative job characteristics. Specifically, over 90 percent offer high wages to retain employees and to attract the best candidates. Roughly two-thirds pay higher wages to increase morale, reduce the need for monitoring, and share rents. About 20 percent state they pay higher wages to compensate for negative job characteristics. The most common reason employers give for offering lower wages is the inability to pay higher wages due to low demand or high competition in the product market, with about

57 percent agreeing and 16 percent disagreeing. The second most relevant motive is the availability of positive job amenities, with about 55 percent agreeing and 18 percent disagreeing.

1.1. Contribution to the Literature

Building on the literature documenting the importance of firm-specific wage effects in explaining wage inequality (see Kline (2024) for a review), a growing literature has examined how worker-side beliefs contribute to labor market outcomes.³ In contrast, relatively little is known about firm-side beliefs and their role in wage setting and inequality.⁴ Recent evidence suggests that such beliefs may matter: most firms retain discretion in setting wages for a large share of their workforce (e.g., Caldwell, Haegele and Heining 2025a; Lachowska, Mas, Saggio and Woodbury 2022). A few empirical studies provide insights into how firms act on wage-related information. Cullen, Li and Perez-Truglia (2025) is closely related to this study, as they show that firms adjust entry wages when provided with benchmarking data, suggesting that information frictions influence wage setting. Relatedly, Dube, Manning and Naidu (2025) provide evidence that firms "misoptimize" wage setting. Consistent with this, Hjort, Li and Sarsons (2025) and Hazell, Patterson, Sarsons and Taska (2025) show that firms follow stable wage policies with limited responsiveness to labor market conditions, while Cordes and Müller (2026) shows that firms underestimate workers' valuations of amenities.⁵ By focusing on the firm side, we fill an important gap in the literature by providing direct

³See, for instance, Mueller, Spinnewijn and Topa (2021), Braun and Figueiredo (2025), Menzio (2023), Cullen and Pakzad-Hurson (2023), Miano (2025), Jäger, Roth, Roussille and Schoefer (2024), and Caliendo, Mahlstedt, Schmeiber and Wagner (2024).

⁴This stands in contrast to the price-setting literature, where firms' beliefs have been extensively studied; see, for example, DellaVigna and Gentzkow (2019) and related work on managerial expectations and pricing behavior. Closer to our setting, Caldwell et al. (2025a) use surveys of firms and workers to study the prevalence and implications of individual bargaining in wage determination. In contrast, our focus is on firms' beliefs about their relative wage position and the motives they associate with paying higher or lower wages, highlighting the presence of information frictions rather than wage-setting regimes.

⁵Relatedly, Passaro, Kojima and Pakzad-Hurson (2025), and Friedrich and Zator (2024) also discuss the role of employer-side frictions.

evidence on firms' beliefs about their relative wage position, complementing worker-level studies that document imperfect information about the external wage distribution.

Additionally, we contribute to the literature on the nature of firm wage effects. A traditional explanation emphasizes compensating differentials, whereby firms offer higher wages to compensate for less desirable job attributes (Rosen 1986), while an alternative view highlights wage-setting power under imperfect competition (Mortensen 2003; Card 2022). Recent work primarily infers the relationship between firm amenities and wages using matched employer-employee data (e.g., Sorkin 2018, Taber and Vejlín 2020, Sockin 2022, Lamadon, Mogstad and Setzler 2022, Lachowska, Mas, Saggio and Woodbury 2025, Roussille and Scuderi 2025). Relatedly, Humlum, Rasmussen and Rose (2025) and Caldwell, Haegele and Heining (2025b) design surveys in Denmark and Germany (respectively) but focus on workers' perspectives. By directly asking firms why they pay higher or lower wages, we provide new direct evidence on firms' stated motivations, offering a firm-side perspective on the mechanisms underlying wage differences across firms that complements and helps interpret existing evidence based on inferred relationships.

2. A Firm Survey Linked to Administrative Datasets

In this section, we detail the survey data collection process, provide an overview of the administrative datasets we use, and describe the sample used in our analysis. In Denmark, wages are negotiated primarily at the firm level, and firms retain substantial discretion in setting pay. While institutional details are provided in Appendix B.1, it is worth noting that key features of the Danish labor market (such as limited wage transparency and decentralized wage setting) are shared by many other settings.

2.1. Measuring Firms' Beliefs about Wage Setting

We now describe our survey, which elicits firms' subjective beliefs about their relative wage levels and the motives underlying their wage-setting decisions.

The target population consists of private and public limited companies in Denmark (ApS and A/S) that were active in the first quarter of 2021. An international consulting firm conducted the online survey in June 2021 by sending invitations through e-Boks, the official Danish digital mail system. The invitation included a cover letter detailing the survey purpose, response deadline, incentives for participation (an anonymized benchmark report), and assurances regarding data protection compliance.

In addition to the wage-related questions analyzed in this paper, the survey included questions on firms' beliefs about layoffs and hiring constraints. It also gathered information about the respondent's role in the firm and familiarity with human resources policies, as well as questions about recent revenue changes. We use this information to ensure that respondents were in a position to answer knowledgeably and to validate their reported revenue changes against administrative records.

2.2. Administrative Datasets

We use the *IDA ansættelser* (IDAN) dataset to measure workers' annual earnings and hours worked, linked to firm identifiers. The data are available at the worker-firm-year level and cover all employees in Denmark. Earnings are defined as pre-tax labor income subject to labor taxation, and hours worked include all paid hours, both contractual and overtime. Information on each worker's highest attained education is obtained from the UDDA registry. Our analysis is conducted at the firm level (rather than the establishment level), as this corresponds to the survey's sampling unit. We use the *Generel firmastatistik* (FIRM) dataset to measure industry classification, revenue, profits, and fixed assets. All administrative registries used are maintained by Statistics Denmark.

2.3. Sample Description

When calculating firm-level wage measures, we apply the following sample restrictions. All earnings are converted to euros and deflated to 2010 prices using the Danish CPI. We restrict the sample to workers aged 20–60 for whom education information is available. We further exclude observations with fewer than 90 days of employment and fewer than 296 hours (corresponding to eight weeks of full-time work) in a given worker-firm-year. Additionally, we drop observations with fewer than 8 or more than 48 working hours per week.⁶ We also exclude observations with hourly wages below 7 EUR or above 1,000 EUR per hour, jobs in a small number of unusual industries, and self-employed workers.⁷ If workers hold multiple jobs in a given year, we keep the job with the highest annual earnings, breaking ties by hours worked and then by days employed. Finally, we restrict the sample to firms for which firm wage effects can be identified following Abowd, Kramarz and Margolis (1999) (AKM). The exact implementation is described in Section 3.1. The estimation sample for firm wage effects covers the period 2015–2021. Descriptive statistics for this sample are presented in Table A.1.

For the main analysis, we further restrict to firms that employed at least one worker and reported positive sales in each of the years 2019–2021. The column labeled “Population” in Table 1 reports descriptive statistics in 2021 for this sample.

In the column labeled “Surveyed”, we further restrict this population to firms with survey responses indicating both the respondent’s role and their perception of the firm’s wages relative to competitors. We additionally require that respondents report being responsible for, or knowledgeable about pay practices.⁸ The survey sample appears

⁶48 hours per week is the legal maximum over a four-month period (“48-timers reglen”). Note that we only observe reported hours.

⁷The excluded industries are: Public Sector, Extraction, Energy, Water Supply, Extraterritorial Organizations, and Unknown Industry. Due to the small number of firms in some industries, we combine finance and real estate. We also combine other services with arts, entertainment, and recreation.

⁸In Figure A.1, we validate that respondents are knowledgeable about their firms’ internal affairs by comparing their reported revenue changes to administrative records.

broadly representative of the target population.⁹ Based on the number of observations in Columns 1 and 2, the response rate for firms with linked survey and administrative data is 10.3 percent (2,889 out of 28,177).

2.4. Representativeness of Survey

We use an entropy-balancing estimator (Hainmueller and Xu 2013) to reweight observations such that key firm characteristics better match those of the overall firm population. The balancing variables include firm size (number of employees), firm age, sector (manufacturing, services, or other), average hourly wage, AKM firm wage premium, and an indicator for being located in Copenhagen. The column labeled “Surveyed (Weighted)” in Table 1 reports summary statistics for the reweighted sample. The reweighting improves the sample’s representativeness, and we apply these sampling weights in all subsequent analyses.¹⁰

Because all firms are legally required to maintain an active e-Boks account, the sampling frame coincides with the target population, and survey selection arises exclusively from nonresponse. To our knowledge, this type of population-wide sampling frame is rare in firm surveys (see Stantcheva (2023) for a discussion of nonresponse in survey-based research). Table 1 compares the full population of eligible firms to survey respondents. Differences along key dimensions (firm size, age, industry, wages, productivity, and location) are modest and largely eliminated after reweighting, suggesting limited scope for selection on observables. If firms with more informative wage beliefs were disproportionately likely to respond, we would expect strong selection along dimensions such as firm size and wage structure. However, Table 1 shows only modest selection along these dimensions. While other recent surveys (e.g., Caldwell et al. (2025a)) report a substantially higher response rate, Table 1 shows that our survey

⁹Differences between the population and survey samples are relatively small, especially for a non-mandatory firm survey. See, for example, Caldwell et al. (2025a) and Dutz et al. (2025) for comparable analyses using survey and administrative data.

¹⁰Appendix Table A.2 shows firm characteristics by their response to the main wage question.

achieves a close match to the population of firms along key observable characteristics, highlighting that response rates and representativeness need not coincide. More generally, response rates between 10 and 20 percent are common in recent voluntary firm surveys in labor economics targeting HR managers or firm decision-makers (e.g., Carry and Schoefer (2024), Hazell et al. (2025), and Caplin et al. (2023)). As with any voluntary survey, we cannot fully rule out selection on unobservables correlated with firms' beliefs. However, the absence of strong selection on observables, combined with population-wide sampling and reweighting, implies that any remaining selection would need to operate through channels not captured by the observable characteristics on which respondents and non-respondents are similar, and be systematically correlated with belief accuracy, in order to meaningfully affect our conclusions.

3. Firms' Knowledge about Their Position in the Wage Distribution

In this section, we compare firms' subjective beliefs about their wages to objective benchmarks and assess their accuracy. We also document heterogeneity in the informativeness of the firms' beliefs. We begin by describing the subjective and objective firm wage measures.

3.1. Subjective and Objective Measures of Firm Wage Levels

The survey elicits firms' beliefs about their position in the wage distribution through the following question: *"Do you think this firm offers lower or higher wages than competing firms in your industry? Competing firms are other employers that hire people with the same abilities in your region. If you are not sure, please give an estimate."* Respondents choose from five options: *"much lower," "lower," "about the same," "higher,"* and *"much higher."* The original Danish version of the questionnaire is provided in Appendix D. This wording is designed to isolate a specific belief, namely, firms' perceived relative wage position, while holding other factors constant. In particular, the question explicitly frames comparisons within

TABLE 1. Characteristics of the Target Population and Surveyed Firms

	Population	Surveyed	Surveyed (Weighted)
<u>Number of Employees (%)</u>			
1-10	36.4	30.2	33.2
11-50	49.1	51.1	52.0
51-200	11.4	14.5	12.1
201+	3.1	4.3	2.6
<u>Firm Age (%)</u>			
1-10 years	33.9	26.0	33.2
11+ years	66.1	74.0	66.8
<u>Industry (%)</u>			
Agriculture	2.1	1.7	2.5
Manufacturing	12.8	16.4	12.8
Construction	17.4	13.8	17.0
Trade	24.1	24.7	23.4
Transportation	4.9	5.2	5.0
Accommodation and Food Services	7.3	4.0	5.8
Information Services	7.0	8.1	7.7
Finance and Real Estate	3.6	3.5	3.1
Professional Services	8.7	11.4	10.3
Administration Services	5.7	6.2	6.6
Healthcare	3.5	2.8	3.0
Other Services	3.0	2.3	2.7
<u>Other Firm Characteristics</u>			
Mean Log Hourly Wage	3.3	3.4	3.3
Copenhagen area (%)	27.6	26.3	27.6
<u>From Survey (%)</u>			
Manager respondent		83.4	84.1
Lower wage		8.3	8.5
About the same		75.0	75.1
Higher wage		16.6	16.3
Observations	28,177	2,889	2,889

Notes: This table reports mean firm characteristics for the study population and survey sample. “Population”: All Danish limited liability companies in the listed industries. “Surveyed”: Survey respondents linked to administrative employer-employee data. “Surveyed (Weighted)”: Weighted using survey weights. All characteristics are measured in 2021. “Manager respondent” indicates the share of firms where the survey respondent identified as a manager. Rows under “From Our Survey” are not available for the “Population” column. All monetary values are in (log) EUR.

the same industry and defines competitors as employers hiring similar workers in the same region. This framing facilitates a direct comparison between subjective responses and administrative measures.

Our main objective measure of firm-level wages is the firm wage effect, $\psi_{j(i,t)}$, estimated using the Abowd-Kramarz-Margolis (AKM) model. This firm effect captures a time-invariant, firm-specific relative wage premium. Specifically, we estimate the following equation:

$$(1) \quad Y_{it} = X'_{it}\beta + \alpha_i + \psi_{j(i,t)} + \varepsilon_{it}$$

where Y_{it} denotes the log hourly wage of worker i in year t , and X_{it} includes quadratic and cubic terms in age, fully interacted with four education levels, and year-education level fixed effects.¹¹ α_i is a worker fixed effect (capturing time-invariant individual wage ability), $\psi_{j(i,t)}$ is a firm fixed effect, with $j(i,t)$ denoting the firm employing worker i in period t , and ε_{it} is an idiosyncratic error term that includes time-varying shocks to human capital, match quality, and other unobserved factors. In order to identify the firm wage effects, and to estimate the bias-corrected variance of these effects using the method developed by Kline et al. (2020), the sample is restricted to the largest leave-one-match-out connected set.

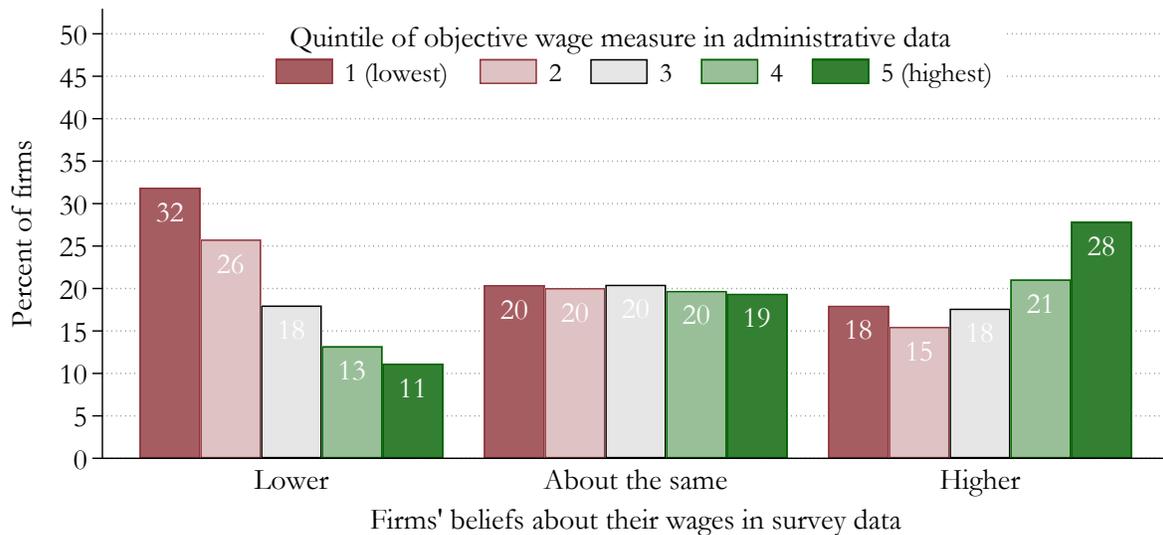
In the survey, a competitor firm is defined as a firm operating in the same industry and region, which we label as a market. We define regions using five administrative areas (corresponding to major local labor markets) and industries using the 12 categories listed in Table 1. As shown below, our results are robust to alternative definitions of markets and the objective wage measure.

¹¹The four groups are lower secondary; upper secondary and vocational training; bachelor's and short-cycle tertiary education; and Master's, Ph.D., or equivalents.

3.2. How informative are firms' beliefs about wages?

Figure 1 presents our first descriptive evidence of the informativeness of firms' beliefs. The x-axis displays survey responses grouped into three categories: “Lower”, “About the same,” and “Higher”. Responses in the extreme categories (“Much lower” and “Much higher”) are combined with “Lower” and “Higher”, respectively, due to the small number of observations. The y-axis shows the distribution of firms across industry-region quintiles of the objective wage measure.

FIGURE 1. Firms' Beliefs About Their Wages and Objective Wages



Notes: This figure shows the distribution of firms across quintiles of the objective wage measure, calculated from administrative data, grouped by firms' beliefs about their own wages relative to competitors as reported in the survey. The objective wage measure is the firm wage premium estimated from an AKM model (Eq. 1). Quintiles are calculated within industry–region cells. “Lower” refers to firms that believe they pay lower or much lower wages than their competitors, while “Higher” refers to firms that believe they pay higher or much higher wages. The sample is described in the “Surveyed (Weighted)” column in Table 1.

Among firms that believe they pay lower wages than other firms (around 8 percent of respondents), 32 percent are in the lowest quintile of the objective wage distribution, while only 11 percent are in the highest quintile. Firms reporting that they pay about the same as their competitors (around 75 percent of respondents) have a relatively uniform distribution across quintiles. Finally, among firms that report paying higher wages

(around 17 percent of respondents), the distribution is skewed towards higher quintiles of the objective wage measure: 28 percent are in the highest quintile, and 18 percent are in the lowest.¹² Based on Figure 1, firms' beliefs appear to be informative about their actual relative wages. However, an important feature of the figure is that firms reporting wages "about the same" as their competitors are not concentrated around the middle of the wage distribution; instead, they are dispersed across it, with around 20 percent in both the top and bottom quintiles. As shown in Table 1, about 75 percent of firms report that they pay about the same. Taken together, these results suggest that many firms hold relatively coarse or imprecise beliefs about their relative wage position, although they may also reflect the limited granularity of the survey scale.

To quantify the degree of informativeness, we now turn to estimating simple regression models of the following format:

$$(2) \quad y_j = \mu + \beta_1 \mathbf{1}[\text{Lower}_j] + \beta_2 \mathbf{1}[\text{Higher}_j] + \eta_j$$

where y_j is an objective measure of the firm's position in the relevant wage distribution, such as the rank, or an indicator for being in a certain quantile of the distribution. We regress these measures on indicators for a firm thinking it pays "Higher" or "Lower" wages than its competitors, with "About the same" being the omitted category. The results are shown in Table 2. Throughout the analysis, we measure belief informativeness as the difference between the coefficients on "Higher" and "Lower", i.e., $\hat{\beta}_2 - \hat{\beta}_1$ in Equation 2. Panel (I) shows the results from the baseline specification where the objective wage measure is the estimated firm wage effects and the ranking is based on the within industry-region cell. The results confirm that the positions differ across firms' beliefs: Firms that think they pay "Lower" are on average 11.5 percentiles lower in the objective distribution; firms that think they pay "Higher" are on average 5.9 percentiles higher in the objective distribution; the resulting "Lower"- "Higher" difference is around 17.5

¹²For completeness, Figure A.2 reports the empirical CDF of firm wage effects by survey answer.

percentiles. The *"Lower"*-*"Higher"* difference in the probability of being in the top half of the distribution is close to 30 percentage points. To put this in perspective, firms that believe they pay higher wages are almost twice as likely to be in the top half of the distribution compared to firms that believe they pay lower wages. The *"Lower"*-*"Higher"* difference in the probability of being in the top decile is around 10 percentage points, and around -10 percentage points for the bottom decile. This means that firms that believe they pay higher wages are almost three times as likely to be in the top decile compared to firms that believe they pay lower wages, while firms that believe they pay lower wages are more than twice as likely to be in the bottom decile. All of the *"Lower"*-*"Higher"* differences are statistically significant at the 5 percent significance level. Panel (II) shows the results using an alternative objective wage measure: the residuals from a regression of mean log hourly wage in 2021 on the share of college-educated workers and average age of workers. In this specification, the *"Lower"*-*"Higher"* differences are larger: The percentile difference is close to 25 and the *"Lower"*-*"Higher"* difference in the probability of being in the top half of the distribution is close to 35 percentage points. Overall, the results from Table 2 confirm that the firms' subjective beliefs are informative about their position in the objective wage distribution.

We conduct a range of robustness tests that are reported in Table A.3. In Panels A.3(I) and A.3(II) we vary the market definition used to calculate the wage distribution, still using the firm wage effects as objective wage measure. In Panel A.3(I) the position is based on the overall distribution for all firms (as opposed to within industry-region). In Panel A.3(II), we use the approach of Schmutte (2014) to endogenously delineate markets based on worker flows, and calculate the position based on the distribution within these markets. We provide descriptive statistics for the different market specifications in Table A.6. Panel A.3(III) reports the result for a sample restricted to firms with at least 10 worker movements (arrivals or departures) during the sample period. This restriction is relevant because the estimated firm wage effects for firms with few movers might be

noisy. This will in turn bias our estimates of firms’ position in the wage distribution. Panel A.3(IV) uses raw mean log hourly wage in 2021 as the objective wage measure; Panel A.3(V) calculates the position based on the employment-weighted distribution of firm wage effects; Panel A.3(VI) calculates the position based on the employment-weighted distribution of regression-adjusted wages. Reassuringly, results across all six alternative specifications are consistent with results reported in Table 2. See Figure A.3 for similar robustness checks for Figure 1.

TABLE 2. Firms’ Beliefs and Position in the Wage Distribution

	(I) Firm Wage Effects				(II) Adjusted Mean Log Wage			
	Rank	Top 50%	Top 10%	Bottom 10%	Rank	Top 50%	Top 10%	Bottom 10%
Constant (About the same)	49.780*** (0.659)	0.503*** (0.011)	0.086*** (0.006)	0.097*** (0.007)	47.328*** (0.665)	0.460*** (0.011)	0.076*** (0.006)	0.110*** (0.008)
Lower	-11.540*** (1.957)	-0.188*** (0.032)	-0.031* (0.017)	0.082*** (0.028)	-13.001*** (1.950)	-0.169*** (0.031)	-0.040*** (0.012)	0.129*** (0.032)
Higher	5.931*** (1.601)	0.093*** (0.026)	0.068*** (0.018)	-0.015 (0.016)	11.598*** (1.523)	0.180*** (0.026)	0.070*** (0.017)	-0.038** (0.016)
Observations	2,889	2,889	2,889	2,889	2,889	2,889	2,889	2,889

Notes: The table reports OLS estimates of Equation 2 regressing measures of firms’ position in the wage distribution on survey beliefs about relative pay. The baseline category is firms that believe they pay "About the same" as competitors, captured by the constant. *Lower* and *Higher* report the deviation from this baseline for firms that believe they pay below or above competitors, respectively. Panel (I) uses firm wage effects from an AKM decomposition as the wage measure (Equation 1), while Panel (II) uses the residuals from regressing mean log hourly wage in 2021 on the share of college-educated workers and average age of workers using OLS. Within each panel, *Rank* is the firm’s position in the market (industry–region) wage distribution, scaled from 0 to 100, *Top 50%*, *Top 10%*, and *Bottom 10%* are indicator variables for whether the firm is in the respective part of the distribution. The sample is described in “Surveyed (Weighted)” column in Table 1. Heteroskedasticity-robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

3.3. Heterogeneity in Belief Informativeness Across Market Characteristics

Having established that firms’ beliefs are on average informative about their objective position in the wage distribution, we now turn to studying heterogeneity in the degree of informativeness. We do this by examining how the degree of informativeness varies across labor markets with different characteristics. Specifically, we use a regression

model of the following form:

$$(3) \quad y_j = \mu + \theta_1 \mathbf{1}[\text{About the same } j] + \theta_2 \mathbf{1}[\text{Higher } j] + \sum_{q \in \mathcal{Q}} \gamma_q D_{jq} \\ + \sum_{q \in \mathcal{Q}} \delta_{1q} \mathbf{1}[\text{About the same } j] \times D_{jq} + \sum_{q \in \mathcal{Q}} \delta_{2q} \mathbf{1}[\text{Higher } j] \times D_{jq} + \eta_j$$

where D_{jq} indicates whether firm j is in quantile q of the market characteristic distribution, with the bottom quantile as the baseline, and \mathcal{Q} is the set of non-baseline quantiles, i.e., the top half for a binary split and the middle and top tercile for a tercile split. The coefficient δ_{2q} for the top quantile captures the change in the "Lower"- "Higher" difference when moving from the bottom to the top quantile.

We focus on market characteristics that are plausibly related to how important wage-setting decisions are and/or the availability of information on competitors' wages. The motivation behind this is that if collecting information on competitors' wages is costly, firms will be more likely to do so in markets where the benefit of having this information is higher. We consider five market characteristics, for which we estimate Equation 3 separately: (i) labor churn, (ii) profit margin, (iii) capital intensity, (iv) market concentration, and (v) average firm size. We now describe each in turn.

Labor churn. The gross job reallocation rate (Davis and Haltiwanger 1992), i.e., the sum of job creation and destruction divided by total employment in the market in 2021. Markets with high churn have higher worker mobility, potentially making it more important for firms to monitor competitors' wages to attract and retain workers. In markets with higher turnover, firms also generally hire more frequently. This may expose them to information about competitors' wages and lead to more informative beliefs.

Profit margin. The aggregate profit margin, measured as the ratio of total operating profits to total revenue within the market in 2021. In low-margin markets, firms operate

with less financial buffer, possibly making the consequences of wage-setting mistakes more severe. This can create stronger incentives to monitor competitors' wages carefully, potentially leading to more informative beliefs about relative pay.

Capital intensity. Aggregate capital intensity, measured as total fixed assets divided by the total number of full-time equivalent workers in the market. Where capital intensity is high, labor might be a less critical input, which may reduce the incentive to carefully monitor competitors' wages.

Market concentration. The Herfindahl-Hirschman Index (HHI) of employment shares in 2021. In concentrated markets, firms may enjoy more market power when setting wages. As highlighted by Dube et al. (2025), this can make misoptimizations less costly, potentially weakening firms' incentives to gather information on competitors' wages.

Average firm size. The mean number of full-time equivalent workers per firm in 2021. Larger firms may have more well-established HR departments that systematically collect information on market wages. At the same time, they may draw workers from a wider range of occupations, making it harder to track all relevant information about competitors' wages.

All five characteristics are calculated at the market (industry-region) level using administrative data, and firms are assigned to the top or bottom half and top, middle, or bottom tercile of the characteristic distribution across markets. Descriptive statistics for each characteristic by quantile group are reported in Table A.7.

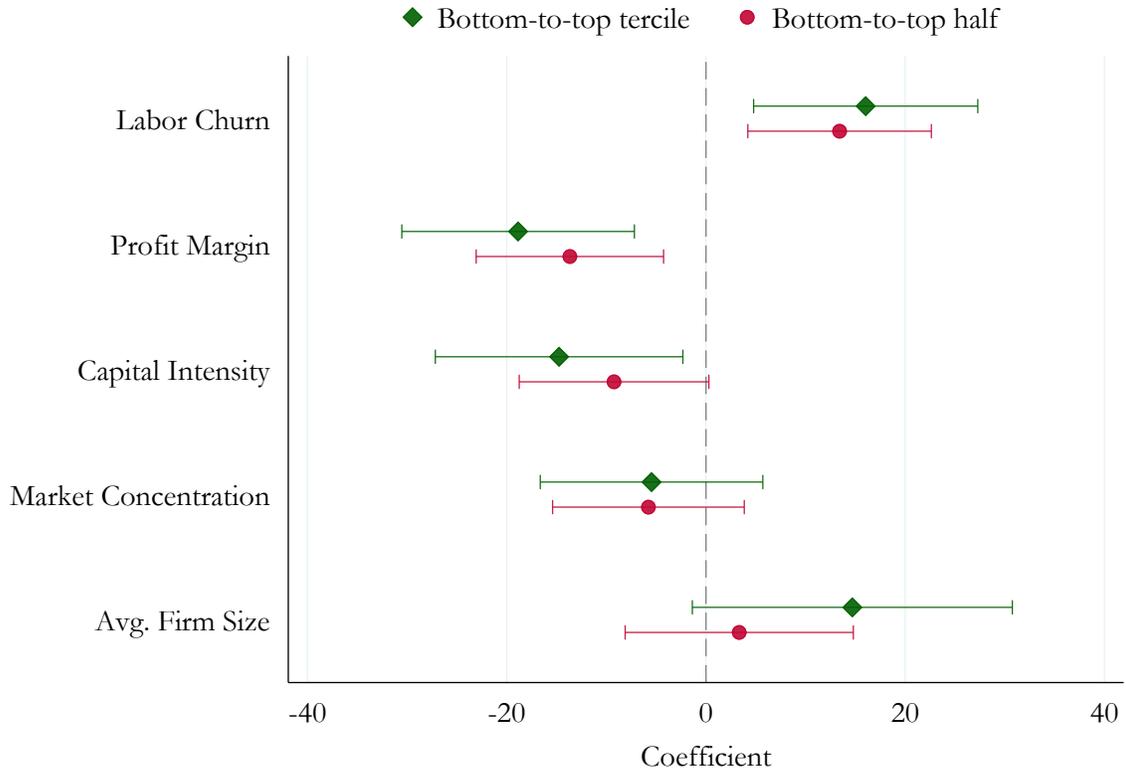
Figure 2 reports δ_{2q} for the top quantile. A positive coefficient indicates that beliefs become more informative when moving from the bottom to the top quantile of the market characteristic. Additionally, the full set of estimated coefficients is reported in Tables A.5 and A.4. For labor churn, we find a large positive and statistically significant coefficient, indicating that beliefs are substantially more informative in high-churn mar-

kets. This is consistent with the idea that firms in high-turnover markets have stronger incentives to monitor competitors' wages and are more frequently exposed to information about them through the hiring process. The differences in the "Lower" - "Higher" difference are large, around 15 percentiles for both the tercile and binary split. As seen from Table A.4, this corresponds to the difference increasing by a factor of around 2.3. The estimated coefficients for profit margins are negative and statistically significant, suggesting that beliefs are less informative in high-margin markets. As argued above, this is consistent with low-margin markets creating stronger incentives for firms to carefully monitor competitors' wages. As with labor churn, the magnitudes of estimates are large, close to 20 percentiles for the tercile split. The corresponding estimates for capital intensity are also negative, suggesting that beliefs are less informative in capital-intensive markets. The magnitudes are also large, around 15 percentiles, although in this case the change in differences for the binary split is not statistically significant. For market concentration, the estimates are negative, in line with the intuition described above. However, the magnitudes are smaller than for the other market characteristics and are statistically insignificant for both splits. Finally, for average firm size, the estimates are positive but statistically insignificant. Overall, the results suggest that belief informativeness is not uniform across markets. Beliefs tend to be more informative in markets where the stakes of wage-setting decisions are likely higher, as proxied by high labor churn, low profit margins, and low capital intensity, while we find less consistent evidence for the role, if any, of market concentration and average firm size.

4. Firms' Wage-Setting Motives

In this section, we investigate the motives behind firms' decisions to set wages above or below those of their competitors. While there is compelling evidence that firms have some discretion regarding wage setting (e.g., Lachowska et al. (2022), Kline (2024)), their reasons for choosing a particular policy vary across models. Efficiency wage models

FIGURE 2. Heterogeneity in Belief Informativeness Across Market Characteristics



Notes: The figure reports OLS estimates of the coefficient δ_{2q} from Equation 3, which captures the change in the "Lower"- "Higher" belief difference in firms' position in the market (industry-region) wage distribution, scaled from 0 to 100, when moving from the bottom to the top quantile of the market characteristic distribution. Each characteristic is defined at the market level, and firms are assigned to quantiles based on the distribution of their market's characteristic value. The market characteristics are defined in Section 3.3 and descriptive statistics are reported in Table A.7. Circles indicate estimates based on a binary top/bottom half split; diamonds indicate estimates based on a tercile split. Each coefficient is estimated from a separate regression per market characteristic. The sample is described in the "Surveyed (Weighted)" column in Table 1. The error bars show 95 percent confidence intervals based on heteroskedasticity-robust standard errors. The full set of estimated coefficients are reported in Tables A.5 and A.4.

(e.g., Katz (1986)) posit that firms deliberately set wages based on the assumption that worker productivity is positively correlated with compensation. Firms offer higher wages to enhance employee motivation or minimize monitoring costs. In wage-posting models (e.g., Burdett and Mortensen (1998)), firms use their wage policy to attract new workers and dissuade incumbent workers from leaving for competitors in a frictional labor market. In the Diamond-Mortensen-Pissarides framework (e.g., Pissarides (2000)) (DMP), wages are determined through bargaining between employers and employees. The negotiated wage depends on the worker's outside options and the firm's surplus (proxied by productivity). Consequently, wage variation across firms is closely linked to differences in surplus. Wage differentials may also reflect compensating differentials for negative, unobservable job characteristics (e.g., Rosen (1986)).

Rather than testing a specific wage-setting model, our objective is to document how firms themselves articulate the motives behind their wage policies. This evidence helps discipline modeling assumptions by highlighting which margins firms emphasize in practice.

4.1. Characterizing Motives for Wage-Setting Strategies

Following the assessment of firms' positions within the wage distribution, we surveyed those firms that reported paying "*Higher*" or "*Much higher*" wages than their competitors to determine the motives behind these wage policies. Respondents were asked to indicate their level of agreement with the following statements: "*We want to compensate for negative aspects of the job (job insecurity, working conditions, etc.)*", "*We want to attract the best candidates*", "*We want to hire quickly*", "*We want to ensure reliable employees who do not change jobs often*", "*We want to increase employee morale*", "*We want to reduce the need to control and monitor employees*", "*We want to share the high earnings we generate with the employees*".¹³

¹³The possible responses were "Strongly disagree", "Disagree", "Neither agree nor disagree", "Agree", and "Strongly agree". We combine "Strongly disagree" with "Disagree" and "Agree" with "Strongly agree"

The responses are shown in Figure 3. Over 90 percent of firms reporting higher wages cite retention and attraction motives, indicating that they view wages as an important tool shaping workers' job search and mobility decisions. This finding is consistent with wage-posting models (Burdett and Mortensen 1998), but it is also compatible with bargaining models in which higher wages improve retention by strengthening workers' attachment to the firm. Almost no firms disagree with these statements.

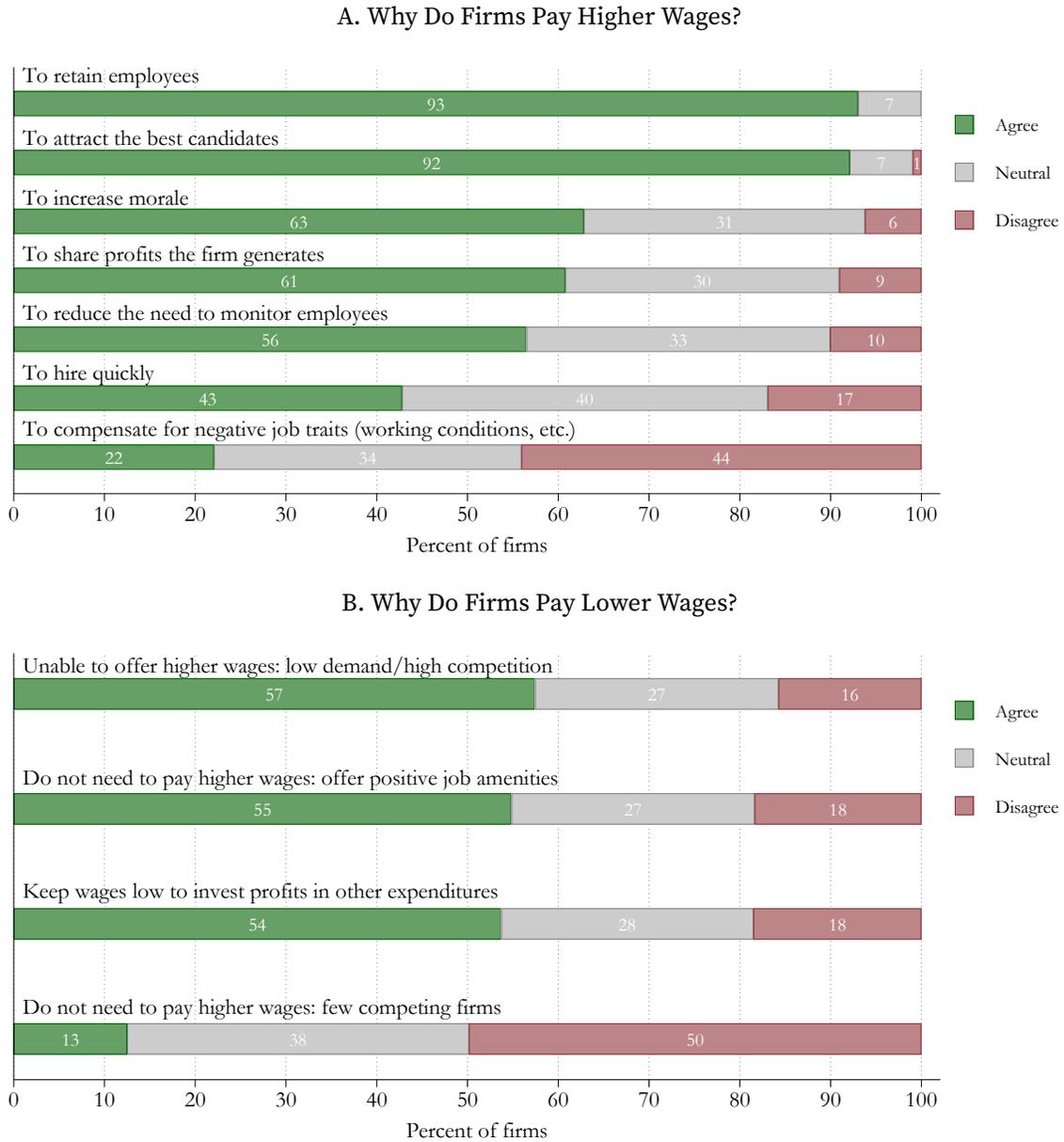
About 40 percent of firms report offering higher wages to hire quickly, while close to 20 percent disagree. This relatively lower emphasis on hiring speed suggests that, for many firms, wages are used more as a longer-term retention and attraction device than as a short-run instrument to accelerate hiring. This pattern is consistent with the empirical evidence of Mueller et al. (2023) and contrasts with models in which hiring speed is the primary determinant of wage-setting decisions.

Roughly two-thirds of firms indicate that they pay higher wages to boost employee morale and reduce the need for monitoring, in line with efficiency wage theories (e.g., Katz 1986). Moreover, 60 percent of firms cite a desire to share high profits with their employees as a motivation for higher wages, and about 10 percent disagree. Overall, the evidence is broadly consistent with the differentiated demand model (Card et al. 2018) and the DMP framework, where a firm's wage is directly related to its productivity level.

Similarly, firms that reported paying "*Lower*" or "*Much lower*" wages than their competitors were asked to explain their wage policies. They were asked whether they agreed, were neutral, or disagreed with the following statements: "*We cannot pay higher wages (low demand for our products/services or high level of competition),*" "*We do not need to pay high wages as there are few competing employers,*" "*We do not have to pay high wages as we can offer a lot of valuable facilities that compensate for higher wages (job security, work environment, etc),*" and "*We need to keep wages low to invest the profit we generate in other strategic priorities (e.g., research and development, marketing).*".

due to the small number of observations. We label "Neither agree nor disagree" and non-responses as neutral.

FIGURE 3. Motives for Offering Higher or Lower Wages



Notes: Panel A shows responses to the question “Why do you offer higher wages than others in your industry? Please state your position on the following statement.” (shown to firms reporting higher wages than competitors; see Figure 1). Nonresponses are coded as “Neutral”. “Disagree” was merged with “Neutral” for the item “To retain employees” to comply with Statistics Denmark’s disclosure rules ($N = 481$). Panel B shows the corresponding question for firms reporting lower wages ($N = 241$). The sample is described in the “Surveyed (Weighted)” column in Table 1.

Overall, there is less clear agreement among firms that declare that they pay lower wages than their competitors. About 57 percent of low-wage-paying firms report being unable to offer higher wages due to low product demand or intense market competition. Only 16 percent of firms disagree with this statement. About 55 percent of firms state that they do not need to pay higher wages since they offer other amenities, while 18 percent disagree. Conversely, fewer than 15 percent of these firms state that they do not need to raise wages because competition from other employers is limited. More than half of the firms that say they pay lower wages think that paying high wages is unnecessary because they offer positive job amenities. This is consistent with recent work on amenities and firm wage premiums (e.g., Humlum et al. (2025); Palladino et al. (2025)).

5. Conclusion

While a large body of literature demonstrates that firms have some degree of wage-setting power, the empirical evidence on how firms exercise this power in practice remains limited. As Card (2022) notes:

“Once we accept that firms set wages, the analysis of wage setting becomes a part of labor economics, just like the analysis of price setting is a part of IO. Right now, much of the practical discussion of wage setting is done by noneconomists.”

To advance our understanding of why similar workers are paid differently, we provide, to our knowledge, the first large-scale, direct evidence on how employers perceive their wage-setting behavior and the motives behind offering higher or lower wages relative to other firms. We do this using a representative survey of approximately 2,900 Danish firms linked to administrative data.

Our findings offer several insights that are valuable to both theoretical and empirical

research on wage determination. First, we show that firms' beliefs are informative about the observed position in the objective wage distribution, and that their beliefs are more informative in industries where wage-setting decisions are likely more important. However, a notable result is that 75 percent of firms report paying wages "*About the same*" as their competitors. This could suggest that many firms hold relatively coarse beliefs about their relative wage position. Second, we document that the most commonly reported motivation for paying higher wages is the desire to attract new candidates and retain incumbent employees. In addition, firms report that variation in positive or negative amenities also matters for explaining wage differences.

Beyond their academic relevance, our results may be informative for policymakers. By reducing information frictions on the employer side, the forthcoming EU Pay Transparency Directive may affect both wage-setting behavior and wage inequality.

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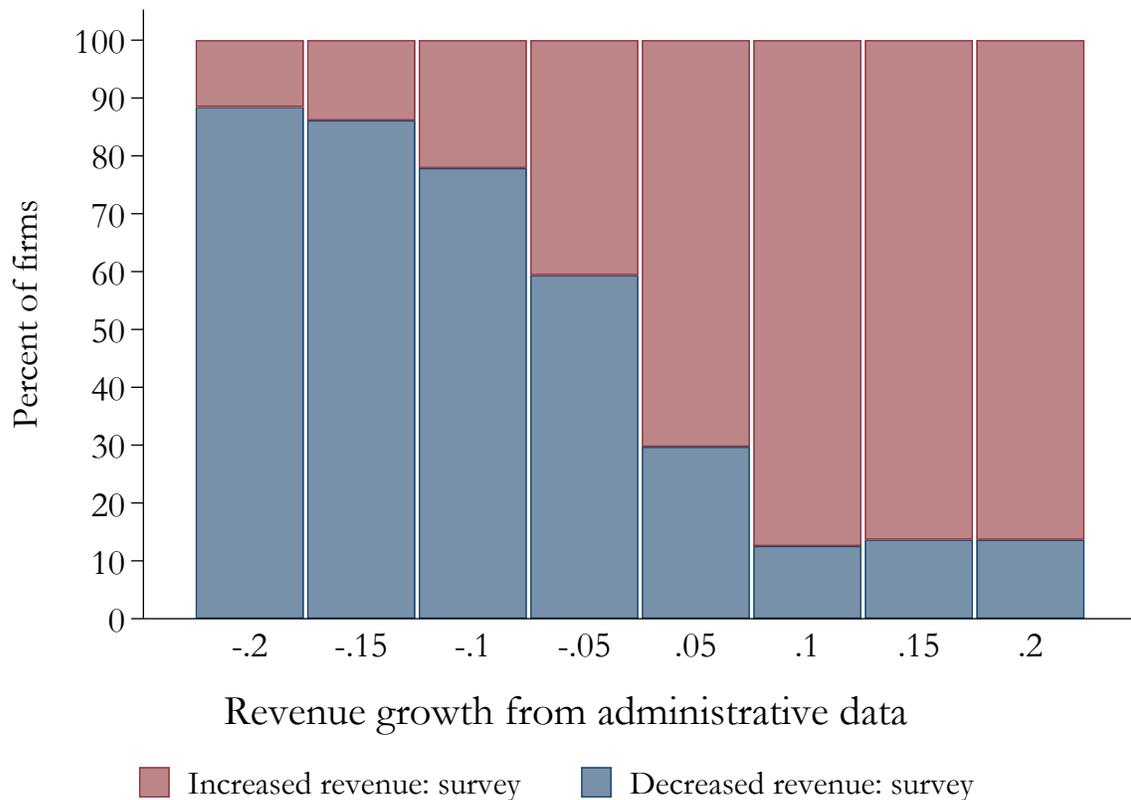
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Appendix

A. Additional Figures and Tables

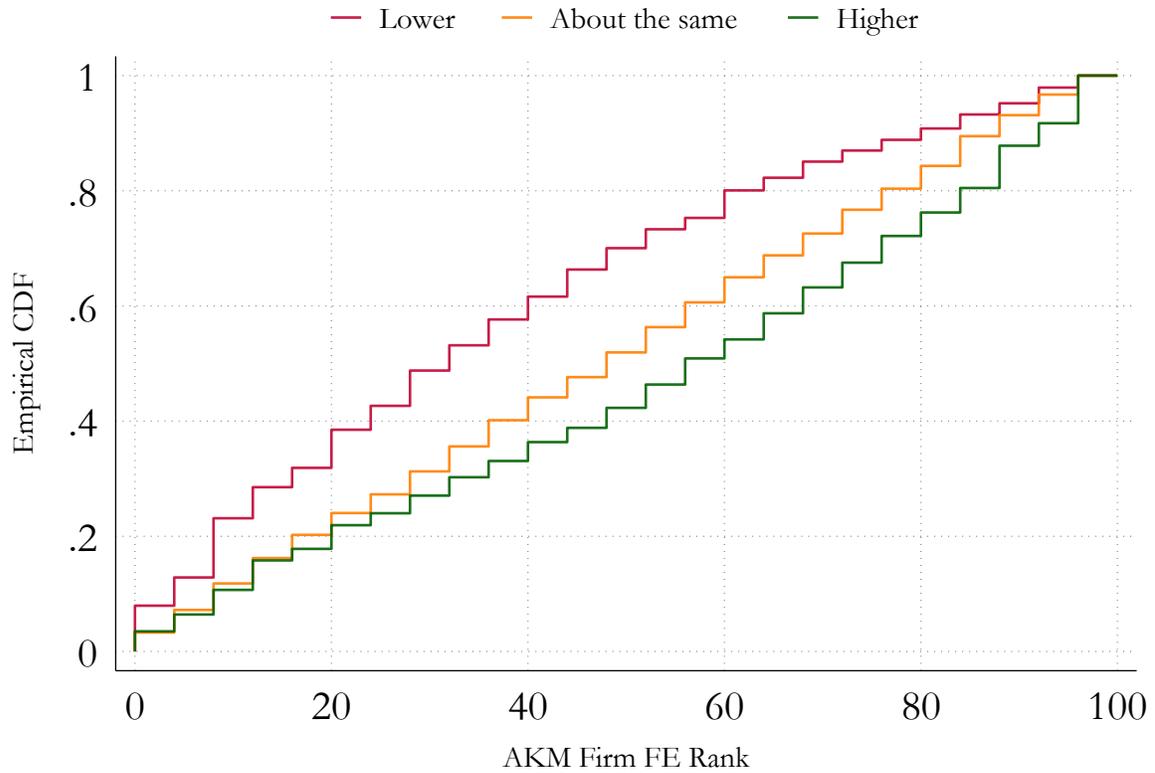
A.1. Figures

FIGURE A.1. Validating Survey: Revenue Change in the Survey and Administrative Data



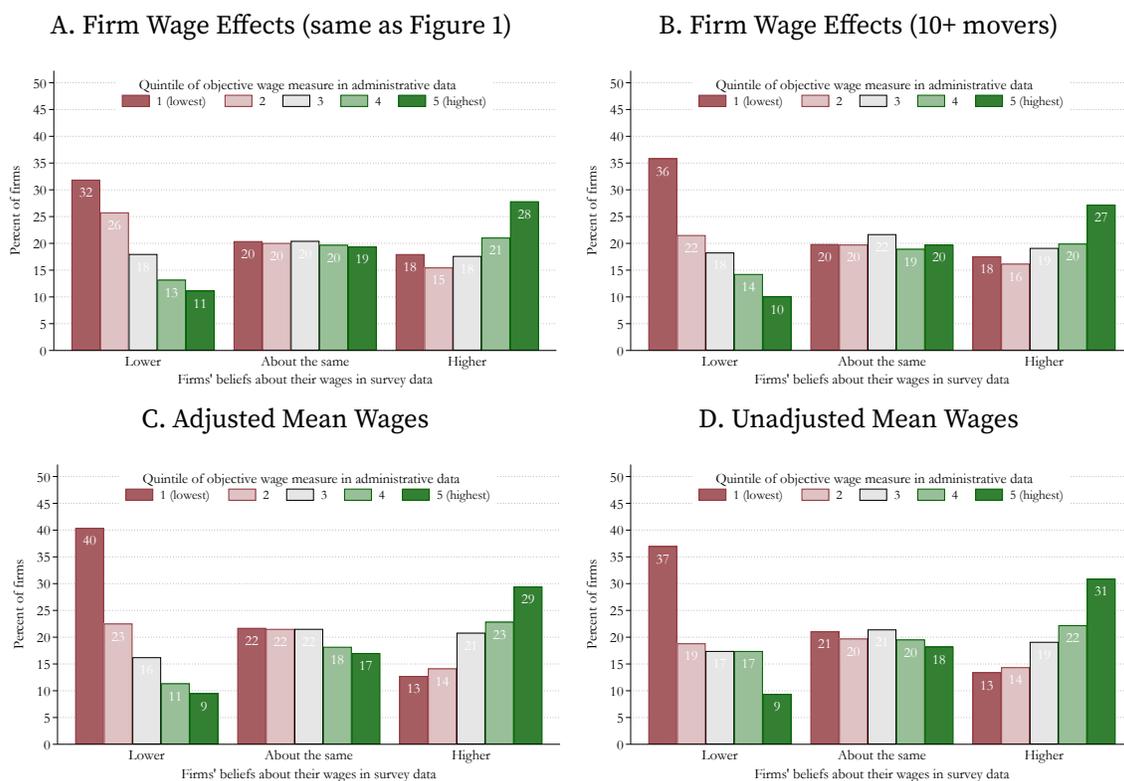
Notes: This figure shows the percentage of firms that, in the survey, reported revenue increases or decreases between 2019 and 2020, grouped into bins defined by revenue changes in administrative firm-level data (FIRM, described in Section 2.2). All firms with revenue growth above 20 percent or below -20 percent are grouped into the most extreme bins. Firms in the top percentile of the 2021 revenue distribution have been removed to comply with Statistics Denmark's disclosure rules. The sample is restricted to firms that reported either a revenue increase or decrease, excluding firms that reported no change ($N = 2,140$).

FIGURE A.2. Empirical Distribution of Firm Wage Effects by Firms' Beliefs



Notes: The figure reports the empirical cumulative distribution function (CDF) of firms' rank in the market (industry-region) wage distribution, scaled from 0 to 100, separately by survey belief category, weighted using survey weights. The rank is based on firm wage effects from the AKM decomposition (Equation 1). To comply with disclosure rules, the distribution is approximated using 25 equal-length bins of width 4. The sample is described in the "Surveyed (Weighted)" column in Table 1.

FIGURE A.3. Alternative Measures of Objective Wages



Notes: This figure shows the distribution of firms across quintiles of an objective wage measure, calculated from administrative data, grouped by firms' beliefs about their own wages as reported in the survey. Panel A uses firm wage effects, as in Figure 1; Panel B restricts the sample to firms with at least ten movers to assess potential noise in the AKM estimates; Panel C uses the residuals from regressing mean log hourly wage in 2021 on the share of college-educated workers and average age of workers using OLS; Panel D uses unadjusted mean wages. Quintiles are calculated within industry-region cells. The sample is described in "Surveyed (Weighted)" column in Table 1.

A.2. Tables

TABLE A.1. AKM Variance Decomposition of Log Hourly Wages

	Baseline Sample	10+ Movers Sample
Number of Observations	10,032,967	9,473,497
Number of Firms	115,909	62,516
Number of Workers	2,223,471	2,128,334
Firm Switchers (pct.)	41.46	39.24
Avg. Number of Firms	1.60	1.55
<i>Log Hourly Wage Distribution</i>		
Std. Dev.	0.384	0.383
Std. Dev. (Residual)	0.359	0.357
Std. Dev. of Firm Effects	0.112	0.101
Std. Dev. of Firm Effects (Bias-Corrected)	0.097	0.091
Std. Dev. of Worker Effects (Bias-Corrected)	0.207	0.215
Share of Variance Explained by Firm Effects	0.063	0.056

Notes: This table reports the estimated variance components after fitting the AKM model in Equation 1 to log hourly wages. The model includes controls for quadratic and cubic terms in age, fully interacted with four education levels, and year-education level fixed effects. “Firm Switchers (pct.)” indicates the percentage of workers who switch firms at least once during the sample period. “Avg. Number of Firms” indicates the average number of firms at which a worker is employed during the sample period. Variance components are corrected using the leave-match-out bias correction of Kline et al. (2020). “Baseline Sample” refers to the decomposition based on the sample described in Section 2.3. “10+ Movers Sample” refers to a sample additionally restricted to firms that have at least 10 worker movements (arrivals or departures) during the sample period.

TABLE A.2. Firms' Characteristics Across Survey Responses

	"Lower"	"About the same"	"Higher"	Total
<u>Number of Employees (%)</u>				
1-10	38.9	33.6	28.5	33.2
11-50	47.3	51.1	58.8	52.0
51+	13.8	15.3	12.7	14.7
<u>Other Firm Characteristics</u>				
Mean Log Hourly Wage	3.3	3.3	3.4	3.3
AKM Wage Effects (Q4)	14.9	24.4	33.5	25.1
Manufacturing (%)	14.7	13.3	9.7	12.8
Services (%)	73.2	65.5	75.0	67.7
Other sectors (%)	12.1	21.2	15.3	19.5
Copenhagen area (%)	41.3	25.6	29.2	27.6
Observations	241	2,167	481	2,889

Notes: This table reports the mean of firm characteristics by survey response, weighted using survey weights. The means are based on the sample described in the “Surveyed (Weighted)” column in Table 1. “Number of Employees” rows report the share of firms in each size category, summing to 100 within each column. “Mean Log Hourly Wage” refers to the mean in 2021. “AKM Wage Effects (Q4)” reports the share of firms in the top quartile of the AKM firm wage effect distribution within their market. All monetary values are in (log) EUR.

TABLE A.3. Firms' Beliefs and Position in the Wage Distribution: Additional Specifications

	(I) Firm Wage Effects (Single Market)				(II) Firm Wage Effects (Flow-based Markets)			
	Rank	Top 50%	Top 10%	Bottom 10%	Rank	Top 50%	Top 10%	Bottom 10%
Constant (About the same)	49.896*** (0.660)	0.499*** (0.011)	0.092*** (0.007)	0.095*** (0.007)	49.746*** (0.662)	0.493*** (0.011)	0.086*** (0.006)	0.095*** (0.007)
Lower	-11.971*** (1.954)	-0.191*** (0.032)	-0.053*** (0.014)	0.086*** (0.029)	-12.414*** (1.941)	-0.201*** (0.032)	-0.037** (0.016)	0.092*** (0.028)
Higher	5.506*** (1.598)	0.076*** (0.026)	0.075*** (0.019)	-0.005 (0.016)	5.512*** (1.604)	0.081*** (0.026)	0.069*** (0.018)	0.006 (0.017)
Observations	2,889	2,889	2,889	2,889	2,889	2,889	2,889	2,889
	(III) Firm Wage Effects (10+ Movers)				(IV) Unadjusted Mean Log Wage			
	Rank	Top 50%	Top 10%	Bottom 10%	Rank	Top 50%	Top 10%	Bottom 10%
Constant (About the same)	49.885*** (0.682)	0.503*** (0.012)	0.086*** (0.007)	0.099*** (0.007)	48.909*** (0.670)	0.490*** (0.011)	0.078*** (0.006)	0.101*** (0.008)
Lower	-11.815*** (2.025)	-0.177*** (0.034)	-0.038** (0.016)	0.099*** (0.030)	-10.945*** (2.005)	-0.142*** (0.033)	-0.034** (0.013)	0.110*** (0.032)
Higher	5.503*** (1.661)	0.092*** (0.027)	0.072*** (0.019)	-0.011 (0.017)	10.096*** (1.546)	0.143*** (0.026)	0.094*** (0.018)	-0.043*** (0.015)
Observations	2,642	2,642	2,642	2,642	2,889	2,889	2,889	2,889
	(V) Firm Wage Effects (Employment-weighted)				(VI) Adjusted Mean Log Wage (Employment-weighted)			
	Rank	Top 50%	Top 10%	Bottom 10%	Rank	Top 50%	Top 10%	Bottom 10%
Constant (About the same)	38.629*** (0.727)	0.337*** (0.011)	0.098*** (0.007)	0.246*** (0.010)	39.188*** (0.702)	0.360*** (0.011)	0.081*** (0.006)	0.240*** (0.011)
Lower	-12.577*** (2.038)	-0.140*** (0.028)	-0.048*** (0.016)	0.146*** (0.035)	-13.412*** (1.996)	-0.141*** (0.028)	-0.040*** (0.013)	0.231*** (0.035)
Higher	7.814*** (1.795)	0.099*** (0.026)	0.084*** (0.019)	-0.019 (0.023)	13.538*** (1.680)	0.185*** (0.026)	0.087*** (0.018)	-0.101*** (0.021)
Observations	2,889	2,889	2,889	2,889	2,889	2,889	2,889	2,889

Notes: The table reports OLS estimates of Equation 2 regressing measures of firms' position in the wage distribution on survey beliefs about relative pay. The baseline category is firms that believe they pay *about the same* as competitors, captured by the constant. *Lower* and *Higher* report the deviation from this baseline for firms that believe they pay below or above competitors, respectively. Panel (I) is similar to the baseline specification (Table 2 Panel (I)), but uses the position in the single aggregate labor market instead of within industry-region; Panel (II) is similar to the baseline specification, but uses the position in flow-based labor markets instead of within industry-region (The construction of flow-based market is based on the approach by Schmutte (2014) and descriptive statistics for the different market specifications are provided in Table A.6); Panel (III) is similar to the baseline, except that the sample is restricted to firms that have at least 10 worker movements (arrivals or departures) during the sample period; Panel (IV) is similar to the baseline, except that positions are based on the raw mean hourly wage in 2021, using the baseline market definition (industry-region); Panel (V) is similar to the baseline specification, except that it uses the position in the employment-weighted (FTE) distribution of firm wage effects within industry-region; Panel (VI) is similar to the alternative specification (Table 2 Panel (II)), except that it uses the position in the employment-weighted (FTE) distribution of regression-adjusted mean wages within industry-region. Within each panel, *Rank* is the firm's position in the relevant market wage distribution, scaled from 0 to 100, *Top 50%*, *Top 10%*, and *Bottom 10%* are indicator variables for whether the firm is in the respective part of the distribution. The sample is described in the "Surveyed (Weighted)" column in Table 1. Heteroskedasticity-robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A.4. Heterogeneity in Belief Informativeness Across Markets: Tercile Split

	Industry characteristic used for split				
	(1) Labor Churn	(2) Profit Margin	(3) Capital Intensity	(4) Market Concentration	(5) Avg. Firm Size
About the same (Survey)	9.574*** (2.985)	14.324*** (3.136)	20.545*** (4.190)	12.868*** (2.844)	-0.601 (7.034)
Higher (Survey)	11.900*** (3.644)	24.275*** (3.733)	29.619*** (5.119)	22.038*** (3.304)	0.979 (7.592)
Middle Tercile (Characteristic)	0.760 (4.391)	-3.355 (4.620)	10.113** (5.139)	4.691 (4.578)	-20.828*** (7.386)
Top Tercile (Characteristic)	-10.569** (4.226)	8.465* (4.375)	10.314** (4.763)	0.411 (4.292)	-10.870 (7.145)
About the same (Survey) × Middle Tercile (Characteristic)	-0.929 (4.630)	2.174 (4.867)	-10.107* (5.438)	-6.313 (4.850)	19.513** (7.727)
About the same (Survey) × Top Tercile (Characteristic)	8.561* (4.587)	-10.443** (4.700)	-11.284** (5.090)	0.987 (4.584)	10.614 (7.456)
Higher (Survey) × Middle Tercile (Characteristic)	3.704 (5.476)	-2.782 (5.668)	-13.715** (6.475)	-12.559** (5.730)	27.213*** (8.567)
Higher (Survey) × Top Tercile (Characteristic)	16.033*** (5.738)	-18.859*** (5.954)	-14.744** (6.337)	-5.465 (5.697)	14.692* (8.192)
Constant	40.781*** (2.796)	36.455*** (2.937)	29.656*** (3.934)	37.072*** (2.690)	50.948*** (6.757)
Observations	2,889	2,758	2,758	2,889	2,889

Notes: The table reports OLS estimates of Equation 3 for the tercile split, with the bottom tercile as the baseline group and *Lower* as the baseline belief category. Each column corresponds to a separate regression using a different market characteristic to define the terciles. The market characteristics are defined at the market (industry-region) level, as described in Section 3.3, and descriptive statistics are reported in Table A.7. In all columns, the dependent variable is the firm's rank, scaled from 0 to 100, in the within market distribution of firm wage effects. The coefficients of interest, *Higher* × *Top Tercile*, are plotted in Figure 2. The sample is described in the "Surveyed (Weighted)" column in Table 1. The number of observations varies as not all characteristics are available for some industries. Heteroskedasticity-robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A.5. Heterogeneity in Belief Informativeness Across Markets: Binary Split

	Industry characteristic used for split				
	(1) Labor Churn	(2) Profit Margin	(3) Capital Intensity	(4) Market Concentration	(5) Avg. Firm Size
About the same (Survey)	8.765*** (2.626)	14.667*** (2.780)	15.098*** (3.111)	11.341*** (2.518)	9.074* (4.644)
Higher (Survey)	11.922*** (3.088)	24.107*** (3.286)	22.928*** (3.587)	19.215*** (2.937)	14.775*** (5.192)
Above Median (Characteristic)	-9.524*** (3.603)	7.100* (3.748)	6.215 (3.818)	-0.014 (3.708)	-2.938 (4.907)
About the same (Survey) × Above Median (Characteristic)	6.675* (3.845)	-6.285 (3.976)	-5.682 (4.042)	0.617 (3.951)	3.009 (5.122)
Higher (Survey) × Above Median (Characteristic)	13.413*** (4.698)	-13.663*** (4.796)	-9.229* (4.854)	-5.777 (4.905)	3.339 (5.840)
Constant	42.286*** (2.490)	34.876*** (2.624)	34.539*** (2.962)	38.245*** (2.379)	40.659*** (4.472)
Observations	2,889	2,758	2,758	2,889	2,889

Notes: The table reports OLS estimates of Equation 3 for the binary split, with the bottom half as the baseline group and *Lower* as the baseline belief category. Each column corresponds to a separate regression using a different market characteristic to define the split. The market characteristics are defined at the market (industry-region) level, as described in Section 3.3, and descriptive statistics are reported in Table A.7. In all columns, the dependent variable is the firm's rank, scaled from 0 to 100, in the within market distribution of firm wage effects. The coefficients of interest, *Higher* × *Top Half*, are plotted in Figure 2. The sample is described in the "Surveyed (Weighted)" column in Table 1. The number of observations varies as not all characteristics are available for some industries. Heteroskedasticity-robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A.6. Descriptive Statistics for Alternative Market Definitions

	Baseline markets	Single market	Flow-based markets
Number of markets	60	1	43
Avg. number of firms	469.6	28,177.0	655.3
Avg. total employment (FTE)	22,206.9	1,332,415.0	30,986.4
Mean log hourly wage: Std. dev. between markets	0.13	.	0.19
Mean log hourly wage: Avg. std. dev. within markets	0.22	0.26	0.25

Notes: The table reports descriptive statistics for the three market definitions used in the analysis. “Baseline markets” defines markets as industry-region cells. “Single market” treats the entire economy as one labor market. “Flow-based markets” defines markets based on worker mobility patterns, as described in Section C. “Avg. total employment (FTE)” reports the average number of full-time equivalent workers per market. Between-market standard deviation of mean log hourly wages is not defined for the single market and is therefore missing. All statistics are calculated at the market level based on 2021 data, using the sample described in the “Population” column of Table 1.

TABLE A.7. Descriptive Statistics for Market Characteristics by Quantile Group

	Bottom half	Top half	Tercile 1	Tercile 2	Tercile 3
Labor Churn (Rate)	0.06	0.14	0.06	0.09	0.15
Profit Margin	0.03	0.20	0.02	0.05	0.26
Capital Intensity (1000 EUR per FTE)	56.14	336.39	31.40	118.95	428.74
Market Concentration (HHI)	0.01	0.08	0.01	0.03	0.11
Avg. Firm Size (FTE)	18.16	44.81	16.17	25.45	52.83

Notes: The table reports the mean value of each market characteristic within each quantile group. “Bottom half” and “Top half” refer to the binary split, while “Tercile 1”, “Tercile 2”, and “Tercile 3” refer to the tercile split. Each characteristic is defined at the market (industry-region) level and the quantile groups are based on the distribution of the characteristic across markets, with each market weighted equally. The market characteristics are defined in Section 3.3. All statistics are based on 2021 data using the sample described in the “Population” column of Table 1.

B. Further Information on Institutional Setting, Data and Methods

B.1. Wage Setting in the Danish Labor Market

In this section, we describe the Danish labor market, including the Danish wage bargaining framework, salary benchmarking and transparency practices, and the importance of firm wage effects on wage inequality.

Minimum wage and collective bargaining. There is no national minimum wage in Denmark. Sectoral collective agreements covered 87 percent of private sector employees in 2017 (DA 2020). This coverage rate is comparable to that in other Scandinavian countries and approximately ten percentage points higher than in continental Europe (Bhuller, Moene, Mogstad and Vestad 2022). However, for 80 percent of covered employees, collective agreements establish only centrally bargained wage floors, which tend to be nonbinding or provide no specific wage guidelines at all. Evidence collected by Jäger, Naidu and Schoefer (2024) suggests that centrally bargained wage floors tend to be nonbinding in Europe. These wage-setting practices are referred to in Danish as "minimallønssystemet," "mindstebetalingssystemet," and "uden lønsats."¹⁴ For the remaining 20 percent of workers, the sectoral level agreements set out all the main terms, including wages ("*normallønssystemet*"). Therefore, as summarized in Mortensen (2003, page 83), Dahl, Le Maire and Munch (2013) and Labanca and Pozzoli (2022), wages are negotiated mainly at the firm level in Denmark.

Salary benchmarking and salary transparency. As in the US (Cullen 2024), firms are prohibited from sharing information regarding their workers' wages with other firms

¹⁴This contrasts with some European countries. For instance, Gautier (2017) documents roughly 3,000 collective wage agreements in France. *The General Agreement* sets the framework for collective agreements. The General Agreement is signed by the Danish Confederation of Trade Unions (LO, since 2019 called the Danish Trade Union Confederation "*FH*") and the Danish Employer Confederation (DA). The General Agreement established the rules for issues the labor code would regulate in many other countries.

(Datatilsynet 2023). The employer association Dansk Arbejdsgiverforening (henceforth DA) provides the main salary benchmarking tool based on detailed wage information submitted by its members. Based on discussions with employees at DA, we learned that only a small minority of DA members use the salary benchmarking tool. To our knowledge, DA is the only provider of large-scale salary benchmarking surveys in Denmark.¹⁵ Firms in Denmark must prepare wage statistics and share them with their employees.

However, there is no such transparency at the job application level. For instance, it is difficult to find a posted wage in the two most relevant job search platforms in Denmark (Jobindex and Jobnet). Hence, employers cannot learn about the wage policy of their competitors through mandatory wage range posting, which is, for example, the case in Austria (e.g., Frimmel, Schmidpeter, Wiesinger and Winter-Ebmer (2024)).

Wage inequality and firm wage effects. Table A.1 reports that about 6 percent of the variance of wages in Denmark between 2015 and 2021 is explained by firm wage effects, when variance components are estimated using the method developed by Kline et al. (2020). Our estimates are in line with previous estimates in Denmark.¹⁶

C. Data construction

Our dataset is comprehensive, as we precisely measure firms' wage policy and firms' workforce characteristics with labor market data and additional firm characteristics from accounting data. For example, all paid hours are recorded, and earnings and hours are not top-coded.

¹⁵The largest firms in Denmark conduct their own surveys, similarly to what has been documented in the US by Bewley (page 92).

¹⁶For instance, see Morin (2023) and Humlum et al. (2025).

Survey design. When designing the survey, we followed the guidelines recommended by Stantcheva (2023). The target population is private and public limited companies (ApS, *Anpartsselskab* and A/S, *Aktieselskab*) in Denmark that were active in the first quarter of 2021.

The international consulting company Ramboll conducted the online survey by sending invitations to firms in June 2021, through the official Danish email system "e-Boks". Online surveys give respondents more flexibility to complete the survey and may be less subject to social desirability bias. The coverage error, i.e., the difference between the potential pool of respondents and the target population, should be zero, as firms must be able to receive digital mail from the authorities (e.g., the tax authority). Firms' email addresses (via e-Boks) are publicly available at datacvr.dk. As all firms are sampled, the planned sample corresponds to the potential pool of respondents.¹⁷ The survey closed at the beginning of August 2021, and a couple of (non-randomized) reminders were sent in July 2021 to increase the response rate.

The email included an invitation letter with details about the survey, such as the completion deadline, the incentives for respondents (i.e., receiving an anonymized benchmark report), and compliance with data protection rules. The letter was designed to recruit as many respondents as possible, minimize selection bias, and appear legitimate and trustworthy. For these reasons, the actual topic of the survey was kept vague, and simple language was used to minimize selection bias. The University of Copenhagen logo was visible, and we explained that all data generated would be handled in compliance with data protection rules.

In addition to the questions considered in this paper, the survey contained questions on firms' beliefs about layoffs, wage cuts, and hiring constraints. The answers to these questions are analyzed in Bertheau, Kudlyak, Larsen and Bennedsen (2025) and

¹⁷The only variation between the target population and the actual sample is a nonresponse error. Nonresponse errors come from respondents ignoring the invitation or answering that they did not want to participate.

Bertheau, Larsen and Zhao (2026).

Administrative data. The data provider is Statistics Denmark. We link the survey to administrative datasets using the firm-level identifier, the CVR number. This allows us to construct objective counterparts to the beliefs elicited in the survey. Worker characteristics are obtained from several registers (IDAP, UDDA). We measure workforce characteristics by aggregating worker-level information at the firm level.

D. The Survey Questionnaire

This section contains the original Danish survey questions and the corresponding English translations. We include only the questions that are used in this paper.

Questions on the role of respondents

- Danish: *Hvad er din rolle i virksomheden. Vælg det der passer bedst.*
 - *Ejerleder*
 - *Direktør uden ejerskab*
 - *Bestyrelsesmedlem uden ejerskab*
 - *Ejer uden at være bestyrelsesmedlem*
 - *Andet: _____*
- English: *What is your role in the company? Choose the one that fits best.*
 - *Owner manager*
 - *Director without ownership*
 - *Board member without ownership*
 - *Owner without being a board member*
 - *Other: _____*
- Danish: *I de følgende spørgsmål vil vi spørge om løn og ansættelsespraksis i virksomheden. Hvor tæt er du på sådanne beslutninger?*
 - *Jeg har ansvaret for løn og ansættelsesforhold.*
 - *Jeg er ikke ansvarlig men jeg kender til og forstår løn og ansættelsesforhold.*
 - *Jeg kender kun en smule til løn og ansættelsesforhold.*
- English: *In the following questions, we ask about pay and hiring practices. How close are you to such decisions?¹⁸*
 - *I am responsible for pay and employment conditions*

¹⁸In Danish, the word løn is usually translated as salary, pay or wages. The definition in the dictionary ordnet.dk is "payment that an employee receives for working".

- *I am not responsible, but I know about pay and employment conditions*
- *I only know a little about pay and employment conditions*

Question on change in revenue

- *Danish: Hvor meget ændrede omsætningen sig i 2020 i forhold til 2019? Note: Hvis du ikke kender den eksakte ændring, giv dit bedste bud.*
 - *Faldet med 100%*
 - *Faldet, angiv med ca. hvor meget: _____%*
 - *0% (Uændret)*
 - *Steget, angiv med ca. hvor meget: _____%*
 - *Steget med 100% eller mere*
- *English: How much did revenue change in 2020 compared to 2019? Note: If you do not know the exact change, give your best estimate.*
 - *Reduced by 100%*
 - *Reduced, indicate approximately how much: _____%*
 - *0% (Unchanged)*
 - *Increased, indicate approximately how much: _____%*
 - *Increased by 100% or more*

Main question about relative wages

Danish: Tror du, at denne virksomhed tilbyder lavere eller højere lønninger end konkurrerende virksomheder i jeres branche? Konkurrerende virksomheder er andre arbejdsgivere, der ansætter folk med samme evner i jeres region. Hvis du ikke er sikker så kom med et estimat.

Options: Meget lavere, Lavere, Cirka det samme, Højere, Meget højere.

English: Do you think this firm offers lower or higher wages than competing firms in your industry? Competing firms are other employers that hire people with the same abilities in your

region. If you are not sure, please give an estimate.

Options: *Much lower, Lower, About the same, Higher, Much higher.*

Motives for paying a higher wage

If firms answered *Higher* or *Much Higher*, in the question on the relative wage of the firm, they were asked the following question:

- Danish: *Hvorfor tilbyder I højere lønninger end andre i jeres branche? Angiv venligst din holdning til det følgende udsagn.*
- English: *Why do you offer higher wages than others in your industry? Please state your position on the following statement.*

The statements were as follows:

- Danish: *Vi vil gerne kompensere for negative aspekter ved jobbet (jobusikkerhed, arbejdsvilkår, etc.).*
- English: *We want to compensate for negative aspects of the job (job insecurity, working conditions, etc.).*
- Danish: *Vi vil gerne tiltrække de bedste kandidater.*
- English: *We want to attract the best candidates.*
- Danish: *Vi vil gerne ansætte hurtigt.*
- English: *We want to hire quickly.*
- Danish: *Vi vil gerne sikre stabile medarbejdere der ikke skifter job tit (undgå at medarbejdere går over til konkurrenter.)*
- English: *We want to ensure reliable employees who do not change jobs often (avoid employees switching to competitors).*
- Danish: *Vi vil gerne øge de ansattes moral.*
- English: *We want to increase employee morale.*
- Danish: *Vi vil gerne reducere behovet for kontrollere og monitorere de ansatte.*

- English: *We want to reduce the need to control and monitor employees.*
- Danish: *Vi vil gerne dele den høje indtjening vi genererer med de ansatte.*
- English: *We want to share the high earnings we generate with the employees.*

For each statement, the firms could choose one of the following responses:

- Danish: *Meget enig, Enig, Hverken enig eller uenig, Uenig, Meget uenig.*
- English: *Strongly agree, Agree, Neither agree nor disagree, Disagree, Strongly disagree.*

Motives for paying a lower wage

If firms answered *Lower* or *Much Lower*, in the question on the relative wage of the firm, they were asked the following question:

- Danish: *Hvorfor tilbyder I lavere lønninger end andre i jeres branche? Angiv venligst din holdning til det følgende udsagn.*
- English: *Why do you offer lower wages than others in your industry? Please state your position on the following statement.*

The statements were as follows:

- Danish: *Vi kan ikke betale højere lønninger (lav efterspørgsel efter vores produkter/service eller høj grad af konkurrence).*
- English: *We cannot pay higher wages (low demand for our products / service or high level of competition).*
- Danish: *Vi har ikke behov for høje lønninger, da der er få konkurrerende arbejdsgivere.*
- English: *We do not need to pay high wages as there are few competing employers.*
- Danish: *Vi behøver ikke at betale for høje lønninger, da vi kan tilbyde en masse værdifulde faciliteter, der kompenserer for højere lønninger (jobsikkerhed, arbejdsmiljø osv.).*
- English: *We do not have to pay high wages as we can offer a lot of valuable facilities that compensate for higher wages (job security, work environment etc).*
- Danish: *Vi er nødt til at holde lønninger lave for at kunne investere indtjeningen, som vi*

genererer, i andre strategiske prioriteter (f.eks. forskning og udvikling, marketing).

- English: *We need to keep wages low to invest the profit we generate in other strategic priorities (e.g. research and development, marketing).*

For each statement, the firms could choose one of the following responses:

- Danish: *Meget enig, Enig, Hverken enig eller uenig, Uenig, Meget uenig.*
- English: *Strongly agree, Agree, Neither agree nor disagree, Disagree, Strongly disagree.*

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