Bargaining and Inequality in the Labor Market*

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Abstract

We use novel surveys of firms and workers, linked to administrative employer-employee data, to study the prevalence and importance of individual bargaining in wage determination. We show that simple survey questions accurately elicit firms' bargaining strategies. Using the elicited strategies for 772 German firms, we document that the majority of firms are willing to engage in individual wage bargaining. Labor market factors predict firms' strategies better than firm characteristics. Survey responses from nearly 10,000 full-time workers indicate that most worker-firm interactions begin with the worker providing their salary expectations. Most interactions end with the worker rejecting the offer and remaining at the incumbent firm. There is substantial heterogeneity in workers' bargaining behavior, which translates into within-firm wage inequality. Firms that set pay via individual bargaining have a 3 percentage point higher gender wage gap.

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1 Introduction

Imperfect competition in the labor market creates scope for bargaining over rents (Manning 2011). How firms and workers agree on a wage may therefore determine which workers receive a greater share of their marginal product. For instance, if firms vary in the wages—or wage premia—that they post, workers who manage to obtain jobs at firms with higher wages or wage premia will earn more than their equally productive counterparts at other firms. If firms set wages by bargaining with individual workers, workers with better outside options—or a better ability to leverage those options—may earn more than their equally productive coworkers.

However, little is known about the prevalence and importance of individual bargaining in wage determination (Card 2022). It is hard to reliably measure firms' wage-setting strategies. Firm-level proxies for bargaining, such as whether a firm announces wages in job ads, may be inaccurate if firms have strategic reasons to not publicize their pay (see Batra, Michaud, and Mongey 2023, for an analysis of firms' behavior in job ads). Aggregating worker-level proxies such as whether a worker knew wages at the time they applied, or whether a worker reported negotiating their salary up, may yield unreliable measures of a firm's policies to bargain with new hires or with incumbent workers if firms differentiate the initial offers they make to potential hires (e.g., by using their salary expectations), or if workers vary in their propensity to bargain, either at the start of, or during an employment spell (e.g., Agan, Cowgill, and Gee 2021; Biasi and Sarsons 2022). Further, it is rare to have data on both the firm- and worker-sides of bargaining, outside of specific industries or contexts, or to have information on workers' outside options during these events.

To overcome these empirical challenges, we developed and validated a survey measure of firms' bargaining strategies for Germany. We fielded this survey to human resource (HR) professionals and managers through the ifo Institute for Economic Research (ifo), an organization with decades of experience surveying this population. We linked responses from 772 German firms to balance sheet information from the Orbis database, and to administrative Social Security records that contain detailed employment histories, wages, industry, and occupation codes for each worker in Germany since 1975. These data allow us to examine the prevalence of individual bargaining

and to examine firm selection into bargaining. We also link firm-level strategies to nearly 10,000 responses we received from a worker survey that we fielded through the Institute for Employment Research (IAB), a group within the German equivalent of the Department of Labor. The result is a unique dataset which contains detailed information on the worker and firm-sides of bargaining for workers in multiple industries and labor markets.

Throughout the paper, we define a firm as having an individual "bargaining strategy" if it differentiates pay between workers in the same position it perceives to have equal productivity. This definition of bargaining encompasses both differentiation that occurs as the result of back-and-forth worker-firm negotiations and differentiation that results from firms varying the initial offers they make to workers. We focus on this definition because, as we document, it is empirically common for firms to elicit (and for workers to provide) workers' salary expectations before making their initial offers. Many firms expect to vary the initial offers they make to workers they perceive to have the same productivity. This wage differentiation would not be captured by definitions that focused solely on back-and-forth negotiations, but could plausibly have an impact on within-firm wage inequality.

In an initial contribution, we show that it is possible to identify whether a firm engages in individual bargaining (has a bargaining strategy) using simple survey questions. We developed the wording of these questions based on conversations with over 100 HR professionals. To account for the likely possibility that firms' wage-setting strategies vary across groups of workers within a firm, we elicited firms' strategies for four groups of full-time workers: recent labor market entrants, experienced non-managers, managers, and workers in hard-to-fill bottleneck occupations (defined by each respondent firm). To allow bargaining strategies to differ for recruiting and retention, we separately elicited firms' strategies for external hires and for incumbent workers who received an outside offer.

A series of validation exercises corroborate the reliability of our survey measures. First, we find that, within a respondent, the answers to distinct questions on wage setting are aligned. Second, among firms for which we have responses from multiple HR professionals, there is agreement

between the responses of professionals within the same firm. Third, for the subset of questions for which we can obtain publicly available information (e.g., from firms' job postings), firms' responses are accurate. Fourth, firms' responses are strongly related to the survey responses of their employees. For instance, at firms which state they elicit workers' salary expectations, workers are significantly more likely to report that they provided these expectations before the firm made its initial salary offer. These validations suggest that firms report their strategies truthfully and that the survey-based bargaining measures capture information about firm policies.

Drawing on our survey-based measures of firm bargaining strategies, we document that the majority (80%) of workers are in positions where individual bargaining is possible. However, there is substantial variation across employee groups: firms are more likely to bargain with managers than they are with experienced non-managers or with recent labor market entrants. This is true both for new hires and for incumbent employees who have received an outside offer.

Our results are inconsistent with models in which firm productivity influences wage-setting strategy (Doniger 2015; Postel-Vinay and Robin 2004; Flinn and Mullins 2021). We find that firms that engage in individual bargaining are not more productive—as proxied for by firm age, size, or assets per employee—than those that do not. They also do not pay higher mean wages. Although firm productivity appears to be largely uncorrelated with bargaining, we do find that other firm-level factors, such as the presence of a collective bargaining agreement (CBA) and whether a firm is headquartered in Eastern Germany, are correlated with bargaining strategies. Our results also reveal an important role for market-level factors. Firms are most willing to adjust pay for workers in positions they are having a hard time filling. In addition, controlling for employee-group characteristics within firms explains more of the variation in bargaining strategies than do firm characteristics.

We use data from the worker survey to examine how worker-firm bargaining interactions typically unfold. We have detailed bargaining histories for all surveyed workers who received an offer in the previous six months, regardless of whether they accepted the offer. The majority of worker-firm interactions begin with the worker providing the firm their salary expectations. Almost all

firms in our sample ask for this information and about a third require it. Many workers choose to provide this information, even when not required. Firms report that they use such expectations to set pay; 44% of firms say that variation in initial offers is as important or more important in determining the final offer as back-and-forth negotiations.

Our results highlight the importance of on-the-job renegotiation and place empirical restrictions on the types of models that are appropriate for the labor market. Among our sample of full-time workers, most offers are rejected, with the worker ultimately remaining at the incumbent firm. In many cases, workers choose to remain at the incumbent firm after engaging in back-and-forth negotiations with the outside firm. In many cases, the worker uses the outside offer to improve her position at the incumbent firm. Our finding that a large share of offers are rejected—and that this sometimes occurs only after several rounds of back-and-forth negotiation—is a clear prediction of models in which both firms and workers have imperfect information about their counterpart's outside options. These results align with previous findings for the product market (Backus, Blake, Larsen, et al. 2020).

Finally, we document that there is substantial between-worker heterogeneity in bargaining behavior, which translates into wage inequality within the firm. We focus on two dimensions of heterogeneity highlighted by the bargaining literature—outside options and risk aversion—and two dimensions highlighted by the literature on wage inequality—gender and individual-specific wage premia (as estimated from a two-way fixed effects model following Abowd, Kramarz, and Margolis 1999). Relative to other workers in the same occupation and establishment, workers with better outside options are more likely to ask for and receive improvements in their offered wage, both at the beginning of and during an employment spell. Differences in outside options better explain differences in bargaining behavior than differences in risk tolerance. Women ask for and receive less both at the start of and during an employment spell. These gender differences cannot be explained by women being more likely to negotiate for non-wage amenities. Though women have worse outside options than their same-occupation male colleagues, this does not fully explain the gender gap in bargaining behavior.

Three pieces of evidence suggest individual bargaining contributes to wage inequality. First, we show that, after controlling for occupation-establishment fixed effects, there is no gender wage gap among surveyed workers whose wages are not set by individual worker-firm bargaining. Among surveyed workers whose wages are set by bargaining, we continue to see a 4 to 5 percentage point gender wage gap. This gap persists even when we control for hours worked (elicited in our worker survey) and is robust across different specifications and subsamples. Second, when pay is set by bargaining, the wage policy—as measured by the AKM firm effect (Abowd, Kramarz, and Margolis 1999)—of an individual's firm continues to predict their pay once they have moved to another firm . At bargaining firms, workers who came from higher-firm effect firms earn more than their same-occupation-establishment peers who joined from lower-firm effect firms. Consistent with the earlier literature, we find a statistically insignificant relationship with the prior-firm effect when we run similar regressions including workers whose pay is not set by bargaining (Di Addario et al. 2022). Finally, we show that, compared to their same-occupation coworkers, workers with higher individual wage premia are more likely to negotiate pay. These workers also ask for more—as a fraction of their current salary—in a hypothetical bargaining scenario in which we provide workers with information about pay. Our results suggest that person effects may reflect, in part, differences in individual bargaining behavior. This finding is important as previous research has shown that the growth in the variance in individual-specific fixed effects explains 40% of the growth in German wage inequality over the past several decades (Card, Heining, and Kline 2013).

Our results contribute to several distinct literatures. First, they contribute to a growing empirical literature on how bargaining works in the field (e.g., Cramton and Tracy 2003; Backus, Blake, and Tadelis 2019; Larsen, Lu, and Zhang 2021; Larsen 2021; Backus, Blake, Pettus, et al. 2023). The results are most analogous to those presented by Backus, Blake, Larsen, et al. (2020), who used new data from eBay to provide the first large-scale evidence on how buyers and sellers interact. This paper introduces and analyzes analogous data for the labor market.

Our results also contribute to a growing literature on firms' wage bargaining strategies. As recent work has noted, we know little about how firms set wages (Card 2022). Our survey-based

approach is distinct from much of the literature, which is either theoretical or relies on the structure of a model (Postel-Vinay and Robin 2004; Michelacci and Suarez 2006; Doniger 2015; Caldwell and Harmon 2019; Flinn and Mullins 2021). Relative to other recent empirical studies of wage bargaining, we are distinct in our wide industry coverage, in the level of detail we have on both the firm- and worker-sides of bargaining, and in our focus on individual (rather than collective) bargaining (Brenzel, Gartner, and Schnabel; Biasi and Sarsons). The worker survey we conducted and which we link to the firm survey and administrative outcomes is most related to the seminal survey by Hall and Krueger (2012), which asked workers about the negotiations that took place when they accepted their job offer.

Our empirical approach was inspired by the literature that uses surveys to elicit information on firm strategies (Blinder et al. 1998; Bewley 1999) and most closely mirrors the approach in Bloom and Van Reenen (2007). In particular, the way in which we developed and validated our firm bargaining measure closely follows the development and validation of their measure of management practices (Bloom and Van Reenen 2007; Scur et al. 2021). Our finding that AKM person effects are correlated with individual bargaining behavior mirrors the finding that AKM firm effects are correlated with firm management practices (Bender et al. 2018).

The rest of the paper proceeds as follows. Section 2 describes our survey instruments and data. Section 3 introduces and validates our survey-based bargaining measures. Section 4 provides new findings on firm-level bargaining strategies. Section 5 documents heterogeneity in worker bargaining behavior and outcomes. Section 6 examines the implications of bargaining for wage inequality. Section 7 concludes.

2 Survey Infrastructure and Data

We obtain data on firms' wage-setting strategies from a survey we fielded to a broad set of firms across all major sectors and regions in Germany. We link firms' survey responses to Social Security records and to additional firm productivity measures. We also link these data to the responses from

a survey we fielded to 135,000 German workers, the majority of whom work at surveyed firms.

2.1 Firm Survey

We surveyed a broad set of German private sector firms about their wage-setting strategies. The ifo Institute for Economic Research (ifo), an organization which regularly surveys firms, fielded the survey on our behalf. They sent invitations via e-mail in two waves: September 2021 and January 2022. The majority of our survey respondents hold senior-level positions, such as human resources (HR) director, chief human resources officer, or CEO. These individuals are usually most involved in and aware of general firm strategies regarding wage setting. See Appendix B for more information on the sampling frame and recruitment procedures, as well as other information on how we implemented the firm survey.

Similar to other surveys conducted by the ifo Institute, the firm survey had a 51% response rate (Sauer, Schasching, and Wohlrabe 2023). Respondents and non-respondents have similar observable characteristics (Appendix Table B1). For our main analysis sample, we restrict to complete responses and keep one observation per firm, yielding a sample of 772 firms.[1]

Table 1 shows that our sample captures a broad set of firms, industries, and regions. While the average firm age is 50 years, the youngest firm in our sample was founded in 2021, and the oldest was founded several centuries ago. Thirty-four percent of firms operate in the manufacturing sector. However, our sample also captures other key sectors, such as retail (17%), professional services (9%), and information services (7%). Twelve percent of firms have their headquarters in East Germany. In addition, Appendix Table B5 shows that our sample covers every German state and has a similar geographic distribution to the set of all German firms. Appendix Section B.3 provides additional information on the coverage of our sample and shows that our firms are similar to those participating in the well-studied World Management Survey (Bender et al. 2018).

[1] A total of 959 HR professionals and managers participated in the survey. We define a response as complete if a respondent saw all questions in the survey; the completion rate is 83%. While this does not require the respondent to have answered every question, Appendix Table B3 documents that the share of missing answers is low. For firms for which we have multiple responses, we prioritized responses according to whether they provided consent to link to the IAB records; within consent type, we prioritized responses in the order received.

The main way in which our sample differs from the set of all German firms is that we undersample small firms. Table 1 shows that, while our firms cover all size classes, the median firm in our sample employs between 50 and 200 workers. We targeted our survey design and outreach at medium and large firms because small firms hire infrequently and are less likely to have formal bargaining strategies in place, making them less suitable for our study. Further, while most German firms are small (83% have fewer than 10 employees), these firms employ 18% of German workers; firms with more than 249 employees cover 45% of employees (Destatis 2022).

While a large minority of firms in our sample (41%) have some workers who are covered by CBAs, these agreements do not eliminate firms' ability to set pay flexibly (see Bhuller et al. 2022, for cross-country comparisons). German law grants firms the right to deviate from regulated wage floors by paying higher than regulated wages ("Günstigkeitsprinzip") and by issuing wage top-ups ("Übertarifliche Zulagen"), which can be implemented either as one-time payments or regular add-ons to the base wage.[2] By law, firms can pay these top-ups for a variety of reasons, including individual negotiation or market factors. In addition, higher-level employees and managers at CBA-covered firms are typically exempt from the CBA. In recent decades, opening clauses, which allow firms to set wages below the CBA-regulated wage, have also become more common (Fitzenberger, Kohn, and Lembcke 2013; Blien et al. 2013). Previous research has confirmed that German firms take advantage of this flexibility; as a result, wage inequality has grown over the past several decades (Dustmann, Ludsteck, and Schönberg 2009; Dustmann, Fitzenberger, et al. 2014; Price 2018).

2.2 Social Security Records and Firm Productivity Measures

We link our firm-level survey responses to German Social Security records, which are assembled by the Institute for Employment Research (IAB) into the Integrated Employment Biographies (IEB) database. The IEB data capture all private-sector and public-sector employees with Social

[2] In the case of Portugal, Cardoso and Portugal (2005) and Card and Cardoso (2022) provide evidence for this practice by documenting that a large share of CBA-covered workers receive wage cushions, which allow pay to differ across individuals in the same position.

Security contributions and provide information on employee demographics (e.g., gender, age, and education), employer information (e.g., sector and location), and job-spell-based information (e.g., full-time status, daily pay, and occupation). We impute daily pay for individuals whose pay is censored at the Social Security maximum, as described in Appendix Section C.1.

Among the 772 firms with complete survey responses, 553 (72%) provided consent for linking the survey responses to the IEB data. Under German privacy laws, this consent is strictly required in order to link firm responses to Social Security records.[3] Appendix Table B4 documents that respondents who provided this consent are similar to those who did not.

We can link 95% of eligible firms to the IEB data. Because both piloting and our validity tests described in Section 3.3 indicated that responses are stable across divisions in a firm, we follow the previous literature and match firm-level responses to all matching establishments in the IEB data (Bloom and Van Reenen 2007; Bender et al. 2018). A special department within the IAB performed this linkage using each firm's name, headquarter address, and legal form. The matched firm survey-IEB data contain 416,821 full-time employees at matched firms in 2020, the most recent year for which we have administrative data. Our main sample includes the subset of these individuals between ages 25 and 50. In order to assign workers to firm bargaining strategies, we group them by experience (as reported in the IEB data) and based on whether their assigned occupational code indicates they are a manager. Appendix C.1 provides additional information on data cleaning and sample construction.

We also link the 772 complete firm-level responses to balance sheet information from the Orbis database, which is compiled by the commercial data provider Bureau van Dijk. This database contains commonly used proxies for firm productivity, including firm age, total assets, and fixed assets. We match 99% of surveyed firms to Orbis.

[3]To the best of our knowledge, our survey is the first external firm survey to explicitly ask for this consent and to link responses to the IAB records. Other institutions in Germany have recently elicited consent to link survey responses to their own internal records. For instance, a 2020 Online Panel Survey of Firms conducted by the Bundesbank, elicited consent to link responses to other Bundesbank databases. Our consent rate is comparable to the 73% consent rate in that survey (Bundesbank 2021).

2.3 Worker Survey

To examine how bargaining events typically unfold, we use data from a survey we fielded to 135,000 full-time German workers.[4] We asked workers for their tenure, weekly hours worked, search behavior, and risk tolerance. We also included three bargaining modules. The first elicited the sequence of bargaining events for workers who had received an outside offer in the previous six months. The second elicited the sequence of bargaining events that occurred when individuals started their first job at their current firm. Because individuals' ability to recall these events may decline over time, we asked these questions only of individuals who have been at the firm for three years or less. The third module asked individuals to provide their salary expectations in response to a hypothetical prompt. Appendix Figure D3 describes the flow of the survey and Appendix F.2 provides the full text of the questions in each bargaining module.

We used the Social Security records to select workers for inclusion in the survey. To ensure we could elicit responses from workers at the firms that participated in our firm survey, we first randomly selected 82,500 workers from the set of full-time workers between ages 25 and 50 at surveyed firms. We then randomly selected 52,500 workers from the set of full-time workers between ages 25 and 50 not employed at these firms. Including these additional workers allows us to obtain estimates representative of full-time German workers. The IAB mailed invitations to participate between June 2022 and December 2022. The invitations described the survey as a scientific study on salary progression in Germany (see Appendix D.1). The effective response rate of 11.4% compares favorably to other recent IAB surveys that target first-time respondents (Haas et al. 2021).[5]

[4]Historically, it has been difficult to link survey data to IAB records. In recent years the German Socio-Economic Panel (GSOEP) has had annual open calls, which offer researchers the opportunity to embed questions into the panel. Recent waves of the GSOEP have contained around 600 individuals whose records could be matched to the IAB data (Jäger et al. Forthcoming). We chose to conduct an independent survey, rather than embed questions into an established panel so that we could ensure a sufficient sample size among the firms in our survey. This approach also gave us more freedom to design our questionnaire, which includes multiple distinct modules.

[5]We contacted workers via mail because the IAB does not have e-mail addresses or phone numbers for individuals who have not been recently unemployed. While surveys in which individuals are invited via mail typically have lower response rates than surveys in which individuals are contacted through other means, our response rate is comparable to recent e-mail-based surveys. For instance, a recent e-mail-based survey that Statistics Denmark sent to the official government inboxes of Danish citizens yielded a response rate of 15% (Caplin et al. 2023). Because we fielded a

For our main analysis sample, we keep the 9,756 respondents who completed the survey and who reported that they were still in Social-Security-covered employment (as opposed to those in self-employment or non-employment). Some of our analysis focuses on the subset of these workers who are at surveyed firms (N=7,079). Appendix Table A2 describes the characteristics of the surveyed workers. Appendix D provides additional details on the implementation of the survey and discusses patterns of non-response.

3 Measuring Firm Bargaining Strategies

We designed and validated a new survey instrument that identifies whether a firm engages in individual bargaining.

3.1 Conceptual Definition of Wage Bargaining

We define wage bargaining as a situation when a firm differentiates pay between workers in the same position that it perceives to have equal productivity. This can occur either at the beginning of an employment spell or during an employment spell. Because we compare workers with the same productivity in the same position, our definition is analogous to standard definitions for price discrimination.[6] Our definition is somewhat broader than standard definitions used in the labor literature; within this literature, whether a firm engages in wage posting or (individual) wage bargaining depends on whether wages are determined ex ante (before a firm and worker meet) or ex post, once a worker's outside options have been revealed (Manning 2003).[7]

A key feature of our definition is that it does not require wage differentiation to occur as the

new survey, our response rate is not directly comparable to the response rates of panels such as the GSEOP, for which response rates are calculated among individuals who responded to previous survey waves. However, the 50% response rate to our follow-up survey (see Appendix D.1) is comparable to that of panel waves of the GSEOP, such as that analyzed in Jäger et al. (Forthcoming).

[6]For instance, a standard graduate textbook in industrial organization says "it can be said that the producer price discriminates when two units of the same physical good are sold at different prices, either to the same consumer or to different consumers" (Tirole 1988).

[7]Firms may post wage schedules that condition on observed markers for productivity. However, they do not observe an individual worker's outside options until they meet a worker.

result of back-and-forth negotiation between an employer and (potential) employee.[8] Instead, we define a firm as having a "bargaining strategy" if it either tailors the initial offers it makes to workers it perceives to have the same productivity or if it engages in back-and-forth negotiations with workers.[9] A recent literature has highlighted the growing use of salary expectations questions, which may give firms information on how to tailor the initial offers they make (Agan, Cowgill, and Gee 2020).[10] In Section 4.4 we document that it is common for firms to ask and for workers to provide this information.[11]

Our definition of wage bargaining also does not require that firms that "post" wages—i.e., those which do not bargain—announce these wages in job ads. This behavior is relatively uncommon both in the United States, where 5% of online ads contain specific pay information (Hazell, Kazemi, and Taska 2018), and among the German firms in our sample (Table A1). As other papers have discussed, the decision whether to provide pay information in job ads may reflect other considerations (Batra, Michaud, and Mongey 2023).

3.2 Survey Measures of Firm Bargaining Strategies

We designed a series of questions to elicit firms' strategies for bargaining with new full-time hires and with existing full-time workers who had received an outside offer. Appendix Figure B1 provides an overview of our survey. Appendix Section F.1 provides the original questionnaire, as well

[8] An alternative definition would differentiate between firms that make "take it or leave it" offers and firms that engage in back-and-forth negotiations. One challenge with this definition is that, if firms respond to workers' salary expectations, these "take it or leave it" offers may not be the first offer in the bargaining event.

[9] When both sides have perfect information, the unique equilibrium of the bargaining game is for employers to make an initial offer just at the margin of triggering a counter-offer on the part of the worker. As a result, no back-and-forth negotiations occur (Fudenberg and Tirole 1983; Chatterjee and Samuelson 1983). While many studies have documented the existence of back-and-forth negotiations, this does not imply that firms make uniform initial offers. Whether firms vary initial offers to workers they perceive to have the same productivity cannot be observed in worker surveys.

[10] While it is illegal in Germany (as it is in many states in the United States) to ask candidates about their current or past wages, it is not illegal to ask for a candidate's salary expectations.

[11] The potential for this behavior was discussed in previous studies of bargaining, including Hall and Krueger (2012). While perfect tailoring of offers to workers' reservation wages can result in the Diamond paradox, our results below suggest that not all firms use this information (Diamond 1971). Further, conversations with HR professionals suggest that, even when firms use information on workers' salary expectations, they do not necessarily offer workers wages exactly equal to those expectations.

as an English translation.

To allow for within-firm variation in bargaining strategies, our bargaining questions distinguish workers into four groups: recent labor market entrants, experienced non-managers, managers, and employees in hard-to-fill bottleneck occupations.[12] Our objective in choosing these groups was to make distinctions that are relevant for common HR strategies, that can be identified in Social Security records (which do not include information on CBA coverage), and that are general enough to apply to firms in different sectors. We asked respondents to name the bottleneck occupation that was most relevant for their firm. Appendix Table B7 documents significant variation in stated occupations, ranging from white-collar management and IT positions to blue-collar jobs as technicians or service workers.

New External Hires. We elicited firms' strategies for new external hires by asking:

> "How much more could a person maximally receive compared to the fixed compensation you would have offered based on the person's qualification/fit for the position alone?"

We prompted respondents to select one of the following options: "0%/no adjustments are possible", "1–10%", "11–20%", "21–30%", "31–40%", and "more than 40%". This question—which we refer to as the protocol question—represents our main measure of firm bargaining strategies. In Section 4 we define a firm as not bargaining with a group of workers if they indicated that no adjustments are possible.

We chose the wording of the question—and in particular the phrase "qualifications and fit"—based on numerous conversations with HR professionals. These conversations suggested that HR professionals typically use "qualifications and fit" to describe observed dimensions of worker productivity, including the quality of one's educational background and prior experience, or how well

[12]The first category includes those that are entering the labor market following the conclusion of their schooling (e.g., college) or following the conclusion of an apprenticeship. The final category is an official term in German: since 2011, the German Federal Employment Agency has published annual statistics on the most common bottleneck occupations (Bundesagentur fuer Arbeit 2021). This concept is not specifically tied to wage setting, but rather captures the length and difficulty of filling a vacancy.

the candidate would integrate with incumbent workers. This question captures both whether and the extent to which a firm is willing to vary the wages it offers to workers it perceives to have equal productivity. This variation could arise due to differences in workers' skills in bargaining or due to differences in their outside options.

Most of our analysis focuses on policies for base wages (often referred to as "fixed compensation" by HR professionals), which comprise the majority of compensation for most workers.[13] To check that our main bargaining measure is robust to alternative measures of compensation, we posed the same bargaining question with respect to special payments, which could include bonus pay or stock options. We also asked respondents whether—at their firm—specific non-wage amenities were more flexible than wages. We focused on four amenities that, during the development of our questionnaire, were most cited by HR professionals as important: flexible work (including vacation days), commute and moving costs, further education and training, and childcare subsidies.

Because firms may have strategies that are flexible in theory, but which do not typically result in wage variation, we also elicited the typical amount of wage variation induced by bargaining at both the initial and final offer stages. We told respondents we were interested in how much wage variation there was within offers for a given position. We prompted respondents to consider (separately for each group) a situation in which their firm made ten offers to candidates who had the same qualifications and fit but differed in their stated salary expectations and offers from other companies. We then asked respondents what they expected the spread would be between the highest and lowest (1) initial and (2) final offers their firm would make to these candidates. We refer to these questions as the incidence questions. We use these questions to validate firms' responses to our main protocol question and to examine the importance of the initial stage.[14]

[13] Non-CBA-covered workers in Germany who do not hold management positions receive, on average, 88% of their pay in the form of base wages (hkp 2021). Even in sectors where special and variable pay are common, these types of pay only represent substantial portions of overall compensation for employees at higher levels. Changes in base wages also have longer-run impacts on firms' budgets and workers' lifetime earnings due to both downward nominal wage rigidity and annual cost-of-living adjustments. Another advantage is that base wages are easier to compare across firms than special payments, which often vary in maturity rates or vesting schedules.

[14] In the protocol question, we asked for the maximum by which wages could be adjusted *upward*. This wording was motivated by the fact that HR professionals rarely reported wage offers—at the initial or final stage—being adjusted *downward.* One potential explanation for this pattern is that most firms, including those without CBAs, have formal pay structures that place lower bounds on the wages offered to workers of a given job title. Because the incidence

Incumbent Workers. Because bargaining may also occur during an employment relationship, we also asked respondents how their firm would respond to a worker who received an outside offer:

> "Suppose an employee at your company receives an external offer from another company and requests a salary increase. What is the maximum percentage by which your firm could possibly increase the fixed compensation (without changing the person's tasks) in order to retain the person?"

This measure identifies whether firms are willing to adjust wages for a given worker without changing their job tasks (which could change the worker's productivity). To the extent to which renegotiations lead to promotions, responses to our question provide us with a conservative measure of firms' renegotiation strategies.[15]

3.3 Validity of Elicited Measures

Several validity exercises suggest that respondents' answers are stable across different areas of the firm, that respondents are well-informed about how their firms set wages, and that our measures accurately capture firms' bargaining strategies.

We first test whether responses are stable across different areas of the firm, which is a prerequisite for using survey responses to assign strategies to firms. We follow Bloom and Van Reenen (2007) and leverage the fact that we have responses for multiple individuals from 37 firms.[16] Appendix Table A3 documents significant overlap between independent responses from the same firm. This finding further corroborates feedback we received from practitioners who indicated that wage-setting strategies are typically determined at the firm level.

question is not subject to this concern, we use this question to probe robustness.

[15] Promotions are difficult to accurately measure and compare across occupations and firms in Germany. While our question focuses on workers with an outside offer, there is no reason to expect—either from a theoretical perspective or based on our conversations with HR professionals—that firms would be more able to adjust wages for workers whose outside options had changed but who had not yet secured an outside offer. In addition, survey evidence from the Survey of Consumer Expectations (SCE) by the Federal Reserve Bank of New York that asked workers about negotiations with their employers in response to an outside offer documents that these negotiations are more than twice as likely to result in pay raises than in promotions (see Faberman et al. 2022, for details on the survey).

[16] Bloom and Van Reenen (2007) compare correlations between the management scores implied by the interviews of 64 firms where they have more than one respondent.

We next verify whether survey responses are reliable. One concern with the reliability of any firm survey is that respondents may lie to put their firms in a positive light. To mitigate this concern, we focused our questionnaire on factual questions regarding wage-setting strategies, rather than more subjective questions about why the firm chose such strategies (Bloom and Van Reenen 2007). Our conversations with HR professionals during piloting corroborate the idea that individuals do not perceive there to be a "right" answer to our questions.The high response rate (51%), completion rate (83%), and the fact that most professionals provided consent (72%) for their responses to be linked to external data sources, such as the administrative IAB data, are consistent with the idea that individuals do not perceive the answers to these questions to be sensitive. Together, these features suggest that it is unlikely that respondents faced strong incentives not to respond truthfully. The high completion rate—and the median response time of 11 minutes—suggest that survey fatigue and limited attention are not major concerns.

To directly test the validity of the provided survey responses, we first gauge intra-respondent reliability: whether respondents' answers to distinct questions within the survey align with each other. When comparing the protocol and the incidence question, internal consistency would require that individuals report an expected variation in final offers (incidence question) that is weakly less than the amount of flexibility they have in giving these offers (protocol question).[17] Appendix Table A4 shows the cross-tabulations between the protocol and incidence question and finds that most of the mass is on or below the diagonal, corroborating internal consistency. As an additional test, we compare responses to the protocol question for firms that are covered by CBAs—and who should by design be restricted in their ability to set wages flexibly—to those who are not covered by a CBA. Appendix Table A5 shows that wages are less flexible for recent labor market entrants (who are most likely to be covered by CBAs) in CBA-covered firms.

Finally, we conduct two distinct exercises that leverage additional data sources in order to verify that respondents provided accurate information. First, we document that their answers to

[17]For instance, a firm that reports wages can be adjusted up to 20% upward should expect the gap between the highest and lowest offers to be at most 20%. If offers can also be adjusted downward, this need not be true. However, conversations with HR professionals suggest downward adjustments are rare.

questions for which we were able to collect publicly available data align with our survey responses. We have publicly available data on (1) whether at least some workers were covered by a collective bargaining agreement, (2) whether pay information is posted in external job ads, and (3) whether the firm elicits salary expectations during the application process. Appendix Section C.3 describes how we assembled these data. For 90% of firms who report that no workers are covered by a CBA, we cannot find any evidence of a CBA. For 99% of firms that report that they do not provide pay information in job ads, we cannot find pay information in online job postings. For 82% of firms who report not eliciting candidates' salary expectations, we find no indication of such elicitations in their online application forms.

Second, the elicited firm strategies are highly correlated with the survey responses from workers who work at those firms. Appendix Table A6 shows that there is a positive relationship between worker and firm responses along several dimensions. While measurement error in firm responses would inflate the standard errors, measurement error in worker responses would attenuate the effects. Columns 1 and 2 show that, at firms where some workers are covered by a CBA, workers are significantly more likely to state that they are covered by such an agreement. At firms that ask or mandate that applicants provide their salary expectations, workers are significantly more likely to report having provided this information (Column 3). Workers at firms that are willing to negotiate are also more likely—conditional on having received an outside offer—to have used such an offer to negotiate their pay (Columns 4 to 7). The results in Section 6 further validate our bargaining measure.

4 Bargaining in the Labor Market

We use data from the firm and worker surveys to describe the prevalence and mechanics of worker-firm wage bargaining. Most firms are willing to differentiate pay between new external hires they perceive to have identical qualifications and fit and to adjust pay for incumbents who receive an outside offer. However, the frequency and magnitude by which they differentiate pay varies

systematically across employee groups. Most bargaining events begin with the worker providing their salary expectations. While most outside offers are rejected, a large fraction of workers use these offers to improve their position at the incumbent firm.

4.1 Individual Bargaining is Pervasive

New External Hires. Panel A of Figure 1 shows that roughly 50% of surveyed firms are able to differentiate base wages between recent labor market entrants they perceive to have identical qualifications and fit. More than 80% of firms are able to differentiate wages for experienced non-managers and for managers. These three groups are mutually exclusive and exhaustive. When asked specifically about workers in the bottleneck occupation that firms indicated they were struggling to fill, nearly all firms are willing to adjust base wages to hire a worker.

Firms have a significant amount of discretion to increase wages, particularly for workers in higher-level positions (Panel A of Figure 2). While only 7% of firms would increase base wages by more than 10% for new external hires that are labor market entrants, 22% of firms are willing to do so for new external hires that are experienced non-managers, and 63% are willing to do so for new external hires that are managers. Because wages are higher for workers in higher-level positions, the level amount by which firms could adjust pay would be larger even if bargaining strategies were equalized across groups. That both the base levels and the amount of discretion vary suggests that bargaining may result in substantial pay dispersion.

The between-group differences do not mechanically reflect differences in the variance of productivity across employee groups. When eliciting firms' bargaining strategies, we specifically prompted respondents to focus on adjustments between individuals with equal qualifications and fit. In our conversations with HR professionals, this was the phrase that most closely aligned with productivity. This result is corroborated by the findings on negotiations with incumbent workers that we discuss next and that hold productivity constant by conditioning on workers staying in their current position.

Incumbent Workers. We find similar patterns for incumbent workers. Panel B of Figure 1 shows that, for recent labor market entrants, 57% of firms say they would be willing to increase an existing worker's base wage if they received an outside offer. More than 80% of firms would be willing to do so for experienced incumbents, for managers, and for workers in bottleneck occupations. Because we specifically asked HR professionals to consider a scenario in which the firm did not change the worker's job tasks, these adjustments do not reflect changes in the worker's productivity. Rather, they suggest that firms expect to earn rents on workers: they are able to increase pay without it becoming unprofitable to employ the worker. This finding is consistent with models in which firms have market power, either due to search frictions, size, or preference heterogeneity (e.g., Manning 2003; Cahuc, Postel-Vinay, and Robin 2006).

The magnitude by which firms are willing to adjust wages is somewhat lower for incumbent workers than for new hires. This pattern is in line with explanations HR professionals gave during the development of our survey. These professionals pointed out that equity considerations are typically more binding when setting pay for incumbent workers.

Robustness. The bargaining patterns we document using our main measure of bargaining over base wages are robust to accounting for other forms of compensation. Panel B of Appendix Table A7 documents similar patterns in bargaining with new external hires once we also include information on bargaining over special payments, such as bonus or stock payments, in our measure of firm bargaining strategies. We also asked respondents whether, at their firm, it was easier to adjust four non-wage amenities—flexible work (including vacation days), commute/moving costs, training, and childcare—than wages.[18] Panel C of Appendix Table A7 shows that, even when we focus on the subset of firms that indicate more flexibility regarding these amenities, we find similar patterns in terms of bargaining for base wages.[19]

[18]We focused on these amenities because, during the development of our questionnaire, they were most frequently cited by HR professionals as important.

[19]The observed bargaining patterns are also not simply explained by the presence of performance pay. In unreported results, we compare bargaining strategies for firms with a high versus low share of performance pay. For each firm, we compute the share of special pay out of total pay, and compare firms in the top versus bottom quartiles (Lemieux, MacLeod, and Parent 2009). We find that the bargaining strategies we elicit are similar even for firms with a low

4.2 Wage Differentiation Occurs In Both Initial and Final Offers

We find that bargaining strategies are more prevalent than previously documented (Hall and Krueger 2012; Brenzel, Gartner, and Schnabel 2014). This may, in part, reflect changes over time: a large literature has documented a decline in collective bargaining and a coinciding increase in the importance of individual-specific factors in wage setting (Card, Heining, and Kline 2013; Bhuller et al. 2022). As we document in Section 5, these individual-specific factors may include differences in how effectively workers negotiate. However, the increased prevalence we document also likely reflects how we define bargaining. In particular, our definition captures wage differentiation that occurs both as a result of workers asking for (and receiving) more after a firm makes its initial offer and differentiation that occurs in the initial offers themselves.

Differences in the wages firms offer to workers they perceive to have identical qualifications and fit emerge both as a result of differences in the initial offers that they make and as a result of back-and-forth negotiations. Figure 3 presents the expected gap between the highest and lowest offers a firm would make to ten candidates for a position who have identical qualifications and fit, but "vary in stated salary expectations and offers from other firms." Firms are more likely to report that they would expect no variation in initial offers than in final offers. However, a large share of firms expect they would make different initial offers to these candidates. Forty-four percent report that this initial stage of bargaining is at least as important as the subsequent back-and-forth negotiations in determining workers' pay.

This variation in initial offers may arise because firms often obtain information on workers' salary expectations before making an initial wage offer. In our sample, 29% of firms require candidates to provide this information; most ask for it. Previous work has documented that how workers respond to questions regarding their salary expectations—whether they agree to provide their expectations, and the level of expectations provided—affects the salary that they are offered (Agan, Cowgill, and Gee 2020; Roussille 2024).

prevalence of performance pay, suggesting that presence of performance pay is not a key driver of the patterns we document.

4.3 Predicting Firm Bargaining Strategies is Difficult

Following the previous literature, we next examine whether firm characteristics (Doniger 2015; Postel-Vinay and Robin 2004; Flinn and Mullins 2021) or characteristics of the labor market a firm is in (Ellingsen and Rosen 2003; Michelacci and Suarez 2006) are associated with firms' decisions to set pay via individual bargaining. The literature emphasizing firm productivity largely predicts that more productive firms will be more likely to set pay by bargaining. The literature that emphasizes labor market factors suggests that firms may be more likely to set pay via bargaining when the variance in worker productivity is larger, or when the labor market is tighter. See Hall and Krueger (2012) for a summary of this literature.

Productivity. We first examine the correlation of firm bargaining strategies with common proxies for firm productivity.[20] Figure 4 presents binned scatterplots of firms' bargaining strategies for experienced non-managers (the largest employment group) against common proxies for firm productivity: firm size, firm age, and total assets per employee. On these dimensions, we do not find significant differences between firms that do and do not bargain with new external hires or with incumbents. We also find that it is difficult to predict a firm's bargaining strategy using its AKM wage premium (Figure 4). Table 2 reports p-values from corresponding tests of equality of means. These confirm that firms that do and do not set pay via individual bargaining are similar with respect to several proxies for productivity. Appendix Figure A1 shows that we obtain similar results regardless of whether we use binary or continuous measures of bargaining.

Other Firm-Specific Factors. While we do not find systematic heterogeneity with regard to firm productivity, our results indicate that bargaining strategies are correlated with several other firm-specific factors. Table 2 shows that firms that have a collective bargaining agreement report less flexibility in adjusting wages, even though the CBA would not prevent them from making such

[20]The choice of wage protocol may both be influenced by and influence firm productivity. However, because firms should choose the wage-setting protocol that maximizes their profits, we would expect that ex post measures of productivity, including firm size, firm age, and total assets per employee, would—if anything—over-estimate the gaps in underlying productivity.

adjustments (in particular, for managers who are typically not covered by CBAs).[21] In addition, firms headquartered in East Germany, which historically had more rigid pay, are less likely to bargain with workers in all groups. We also find some evidence that firms' legal form is correlated with their bargaining strategies: firms whose shares can be traded on the stock market are more likely to set wages flexibly than firms with other legal forms. These results are consistent with the view that managerial style and culture are important for firms' wage-setting strategies Bertrand and Schoar (e.g., 2003), Acemoglu, He, and Le Maire (2022), and Hjort, X. Li, and Sarsons (2020).

Labor Market Factors. The group-level variation documented in Figures 1 and 2 is consistent with the idea that workers' job characteristics and labor market factors such as tightness drive variation in wage-setting strategies. Figure 2 shows that there is more scope to adjust pay for managers than for experienced non-managers, and more scope to adjust wages for experienced non-managers than for recent labor market entrants. Further, we find that firms are most willing to make adjustments for workers in the occupation they specify they are having a hard time filling (i.e. workers in bottleneck positions). As Appendix Table B7 documents, the firm-provided bottleneck occupations span a large range of occupations, and are not limited to higher-level positions. Firms' increased willingness to bargain with workers in positions they are struggling to fill suggests that market tightness may affect how firms choose to set wages.

Relative Importance of Firm and Market Factors. A simple variance decomposition provides additional support for the importance of market factors. In particular, it shows that employee-group characteristics within firms, rather than firm characteristics, explain more of the variation in bargaining strategies. We perform this decomposition by running a regression where the dependent variable, b_{ig}, is an indicator for whether firm i bargains with workers in group g (e.g., with recent

[21] In our sample, 41% of firms are covered by a CBA , reflecting the substantial decline of CBA coverage in Germany over the past decades. While 70% (56%) of workers in West Germany (East Germany) were covered by a CBA in 1996, this was only true for 45% (34%) in 2021 (Institut fuer Arbeitsmarkt- und Berufsforschung 2021). The decline in coverage occurred both across and within firms (Hassel and Rehder 2001; Brändle, Heinbach, and Maier 2011; Fitzenberger, Kohn, and Lembcke 2013; Fitzenberger and Sommerfeld 2016). While not all workers within a firm are covered by a CBA, we find that CBA coverage predicts firms' policies even for groups that are not covered. This finding mirrors the results on union spillovers on non-union employees documented in Beauregard et al. (2024).

labor market entrants) and the independent variables include different sets of covariates.

Column 1 of Table 3 shows that the four employee-group dummies alone explain 35% of the variation in wage-setting strategies for new hires. After adjusting for the number of fixed effects used, the amount of variation explained by the four group dummies is comparable to that explained by the more than 500 firm dummies (Columns 1 and 2). Columns 4 to 6 show that adding firm characteristics or coarse industry dummies does not significantly improve the adjusted R-squared, relative to a model that contains only the group dummies. Panel C documents similar results for the bargaining strategies for incumbent workers. Appendix Table A8 shows that we obtain similar results when we use alternative definitions of bargaining or drop the strategies for workers in bottleneck occupations, which are harder to compare across firms. These results suggest that firms' bargaining strategies are not easy to predict using observable firm characteristics.[22]

4.4 Implications of Worker-Firm Dynamics

Motivated by the documented prevalence of firms' willingness to engage in individual wage bargaining, we conclude this section by examining how worker-firm bargaining interactions typically unfold. The patterns we document place empirical restrictions on the types of models appropriate for the labor market. They also provide guidance for empirical researchers interested in studying heterogeneity in worker bargaining behavior and in the consequences of bargaining.

Our data on worker-firm interactions come from the worker survey described in Section 2.3. In this survey, we asked workers whether they had received an outside offer in the previous six months.[23] If a worker said yes, we posed a series of follow-up questions about the offer and subsequent bargaining process. We use these questions to construct the extensive-form bargaining tree displayed in Figure 5 and the summary statistics in Table 4. For workers who accepted an offer

[22] In unreported results, we attempted to use machine learning methods to predict firms' strategies. This exercise corroborates the importance of firm characteristics such as collective bargaining or legal form for firms' bargaining strategies. However, proxies for firm productivity such as firm age or firm assets are not systematically predictive of whether or not a firm engages in individual wage bargaining.

[23] Our main survey question asked about any job offer workers received. In this setting, while final offers are typically made in writing, most intermediate bargaining steps are made verbally.

(i.e. workers who then moved to a new firm), we use the interactions between the worker and their now-current firm.[24] For workers who rejected an offer (i.e. workers who received an outside offer but did not switch firms), we use the bargaining associated with the most recent outside offer. We use at most one event per worker; if a worker reports that they both switched firms and received and rejected an outside offer in the previous six months, we use data on the event that led to the change in firm.

The first branch of the tree in Figure 5 shows that the majority (58%) of worker-firm interactions begin with the worker providing his or her salary expectations. This stage is not typically captured in surveys of bargaining. It is common for a worker to ask a firm to improve its initial offer, even when these expectations are met: 25% (61%) of workers whose expectations were met (not met) ask for more money. Conditional on a worker asking for more, it is also common for firms to counter by offering the worker more than they initially offered, but less than the worker asked for.

Figure 5 also shows that most offers are rejected, with the worker remaining at the incumbent firm. The tree indicates that only 9% of workers who received one or more outside offers in the past six months chose to move to a new firm. However, even when an offer is rejected, it sometimes takes several rounds: after providing an initial offer, a worker may counter the firm's offer, and the firm may in turn counter the worker's offer. Models of two-sided incomplete information such as the Perry (1986) and Chatterjee and Samuelson (1983) models would rationalize such patterns. Our findings are consistent with a growing literature that has documented (separately) that firms have imperfect information about what other firms pay (i.e., what workers' outside options are) and that workers have imperfect information about what their firm is willing to pay (Cullen, S. Li, and Perez-Truglia 2022; Cullen 2023). Indeed, 69% of the HR professionals in our survey said that decision-makers at their firm only have market-level information on wages, not specific information on what their firm's competitors pay.

[24] One distinction between this setting and the product market setting studied in Backus, Blake, Larsen, et al. (2020) is that only workers can "accept" offers. While a firm may accept a worker's proposed salary, in order for the match to be formed, the worker must still formally accept the firm's offer.

Table 4 summarizes the bargaining dynamics and highlights the importance of on-the-job renegotiation. In the majority of cases in which a worker remains at the incumbent firm, the worker does not report that they re-negotiated their salary at the incumbent firm. However, it is much more common for workers to receive and reject outside offers than it is for them to receive and accept them. As a result, workers are more likely to have used an outside offer to renegotiate than they are to have moved firms.

Robustness. The findings from two robustness exercises corroborate the validity of the patterns we document. First, while our main sample focuses on workers who were employed at surveyed firms in 2020, in unreported results we find similar patterns when we include a random sample of German workers who are employed at non-surveyed firms. This result indicates that the bargaining dynamics we document are not restricted to the specific sets of firms who participated in the firm survey.

Second, data from a follow-up survey we fielded in spring 2024—more than a year after the initial wave—confirm our finding that most outside offers are rejected. In this wave, we asked workers whether they had switched firms since the last survey wave; we again asked workers whether they had received an outside offer in the previous six months. These data allow us to address two potential concerns: (1) that workers who moved due to an accepted outside offer may have been less likely to receive our initial survey invitation or (2) that workers accepted some of the outside offers they reported in the survey after they completed the survey. Focusing on workers who provided their e-mail address in the initial wave and were randomized into being contacted via e-mail (to avoid the concern that workers who moved might have been more difficult to contact by mail), we find that the majority of workers (~80%) who received an outside offer chose to remain at the incumbent firm. Similarly, even if we re-code all offers as "accepted" if a worker switched to a new firm between the initial wave and the follow-up survey (assuming that all job-to-job transitions are the result of this offer, not offers they may have received in between survey waves), we find that no more than 26% of offers lead to a job-to-job transition.

5 Between-Worker Differences in Bargaining

The results from our firm survey highlight that many firms are willing to individually differentiate pay. This finding suggests that the actions of individual workers may be influential in pay determination. We next examine between-worker differences in bargaining behavior and outcomes, both before and after a firm makes its initial offer.

5.1 Dimensions of Worker Heterogeneity and Bargaining Outcomes

We focus on two dimensions of heterogeneity highlighted by the bargaining literature—outside options and risk aversion—and two dimensions highlighted by the literature on wage inequality—gender and AKM person effects.

We elicited information on outside options and risk tolerance in the worker survey. Outside options are a key driver of bargaining outcomes in most models (see, e.g., Nash 1950; Cahuc, Postel-Vinay, and Robin 2006; Caldwell and Danieli 2024) and have been shown to affect worker mobility and wage growth (Caldwell and Harmon 2019). Risk tolerance is sometimes thought to be related to bargaining power. We measure workers' perceptions of their outside options by asking them how difficult it would be to obtain an outside offer that they would prefer to their current position.[25] We followed Dohmen et al. (2011) and elicited risk tolerance by asking workers whether they were "generally [someone] who is willing to take risks or [whether they tried] to avoid taking risks". We asked workers to provide their responses on a ten-point scale and we define someone as having high risk tolerance if they selected seven or above.[26]

We obtain information on gender and on AKM person effects from the administrative data. Our focus on the AKM person effect was inspired by a large literature which has documented

[25]This question generates variation across workers within the same establishment and occupation that could stem from—among other things—differences in preferences or information. While we do not attempt to distinguish between potential explanations, Appendix Table A9 documents that workers' perceptions are positively correlated with objective measures.

[26]Previous studies of bargaining have also highlighted the role of patience in determining prices in the product market (Backus, Blake, Larsen, et al. 2020). We elicited patience in a follow-up survey using the question developed by Falk et al. (2023) and analyze heterogeneity on this dimension in Appendix Table A11.

that the rise in variance of the AKM person effects explains a large share (40%) of the growth in German wage inequality over the past several decades (Abowd, Kramarz, and Margolis 1999; Card, Heining, and Kline 2013), and an even larger share of the rise of U.S. wage inequality (Song et al. 2019). While a common interpretation of the AKM person effects is that they represent workers' observed and unobserved skills, they capture all worker characteristics that are valued across firms and do not vary over the time window used for estimation. Because the growth in variance of these person effects coincides with the decline in collective bargaining, it is thus plausible that they reflect differences in bargaining skill (Ellguth and Kohaut 2019). We take these person effects from Bellmann et al. (2020). Because the person effects we use are estimated from regressions using population data from 2010–2017, they are not mechanically related to the outcomes of the bargaining events elicited in our survey, which only captures bargaining events dating back to 2019.[27]

For each of these four dimensions of potential worker heterogeneity, we run regressions of different bargaining outcomes y_i on the heterogeneity dimension X_i, age, a quadratic in experience, education dummies, and three-digit occupation-establishment fixed effects:

$$y_i = \beta X_i + \delta \text{age}_\text{i} + \alpha \text{exp}_i + \gamma \text{exp}_i^2 + \zeta_{educ(i)} + \lambda_{o(i),est(i)} + \epsilon_i. \tag{1}$$

We include occupation-establishment fixed effects ($\lambda_{o(i),est(i)}$) to ensure that heterogeneity in bargaining behavior is not driven by heterogeneity in firm bargaining strategies. We cluster the standard errors at the firm level. Our baseline sample includes individuals who worked at surveyed firms in 2020.[28]

Each row of Table 5 corresponds to a different bargaining outcome. We elicited information on bargaining at the start of the spell (Panel A) for workers who started their job in the previous three years and on bargaining during a job spell (Panel B) for all workers. Panel A shows that

[27]The model used in Bellmann et al. (2020) is a regression of log wages on worker and firm fixed effects, on demographic controls, and on occupation fixed effects.

[28]The sample used in this section differs from the sample in Section 4.4, which only includes bargaining events that occurred within the previous six months for new hires and incumbents who received an outside offer.

the majority (69%) of workers provided their salary expectations to their current firm before they received an initial salary offer; about a third of workers asked the firm to increase the offer it made. Most of these workers (70%) were successful: overall about a quarter of workers successfully negotiated their salary upward at the start of the spell. Panel B shows that in the previous six months, about a third of workers asked for a raise, most of them (80%) successfully.

Panel C describes workers' responses to a hypothetical bargaining scenario we embedded in the survey. We asked workers:

> "Suppose you wanted to change jobs and were applying to a new position in a different company. The job ad lists a salary range, which goes from {90/110}% to {120/140}% of your current salary. You are asked for your salary expectations. Relative to your salary, what do you say?"

We provided a salary range as firms typically provide pay ranges, rather than exact numbers (Batra, Michaud, and Mongey 2023). We included this scenario so we could compare workers' behavior—independent of firm actions—in a scenario in which information was equalized.[29] The scenario also provides us with more information on how workers behave at the salary expectations stage. Appendix Table A12 confirms that workers' salary expectations differ depending on their randomly assigned range (90-120% or 110-140%). Appendix Table A13 confirms that workers' responses to this hypothetical scenario are correlated with observed behavior and, in particular, that workers who provided their expectations in the past are more likely to do so in our scenario.

For this hypothetical scenario, we focus on three key outcomes: whether a worker provided their expectations, whether their stated expectations were at or above the midpoint of the stated range, and whether their expectations were above the top of the stated range. We focus on these outcomes as previous work has documented that firms offer higher wages to workers who state

[29]Much of the recent policy discussion of bargaining has focused on the role of information. For instance, Germany—and many states in the United States—have made it illegal for firms to ask a worker for their previous salary when discussing pay (Agan, Cowgill, and Gee 2020). However, many firms continue to ask workers for their salary expectations, and, in the absence of information on the pay range associated with a position, workers may anchor their stated expectations to their previous salary (Agan, Cowgill, and Gee 2021). In recognition of this, policymakers have started to introduce and pass legislation which requires firms to provide pay information in job postings. In many cases, the stated goal of these policies is to close the gender pay gap (Council of the EU 2023).

higher salary expectations (Agan, Cowgill, and Gee 2020).[30]

5.2 Differences in Bargaining Outcomes

Table 5 documents substantial differences in workers' bargaining outcomes across the four dimensions of worker heterogeneity we study. Each entry in Columns 2 to 7 presents an estimate of β corresponding to a regression where y_i is the action provided in that row and X_i is the dimension of worker heterogeneity provided at the top of the column.

Outside Options. Columns 2 and 3 of Table 5 document that workers with better outside options are more likely to engage in wage negotiations than their same-occupation coworkers with worse outside options. After the initial offer is made, workers who said it would be "easy" or "very easy" to obtain a better outside offer are 9 percentage points more likely to ask the firm to increase their offer (Column 2) than workers who said it would be "difficult" or "very difficult" to do so. Similarly, workers who said it would be easy or very easy to obtain a better outside offer are 7 percentage points more likely to successfully negotiate a raise. We observe a similar pattern on the intensive margin (including zeros): workers with better outside options see larger increases in pay during negotiation at the start of a job spell.

Panel B of Table 5 shows that heterogeneity in workers' behavior after they have joined a firm mirrors the heterogeneity at the beginning of the spell. Workers with better outside options are 9 percentage points more likely to initiate and 8 percentage points more likely to succeed in renegotiations with their employer. Appendix Table A10 shows that these workers are not more likely to receive raises without asking for them.

Risk Tolerance. Columns 4 and 5 of Table 5 report similar patterns for workers who are more willing to take risks. Both at the beginning and during the employment spells, these workers are more likely to engage in wage negotiations and are also more likely to be successful, relative to

[30]This work has also shown that firms interpret these asks as more informative of a worker's outside options than of a worker's productivity (Agan, Cowgill, and Gee 2020).

their same-occupation coworkers. The gaps in successful negotiations are somewhat larger than those in attempted negotiations.[31] Workers with greater risk tolerance also ask for significantly more in our hypothetical scenario.

Gender. When examining bargaining differences by gender (Column 6 of Table 5), we find that women are less likely to engage in back-and-forth negotiations, and that they are somewhat less likely to provide their salary expectations before the initial offer is made. While the gap of 5 percentage points in having provided their expectations at the start of the spell is not statistically significant,[32] we see a significant gap in expectations provision in the hypothetical scenario, for which we have responses for all workers. Women are less likely to provide salary expectations and provide lower expectations as a fraction of their current salary, even when the range is provided. For instance, women are 6 percentage points less likely to provide salary expectations that would lie above the range which is listed in the job ad. Panel B of Table 5 shows that these gender differences in bargaining also continue during workers' employment spell. Women are 6 percentage points less likely to successfully negotiate their pay up. In Appendix E, we discuss potential mechanisms. We do not find evidence that women fail to bargain because they are less likely to think that it will pay off or because they fear backlash. Rather, our findings are most consistent with a story in which individual women—most of whom would advise other women to bargain if presented with an outside offer—fail to ask for more because they find it uncomfortable .

AKM Person Effects. Finally, we find differences in bargaining outcomes between same-occupation coworkers with different AKM person effects. Column 7 of Table 5 shows that higher-person effect individuals are more likely to have provided their salary expectations when they applied to their current firm. Workers' responses to the hypothetical question on salary expectations show that higher-person effect workers also state higher expectations. Because this question asks respon-

[31] Appendix Table A11 shows that we also find differences in bargaining actions by worker patience. In the smaller subset of workers who also participated in our follow-up survey, those with higher patiences are more likely to provide expectations and to negotiate at the beginning of the employment spell.

[32] This reflects, in part, the fact that we only observe this outcome for workers who switched firms in the previous three years; the standard errors indicate we would be unable to detect gaps of less than ten percentage points.

dents to provide their expectations as a fraction of their current salary, this finding does not simply reflect the fact that these individuals earn higher salaries at their current firms. Rather, it suggests that, conditional on their wage, these individuals ask for more. These results—and the fact that high-AKM workers are not more likely to receive raises without asking for them (Appendix Table A10)—are inconsistent with the idea that variation in AKM person effects solely reflects variation in skill. Consistent with the idea that high AKM person effects reflect, in part, fixed differences in worker bargaining behavior, we find significant differences by AKM person effect in whether workers attempted and whether they succeeded in salary negotiations.

5.3 Discussion and Robustness

Differences in When or Over What Workers Bargain. In theory, workers could negotiate over different things, or at different stages. However, we do not find any evidence that workers who negotiate less over base pay (e.g., workers with worse outside options or women) negotiate more on other dimensions. Panel A of Appendix Table A10 documents that the two non-wage amenities that workers most frequently report having negotiated over are vacation days (27% of workers) and training opportunities (18%). We find no evidence that workers with worse outside options, lower risk tolerance, lower-person effects, or women negotiate more on non-wage dimensions. Further, with the exception of gender, we also do not find meaningful differences in bargaining for special pay, such as bonus and stock payments.

Similarly, we find no evidence that the groups of workers who negotiate more at the beginning of their employment spell bargain less later on. Instead, the heterogeneity in workers' behavior after they have joined a firm mirrors the heterogeneity at the beginning of the spell. The consistency of these results—and the fact that individuals who ask for more at the initial stages do not ask for less at later stages—suggests that the heterogeneity we uncover does not reflect heterogeneity in when individuals bargain, but rather heterogeneity in whether, and how effectively, they bargain.

Correlation Between Heterogeneity Dimensions. While the dimensions of worker heterogeneity are correlated with each other, they each have an individual contribution to the documented differences in bargaining. For instance, while women have worse outside options and are less tolerant of risk (Appendix Table E3), this does not fully explain the gender differences in bargaining. When we include each of the three characteristics in a single regression, we find that the coefficient on female shrinks by most 15% (Appendix Table E4). Appendix Figure A2 presents a more general version of this analysis and shows that when we include all four worker characteristics in a single regression, we obtain similar coefficients on each dimension of heterogeneity. For the outcomes measured in the previous six months (for which we have the largest sample), each dimension is individually significant.

Specification and Sample. Two further robustness tests indicate that the results in this section are not specific to the sample or specification used. First, Appendix Figure A2 shows that we obtain similar results when we expand our sample to include the random sample of workers who did not recently work at surveyed firms. Second, this figure shows that we also find similar results when we use alternative sets of fixed effects instead of the occupation-establishment fixed effects included in our main specification.[33]

6 Bargaining and Pay Inequality

We conclude our analysis of bargaining by examining the link between individual wage bargaining and pay inequality. We conduct two empirical exercises which test whether the documented differences in individual bargaining have meaningful impacts on pay inequality. First, motivated by the literature on the gender pay gap we test whether gender differences in pay are larger under individual bargaining. Second, based on the idea that workers who make job-to-job transitions use their previous firm as the outside option in negotiation (Cahuc, Postel-Vinay, and Robin 2006), we

[33]Our preferred specifications group workers by 3-digit occupation fixed effects, rather than by finer level-occupation fixed effects. The similarity of these estimates across specifications with different sets of fixed effects suggests that our findings are not driven by compositional differences across specifications.

test whether under individual bargaining the pay policies associated with workers' previous firms continue to affect their pay. We find that at firms that engage in individual bargaining, gender wage gaps are 3 percentage points larger, and the characteristics of a worker's previous firm continue to influence their pay.

6.1 Bargaining and the Gender Pay Gap

The extent to which individual bargaining contributes to the overall gender pay gap depends on two empirical objects: the fraction of workers whose pay is set by individual bargaining and the gender pay gap associated with this type of pay strategy. Most (80%) workers in our sample are exposed to individual bargaining. Panel A of Appendix Table A14 shows that, within a labor market, women are not more exposed than men. This result holds also for the subset of surveyed workers (Panel B of Appendix Table A14), who are of particular interest because we observe their hours worked. To estimate the gender pay gap associated with individual bargaining for these workers, we run regressions of the following form:

$$\log w_i = \beta \text{Female}_i + \delta \text{age}_\text{i} + \alpha \text{exp}_i + \gamma \text{exp}_i^2 + \zeta_{educ(i)} + \lambda_{o(i),est(i)} + \epsilon_i. \quad (2)$$

where $\log w_i$ is a measure of an individual's log daily pay. We start by running these models separately for workers who are and are not exposed to individual bargaining. Because the bargaining strategies come from a firm-level survey, we cluster the standard errors at the firm level.[34]

Panel A of Table 6 presents estimates of equation 2 for the set of surveyed workers. Columns 1 and 4 show that, before we control for occupation-establishment fixed effects, there is a large (9 percentage point) gender pay gap at firms with and without individual bargaining. This gap narrows substantially once we include occupation-establishment fixed effects (Columns 2 and 5). The gap closes at firms without individual bargaining (Column 2) and is 5 percentage points at firms with

[34]Note that because the sets of fixed effects that are typically available in administrative data are imperfect proxies for individuals' job titles, residual gaps at posting firms may reflect unobserved differences in skills and job tasks. Residual gaps at bargaining firms reflect both this and the effect of bargaining.

individual bargaining (Column 5). We find similar results once we include finer level-occupation-establishment fixed effects rather than occupation-establishment fixed effects (Columns 3 and 6).[35]

Interpreting residual pay gaps as the result of individual bargaining can be difficult if men and women differ in the number of hours worked (Caldwell and Danieli 2024). For the subset of surveyed workers for whom we observe hours, we do find meaningful gender differences in hours worked among full-time workers in the same occupation and firm (Appendix Table A15). However, our estimates of the gender pay gap are not explained by these differences in hours worked. Panel B of Table 6 shows that we obtain very similar estimates of the gender pay gap when we condition on log hours worked.

Figure 6 shows that the differences in gender gaps at firms with and without individual bargaining are robust to considering alternate measures of pay or to including non-surveyed workers. The estimates in this figure come from models in which we interact all of the covariates and fixed effects with an indicator for whether the firm engages in individual bargaining. We present the coefficient on an interaction between a female dummy and an indicator for whether the firm engages in individual bargaining. Estimates from our baseline specifications which use occupation-establishment fixed effects, are presented in black; estimates which use the finer level-occupation-establishment fixed effects are in blue.

The black line at the top of this figure (which corresponds to the difference in Columns 2 and 5 in Panel A of Table 6) shows that the there is an almost 4 percentage point difference in the gender pay gap between firms who engage in individual bargaining and those who do not. We also find a substantial gender pay gap when we use daily base pay, which excludes special pay, as an outcome of interest. While this outcome is less commonly used when estimating gender pay gaps, it has the advantage of most closely capturing our survey-based measures of bargaining which asked firms about individual bargaining over base wages. The gender pay gap also persists when we condition on hours and when including all workers at surveyed firms irrespective of whether they participated

[35]The overlap between 3-digit occupation groups between bargaining and posting firms in our sample is large, with approximately 80% of occupation groups existing in both bargaining and posting firms. In unreported results, we find similar patterns when we hold the number of observations constant across Columns 1 and 2 (and Columns 4 and 5) by restricting to workers for whom we can estimate specifications with occupation-establishment fixed effects.

in our survey. The pay gap we associate with bargaining is significantly larger than that presented in previous work; this likely reflects the fact that we focus on the private, rather than public, sector (Biasi and Sarsons 2022). Appendix Table A14 presents a simple decomposition which suggests that at our surveyed firms 44% of the residual gender pay gap can be attributed to bargaining.

Appendix Table A16 shows that the 3-5 percentage point gender pay gap we attribute to bargaining is not only robust across different types of pay and samples of workers, but also persists when we define firms' bargaining strategies based on renegotiation during an employment spell instead of bargaining at the beginning of an employment spell. Appendix Table A17 shows that the gender pay gap among workers at surveyed firms is comparable, though somewhat smaller, than the gender pay gap among workers at non-surveyed firms.Taken together, our results provide strong evidence that gender differences in pay are significantly larger when workers are exposed to individual wage bargaining, suggesting that bargaining substantially contributes to wage inequality within firms.[36]

6.2 Origin and Destination Effects in Pay Setting

If pay is set by bargaining, the pay policy of an individual's firm may influence their pay even after they have moved to a new firm (Di Addario et al. 2022). We examine the link between an individual's pay and the pay policy of her previous employer by running regressions of the form:

$$\log w_i = \beta \psi_{i,j^{prev}(i)} + \delta \text{age}_\text{i} + \alpha \text{exp}_i + \gamma \text{exp}_i^2 + \zeta_{educ(i)} + \lambda_{o(i),est(i)} + \epsilon_i.$$

In this regression the $\lambda_{o(i),est(i)}$ are occupation-establishment fixed effects and the $\psi_{i,j^{prev}(i)}$ indicate the wage premium associated with an individual's previous employer. Because these premia are estimated in population regressions in which log daily pay is the dependent variable, we use log daily pay as the dependent variable. We cluster the standard errors at the firm level.

[36]Previous research has documented that important wage disparities can arise in the position in the earnings distribution, in addition to the level of earnings (Blau and Kahn 2017; Bayer and Charles 2018). In Appendix E, we document larger gender disparities in the presence of bargaining when we estimate gender gaps in wage percentiles computed within establishment and employee group.

Table 7 presents estimates of models which are run separately for workers who are and are not exposed to bargaining. The first entry shows that, when pay is not set via individual bargaining, the pay premium offered by an individual's previous firm has no statistically significant relationship with her current pay after we control for occupation-establishment fixed effects (Column 1). However, when individual bargaining is possible, a 10 percentage point higher pay premium at an individual's previous firm is associated with 0.5 percent higher pay at her new firm (Column 2). We see a similar pattern both among all workers at surveyed firms (Columns 1–2) and among surveyed workers (Columns 3–4) at these firms. Panel B shows that we find similar results when focusing on the first pay a worker received when they joined their current firm. These results suggest that when pay is set via individual bargaining, the quality (as measured by pay) of an individual's firm matters even after he or she has left the firm.[37] This result are consistent with the fact that during negotiations with an outside firm, an individual's outside options include the option of remaining at her previous firm.

7 Conclusion

This paper presents novel evidence on the prevalence and importance of individual worker-firm wage bargaining. We first introduced and validated a survey measure of firms' bargaining strategies. Using the strategies we elicited from 772 firms—which span all major sectors and states in Germany—we documented that most workers are employed at firms which indicate they would differentiate pay between workers they perceive to have identical qualifications and fit, and which indicate they would adjust pay (even without adjusting job tasks) for workers who received an outside offer. These results suggest that bargaining is pervasive: 80% of workers are in firms which

[37] Di Addario et al. (2022) use Italian register data and find limited influence of an individual's previous firm. Like the authors of that paper, we find a limited (and statistically insignificant) role for the previous firm when we include all workers. We only find a significant relationship among workers whose pay is set via individual bargaining. A plausible explanation for why we find an effect in Germany, contrasting the lack of effect in Italy, are differences in the prevalence and importance of individual wage bargaining in the two countries. Previous research has documented that "the Italian system has not shown the [wage] flexibility exhibited by the German one", in part because Italian firms are more likely to be covered by industry-wide settlements (Devicienti, Fanfani, and Maida 2019). While the variance of firm effects has grown over time in Germany, this is not the case in Italy.

say they differentiate pay between workers they perceive to have the same productivity. Our results confirm that workers' wages are typically set below their marginal product.

The firm-level results also suggest that firm productivity does not predict a firm's bargaining strategy, but labor market factors do. The worker-level results indicate substantial between-group differences in bargaining behavior and outcome. For instance, we document that workers' outside options and gender significantly influence bargaining. The dynamics of worker-firm interactions suggest that both workers and firms have imperfect information about the bargaining positions of their counterparts. These dynamics also indicate that behavior that occurs before a firm makes its initial offer (i.e. during the salary expectations stage) and while on the job (i.e. renegotiating on the basis of an outside offer) is empirically important.

Differences in bargaining behavior lead to wage inequality within the firm, and may explain trends in wage inequality over the past several decades: we provide suggestive evidence that high-person effect workers ask for more in both real and hypothetical bargaining scenarios. In addition, residual gender wage gaps are 3 percentage points larger in firms which bargain. Providing information on firms' bargaining positions—as proposed by multiple policymakers (The Department of the Treasury 2022; Council of the EU 2023)—may not suffice to close between-group differences in worker behavior: we still see differences, e.g., between men and women, in a hypothetical situation in which we equalize pay information.

Our analysis has a number of limitations. First, because we use data from a single cross-section, we are unable to examine whether individual bargaining has become more prevalent or more influential in wage determination over time. Similarly, we are not able to decompose the individual person effects into the portion that is due to individual-specific bargaining factors and the portion that is due to individual-specific productivity. Understanding the relative importance of each factor is an important open question. Second, to avoid issues associated with limited recall, we did not collect information on the specific salaries associated with each stage of negotiation. Such data could shed light on whether bargaining outcomes are efficient and on whether "split the difference" behavior is common in the labor market, as it is in the product market (Backus, Blake,

Larsen, et al. 2020; Larsen 2021; Loertscher and Marx 2022).

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8 Tables

Table 1: Characteristics of Surveyed Firms

	Mean (1)	Std. Dev (2)	N (3)
Have a CBA	0.41	0.49	770
Number of Employees			
1-10	0.08	0.27	772
11-50	0.26	0.44	772
51-200	0.33	0.47	772
201-1000	0.23	0.42	772
1001-10000	0.04	0.21	772
10001+	0.03	0.17	772
Sector			
Manufacturing	0.34	0.47	772
Retail	0.17	0.37	772
Professional Services	0.09	0.29	772
Information Services	0.07	0.26	772
Transport	0.06	0.24	772
Real Estate	0.05	0.22	772
Administration	0.05	0.21	772
Finance	0.04	0.20	772
Other Firm Characteristics			
HQ in Eastern Germany	0.12	0.33	764
Year of Incorporation	1972	41	760
Total Assets per Employee	566	7680	576
Fixed Assets per Employee	395	5801	571

Note: This table describes firms in the firm survey. We elicited CBA coverage in our survey and take all other characteristics from Orbis. See Appendix Section C.2 for a detailed description of these variables. The number of observations for which we have data is listed next to each characteristic. Not all variables in Orbis are available for all firms.

Table 2: Comparison Between Posting and Bargaining Firms

	Bargain with Recent Entrants			Bargain with Experienced Non-Managers			Bargain with Managers		
	No	Yes	p-value	No	Yes	p-value	No	Yes	p-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Financial Status									
Total Assets per Employee	1041.9	191.9	0.21	250.45	641.79	0.69	378.93	602.74	0.89
(std.dev)	(11521.90)	(864.58)		(568.06)	(8480.20)		(781.30)	(8111.73)	
Fixed Assets per Employee	727.4	138.7	0.25	124.71	454.97	0.66	195.57	423.09	0.86
(std.dev)	(8736.26)	(817.97)		(317.92)	(6398.10)		(410.67)	(6124.16)	
Number of Employees									
1-10	0.09	0.08	0.81	0.10	0.08	0.51	0.18	0.08	0.03
11-50	0.24	0.27	0.44	0.30	0.25	0.20	0.46	0.24	0.00
51-200	0.34	0.33	0.72	0.31	0.34	0.55	0.18	0.35	0.03
201-1000	0.21	0.23	0.65	0.18	0.23	0.23	0.08	0.23	0.02
1001-10000	0.06	0.04	0.18	0.05	0.04	0.62	0.03	0.05	0.55
10000+	0.04	0.03	0.31	0.02	0.03	0.38	0.00	0.03	0.25
Other Firm Characteristics									
HQ in Eastern Germany	0.15	0.10	0.02	0.22	0.11	0.00	0.32	0.11	0.00
Have a CBA	0.50	0.35	0.00	0.56	0.39	0.00	0.46	0.42	0.58
Year of Incorporation	1969.2	1974.0	0.12	1974.29	1971.40	0.50	1973.70	1971.53	0.76
(std.dev)	(43.55)	(39.27)		(36.55)	(42.19)		(39.59)	(41.76)	
Legal Form									
Stock corporation	0.06	0.11	0.03	0.04	0.10	0.07	0.05	0.09	0.38
Limited liability company	0.83	0.80	0.32	0.82	0.82	0.90	0.74	0.82	0.23
Sector									
Manufacturing	0.37	0.32	0.12	0.42	0.32	0.05	0.21	0.35	0.07
Retail	0.15	0.19	0.20	0.17	0.17	0.95	0.10	0.18	0.24
Professional Services	0.07	0.11	0.08	0.04	0.11	0.02	0.03	0.10	0.14
Information Services	0.06	0.08	0.37	0.03	0.07	0.07	0.10	0.07	0.36
Transport	0.06	0.07	0.72	0.04	0.07	0.37	0.08	0.06	0.65
Real Estate	0.07	0.03	0.02	0.06	0.05	0.51	0.10	0.05	0.11
Administration	0.05	0.04	0.32	0.07	0.04	0.14	0.05	0.04	0.85
Finance	0.05	0.03	0.12	0.07	0.04	0.07	0.13	0.04	0.00
Bargain With									
Recent Entrants	0.00	1.00	---	0.06	0.62	0.00	0.23	0.55	0.00
Experienced Non-Managers	0.70	0.98	0.00	0.00	1.00	---	0.41	0.88	0.00
Managers	0.91	0.98	0.00	0.79	0.97	0.00	0.00	1.00	---
Observations	341	399		112	627		39	691	

Note: This table compares posting and bargaining firms based on the bargaining protocol reported for three employee groups: recent labor market entrants, experienced non-managers, and managers. Posting firms are those that report zero wage flexibility, while bargaining firms are those that report non-zero wage flexibility. Within each set of columns, the first (second) column shows the mean for posting (bargaining) firms; the third column shows p-values from a test of equality between those means. CBA-coverage and bargaining strategies are elicited in the firm survey. All other firm characteristics are collected from Orbis. See Appendix Section C.2 for a detailed description of these variables. Levels of significance: *10%, ** 5%, and *** 1%.

Table 3: Explaining Variation in Bargaining Strategies

	Fixed Effects Only			Group Effects and Firm Characteristics				
	Group	Firm	Group + Firm	Size, Productivity	Norms	Size, Productivity, Norms	Size, Productivity, Norms	Size, Productivity, Norms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				A. Bargaining with New Hires (Protocol Question)				
R-Squared	0.35	0.39	0.73	0.35	0.36	0.36	0.38	0.52
Adjusted R-Squared	0.35	0.18	0.64	0.35	0.35	0.36	0.37	0.46
				B. Bargaining with New Hires (Incidence Question)				
R-Squared	0.26	0.44	0.70	0.26	0.27	0.27	0.29	0.46
Adjusted R-Squared	0.26	0.25	0.59	0.26	0.26	0.26	0.28	0.39
				C. Renegotiating with Incumbent Workers				
R-Squared	0.22	0.48	0.69	0.22	0.22	0.22	0.24	0.42
Adjusted R-Squared	0.21	0.30	0.59	0.22	0.22	0.22	0.23	0.35
Industry Dummies							1-digit	4-digit

Note: This table presents the R-squared and adjusted R-squared from regressions of the firm-group bargaining protocol for new external hires (Panel A), the expected variation in final offers to new external hires (Panel B), and the amount of adjustment for incumbent workers (Panel C) in each firm-group on the covariates indicated at the bottom of the table. There are up to four observations for each firm.

Table 4: Summary Statistics of Bargaining Events

	Rejected Offers (1)	Accepted Offers (2)
Number of Workers	2651	275
A. Before Firm Makes Initial Offer		
Worker Provides Expectations	57%	74%
Expectations are Met | Expectations Provided	52%	64%
B. Between Firm's Initial and Final Offers		
Worker Counters Salary Offer	31%	39%
Firm Raises Offer | Worker Counters	42%	45%
Counter is Matched | Worker Counters	21%	28%
Firm Improves Amenities (New Hires Only)		
Bonus payment or Stock Options	---	21%
Vacation Days or Remote Work	---	11%
Company Car or Commuting Subsidy	---	13%
Training	---	4%
Childcare Subsidy	---	24%
C. On-The-Job Renegotiation		
Worker Attempts to Renegotiate with Incumbent	33%	---
Renegotiation is Successful | Attempt	46%	---

Note: This table describes the bargaining events reported in the worker survey. We use one event for each worker who reported that they either switched firms or received and rejected an outside offer in the previous six months. If a worker reported that both of these events occurred, we use data on the accepted offer. Events end in acceptance if the worker moved to the firm in question. Events end in rejection if the worker stayed at their former firm. An event ends immediately if the worker either accepts or rejects the first offer presented by the firm. An event takes one round if the worker either accepts the offer or rejects the offer after the firm accepts the worker's initial counter-offer. An event takes two or more rounds if the firm counters or rejects the worker's initial counter. The full sequence of events is presented in Figure 5. Appendix Table A1 describes the characteristics of workers in this sample.

Table 5: Differences in Worker Bargaining Behavior

		Outside Options		Risk Tolerance			AKM Worker
	Mean	Binary	Level	Binary	Level	Female	Effect
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
A. Bargaining at the Start of the Spell							
Provided Expectations	0.69	-0.016	0.012	0.007	-0.010	-0.050	0.118**
		(0.038)	(0.021)	(0.032)	(0.010)	(0.051)	(0.054)
		842	842	844	844	847	603
Asked Firm to Increase Base Wage	0.36	0.087***	0.056***	0.052	0.021*	-0.075	0.121**
		(0.029)	(0.021)	(0.037)	(0.012)	(0.051)	(0.055)
		846	846	848	848	851	607
Negotiated Base Wage Upward							
Binary	0.26	0.067*	0.049*	0.075*	0.024**	-0.068	0.187**
		(0.034)	(0.025)	(0.038)	(0.010)	(0.048)	(0.073)
		844	844	846	846	849	605
Percentage Points	1.46	0.513**	0.487***	0.413*	0.129*	-0.614*	1.555**
		(0.219)	(0.182)	(0.238)	(0.066)	(0.325)	(0.667)
		840	840	842	842	845	602
B. Events in Previous Six Months							
Asked for a Raise	0.36	0.090***	0.062***	0.079***	0.022***	-0.058***	-0.023
		(0.014)	(0.008)	(0.015)	(0.003)	(0.018)	(0.021)
		5103	5103	5085	5085	5138	4360
Asked for & Received a Raise	0.28	0.077***	0.054***	0.085***	0.023***	-0.064***	0.005
		(0.010)	(0.006)	(0.015)	(0.003)	(0.014)	(0.021)
		5103	5103	5085	5085	5138	4360
C. Hypothetical Bargaining Scenario							
Provided Expectations	0.93	-0.001	0.002	0.001	0.002	-0.022***	0.006
		(0.007)	(0.005)	(0.007)	(0.002)	(0.007)	(0.011)
		5121	5121	5104	5104	5158	4380
Level of Expectations							
Midpoint of Range or Above	0.73	-0.008	-0.003	0.027**	0.006*	-0.043***	0.039**
		(0.016)	(0.010)	(0.013)	(0.003)	(0.012)	(0.015)
		5044	5044	5023	5023	5072	4303
Above Range	0.11	-0.002	0.003	0.025*	0.007***	-0.057***	0.050***
		(0.006)	(0.005)	(0.014)	(0.003)	(0.008)	(0.014)
		5044	5044	5023	5023	5072	4303

Note: This table reports OLS regressions that shed light on worker differences in bargaining behavior based on the worker survey. Each entry provides the coefficient on the variable indicated in the column from a model which regresses the outcome indicated in the row on the column characteristic, and on an individual's level of education, a quadratic in experience, age, and three-digit occupation-establishment fixed effects. Standard errors, presented in parentheses, are clustered at the firm level. Panel A uses data on individuals who joined their firm in the previous three years. The first outcome is an indicator for whether the individual provided salary expectations during the application and hiring process. The second outcome is an indicator for whether the worker asked for a higher wage, independent of whether the worker was successful in her negotiation. The third outcome is an indicator for whether the worker negotiated successfully, that equals one if they asked the firm to increase the salary provided in their initial offer and the firm increased the offer. The fourth outcome captures the intensive margin of negotiating successfully, including zeros for those who do not successfully negotiate up. Panel B focuses on all workers who have experienced a bargaining event in the previous six months. The first outcome is an indicator for whether a worker asked for a higher wage. The second outcome is an indicator for whether a worker successfully negotiated a higher wage. Panel C examines how workers respond to a hypothetical scenario which asks them to provide their salary expectations in response to a stated salary range. The first outcome is an indicator for whether an individual did provide their expectation. The second and third outcomes represent indicators for whether the level workers provided is at least at the midpoint of the provided range or above the range, respectively. These outcomes are missing for individuals who did not provide their expectations. Additional outcomes are presented in Appendix Tables A10 and A11. Appendix Figure A2 presents robustness checks. Levels of significance: *10%, ** 5%, and *** 1%.

Table 6: Gender Pay Gaps and Firm Bargaining Strategies

	Without Individual Bargaining			With Individual Bargaining		
	(1)	(2)	(3)	(4)	(5)	(6)
	A. Daily Pay					
Female	-0.088***	-0.013	-0.011	-0.093***	-0.051***	-0.047***
	(0.022)	(0.026)	(0.027)	(0.017)	(0.019)	(0.016)
p-value for equality	0.821	0.140	0.199	0.821	0.140	0.199
Clusters	90	32	32	307	132	126
Observations	1617	1226	1181	5320	3820	3620
	B. Daily Pay, Controlling for Hours					
Female	-0.097***	-0.021	-0.019	-0.081***	-0.063***	-0.058***
	(0.026)	(0.029)	(0.029)	(0.018)	(0.017)	(0.013)
p-value for equality	0.540	0.119	0.167	0.540	0.119	0.167
Clusters	90	32	32	307	132	126
Observations	1617	1226	1181	5320	3820	3620
	C. Daily Base Pay					
Female	-0.073***	0.008	0.007	-0.090***	-0.050**	-0.048***
	(0.026)	(0.032)	(0.031)	(0.019)	(0.020)	(0.018)
p-value for equality	0.426	0.065	0.089	0.426	0.065	0.089
Clusters	90	32	32	307	132	126
Observations	1616	1225	1180	5312	3815	3617
Fixed Effects	---	Occ-Est	Level-Occ-Est	---	Occ-Est	Level-Occ-Est

Note: This table presents estimates of the gender pay gap separately by whether workers are exposed to individual bargaining. Columns 1-3 include workers in positions at firms which do not engage in individual bargaining, while Columns 4-6 include those whose pay is set by individual bargaining. Each column presents results from a separate regression of log wages on a female dummy, age, a quadratic in experience, education dummies, and on the fixed effects indicated in each column. Panel A and B focus on daily pay as outcome of interest. Panel C uses daily base pay, which excludes special pay, such as bonus and stock payments. See Appendix C for more details on how these pay measures are constructed. Appendix Table A15 documents an gender gap in hours. Panel B includes log hours as additional control. Standard errors are clustered at the firm level. Levels of significance: *10%, ** 5%, and *** 1%.

Table 7: Bargaining and the Influence of the Previous Firm

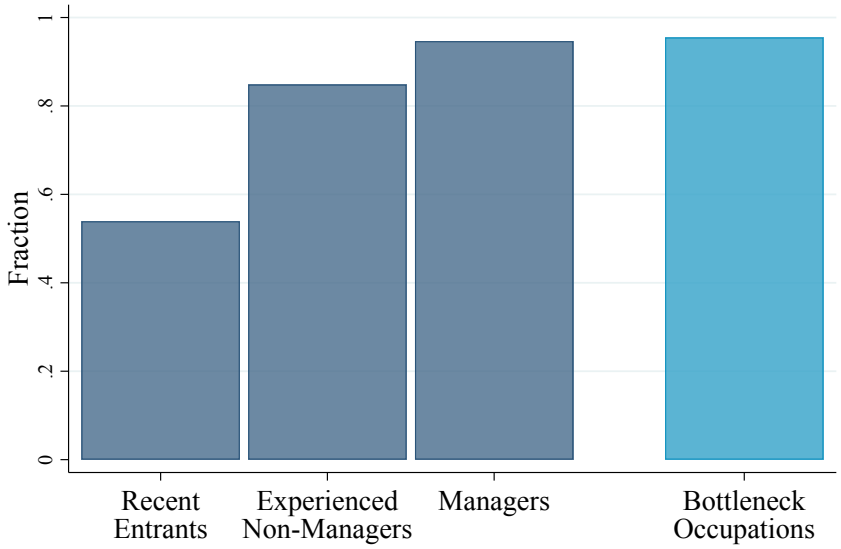
	All Workers		Surveyed Workers	
	Without Bargaining	With Bargaining	Without Bargaining	With Bargaining
	(1)	(2)	(3)	(4)
	A.Current Daily Pay			
Prior Firm Effect	0.006	0.056***	-0.036	0.051***
	(0.013)	(0.010)	(0.058)	(0.018)
Clusters	168	437	25	111
Observations	36155	139082	1018	3200
	B. Starting Daily Pay			
Prior Firm Effect	0.137*	0.209***	0.347	0.486***
	(0.078)	(0.026)	(0.353)	(0.162)
Clusters	73	227	11	25
Observations	4190	6820	105	147

Note: This table describes the relationship between an individual's current pay and the pay policy (firm effect) of her previous firm. Columns 1 and 3 include workers in positions at firms which do not engage in individual bargaining, while Columns 2 and 4 include those whose pay is set by individual bargaining. Each column presents results from a separate regression of log daily pay on the prior-firm effect, age, a quadratic in experience, education dummies), and occupation-establishment fixed effects. Panel A focuses on an individual's current daily pay. Panel B focuses on the daily pay the individual received when they joined their firm. Standard errors are clustered at the firm level. Levels of significance: *10%, ** 5%, and *** 1%.

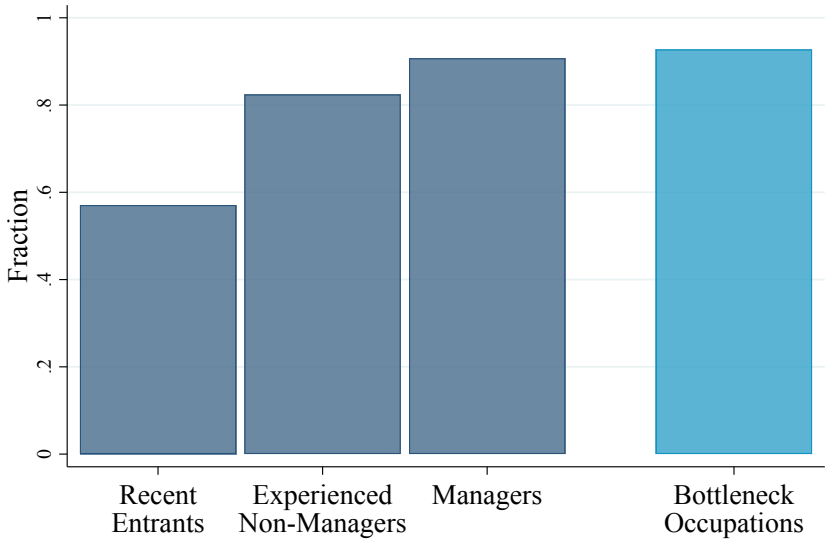
9 Figures

Figure 1: Share of Firms with Individual Bargaining Strategies

A. Base Wages for New Hires

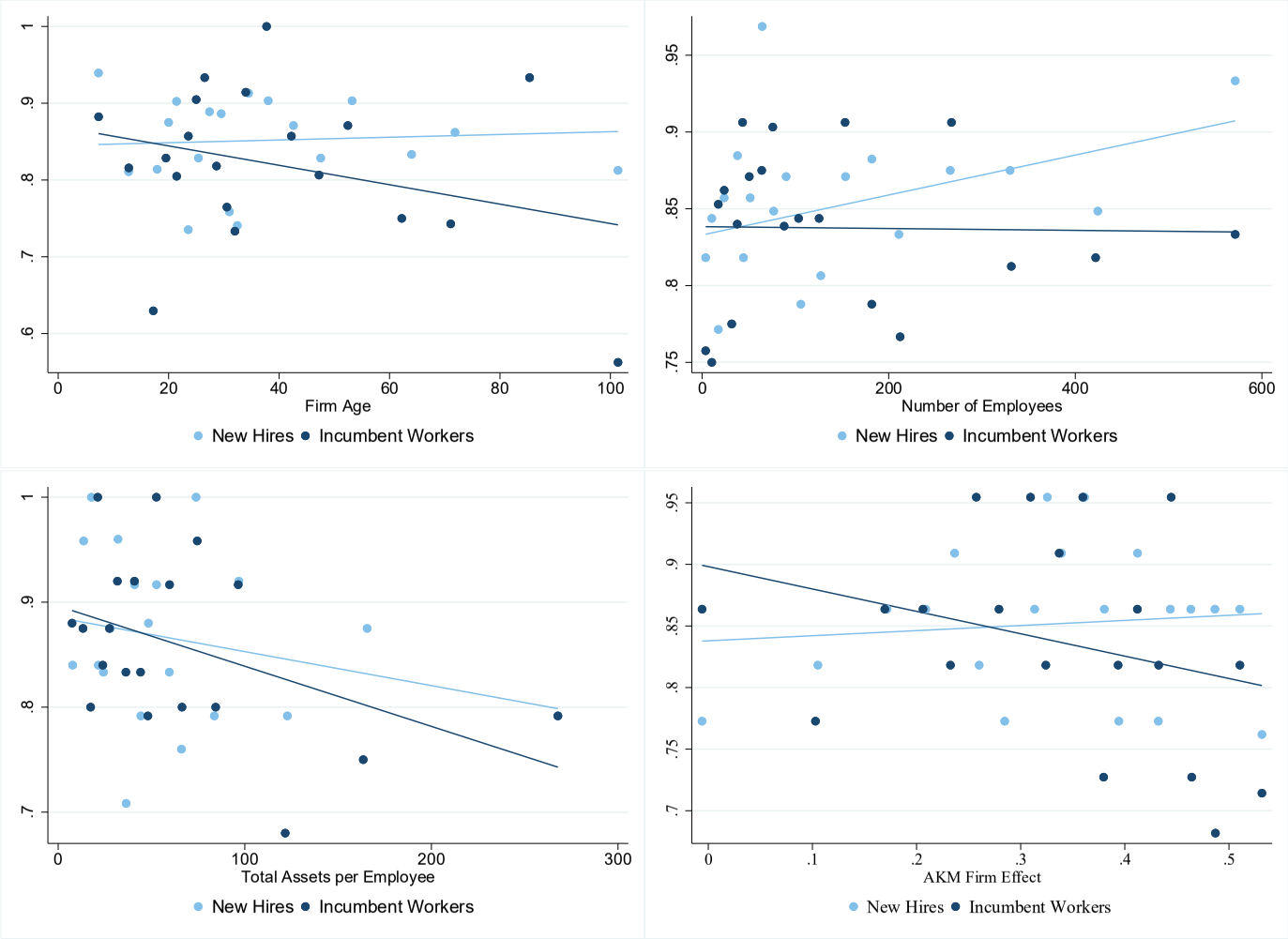


B. Base Wages for Incumbents with Outside Offers



Note: This figure documents the prevalence of individual bargaining strategies based on the protocol question, as described in Section 3. Panel A shows the share of firms that say they could increase base wages for new external hires by a non-zero amount beyond what is offered to an individual with given qualifications and fit. Panel B shows the share of firms that could adjust incumbent workers' base wages by a non-zero amount—without changing their job tasks—in response to an outside offer. Results are presented separately for each of the following employee groups: recent labor market entrants, experienced non-managers, managers, and employees in bottleneck occupations. The sample contains 772 firms.

Figure 4: Bargaining Strategies and Firm Characteristics

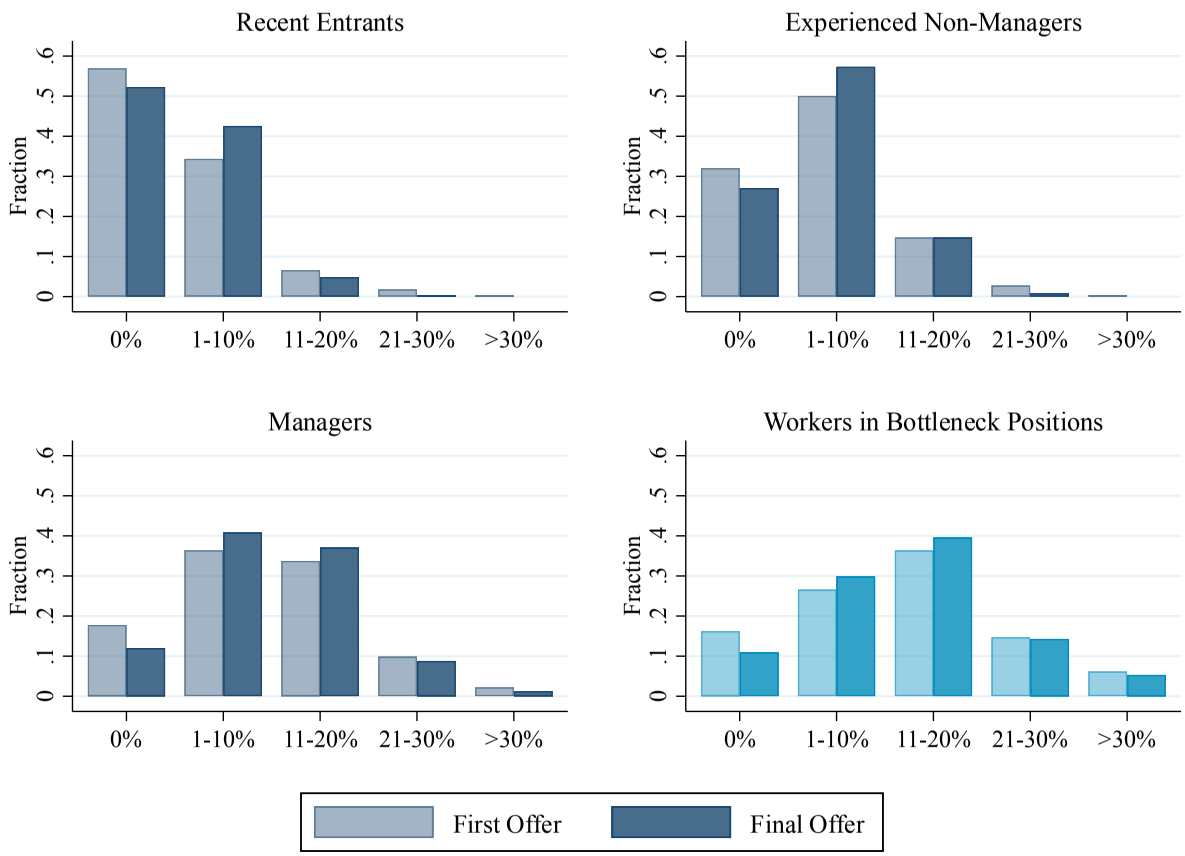


Note: This figure describes the relationship between the bargaining and renegotiation protocols for experienced non-managers and each of the indicated firm characteristics. The first three figures focus on our firm-level sample of 772 respondents. The fourth figure uses data from the 527 firms that are linked to the Social Security records and for which we have AKM firm effects. Information on the number of employees, firm age, and total assets stem from Orbis. The AKM firm effects come from regressions using population data from 2010–2017 (Bellmann et al. 2020). See Appendix Section C.2 for a detailed description of these variables.

Figure 2: Variation in the Intensive Margin of Bargaining

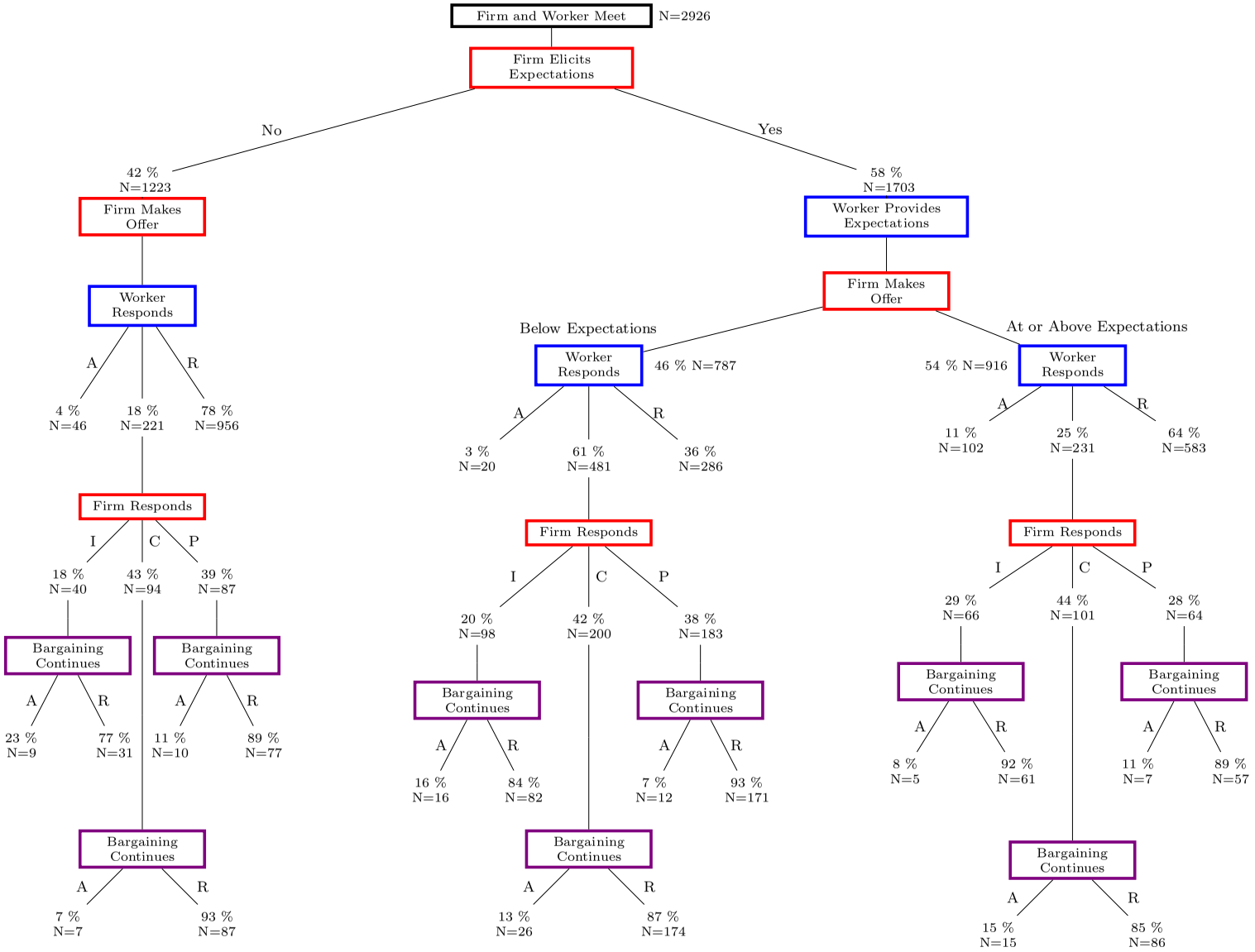
Note: This figure describes the extent to which firms can adjust base wages for new external hires. These graphs use our main protocol question, as described in Section 3. Table A7 presents additional tabulations. The sample contains 772 firms.

Figure 3: Firms' Expected Variation in First and Final Offers



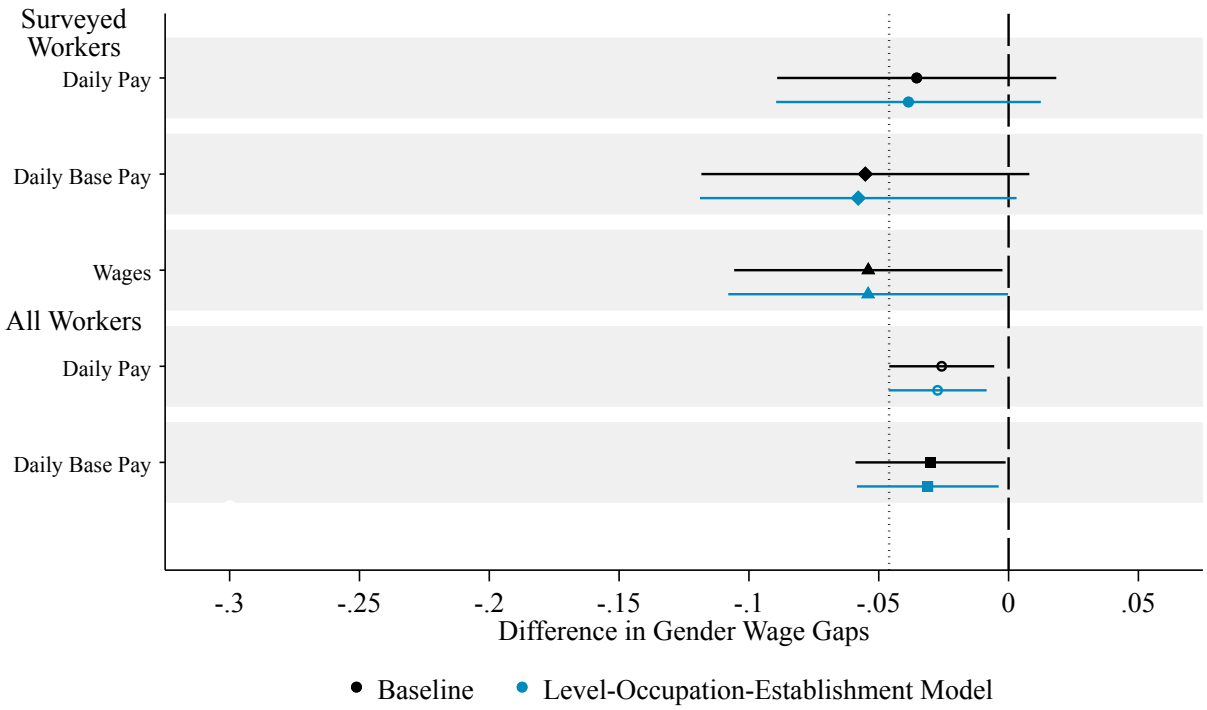
Note: This figure reports the expected gap between the highest and lowest offers made to ten hypothetical external candidates who are identical in qualifications and fit, but with potentially different offers from other firms. This uses the incidence question, as described in Section 3. We elicited results for four employee groups: recent labor market entrants, experienced non-managers, managers, and employees in bottleneck occupation. The sample contains 772 firms.

Figure 5: Dynamics of Bargaining Events



Note: This figure summarizes the worker-offer data elicited in the worker survey. The data include all surveyed workers who have received an offer in the previous six months. An accepted offer is one in which the respondent joined the firm as an external hire. A rejected offer is one in which the respondent remained at their incumbent firm. At each stage, workers can choose to accept an offer, counter an offer, or reject an offer. Firms can choose to improve the offer (match the worker's counter), counter the offer, or persist at their original offer.

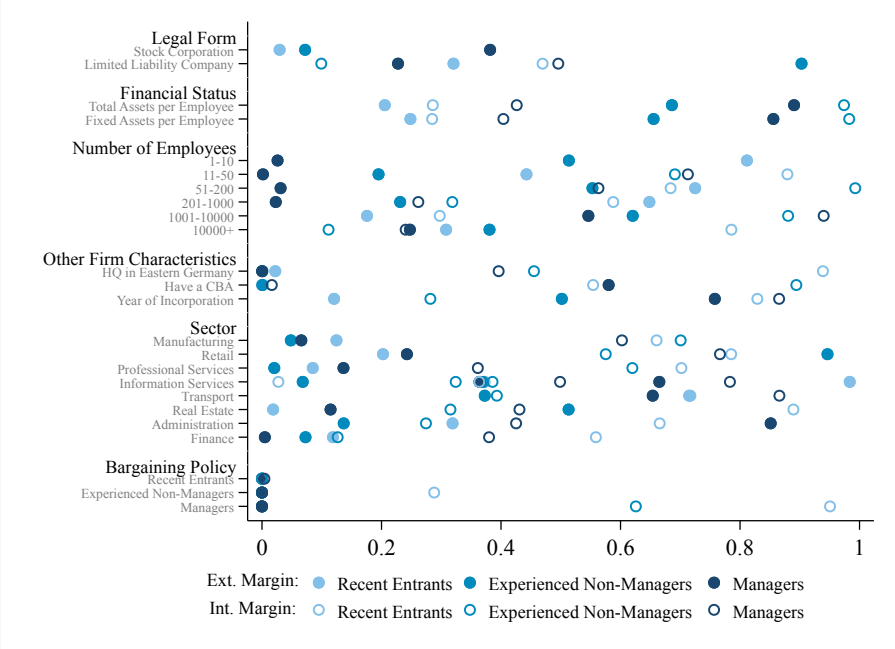
Figure 6: Gender Pay Gaps and Bargaining



Note: This figure presents estimates of the gender pay gap that we attribute to individual bargaining. We estimate fully interacted versions of equation 2. Each dot and whiskers plots the coefficient and 95% confidence interval from the coefficient on the interaction between a female dummy and a dummy for whether pay is set via individual bargaining. The baseline model includes demographic controls (age, a quadratic in experience, and education dummies), as well as occupation-establishment fixed effects. Standard errors are clustered at the firm level. We present robustness checks for each specification in blue, which include finer level-occupation-establishment fixed effects. The first panel focuses on surveyed workers only, while the second panel includes all workers at surveyed firms. The first estimates in each panel correspond to the difference between Columns 5 and 2 (or Columns 6 and 3) of Table 6. The second estimates use daily base pay as an alternative outcome, which excludes special pay. To account for gender differences in hours, we also use hourly wages as an additional outcome for surveyed workers for whom we collect hours information in the survey. See Appendix C for more details on how these pay measures are constructed.

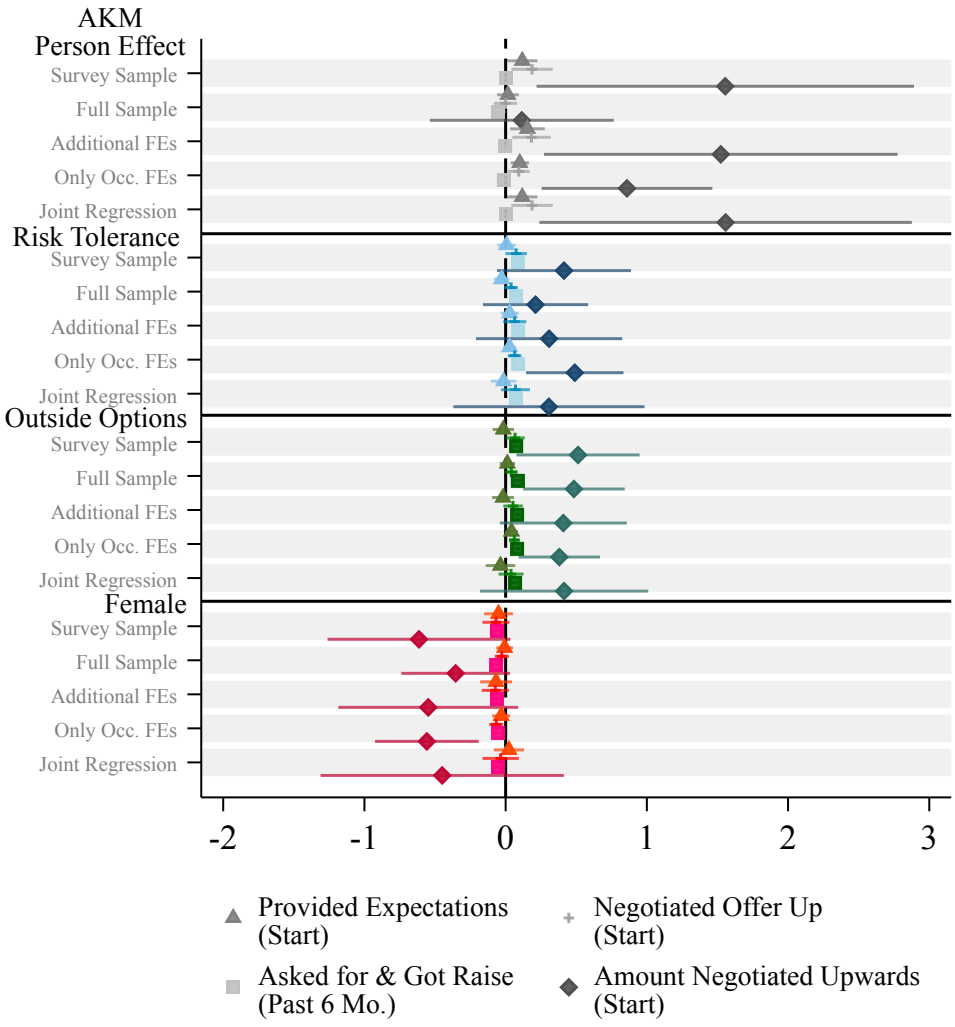
A Appendix Figures and Tables

Figure A1: Additional Comparisons Between Posting and Bargaining Firms



Note: This figure compares firms based on the bargaining protocol reported for three employee groups: recent labor market entrants, experienced non-managers, and managers. The solid dots are from tests of heterogeneity on the extensive margin. Each solid dot is the p-value from a test of equality between the means of posting and bargaining firms. Posting firms are those that report zero wage flexibility, while bargaining firms are those that report non-zero wage flexibility for a given employee group. The hollow dots represent tests of heterogeneity on the intensive margin. Each hollow dot is the p-value from a regression of the bargaining protocol for a specific employee group on the firm characteristic indicated on the y-axis. The bargaining protocol for each firm and employee group is either 0%, 1-10%, 11-20%, 21-30%, 31-40%, or more than 40%. We elicit CBA-coverage and bargaining strategies in the firm survey. We obtain the remaining firm characteristics from Orbis. Additional comparisons are presented in Table 2.

Figure A2: Worker Bargaining Behavior: Additional Specifications



Note: This figure presents additional specifications that test for differences in worker bargaining behavior based on the worker survey. We focus on heterogeneity along four worker dimensions: AKM person effect, risk tolerance, outside options, and gender. Each coefficient is based on a separate regression. The outcome variables are listed below the figure. Each regression controls for age, a quadratic in experience, education dummies, and occupation-establishment fixed effects. Each panel (in grey) uses a different sample or specification. The first panel for each of the four worker dimensions presents our baseline estimates. The second panel also includes the random sample of workers from non-surveyed firms. The third panel uses finer level-occupation-establishment fixed effects. The fourth panel uses occupation fixed-effects.The fifth panel reports the respective coefficient from a joint regression that adds indicators for the other dimensions of worker heterogeneity to our baseline model. Standard errors are clustered at the firm level. Whiskers denote 95% confidence intervals.

Table A1: Additional Characteristics of Surveyed Firms

	Mean (1)	Std. Dev (2)	N (3)
Legal Form			
Stock corporation	0.09	0.29	772
Limited liability company	0.81	0.39	772
First year participated in ifo survey	2014	5.40	772
Bargain With			
Recent Entrants	0.54	0.50	740
Experienced Non-Managers	0.85	0.36	739
Managers	0.95	0.23	730
Renegotiate With			
Recent Entrants	0.57	0.50	741
Experienced Non-Managers	0.82	0.38	740
Managers	0.91	0.29	734
Provided Wage Information			
Exact amount (public ad)	0.02	0.14	772
Range (public ad)	0.04	0.20	772
Exact amount (internal ad)	0.04	0.20	486
Ask Candidate for Salary Expectations			
Mandatory	0.29	0.45	772
Optional	0.62	0.48	772
Initial bargaining stage is important	0.44	0.50	772

Note: This table describes the surveyed firms. The ifo Institute provided information on firms' legal form and on the first year a firm participated in an ifo survey. The remaining rows use information from the firm survey. Section 3 defines the bargaining and renegotiation policies. We elicited whether firms report wage information in internal job ads only for firms with internal ads. Whether the initial stage of bargaining is important is defined based on firms reporting that variation at the initial is stage is either more important or at least as important as subsequent negotiation. Additional descriptive statistics are in Table 1.

Table A2: Worker Characteristics

	Social Security Sample		Surveyed Workers: Core Sample		Surveyed Workers: Random Sample		Core with Bargaining Events	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Demographics								
Female	0.21	(0.41)	0.27	(0.45)	0.41	(0.49)	0.27	(0.44)
Age	37.86	(7.26)	34.23	(6.40)	31.00	(5.09)	34.33	(6.30)
German Citizen	0.91	(0.29)	0.94	(0.24)	0.88	(0.32)	0.94	(0.24)
College Degree	0.39	(0.49)	0.63	(0.48)	0.52	(0.50)	0.72	(0.45)
Apprenticeship	0.54	(0.50)	0.32	(0.47)	0.37	(0.48)	0.23	(0.42)
Employment								
Daily Wage (Allocated)	179.21	(55.64)	182.94	(53.73)	134.04	(46.36)	187.47	(52.83)
Censored Wages	0.28	(0.45)	0.28	(0.45)	0.05	(0.23)	0.32	(0.47)
Hours (Survey)	---	---	40.23	(5.78)	40.37	(6.50)	41.30	(6.04)
CBA Covered (Survey)	---	---	0.63	(0.48)	0.48	(0.50)	0.52	(0.50)
Manufacturing Sector	0.68	(0.47)	0.57	(0.49)	0.20	(0.40)	0.50	(0.50)
Retail Sector	0.07	(0.26)	0.08	(0.28)	0.10	(0.29)	0.11	(0.32)
Professional Sector	0.08	(0.28)	0.12	(0.33)	0.16	(0.36)	0.14	(0.34)
Observations	254414		7079		2677		2926	

Note: This table describes the workers included in each of our main samples. Columns 1 and 2 describe all workers between the ages of 25 and 50 at the firms who participated in the firm survey and were in Social-Security-covered employment. Columns 3 and 4 describe the subset of these workers who were invited to and who responded to our worker survey; we use this sample to examine heterogeneity in bargaining behavior and the importance of bargaining for the gender gap in Section 5. Columns 5 and 6 describe surveyed workers drawn from the random set of workers who did not work at surveyed firms in 2020; we use this sample to probe the robustness of our results. Columns 7 and 8 describe the subset of surveyed workers at surveyed firms who had a bargaining event in the previous six months.

Table A3: Comparing Responses for Multi-Respondent Firms

	Share Agreement (1)
CBA Coverage	0.89
Announce Wages in Public Ads	0.97
Announce Wages in Internal Ads	0.88
Elicit Salary Expectations	0.70
Key Bargaining Definitions	
Bargaining with New Hires	0.92
Renegotiating with Incumbents	0.88
Auxiliary Questions	
Scope for Negotiations	0.73
Systematic Compensation Structure	0.76

Note: This table assesses the validity of the firm survey by examining the agreement among respondents for the 37 firms in which we have multiple respondents. The rows indicate different questions within the firm survey. Column 1 presents the average share of agreement in the responses.

Table A4: Cross-Tabulation of Bargaining Strategies with Expected Variation in Final Offers

A. Recent Labor Market Entrants

Bargaining Policy \ Expected Variation in Final Offers	0%	1-10%	11-20%	21-30%	>30%
0%	80%	19%	1%	0%	0%
1-10%	29%	66%	5%	0%	0%
11-20%	25%	51%	24%	0%	0%
21-30%	--	--	--	--	--
31-40%	--	--	--	--	--
>40%	--	--	--	--	--

B. Experienced Non-Managers

Bargaining Policy \ Expected Variation in Final Offers	0%	1-10%	11-20%	21-30%	>30%
0%	82%	16%	2%	0%	0%
1-10%	20%	71%	9%	0%	0%
11-20%	10%	49%	38%	3%	0%
21-30%	0%	36%	64%	0%	0%
31-40%	--	--	--	--	--
>40%	--	--	--	--	--

C. Managers

Bargaining Policy \ Expected Variation in Final Offers	0%	1-10%	11-20%	21-30%	>30%
0%	70%	27%	3%	0%	0%
1-10%	16%	68%	15%	1%	0%
11-20%	4%	34%	54%	8%	1%
21-30%	7%	15%	43%	32%	3%
31-40%	0%	0%	33%	50%	17%
>40%	43%	29%	14%	0%	14%

D. Workers in Bottleneck Occupations

Bargaining Policy \ Expected Variation in Final Offers	0%	1-10%	11-20%	21-30%	>30%
0%	85%	15%	0%	0%	0%
1-10%	14%	71%	13%	2%	0%
11-20%	6%	28%	56%	9%	1%
21-30%	4%	14%	41%	33%	8%
31-40%	0%	6%	31%	31%	31%
>40%	19%	13%	0%	6%	63%

Note: This table presents the cross-tabulation between firms' bargaining protocols (rows) and expected variation in final offers (columns). For each group (panel) and bargaining protocol (row), we compute the share of firms that expect 0%, 1-10%, 11-20%, 21-30% or >30% variation in final offers to candidates in that group. The numbers in each row sum to 100% (subject to rounding). In order to comply with privacy regulations, we suppress rows with fewer than 4 observations.

Table A5: Bargaining Strategies at CBA and Non-CBA Firms

	Employee Groups			
	Recent Graduates	Experienced Non-Managers	Managers	Employees in Bottleneck Positions
	(1)	(2)	(3)	(4)
	A. Bargaining Over Base Salary with New Hires			
0%	55%	20%	6%	6%
1-10%	39%	59%	25%	16%
11-20%	6%	19%	53%	42%
21-30%	0%	2%	12%	30%
31-40%	0%	0%	2%	4%
>40%	0%	0%	1%	3%
Firms	308	309	305	308
	B. Bargaining Over Special Payments with New Hires			
0%	76%	57%	26%	30%
1-10%	22%	33%	34%	31%
11-20%	2%	9%	28%	26%
21-30%	0%	0%	10%	9%
31-40%	0%	0%	2%	3%
>40%	0%	1%	1%	2%
Firms	305	305	304	300
	C. Renegotiating Base Salary			
0%	53%	23%	11%	8%
1-10%	43%	61%	44%	40%
11-20%	3%	14%	36%	37%
21-30%	1%	1%	6%	10%
31-40%	0%	0%	1%	4%
>40%	0%	0%	1%	3%
Firms	303	302	300	302

Note: This table describes the bargaining strategies for new external hires in four employee groups—recent labor market entrants, experienced non-managers, managers, and employees in bottleneck occupations. Panel A presents the strategies for firms with a CBA that covers at least some workers within the firm. Panel B presents the strategies for firms without a CBA.

Table A6: Comparing Firm and Worker Responses

	CBA Coverage		New Hire Bargaining				
				Binary Definition		Continuous Definition	
	All	Recent Entrants	Provided Salary Expectations	Asked for More	Asked and Got More	Asked for More	Asked and Got More
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Firm Policy	0.619***	0.645***	0.163***	0.075**	0.104***	0.041**	0.058***
	(0.049)	(0.058)	(0.059)	(0.036)	(0.033)	(0.017)	(0.020)
Constant	0.121***	0.145***	0.490***	0.288***	0.170***	0.259***	0.130***
	(0.021)	(0.037)	(0.052)	(0.024)	(0.023)	(0.039)	(0.042)
Observations	6055	731	706	681	678	681	678
Firms (Clusters)	324	122	154	146	146	146	146

Note: This table validates firms' survey responses by comparing firms' responses with those of workers at the same firm. Each column presents results from a different regression of worker responses (indicated in the column) on the relevant firm strategy. Columns 1 and 2 include individuals who have not changed their firm in the previous two years (and who are still at the firm indicated in the firm survey). Because we only elicited bargaining histories for workers who had joined their firm within the previous three years, the remaining columns include individuals who have been at their firm for between two and three years. Standard errors are clustered at the firm level. Levels of significance: *10%, ** 5%, and *** 1%.

Table A7: Variation in the Intensive Margin of Bargaining

	Employee Groups			
	Recent Entrants	Experienced Non-Managers	Managers	Workers in Bottleneck Positions
	(1)	(2)	(3)	(4)
	A. Bargaining Over Base Wages with New Hires			
0%	46%	15%	5%	5%
1-10%	46%	63%	32%	19%
11-20%	7%	20%	48%	44%
21-30%	0%	1%	13%	25%
31-40%	0%	0%	2%	5%
>40%	0%	0%	1%	2%
Firms	740	739	730	732
	B. Bargaining Over Base Wages or Special Pay with New Hires			
0%	38%	12%	3%	4%
1-10%	48%	59%	27%	16%
11-20%	9%	23%	45%	41%
21-30%	1%	2%	16%	25%
31-40%	0%	0%	3%	6%
>40%	1%	1%	3%	4%
Firms	772	772	772	772
	C. Bargaining Over Base Wages With New Hires (Flexible-Amenities Firms)			
0%	43%	13%	4%	3%
1-10%	48%	63%	29%	16%
11-20%	8%	22%	49%	44%
21-30%	1%	2%	14%	27%
31-40%	0%	0%	2%	6%
>40%	0%	0%	1%	3%
Firms	591	591	585	585
	D. Renegotiating Base Wages			
0%	43%	18%	9%	7%
1-10%	51%	65%	46%	38%
11-20%	6%	16%	35%	37%
21-30%	1%	1%	7%	12%
31-40%	0%	0%	1%	3%
>40%	0%	0%	1%	2%
Firms	741	740	734	731

Note: This table describes the bargaining protocols for four groups of employees: recent labor market entrants, experienced non-managers, managers, and employees in bottleneck occupations. Panel A presents the bargaining protocols for new external hires with respect to base wages. Panel B presents bargaining protocols that include flexibility in either base wages or special payments for new external hires. Panel C presents the base wage strategies for new external hires in the subset of firms that indicated having a high flexibility with respect to either of the following non-wage amenities: flexible work, commute and moving costs, further education and training, and childcare subsidies. Panel D presents the renegotiation protocols for incumbent workers who have received an external offer. The tabulations in Panel A are additionally depicted in Figure 2.

Table A8: Explaining Variation in Bargaining Strategies

	Fixed Effects Only			Group Fixed Effects and Firm Characteristics				
	Group	Firm	Group + Firm	Size, Productivity	Norms	Size, Productivity, Norms	Size, Productivity, Norms	Size, Productivity, Norms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				A. Bargaining with New Hires (Protocol Question)				
R-Squared	0.28	0.46	0.74	0.28	0.29	0.29	0.32	0.47
Adjusted R-Squared	0.28	0.18	0.60	0.28	0.29	0.29	0.31	0.39
				B.Bargaining with New Hires (Incidence Question)				
R-Squared	0.23	0.49	0.72	0.23	0.24	0.24	0.26	0.45
Adjusted R-Squared	0.23	0.23	0.58	0.23	0.24	0.24	0.25	0.36
				C. Renegotiating with Incumbent Workers				
R-Squared	0.19	0.54	0.73	0.20	0.20	0.20	0.23	0.43
Adjusted R-Squared	0.19	0.31	0.59	0.20	0.20	0.20	0.21	0.34
				D. Bargaining with New Hires (Special Pay)				
R-Squared	0.14	0.63	0.77	0.15	0.16	0.16	0.18	0.48
Adjusted R-Squared	0.14	0.45	0.66	0.14	0.15	0.16	0.17	0.39
Industry Dummies							1-digit	4-digit

Note: This table presents R-squared and adjusted R-squared from regressions of the firm-group bargaining protocol in each firm-group on the covariates indicated at the bottom of the table. To probe robustness, this table drops the strategies for workers in bottleneck occupations, which are harder to compare across firms. Panel A uses our main bargaining measure that elicits bargaining protocols. Panel B uses the incidence question to define bargaining. Panel C uses renegotiation with incumbents as measure of bargaining. Panel D uses the protocol question, but focuses on bargaining over special payments. Results that include all four groups of workers are presented in Table 3.

Table A9: The Correlation Between Workers' Stated Outside Options and Objective Measures

	Easy to Find a Better Job (0/1)			Ease of Finding a Better Job (0-3)		
		Search in Past 6 Months?			Search in Past 6 Months?	
	Full Sample	Yes	No	Full Sample	Yes	No
	(1)	(2)	(3)	(4)	(5)	(6)
	A. Received an Offer in Previous 6 Months					
Any Offers	0.128***	0.124***	0.067***	0.230***	0.204***	0.173***
	(0.012)	(0.014)	(0.024)	(0.019)	(0.022)	(0.045)
Constant	0.373***	0.404***	0.311***	1.298***	1.370***	1.156***
	(0.007)	(0.009)	(0.012)	(0.012)	(0.014)	(0.022)
Observations	7018	5071	1947	7018	5071	1947
	B. Number of Job Offers in Previous Six Months					
Number of Offers	0.057***	0.057***	0.030***	0.102***	0.094***	0.073***
	(0.005)	(0.005)	(0.010)	(0.008)	(0.009)	(0.018)
Constant	0.371***	0.400***	0.311***	1.295***	1.362***	1.158***
	(0.007)	(0.009)	(0.012)	(0.012)	(0.014)	(0.021)
Observations	7000	5061	1939	7000	5061	1939
	C. Was Contacted with Job Information in Previous Six Months					
1{Contacted}	0.135***	0.134***	0.070***	0.244***	0.227***	0.143***
	(0.012)	(0.015)	(0.022)	(0.019)	(0.023)	(0.038)
Constant	0.341***	0.369***	0.299***	1.240***	1.307***	1.141***
	(0.009)	(0.012)	(0.014)	(0.015)	(0.019)	(0.025)
Observations	7023	5075	1948	7023	5075	1948

Note: This table examines the correlation between workers' stated outside options and other characteristics. The dependent variable in Columns 1-3 is an indicator for whether the worker said it would be "easy" or "very easy" to get an offer from a firm they preferred. The dependent variable in Columns 4-6 is a continuous measure, which ranges from 0-3 where 0 is "very difficult" and 3 is "very easy". Each panel presents results from a bivariate regression with robust standard errors. The sample in Columns 1 and 4 includes all workers at surveyed firms who participated in the worker survey. The remaining columns look at the subset of these workers who report they did (Columns 2 and 5) or did not (Columns 3 and 6) search for a job in the previous six months. Levels of significance: *10%, ** 5%, and *** 1%.

Table A10: Worker Bargaining Behavior: Additional Outcomes

		Outside Options		Risk Tolerance			AKM Worker
	Mean	Binary	Level	Binary	Level	Female	Effect
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
A. Bargaining at the Start of the Spell							
Negotiated Bonuses or Stock Upward	0.23	-0.002	0.018	0.005	0.009	-0.063*	-0.027
		(0.039)	(0.030)	(0.030)	(0.007)	(0.035)	(0.063)
		849	849	851	851	854	608
Negotiated over Non-Wage Amenities							
Vacation Days or Remote Work	0.27	0.037	0.022	-0.023	-0.002	0.018	-0.076
		(0.040)	(0.028)	(0.042)	(0.010)	(0.048)	(0.061)
		849	849	851	851	854	608
Commuting	0.07	-0.025	-0.009	0.015	0.008	-0.012	0.011
		(0.017)	(0.011)	(0.020)	(0.007)	(0.023)	(0.031)
		849	849	851	851	854	608
Training	0.18	0.018	0.021	-0.031	-0.002	-0.004	-0.061
		(0.032)	(0.021)	(0.033)	(0.007)	(0.035)	(0.051)
		849	849	851	851	854	608
Childcare	0.02	-0.028**	-0.012	-0.017	-0.000	-0.020	0.002
		(0.013)	(0.008)	(0.014)	(0.003)	(0.015)	(0.014)
		849	849	851	851	854	608
B. Events in Previous Six Months							
Level of Increase | No Outside Offer	0.32	0.138*	0.087*	0.174**	0.037**	-0.070	0.127
		(0.071)	(0.049)	(0.078)	(0.015)	(0.062)	(0.080)
		2837	2837	2830	2830	2857	2444
Received a Raise Without Asking	0.32	-0.017	-0.015***	0.010	-0.001	-0.008	-0.018
		(0.011)	(0.005)	(0.017)	(0.004)	(0.020)	(0.015)
		5068	5068	5050	5050	5104	4334
Any Search Activity	0.72	0.091***	0.071***	0.062***	0.021***	-0.078***	0.007
		(0.013)	(0.007)	(0.012)	(0.003)	(0.017)	(0.024)
		5121	5121	5104	5104	5158	4380

Note: This table examines between-worker differences in bargaining behavior using additional outcomes for the specifications presented in Table 5. Panel A uses data on individuals who joined their firm in the previous three years. Each outcome is an indicator for whether individuals negotiated over special payments or one of four non-wage amenities. Panel B focuses on all workers who have experienced a bargaining event in the previous six months. The first outcome captures the intensive margins of asking for more conditional on not having received an outside offer. The second outcome is an indicator for whether the worker said their firm offered them a salary increase in the previous six months without the worker asking for it. The third outcome is an indicator for whether an individual reported any job search activity. The sample includes workers at surveyed firms who participated in the worker survey. Standard errors are clustered at the firm level. Levels of significance: *10%, ** 5%, and *** 1%.

Table A11: Worker Bargaining Behavior: Additional Dimensions of Worker Heterogeneity

	Mean	Above-Median AKM Worker	Patience	
			Binary	Level
	(1)	(2)	(3)	(4)
A. Bargaining at the Start of the Spell				
Provided Expectations	0.69	0.041	0.117*	0.007
		(0.047)	(0.067)	(0.012)
		603	230	230
Asked Firm to Increase Base Wage	0.36	0.041	0.021	-0.000
		(0.050)	(0.087)	(0.016)
		607	233	233
Negotiated Base Wage Upward				
Binary	0.26	0.135**	0.105	0.013
		(0.057)	(0.068)	(0.011)
		605	233	233
Percentage Points	1.46	1.137**	1.018*	0.206**
		(0.466)	(0.521)	(0.083)
		602	232	232
B. Events in Previous Six Months				
Asked for a Raise	0.36	-0.029	0.004	-0.004
		(0.020)	(0.028)	(0.005)
		4360	1620	1620
Asked for & Received a Raise	0.28	-0.010	0.005	-0.002
		(0.017)	(0.025)	(0.004)
		4360	1620	1620

Note: This table examines between-worker differences in bargaining behavior using additional dimensions of heterogeneity. Column 1 focuses on workers with an above-median AKM person effect. Columns 2 and 3 use information on worker patience, which we elicited in a follow-up survey (see Appendix D for details). The specifications we use and bargaining outcomes we examine follow those presented in Table 5 Panel A uses data on individuals who joined their firm in the previous three years. The first outcome is an indicator for whether the individual provided salary expectations during the application and hiring process. The second outcome is an indicator for whether the worker asked for a higher wage, independent of whether the worker was successful in her negotiation. The third outcome is an indicator for whether the worker negotiated successfully, that equals one if they asked the firm to increase the salary provided in their initial offer and the firm increased the offer. The fourth outcome captures the intensive margin of negotiating successfully, including zeros for those who do not successfully negotiate up. Panel B focuses on all workers who have experienced a bargaining event in the previous six months. The first outcome is an indicator for whether a worker asked for a higher wage. The second outcome is an indicator for whether a worker successfully negotiated a higher wage. The sample includes workers at surveyed firms who participated in the worker survey. Standard errors are clustered at the firm level. Levels of significance: *10%, ** 5%, and *** 1%.

Table A12: Impact of the Randomized Range on Workers' Stated Salary Expectations

		Level of Expectations		
	Provided Expectations	Continuous	Top Half or Above Range	Above Range
	(1)	(2)	(3)	(1)
Saw 110-140% Range	-0.003	13.024***	-0.199***	-0.004
	(0.006)	(0.601)	(0.010)	(0.007)
Constant	0.930***	112.783***	0.826***	0.109***
	(0.004)	(0.389)	(0.006)	(0.005)
Observations	7079	6477	6982	6982

Note: This table documents the relationship between the randomly provided salary range that survey respondents saw in the hypothetical scenario and the answers they gave. Column 1 focuses on whether respondents indicated that they would provide their salary expectations. Columns 2-4 focus on the level of expectations respondents would provide. Each entry presents results from a separate regression of the hypothetical bargaining outcome indicated in the column on an indicator for whether the worker was shown the higher range (110-140% rather than 90-120%). Robust standard errors are in parentheses. The sample includes workers at surveyed firms who participated in the worker survey. Levels of significance: *10%, ** 5%, and *** 1%.

Table A13: Relationship Between Actual and Hypothetical Negotiations

		Level of Expectations		
	Provided Expectations	Continuous	Top Half or Above Range	Above Range
	(1)	(2)	(3)	(4)
Provided Expectations	0.203***	0.000	0.057**	0.020
	(0.046)	(0.000)	(0.026)	(0.034)
	1722	1566	1694	1694
Asked for More (Start of Spell)				
Binary	-0.037	-0.000	0.011	0.102***
	(0.045)	(0.000)	(0.026)	(0.038)
	1731	1573	1702	1702
Level	-0.060	0.001	0.188	1.697***
	(0.444)	(0.005)	(0.257)	(0.460)
	1725	1569	1697	1697
Negotiated for More (Start of Spell)				
Binary	0.014	-0.000	0.011	0.106***
	(0.040)	(0.000)	(0.024)	(0.036)
	1728	1570	1699	1699
Level	0.105	0.002	0.041	0.769***
	(0.282)	(0.003)	(0.174)	(0.288)
	1723	1567	1695	1695
Asked for and Got a Raise in Previous 6 Months (Binary)	0.020	-0.000	0.028**	0.070***
	(0.020)	(0.000)	(0.012)	(0.018)
	7054	6454	6957	6957

Note: This table presents results from regressions of hypothetical bargaining outcomes on actual bargaining behavior and on age, a quadratic in experience, a female dummy, education dummies, and on the fixed effects indicated in each column. Each entry presents results from a separate regression of the hypothetical bargaining outcome indicated in the column on an individual's historical bargaining choice (row). The sample includes workers at surveyed firms who participated in the worker survey. The outcome in Column 1 is an indicator for whether the respondent provided their salary expectations in the hypothetical scenario. The outcomes in Columns 2-4 measure the level of the provided expectations. The sample in Column 2 includes only the subset of workers who provided their expectations; the sample in Columns 3-4 includes all surveyed workers. Robust standard errors are in parentheses. Levels of significance: *10%, ** 5%, and *** 1%.

Table A14: Bargaining and the Gender Pay Gap

	Daily Pay		Daily Base Pay	
	Without Individual Bargaining	With Individual Bargaining	Without Individual Bargaining	With Individual Bargaining
	(1)	(2)	(3)	(4)
		A. All Workers		
Share Exposed	20%	80%	20%	80%
Gender Wage Gap	0.028	0.056	0.024	0.055
Overall Gender Wage Gap		0.050		0.049
Wage Gap Associated with Bargaining		0.022		0.025
% Wage Gap Associated with Bargaining		44%		51%
		B. Surveyed Workers		
Share Exposed	23%	77%	23%	77%
Gender Wage Gap	0.013	0.051	0.008	0.050
Overall Gender Wage Gap		0.043		0.040
Wage Gap Associated with Bargaining		0.030		0.032
% Wage Gap Associated with Bargaining		70%		80%

Note: This table examines the importance of individual bargaining for the gender pay gap. Panel A focuses on all workers at surveyed firms. Panel B includes only workers at surveyed firms who participated in the worker survey. Gender pay gaps come from regressions which control for demographic characteristics (age, a quadratic in experience, education dummies) and for occupation-establishment fixed effects. We calculate the population gender pay gap attributable to bargaining by multiplying the gap attributable to bargaining (difference in gaps at bargaining and non-bargaining firms) by the share exposed to bargaining. We calculate the percent share of the pay gap due to bargaining by dividing this number by the overall gender pay gap.

Table A15: The Gender Gap in Hours Worked

	Without Individual Bargaining			With Individual Bargaining		
	(1)	(2)	(3)	(4)	(5)	(6)
Female	-0.046***	-0.071***	-0.076***	-0.047***	-0.056***	-0.057***
	(0.006)	(0.009)	(0.010)	(0.007)	(0.008)	(0.008)
p-value for equality	0.906	0.247	0.188	0.906	0.247	0.188
Adjusted R-Squared	0.039	0.092	0.088	0.032	0.123	0.122
Clusters	90	32	32	307	132	126
Observations	1617	1226	1181	5320	3820	3620
Fixed Effects	---	Occ-Est	Level-Occ-Est	---	Occ-Est	Level-Occ-Est

Note: This table presents results analogous to those in Table 6 for specifications in which the dependent variable is log hours. Each column presents results from a separate regression of log hours on a female dummy, age, a quadratic in experience, education dummies, and on the fixed effects indicated in each column. Because hours are measured in the worker survey, this table only includes surveyed workers. Standard errors are clustered at the firm level. Levels of significance: *10%, ** 5%, and *** 1%.

Table A16: Robustness of Gender Wage Gap Results

	All Workers		Surveyed Workers	
	(1)	(2)	(3)	(4)
	A. Baseline Definition			
Daily Pay	-0.027***	-0.026**	-0.039	-0.035
	(0.010)	(0.010)	(0.026)	(0.027)
	243002	240890	5046	4801
Daily Base Pay	-0.031**	-0.030**	-0.058*	-0.055*
	(0.014)	(0.015)	(0.031)	(0.032)
	242778	240665	5040	4797
Hourly Pay	---	---	-0.054**	-0.054*
			(0.026)	(0.027)
			5046	4801
Pay is Censored	-0.014	-0.015	-0.057*	-0.051**
	(0.012)	(0.012)	(0.029)	(0.025)
	243002	240890	5046	4801
	B. Definition Based on Renegotiation			
Daily Pay	-0.043***	-0.039***	-0.071***	-0.060***
	(0.010)	(0.010)	(0.021)	(0.021)
	243002	240890	5136	4891
Daily Base Pay	-0.048***	-0.045***	-0.072***	-0.064***
	(0.016)	(0.015)	(0.020)	(0.019)
	244780	242665	5130	4887
Hourly Pay	---	---	-0.070***	-0.062***
			(0.019)	(0.019)
			5136	4891
Fixed Effects	Occ-Est	Level-Occ-Est	Occ-Est	Level-Occ-Est

Note: This table documents robustness for our estimates of the gender pay gap from a fully interacted version of equation 2. Each column presents the coefficient on the interaction between a female dummy and a dummy for whether pay is set via individual bargaining from a separate regression of log wage that uses age, a quadratic in experience, education dummies, and the fixed effects indicated in each column as controls. Panel A uses our baseline definition to characterize firms' bargaining strategies based on survey measures of bargaining with new hires. Panel B uses an alternative definition to identify firm bargaining strategies based on reported bargaining with incumbents. Columns 1-2 capture all workers at surveyed firms, while Columns 3-4 only include the subset of those workers who participated in the worker survey. In addition to using our main outcome measure of daily pay, the table also provides results for daily base pay (excluding special pay such as bonuses), hourly pay (dividing daily pay by hours worked for surveyed workers who report hours in the worker survey), and an indicator of whether pay is censored at the Social Security maximum. See Appendix C for more details on how these pay measures are constructed. Standard errors are clustered at the firm level. Levels of significance: *10%, ** 5%, and *** 1%.

Table A17: Gender Pay Gaps at Surveyed and Non-Surveyed Firms

	Non-Surveyed Firms			Surveyed Firms		
	(1)	(2)	(3)	(4)	(5)	(6)
Daily Pay	-0.147***	-0.073***	-0.071***	-0.071***	-0.051***	-0.051***
	(0.001)	(0.001)	(0.001)	(0.017)	(0.009)	(0.009)
	1140053	532949	507379	254391	246014	243869
Daily Base Pay	-0.148***	-0.078***	-0.076***	-0.071***	-0.050***	-0.050***
	(0.001)	(0.001)	(0.001)	(0.018)	(0.012)	(0.011)
	1139161	532342	506798	254165	245788	243642
Fixed Effects	Occ	Occ-Est	Level-Occ-Est	Occ	Occ-Est	Level-Occ-Est

Note: This table compares the gender pay gaps at the surveyed firms in our sample to those among a random set of workers at non-surveyed firms. Each column presents the female coefficient of a separate regression of log wages on a female dummy, age, a quadratic in experience, education dummies, and on the fixed effects indicated in each column. In addition to using our main outcome measure of daily pay, the table also provides results for daily base pay (excluding special pay such as bonuses). See Appendix C for more details on how these pay measures are constructed. Standard errors are clustered at the firm level. Levels of significance: *10%, ** 5%, and *** 1%.

B Firm Survey

This section provides additional information on the implementation and validation of the firm survey. We discuss selection into non-response and the extent to which the firm survey covers the different parts of the German labor market. We also provide detailed information about the elicited bottleneck occupations. See Appendix Section F.1 for the original questionnaire, as well as an English translation.

B.1 Implementation Details

Our firm survey was fielded by the ifo Institute and was pitched to participants as a new survey aimed at eliciting wage-setting strategies. The sampling frame included two survey panels housed at the ifo Institute. The first panel contains over 1,000 HR professionals which participate in quarterly HR surveys. Most of these HR professionals participate online, but some only participate via mail. Because our survey was a special edition survey, we conducted the survey online and invited participants via e-mail.[38] We included all HR professionals with regular online access as well as those HR professionals who typically respond via mail, but for whom e-mail addresses were available. From this first panel, we invited 1,061 HR professionals. The second panel contains 654 senior managers, all of whom normally participate online. The majority of these panelists hold higher-level management positions, such as company owner, CEO, or segment head.

We complemented these two existing panels (continuing respondents) with a second sample of HR professionals (new respondents) through a targeted outreach. We advertised the survey through HR newsletters, social media posts, articles, and HR events. We invited interested HR professionals to register online through the ifo Institute. In total, 126 individuals registered and received their invitation via e-mail together with the continuing respondents. 64% of newly registered individuals responded to the survey.

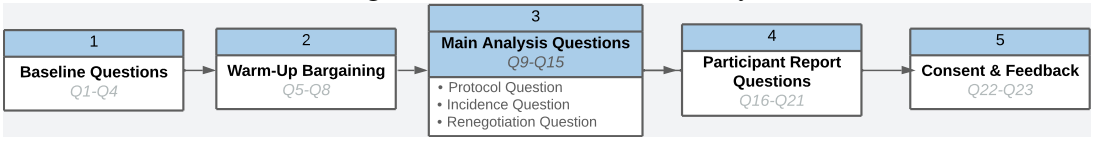
The ifo Institute sent the invitations to participate in the survey in two waves: in September 2021 and in January 2022. We invited a randomly selected half of HR professionals to participate in the first wave and invited the remainder in the second wave. We invited all managers in the second wave. The survey stayed open for two weeks, and we sent a reminder e-mail after 1.5 weeks.

The survey included 23 questions and we told practitioners that responding to the survey would take approximately 15 minutes. Appendix Figure B1 describes the organization of the firm survey. First, we asked participants a few simple questions about their firm's wage-setting strategies. Next, we used a series of warm-up questions to introduce the concept of wage bargaining. These questions were not intended to be used for our analysis. Instead, their purpose was to introduce our definition of bargaining and to make sure participants are familiar with answering this type of questions. For simplicity, these warm-up questions do not distinguish between employee groups and are therefore not used in our analysis. The main questions used for our analysis—our protocol question, incidence question, and renegotiation question—are in the third survey block. In order to encourage individuals to participate, we also included several questions that practitioners had

[38] Participation via mail requires a specific question format that would have imposed severe limitations on the breadth and content of our questionnaire.

expressed interest in during piloting. In the survey invitation, we told potential participants that we would send aggregated survey results to participants after the we closed the survey. We included these questions in the survey and prepared a report using these questions. In the last module, we elicited participants' consent to have their responses linked to the IAB data. We also included a space for feedback, which is a standard practice at the ifo Institute.

Figure B1: Flow of Firm Survey



Note: This figure provides an overview over the modules in the firm survey. The main questions used for our analysis are elicited in the third survey block. See Appendix F.1 for the exact wording of our questions.

For the majority of our analysis, we pool new respondents and respondents from both of the ifo Institute's panels. This decision was motivated by two findings. First, we do not detect meaningful differences in response behavior between these groups along several margins. Completion rates are similar: 82.05% of continuing and 83.93% of new respondents complete the survey. In addition, the shares of continuing (70.63%) and new respondents (73.53%) who provide linkage consent are similar. We also find that the share of responses that are missing throughout the survey and the amount of time it took respondents to complete the survey are similar. The median continuing respondent spent 10.67 minutes, while the median new respondent spent 10.32 minutes. Second, in unreported results we find that our main results look similar across samples.

B.2 Non-Response and Linkage Consent

A standard concern in the survey literature is that of selection into response. While it is difficult to examine selection among new respondents (who came from a variety of channels), we are able to examine response behavior systematically for the 878 continuing respondents who were part of the ifo Institute's existing panels.

We first follow standard practices of the ifo Institute and use internal data that ifo collects as part of the maintenance of its survey panel to compare respondents and non-respondents. We conduct this exercise separately for three respondent subgroups: HR professionals who normally participate online, HR professionals who normally participate via mail, and managers (all of whom normally participate online). We distinguish between the two subgroups of HR professionals because participation in our survey is only possible online. HR professionals who normally respond via mail may be less likely to respond via e-mail.

Table B1: Selection into Response

	Panel A HR Panel Online Respondent			Panel B HR Panel Mail Respondent			Panel C Manager Panel		
	Non-Respondent (1)	Respondent (2)	p-value (3)	Non-Respondent (4)	Respondent (5)	p-value (6)	Non-Respondent (7)	Respondent (8)	p-value (9)
Sector									
Manufacturing	0.38	0.35	0.42	0.37	0.35	0.78	0.34	0.35	0.85
Service	0.42	0.41	0.83	0.41	0.44	0.63	0.10	0.07	0.18
Retail	0.20	0.23	0.23	0.23	0.21	0.80	0.16	0.11	0.03
Number of Employees									
1-49	0.40	0.32	0.02	0.46	0.45	0.89	0.43	0.58	0.08
50-249	0.36	0.44	0.01	0.39	0.38	0.82	0.41	0.26	0.06
250-449	0.14	0.13	0.46	0.06	0.09	0.48	0.02	0.14	0.02
Sales									
1-<5 M €	0.32	0.25	0.05	0.38	0.29	0.24	0.15	0.11	0.24
5-<25 M €	0.28	0.34	0.10	0.28	0.47	0.01	0.25	0.21	0.41
25-100 M €	0.21	0.23	0.59	0.20	0.07	0.04	0.33	0.35	0.65
Other									
In ifo panel >10 years	0.37	0.40	0.39	0.46	0.45	0.95	0.29	0.31	0.65
Family firm	0.63	0.64	0.86	0.64	0.78	0.08	-	-	-
Observations	375	435		185	66		277	377	

Note: This table compares the firm characteristics of respondents and non-respondents from the ifo Institute's HR panel and manager panel. The data used to construct this table come from the ifo Institute and are regularly used to examine selection into response. Panel A contains HR professionals who normally participate in surveys online. Panel B contains HR professionals who normally participate via mail, but for whom e-mail addresses are available. Panel C contains all individuals from the manager panel. Sales values are reported in millions. Note that this table does not contain the 81 new respondents that were not part of the ifo panel at the time we conducted the survey.

Appendix Table B1 shows that there are no systematic patterns of selection into response. This table displays the means of non-respondents and respondents as well as p-values from a test of equality between those means, separately for the three subgroups. As the first three rows indicate, respondents and non-respondents work in similar sectors. We find that, among HR professionals who normally participate online, medium-sized firms are more likely to participate. However, the opposite is true for the manager panel. For HR professionals, we detect some differences in the likelihood to respond based on their firm's sales. In the manager panel, however, respondents and non-respondents work at firms with similar levels of sales. We also do not find any evidence that firms are more likely to respond if they have participated for longer in surveys conducted by the ifo Institute, which could have altered the sample of respondents. [39]

We also analyze selection into response by comparing the characteristics of respondents who participate before and after a reminder is sent. The goal of this exercise is to test whether firms' (unobservable) propensity to respond, as measured by whether they responded before we sent the reminders, is correlated with their bargaining strategy and other firm characteristics. Appendix Table B2 presents characteristics of respondents who respond before and after we sent the reminders, as well as p-values of a test for equality between the two means. We do not find any indication that our elicited bargaining strategies are correlated with firms' propensity to respond. We also do not find that firms with different propensities to respond differ in key observable characteristics.

Finally, we examine the extent to which respondents left questions blank. In this exercise, we focus on the 772 respondents who completed the survey, which we define based on whether a respondent has clicked through to the final question in the survey. Even though we did not enforce responses to individual questions, Appendix Table B3 shows that the share of respondents who leave an answer blank is low throughout the survey.

Some of our analysis relies on a linkage with the Social Security records housed at the IAB. Sample selection may also occur due to differential rates of linkage consent, which is necessary under German privacy laws in order to link firms' survey responses to Social Security records. Out of the 772 firms with complete responses, 553 (72%) respondents provided this consent. Appendix Table B4 compares respondents who do not provide linkage consent (Column 1) to those who do (Column 2). Column 3 presents p-values from a test of equality between the two means. Both groups are similar with respect to the length of their participation in the ifo panel, whether they are covered by a CBA, firm size, firm age, and other measures of firm productivity.

The only differences we detect when it comes to the likelihood of providing linkage consent are with respect to sector. Manufacturing firms are somewhat under-represented among consenting firms, while professional services firms are somewhat over-represented among these firms. Because manufacturing firms are over-represented in our firm survey, this pattern has the effect of making the final sample more representative of the overall sectoral composition of Germany.

B.3 Coverage of German Labor Market

We assembled a sampling frame with the goal of eliciting bargaining strategies for a broad set of German firms. In order to assess the coverage of our sample, we begin by following standard practices of the ifo Institute and compare the regional and sectoral coverage of the firms in our

[39] In our main analysis we use more detailed information on firms (e.g., age, size, total assets sales) from Orbis. We do not use Orbis data for this exercise as we do not have permission to merge these data for non-respondents.

Table B2: Comparison Between Early and Late Responders

	Responded Before Reminder		
	No	Yes	p-value
	(1)	(2)	(3)
Have a CBA	0.39	0.42	0.45
Number of Employees			
1-10	0.06	0.09	0.20
11-50	0.23	0.27	0.20
51-200	0.33	0.33	0.97
201-1000	0.27	0.21	0.10
1001-10000	0.05	0.04	0.66
10001+	0.03	0.03	0.99
Sector			
Manufacturing	0.36	0.34	0.61
Retail	0.19	0.16	0.28
Professional Services	0.09	0.09	0.87
Information Services	0.08	0.07	0.55
Transport	0.06	0.06	0.81
Real Estate	0.02	0.06	0.02
Administration	0.03	0.05	0.18
Finance	0.04	0.04	0.71
Other Firm Characteristics			
HQ in Eastern Germany	0.11	0.13	0.37
Year of Incorporation	1975.95	1970.99	0.15
Total Assets per Employee	197.18	692.15	0.50
Fixed Assets per Employee	70.50	505.07	0.44
Legal Form			
Stock corporation	0.11	0.09	0.42
Limited liability company	0.79	0.82	0.40
First Year in ifo Panel	2014.72	2013.45	0.00
Bargain With			
Recent Entrants	0.57	0.53	0.40
Experienced Non-Managers	0.86	0.84	0.51
Managers	0.97	0.94	0.14
Renegotiate With			
Recent Entrants	0.53	0.58	0.19
Experienced Non-Managers	0.81	0.83	0.44
Managers	0.92	0.90	0.57
Provided Wage Information			
Exact amount (public ad)	0.01	0.02	0.25
Range (public ad)	0.03	0.04	0.64
Exact amount (internal ad)	0.04	0.05	0.66
Ask Candidate for Salary Expectations			
Mandatory	0.27	0.30	0.43
Optional	0.64	0.62	0.51
Observations	202	570	

Note: This table compares the characteristics of the firms who responded before we sent the reminders (Column 2) to those that only responded after we sent the reminders (Column 1). Column 3 presents the p-value from a test of equality of means. The ifo Institute provided information on length of time each respondent had been in the ifo Panel. We elicited CBA coverage and bargaining strategies in the firm survey. All other variables stem from Orbis. See Appendix Section C.2 for a detailed description of these variables. The sample contains 772 firms.

Table B3: Question Non-Response in Firm Survey

Question (1)	Non-Response Rate (2)
Collective Bargaining Agreement	0%
Policy for External Job Ads	0%
Policy for Internal Job Ads	0%
Elicit Worker Expectations	0%
Bargaining Policies (Base Wages)	
Recent Labor Market Entrants	4%
Experienced Non-Managers	4%
Managers	5%
Workers in Bottleneck Positions	5%
Bargaining Policies (Special Pay)	
Recent Labor Market Entrants	6%
Experienced Non-Managers	5%
Managers	6%
Workers in Bottleneck Positions	7%
Hypothetical Variation in First Offers	
Recent Labor Market Entrants	6%
Experienced Non-Managers	6%
Managers	7%
Workers in Bottleneck Positions	7%
Hypothetical Variation in Final Offers	
Recent Labor Market Entrants	7%
Experienced Non-Managers	7%
Managers	7%
Workers in Bottleneck Positions	8%
Renegotiation Policy	
Recent Labor Market Entrants	4%
Experienced Non-Managers	4%
Managers	5%
Workers in Bottleneck Positions	5%
Observations	772

Note: This table documents which share of the 772 respondents who completed the survey left the answer to a given question blank. We focus on the subset of questions that are most relevant for our analysis.

Table B4: Differences Between Consenting and Non-Consenting Firms

	Provided Consent		
	No	Yes	p-value
	(1)	(2)	(3)
First Year in ifo Panel	2013.47	2013.91	0.31
Have a CBA	0.42	0.41	0.68
Number of Employees			
1-10	0.08	0.08	0.90
11-50	0.24	0.27	0.44
51-200	0.31	0.33	0.52
201-1000	0.23	0.22	0.75
1001-10000	0.06	0.04	0.09
10000+	0.03	0.03	0.81
Sector			
Manufacturing	0.39	0.32	0.06
Retail	0.20	0.16	0.13
Professional Services	0.06	0.10	0.05
Information Services	0.04	0.08	0.05
Transport	0.05	0.07	0.27
Real Estate	0.03	0.06	0.14
Administration	0.04	0.05	0.65
Finance	0.03	0.05	0.26
Other Firm Characteristics			
HQ in Eastern Germany	0.10	0.13	0.23
Year of Incorporation	1970.85	1972.85	0.55
Total Assets per Employee	256.01	686.03	0.55
Fixed Assets per Employee	163.22	484.05	0.55
Observations	219	553	

Note: This table compares firm characteristics of respondents that did and did not provide consent for their responses to be linked to Social Security records out of our firm-level sample of 772 respondents. Column 1 describes the firms of non-consenting respondents. Column 2 describes the firms of consenting respondents. Column 3 presents the p-value from a test of equality of means. The ifo Institute provided us with information on how long each respondent had been in the ifo panel. We elicit CBA coverage in the survey. All other variables stem from Orbis. See Appendix Section C.2 for a detailed description of these variables.

survey to that of the overall German labor market (Hiersemenzel, Sauer, and Wohlrabe 2022). We also compare the manufacturing firms in our sample to those that participated in the well-studied World Management Survey (Bender et al. 2018).

B.3.1 Coverage Relative to All German Firms

Appendix Table B5 compares the distribution of firms in the German labor market across regions, sectors, and firm size classes, to the firms in our firm-level sample of 772 respondents. We find that our firm survey is similar in terms of regional coverage to the overall labor market. The key difference is that we under-sample small firms. This also means that a relatively large fraction of firms in our sample are manufacturing firms. Nevertheless, our firm survey captures all major sectors in Germany. Among large firms, our sample coverage is high. For instance, our sample sample covers 38% of the top publicly listed firms in Germany (the "Dax 40").

B.3.2 Comparison with World Management Survey Firms

To further probe the coverage of the firm survey, we next compare the manufacturing firms in our survey that we can link to the Social Security records to the manufacturing firms who participated in the well-studied World Management Survey and whose responses were linked to the same administrative records (Bender et al. 2018).

We collect the location of the firm's headquarters, the incorporation date, the amount of fixed assets, and material costs from Orbis. We use two industry-level measures from the OECD ISIC4 Database: the labor revenue share and the intermediate input revenue share. The former is based on the share of wage bill out of total revenue. The latter is constructed by dividing industry-level inputs by industry-level revenue. Both are available at the industry-level in 2019. We use the Social Security data to compare the number of employees, the median daily wages (in Euros), the share of female workers, and the share of workers with a university degree. Because only 19 firms in our sample are also contained in the 361 firms that Bender et al. (2018) study, we refrain from making comparisons using the World Management Survey itself.

Appendix Table B6 shows that the manufacturing firms in our sample (Columns 1-3) are not substantially different from the World Management Survey firms (Columns 4-6) studied by Bender et al. (2018). Given that the World Management Survey was fielded to different individuals in each firm (plant managers, rather than HR professionals), used a different interview technology (lengthy phone conversations, rather than an online questionnaire), and focused on different topics (primarily productivity-related, rather than bargaining-related), the similarity in the firm characteristics across these two different samples is reassuring. If there were systematic selection into our sampling frame based on the topics covered, we would not expect this similarity.

Table B5: Comparison to Set of All German Firms

	German Labor Market	Firm Survey Sample
	(1)	(2)
Region		
Baden-Württemberg	13.7	16.3
Bavaria	18.8	22.5
Berlin	5.0	1.8
Brandenburg	2.8	1.6
Bremen	0.7	1.1
Hamburg	2.8	2.7
Hesse	7.6	8.0
Lower Saxony	8.7	7.8
Mecklenburg Western Pomerenia	1.7	0.8
Northrhine-Westphalia	20.2	18.8
Rhineland Palatinate	4.7	5.3
Saarland	1.0	0.8
Saxony	4.4	4.3
Saxony-Anhalt	1.9	2.3
Schleswig Holstein	3.6	3.6
Thuringia	2.2	2.3
Sector		
Accomodation and Food Services	9.2	3.6
Administrative Services	8.4	4.7
Construction	14.6	4.1
Electricity, Water, and Waste Managem	3.2	1.5
Information and Communication	4.9	7.1
Manufacturing	8.2	34.7
Professional Services	18.9	9.3
Real Estate	6.2	5.1
Retail	22.3	17.1
Transportation	4.1	6.2
Number of Employees		
1-49	96.8	34.4
50-249	2.6	38.2
250+	0.6	27.4

Note: This table compares firm characteristics from the universe of all German firms to our sample of 772 firms. Information on all German firms stems from Hiersemenzel, Sauer, and Wohlrabe (2022). The firm characteristics for firms in our survey stems from Orbis. See Appendix Section C.2 for a detailed description of these variables.

Table B6: Comparison to Linked World Management Survey Data

	Manufacturers in Bargaining Survey			World Management Survey		
	Mean	Std. Dev.	Median	Mean	Std. Dev.	Median
	(1)	(2)	(3)	(4)	(5)	(6)
Orbis data						
HQ in East Germany	0.16	(0.37)	0.00	0.13	(0.34)	0.00
Log Fixed Assets	8.24	(2.80)	7.80	9.89	(1.69)	10.18
Log Materials Cost	9.82	(1.40)	9.54	11.29	(1.07)	11.78
Firm Age (years)	55.15	(47.69)	35.00	64.34	(62.79)	42.50
OECD data (industry level)						
Intermediate Input Revenue Share	0.64	(0.07)	0.64	0.67	(0.05)	0.67
Labor Revenue Share	0.20	(0.04)	0.21	0.23	(0.04)	0.23
IEB data						
Number of workers	1615.00	(7055.88)	166.00	440.02	(642.90)	238.00
Median Daily Wage (Euros)	123.25	(36.73)	116.25	101.58	(28.46)	99.51
Share Female Workers	0.24	(0.17)	0.19	0.27	(0.17)	0.22
Share Workers With University Degree	0.15	(0.14)	0.11	0.12	(0.13)	0.08
Observations	178			361		

Note: This table compares the manufacturing firms in our survey that are linked to the IAB data to the manufacturing firms analyzed by Bender et al. (2018) that are linked to the IAB data. The last three columns come from Bender et al. (2018). Bender et al. (2018) refer to fixed assets as the book value of capital and to material costs as intermediate inputs. We use the most recently available data from Orbis. The industry-level data in the OECD ISIC4 Database are from 2019. The IEB data are from 2020. The top panel includes the 178 manufacturing firms which provided consent to be linked to the IAB records; the estimates based on IEB data are based on the 175 firms that provided consent and we were able to link to the IEB records.

B.4 Elicited Bottleneck Occupations

Our bargaining questions elicit strategies for four groups of employees: recent labor market entrants, experienced non-managers, managers, and workers in bottleneck occupations. The German Federal Employment Agency (Bundesagentur fuer Arbeit) has published official statistics about bottleneck occupations since 2011 (Bundesagentur fuer Arbeit 2021). Bottleneck occupations are defined as positions that are hard to fill. Official measures of bottleneck occupations include the time it takes to fill a vacancy, the ratio of job seekers to vacancies for a given occupation, and the occupation-level unemployment rates.

To capture bargaining strategies for this specific set of occupations, we prompt respondents to list the bottleneck occupation that is most relevant for their firm. Appendix Table B7 presents the most commonly named bottleneck occupations, categorized into groups. We find that respondents name a wide range of occupations, both spanning higher-level positions such as management occupations and IT jobs, as well as lower-level positions including food and service workers or blue-collar technicians and mechanics. Because bottleneck occupations may fall into one of the other three categories (which are mutually exclusive), most of our analysis focuses on the distinction between labor market entrants, experienced non-managers, and managers.

Table B7: Frequency of Reported Bottleneck Occupations

	Share
IT occupation	18%
Manager	16%
Technician	11%
Sales occupation	6%
Food/service worker	4%
Engineer	3%
Driver	3%
Consultant	3%
HR professional	1%
Purchaser	1%
Lawyer	1%
Other	20%
No occupation provided	13%
Observations	772

Note: This table shows the frequency with which different bottleneck occupations were named in our firm survey. We categorized bottleneck occupations that respondents reported as most relevant for their firm into different occupational groups. 13% of respondents do not provide a bottleneck occupation.

C Additional Data Sources

This section provides detailed descriptions of how we collect and construct variables from the IEB data, the Orbis database, and other publicly available data sources.

C.1 Social Security Records

Pay. We follow past work and use daily pay as our main outcome of interest. In order to create this outcome, we first account for the fact that earnings in the IEB data are censored at the social security maximum. We therefore stochastically impute the upper tail of the wage distribution, following Dustmann, Ludsteck, and Schönberg (2009). Second, we calculate the average daily wage by dividing total earnings by the duration of the job spell. As a secondary outcome, we construct daily base pay, which more closely aligns with the survey-based bargaining measures we elicit in the firm survey. To do so, we distinguish between earnings comprised of base wages and earnings in the form of special payments based on the stated reason for the payment. We then again account for censoring and divide the base pay by the length of the spell to create our measure of daily base pay. For the subset of workers who participated in the worker survey, we also construct a measure of hourly pay that divides pay by hours worked.

Labor market experience. We define workers' labor market experience at each point in time by the cumulative duration that they have been observed as employed in the IEB data up to that point, excluding spells as student worker, intern, and apprentice. Part-time spells are counted as half spells. Our final variable is measured as experience in years.

Employee groups. We construct indicators for our three employee groups of interest—recent labor market entrants, experienced non-managers, and managers—using occupation codes and individuals' work experience in the IEB data. We identify employees as managers if the 4th digit of the 5-digit occupation code is a "9". We identify individuals as experienced non-managers if the 4th digit of the 5-digit occupation code is not a "9" and if they have at least three years of labor market experience. We identify individuals as recent labor market entrants if the 4th digit of the 5-digit occupation code is not a "9" and if they have less than three years of experience.

To validate whether our measure for manager is correct, we asked workers in a pilot survey, conducted through the IAB in Spring 2022, whether they have leadership responsibility over employees, for instance in the form of leading a team. When we compare our indicator for managers from the IEB occupation code to workers' survey responses, we find that 85% of manager assignments we make based on the IEB data align with workers' survey reports.

C.2 Orbis

We link our firm survey to information from the Orbis database, compiled by the Bureau van Dijk based on firm balance sheet information. In order to find our 772 firms in the Orbis database, we manually match every firm based on firm name and address to the firm records in Orbis. We are able to match 99% of the firms in our survey sample.

From Orbis we collect following firm characteristics: year of incorporation, sector based on the 4-digit NACE industry code, whether the firm's headquarters are based in East Germany using information about the zip-code of the headquarters, and the number of employees. Note that because Orbis draws on firms' balance sheet information, the number of employees may include employees outside of Germany.

The previous literature has used information in Orbis as proxies for firm productivity (Bender et al. 2018). We use information on firms' fixed assets per employee and total assets per employee as our preferred proxies for productivity because they have the lowest share of missing values.[40] Fixed assets refer to the total amount (after depreciation) of non-current assets (intangible assets, tangible assets, other fixed assets) and thus represent long-term assets that are not likely to be converted into cash anytime soon. Total assets are the sum of fixed assets and current assets (e.g., cash and any assets that will be converted into cash within the year). For each variable from Orbis, we select the last year that the data is available. For over 90% of our firms, the most recent information is not older than three years. For fixed and total assets, we CPI-adjust our variables.

C.3 Other Publicly Available Firm Data

In order to create an external benchmark that allows us to validate our firm survey, we also collected publicly available data on the 772 firms in our sample. We focused on three dimensions of firm strategies that are both relevant for the validity of our bargaining measures and feasible to collect using publicly available data. First, we manually collected information on whether a firm is covered by a CBA. To do so, we searched for whether the firm name is mentioned with respect to a CBA in the news or in any other online source. Firms for which we could (could not) find any such information are identified as (not) covered by a CBA.

Second, we collected information on whether firms ask applicants to provide their salary expectations. We searched for each firm's online application portal and set up an application account in order to receive access to the input screen that applicants are required to use. We then looked up the first five job ads that came up when we searched for the firm. For smaller firms that do not have online application systems, we looked for instructions for how to apply by email; these often prompt respondents to provide their salary expectations. We define a firm as not requiring salary expectations if none of the job openings we consider prompts applicants to provide such information. This measure of salary expectations is likely a lower bound, since it only captures whether expectations are elicited at the first step of applying, but does not include whether firms ask about expectations in the interview or in subsequent application rounds. In our firm survey, we asked whether firms elicited this information at any stage of the application or interview process.

Third, using the five ads we identified for each firm, we collected information on whether the firm provided wage information in its external job ads. For ads with pay information, we recorded how coarse the information was (e.g., salary group such as CBA group, salary range, precise salary). We define a firm as not providing any salary information if none of the job ads we collected provided any salary information.

[40] Productivity measures from Orbis are typically characterized by a high share of missing values. For the sample of our 772 firms, we have information on total assets for 576 (75%) and fixed assets for 571 (74%), while alternative productivity measures used in the literature, such as firms' operating revenue or profit-loss ratio, are only available for 294 (38%) and 318 (42%) of the firms, respectively.

D Worker Survey

In this paper we use data from a worker survey we conducted in order to (1) describe bargaining dynamics, (2) examine within-occupation-establishment heterogeneity in behavior, and (3) examine gender wage gaps among workers for whom hours are observed. This Appendix provides additional information on the implementation of the worker survey and discusses selection into non-response and linkage consent. See Appendix F.2 for the original survey questions and their English translation for the relevant bargaining modules.

D.1 Implementation Details and Response Patterns

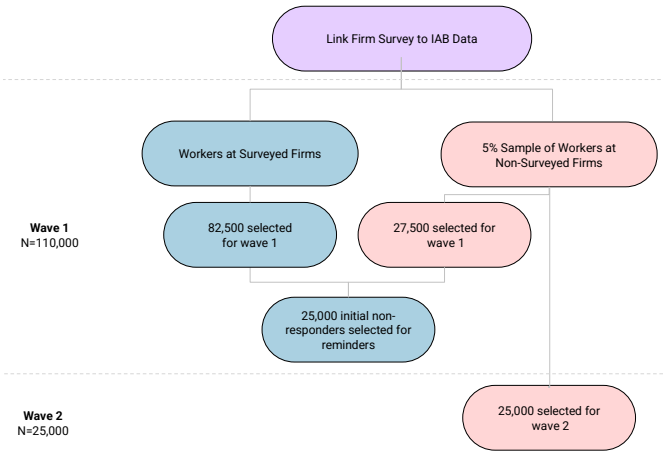
We used German Social Security records to identify participants for the survey. Our eligible pool consisted of workers who were—as of December 30, 2020—between the ages of 25 and 50, employed at a full-time job, and who had been at their current establishment for fewer than eight years. In order to manage the large number of letters, we mailed the survey in batches. For the first batch, we selected 75% of the sample (N=82,500) by randomly sampling from the set of eligible workers at firms in the matched IAB-firm survey sample (as of end of 2020). We over-sampled these workers so that we would have appropriate power for our main analysis. We selected the remaining 25% (N=27,500) at random from (a random 5% sample of) workers at non-surveyed firms. We selected all of the workers (N=25,000) for the second batch from the random 5% sample of eligible workers at non-surveyed firms. We mailed reminders to a random 25% subset of individuals in the first batch who had not responded to the initial invitation at the time of the second mailing. In spring 2024, we invited all respondents from the initial survey who provided panel consent to participate in a follow-up survey.

D.1.1 Invitations

After we identified workers for inclusion in the survey, a specialized department at the IAB pulled their addresses. This approach followed the standard protocol for surveys through the IAB. The IAB fielded the survey and the director of the IAB signed the invitation to participate. We mailed invitations to respondents between June 2022 and December 2022. We described the survey to potential respondents as a scientific study on salary progression in Germany. In order to manage the large number of letters, we staggered the mailings. Figure D1 describes the source of the workers in each batch.

We chose to invite respondents via mail instead of e-mail or phone because the Federal Employment Agency in Germany ("Bundesagentur für Arbeit") only has e-mail and phone numbers of individuals who have recently been unemployed or have participated in re-employment measures. Postal addresses are available for all workers. In the invitation we informed respondents that the survey would take approximately 10 minutes to complete. Figure D2 shows (a translation of) the wording of the invitation; the sample we include is for a worker randomized into one of the gift card treatments.

Figure D1: Breakdown of Invited Workers



Note: This figure shows the breakdown of selected workers across batches and by whether the individual was in one of the surveyed firms.

D.1.2 Exogenous Variation in Incentives to Participate

In order to analyze patterns of non-response, we introduced random variation in individuals' incentives to participate. We did this through (1) randomized financial incentives, (2) randomized endorsement letters, and (3) randomized follow-up.

Gift Card Lottery. We randomly assigned random subsets of the 110,000 workers selected for batch 1 to the gift card lottery. We selected 10,000 workers for the 5 euro gift card raffle and 20,000 workers for the 10 euro gift card raffle. We informed workers about the lottery in the cover letter, which stated:

> As a thank you for your participation, we are raffling off 1,500 vouchers, each with a value of 10 euros.
>
> As a thank you for your participation, we are raffling off 1,000 vouchers, each with a value of 5 euros.

After the survey closed in January 2023, the IAB conducted the gift card lottery by randomizing among participants who started the survey. The IAB informed winners either via e-mail or mail, according to the preferences indicated in the survey.

Endorsement Letters. We also sent a random subset of batch 1 workers an endorsement letter with the initial invitation. The letter was signed by one of the 2021 Nobel Prize winners in economics, identified both as one of the 2021 Laureates and as a previous collaborator of the IAB. The letter highlighted the importance of scientific labor market research and urged recipients to complete the survey. The letter stated:

> Hello «First name» «Last name», With this letter, I would like to ask for your support for a scientific study by the Institute for Employment Research (IAB), which

Figure D2: Original Invitation (English Translation)

INSTITUT FÜR ARBEITSMARKT- UND BERUFSFORSCHUNG
Die Forschungseinrichtung der Bundesagentur für Arbeit

Bei Rückfragen wenden Sie sich bitte an:
Dr. Jörg Heining
Regensburger Str. 104
90478 Nürnberg
E-Mail: lf-befragung@iab.de

Institut für Arbeitsmarkt- und Berufsforschung
Regensburger Str. 104 · Re100 407 · 90478 Nürnberg

«First name» «Last name»
«Street address»
«Zip code» «City»

Anschreiben-ID: «anschreiben_id»
Nürnberg, «date»

Scientific Study on Wage Flexibility in Germany

Hello «First name» «Last name»,

The Institute for Employment Research (IAB) is conducting a scientific study to understand how the salary progression of employees in Germany is changing. We are therefore interested in your experience in the labor market and would like to invite you to a survey. By participating, you support the IAB in advising political decision-makers and thus help to improve economic and social policy in Germany.

In a nutshell - we will interview you via the Internet

The survey will not take more than **10 minutes** of your time. Your participation is of course voluntary and anonymous. To get to the survey, you can use the display **QR code** or click on the following link: **https://umfragen.iab.de/goto/LF-befragung**

Your personal password for participation is: **«survey_password»**

Participating pays off

As a thank you for your participation, we are raffling off 1,500 vouchers, each with a value of 10 euros.

Your information is confidential

The safety of your personal data is important to us. We assure you that your information will be treated with strict confidentiality in accordance with the statutory data protection regulations and will only be used for scientific purposes. Your answers cannot be linked to your person. You will find additional data protection explanations attached.

Thank you for your cooperation and for your trust!

Kind regards

Prof. Bernd Fitzenberger Ph.D.
Direktor des Instituts für Arbeitsmarkt- und Berufsforschung (IAB)

Note: This is a screenshot of the translated cover letter sent to workers randomized to the high-gift-card treatment. The text in quotes was auto-filled with the relevant information for each respondent.

examines how the current changes in the labor market will affect employees in Germany.

As a labor economist, I've spent decades studying how wages react to changes in the labor market. From my research, I know that many of the labor market dynamics we see today –e.g. the pandemic and its consequences, the rising level of inflation, and the increased need for skilled workers – will be decisive for workers' long-term earnings progression and therefore also their job satisfaction. Now, in particular, it is important to understand now measures can be used to ensure a positive salary progression. To study how wages in Germany evolve and to identify the factors that contribute to rising income inequality, I've over the years collaborated with the IAB on several occasions. I am convinced that the work of the IAB makes an important contribution to understanding the labor market and provides politicians and the public with valuable insights into the situation of employers and employees.

I therefore ask for your support and your participation in the ongoing survey. Because the more people participate in the survey, the more precise and comprehensive the picture of how the labor market changes affect long-term earnings progression in Germany. Thank you very much for your help!

We sent this letter to 82,500 of the 110,000 workers included in batch 1.

Reminder Mailings. There were 99,698 initial non-responders in batch 1. We randomly selected 25,000 of initial non-responders to receive a follow-up letter. The reminder letters had nearly identical wording to the initial invitations, but reminded individuals that they had previously been invited to participate in the survey. The letters included the same information on data protection as before. Individuals who had been included in the gift card raffle in the initial invitation received reminders of their offer to participate. Individuals who had been randomized to receive endorsement letters did not receive a second endorsement letter.

D.1.3 Balance Check

Appendix Table D1 describes the workers we invited for the survey. As Columns 2 and 3 indicate, conditional on the strata used for selection (whether an individual is at a surveyed firm), there is no difference in the characteristics of eligible workers and those invited to participate in our survey. Columns 4 and 5 compare those selected for the treatment and control groups for the endorsement letters and gift card treatments. Conditional on the strata used to assign these treatments, we find no difference in the characteristics of those selected and those not selected.[41] Column 6 shows that among those eligible to receive a reminder (initial non-responders in batch 1), there is no difference between those selected to receive a reminder and those not selected.

D.1.4 Response Rate and Consent

The survey was open until January 15, 2023. We received 13,680 total responses. Subtracting the number of letters that could not be delivered, the survey had an effective response rate of 11.4%.

[41] We grouped individuals into two groups based on their federal state of residence and randomly assigned gift cards within these strata. We randomly assigned endorsement letters without regard to state.

Table D1: Randomization Assessment

		Selection		Batch 1 Randomization		
	Eligible Mean	Batch 1 - Eligible (p)	Batch 2 - Eligible (p)	Lottery - No Lottery (p)	Letter - No Letter (p)	Reminder - No Reminder (p)
	(1)	(2)	(3)	(4)	(5)	(6)
Demographics						
Female	0.32	0.63	0.33	0.48	0.41	0.32
	(0.47)					
Age	33.02	0.29	0.94	0.75	0.73	0.82
	(6.49)					
German Citizen	0.77	0.22	0.65	0.75	0.67	0.22
	(0.42)					
College Education	0.34	0.59	0.47	0.06	0.35	0.39
	(0.47)					
Apprenticeship	0.45	0.90	0.67	0.64	0.51	0.69
	(0.50)					
Daily Earnings	129.12	0.22	0.39	0.23	0.47	0.09
	(58.15)					
Occupation Group						
Manager	0.04	0.96	0.45	0.95	0.71	0.57
	(0.20)					
Recent Entrant	0.34	0.86	0.84	0.95	0.06	0.01
	(0.47)					
Sector						
Manufacturing	0.32	0.86	0.72	0.01	0.74	0.44
	(0.47)					
Retail	0.10	0.47	0.40	0.53	0.47	0.41
	(0.31)					
Professional	0.10	0.95	0.42	0.08	0.44	0.70
	(0.29)					
Firms		513	1	383	509	459
Establishments		24928	21248	7253	19600	7204
Workers		110000	25000	30000	82500	25000
F-test p-value		0.747	0.936	0.104	0.460	0.408

Note: Column 1 describes workers eligible for inclusion in our worker survey. Columns 2 and 3 show that, conditional on the strata used for selection (i.e. whether an individual worked at a surveyed firm in 2020), selected individuals are not statistically distinguishable from non-selected individuals. Columns 4 to 6 show that, conditional on the strata used for random assignment, individuals selected to receive each of the three types of incentives, are not distinguishable from those who were not selected. We only randomized these incentives to workers in batch 1.

Table D2: Impact of Randomized Incentives on Response Rates

	Endorsement	Gift Card		
	Letter	Continuous	Binary	Reminder
	(1)	(2)	(3)	(4)
Treatment	0.000	-0.000	-0.002	0.040***
	(0.002)	(0.000)	(0.002)	(0.001)
Observations	109995	109995	109995	99698

Note: This table analyzes the effect of the randomized incentives on the likelihood that invited individuals completed the survey and provided linkage consent. Each coefficient stems from a separate regression of survey completion on an indicator for the respective incentive, conditional on the strata used for random assignment. Column 1 focuses on endorsement letters. Columns 2 and 3 focus on gift cards. Column 4 focuses on the survey reminder. Robust standard errors are presented in parentheses. Levels of significance: *10%, ** 5%, and *** 1%.

This response rate is much higher than those of other surveys at the IAB that invite respondents for the first time (Haas et al. 2021). Among the 13,680 individuals who started the survey, 11,868 completed it; this represents a completion rate of 74%.[42] The median response time among individuals who completed the survey was 9 minutes.

We asked participants for their consent to link their answers to the employer-employee data at the IAB. We have 10,134 complete responses with linkage consent, which we link to the IAB records. While this direct consent is necessary under German privacy laws in order to link the survey data to other data sources, we are able to analyze the raw and unlinked data for both consenters and non-consenters. We also asked participants for their consent to participate in follow-up surveys. 8,416 respondents who provided consent for this linkage also provided consent to be contacted for future survey waves. Among the 11,868 complete responses, this represents a panel consent rate of 83%.

Appendix Table D2 shows that neither the gift cards nor the endorsement letter had a statistically significant (or economically meaningful) impact on response rates. By contrast, the reminder message increased response rates by 4 percentage points among workers who did not initially respond to the survey. Because both the endorsement letter and gift card information were only visible to individuals who opened the initial mailer, one plausible interpretation is that much of the initial non-response was driven by individuals simply ignoring our initial invitation.

We follow (Dutz et al. 2021) in analyzing the characteristics of compliers. Because neither the endorsement letter nor gift card affected response rates, there are no compliers. Appendix Table D3 describes three populations of workers. Column 1 describes "early always takers": those who responded to the survey before we mailed the reminder. Column 2 describes the "late always takers": those who we randomized into not receiving a reminder, but who nonetheless responded after we mailed the reminders. Column 3 describes the reminder compliers. As Column 2 indicates, virtually all of the always takers responded before we mailed the reminder. Column 3 indicates that the reminder compliers are, relative to the early always takers, somewhat more likely to be male or

[42] We define a response as complete if a respondent clicked through to the (second to last) question eliciting consent for participating in a follow-up survey. We do not require respondents to have answered every question to be counted as complete responses. The survey did not require individuals to respond to particular questions.

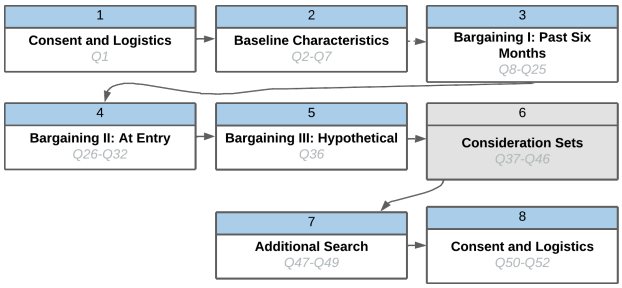
covered by a collective bargaining agreement.

Appendix Table D4 describes the characteristics of invited individuals (Column 1) to those who completed the survey and provided linkage consent (Column 2) and to those who additionally provided consent to participate in future surveys (Column 4). Columns 3 and 5 compare the samples in Columns 2 and 4 to the samples in Columns 1 and 2, respectively. We find modest differences in respondent characteristics with respect to gender, age, occupation type, and sector. For instance, while the female share is 30% among invited individuals, it is 32% among those who responded and provided consent. German citizens on the other hand were much more likely to respond than non-citizens. This is not surprising: these workers are likely more comfortable with the German language (we fielded our survey in German) and may feel more of an obligation to contribute to research on the German labor market. We also find meaningful differences with respect to education and earnings: more educated workers were more likely to respond to the survey. This may reflect the fact that they are more likely to be familiar with the IAB.

D.1.5 Survey Logistics and Flow

In one set of the invitations, a printing issue led to some cases where endorsement and cover letters were mixed up. This meant that two different addresses (endorsement person a, cover person b) ended up in one envelope. Letters were sent to the addresses provided on the endorsement letter, but the cover letter information included the name and password of a different individual. If an individual who received an incorrect mailing participated in the survey they therefore would have been linked to the wrong survey. Based on inspection of the frequency of this error in letters that were returned due to incorrect addresses (which is an independent issue, but allows us to analyze the frequency of the error), we calculate that at most 431 people among the 17,772 recipients in this set of invitations were likely affected (2.4%), assuming the share among returns is the same as in the overall sample. People may likely have realized the mix-up and may not have participated. Since this only affected people with endorsement letters, this may have reduced the response rate for this group. In unreported results, we have found the results are robust to excluding the entire group of 17,772 respondents with endorsement letters from our analyses.

Figure D3: Flow of Worker Survey



Note: This figure provides an overview over the modules in the worker survey. The main questions used for our analysis are elicited in the three bargaining modules. See Appendix F.2 for the questionnaire.

While the survey includes several distinct modules, the focus of this paper is on the three bargaining modules of the worker survey (see Appendix Figure D3 for an overview). The first of

Table D3: Characteristics of Reminder Compliers and Always Takers

	Always Takers		Reminder
	Early	Late	Compliers
	(1)	(2)	(3)
Shares	0.05	0.000	0.02
Female	0.28	0.58	0.23
Age	33.98	34.17	33.98
German	0.94	0.92	0.92
College Degree	0.63	0.67	0.59
Apprenticeship	0.31	0.17	0.34
Daily Wage (allocated)	181.89	199.76	178.84
Censored Wage	0.26	0.33	0.28
Hours Worked	40.78	41.63	40.59
CBA	0.57	0.67	0.62
Sector			
Manufacturing	0.52	0.58	0.54
Retail	0.07	0.00	0.06
Professional	0.16	0.17	0.18
AKM Fixed Effects			
Person Effect	4.46	4.28	4.43
Firm Effect	0.51	0.58	0.52
Risk Tolerance	6.24	5.67	6.21
Outside Options	1.40	1.17	1.42

Note: This table compares the characteristics of early and late always takers to reminder compliers. Early always takers are workers in the control group who responded before we mailed the (randomized) reminders. Late always takers are workers in the control group who responded after we mailed the reminders. Reminder compliers are workers who responded after being mailed a reminder. Following (Dutz et al. 2021), we estimate the reminder compliers' average characteristics via an instrumental variables regression with $Y_i(1-R_{i1})R_{i2}$ as the outcome variable, $(1-R_{i1})R_{i2}$ as the endogenous variable, and $Z_i$as the instrument. $Y_i$is the characteristic of interest (e.g., person effect), $R_{i1}$is an indicator for responding before we mailed the reminders, $R_{i2}$is an indicator for responding after we mailed the reminders, and $Z_i$is an indicator for having (randomly) received a reminder.

Table D4: Non-Response and Consent in the Worker Survey

		Linkage Consent			Panel and Linkage Consent		
	Invited Mean	Mean	Difference Rel. Invited		Mean	Difference Rel. Linked	
	(1)	(2)	(3)		(4)	(5)	
Demographics							
Female	0.30	0.32	0.02	***	0.32	0.01	
	(0.46)	(0.46)	(0.00)		(0.47)	(0.01)	
Age	33.63	33.33	-0.32	***	33.33	-0.02	
	(6.59)	(6.23)	(0.06)		(6.14)	(0.17)	
German Citizen	0.78	0.91	0.13	***	0.91	0.04	***
	(0.41)	(0.29)	(0.00)		(0.28)	(0.01)	
College Education	0.35	0.53	0.20	***	0.54	0.05	***
	(0.48)	(0.50)	(0.01)		(0.50)	(0.01)	
Apprenticeship	0.40	0.30	-0.11	***	0.29	-0.03	**
	(0.49)	(0.46)	(0.00)		(0.46)	(0.01)	
Daily Earnings	146.95	170.66	25.64	***	171.78	6.57	***
	(61.60)	(57.25)	(0.59)		(57.20)	(1.51)	
Occupation Group							
Manager	0.05	0.06	0.01	***	0.06	0.01	*
	(0.21)	(0.24)	(0.00)		(0.24)	(0.01)	
Recent Entrant	0.49	0.46	-0.03	***	0.47	0.02	
	(0.50)	(0.50)	(0.01)		(0.50)	(0.01)	
Sector							
Manufacturing	0.44	0.46	0.03	***	0.46	-0.01	
	(0.50)	(0.50)	(0.01)		(0.50)	(0.01)	
Retail	0.10	0.09	-0.01	***	0.09	0.01	
	(0.30)	(0.28)	(0.00)		(0.28)	(0.01)	
Professional	0.10	0.13	0.04	***	0.13	0.01	
	(0.29)	(0.34)	(0.00)		(0.34)	(0.01)	
Surveyed Firms	513	363			339		
Establishments	42690	3553			2983		
Observations	134995	10134			8416		

Note: This table describes the characteristics of workers we invited to complete the survey (Column 1) to workers who completed the survey and provided consent to link their responses to the administrative data (Column 2), to the subset of these workers who additionally provided consent to participate in follow-up surveys (Column 4). Columns 3 and 5 present the strata-adjusted differences between the samples indicated in the header and sub-header. For instance, Column 3 reports the difference between workers who completed the survey and provided linkage consent to the set of invited workers. Levels of significance: *10%, ** 5%, and *** 1%.

these modules elicited the sequence of bargaining events for workers who had received an outside offer in the previous six months. The second elicited the sequence of bargaining events that occurred when individuals started their first job at their current firm. The third asked individuals to provide their salary expectations in response to a hypothetical prompt. At the end of the survey we collected additional worker characteristics, such as risk aversion.

D.1.6 Follow-Up Survey

We fielded a follow-up survey in spring 2024. Roughly 50% of workers we invited to this survey completed it. We elicited worker patience following Falk et al. (2023). In particular, we asked respondents "how willing are you to give up something that is beneficial for you today in order to benefit more from that in the future?". We define someone as having high patience if they selected seven or above (on a ten point scale). This measure is used in Appendix Table A11.

We also used this survey to validate one of the key findings: that most outside offers are rejected. While we did not include the full bargaining modules in this survey, we did ask all workers whether they had received an outside offer in the previous six months. We also asked workers whether they had switched firms since the previous survey wave.

E Additional Analysis: Gender Differences in Bargaining

This section provides additional results focused on gender. Our analysis is motivated by the large literature on gender differences in negotiations (e.g., Babcock and Laschever 2009; Dittrich, Knabe, and Leipold 2014; Exley, Niederle, and Vesterlund 2020) and by previous work by Biasi and Sarsons (2022), which documents a causal link between bargaining and the gender pay gap in the context of public schoolteachers. We first show that men and women are, within an occupation and sector, equally likely to be in firms which individually bargain over pay. We then test to what extent men and women also differ in the positions they fall in the earnings distribution. In addition, we analyze gender differences in outside options and risk tolerance as potential drivers of the observed gender differences in bargaining. Finally, we analyze reasons women may be less likely to negotiate (as documented in Section 5.2). We examine gender differences in workers' stated reasons for not negotiating and use data from a vignette experiment we embedded in the follow-up survey.

E.1 Gender Differences in Exposure to Firm Bargaining Strategies

As described in the main text, we classify a firm as using a bargaining strategy if they report that they differentiate pay between workers they believe are equally productive. We use the Social Security records of workers at surveyed firms to examine whether women and men are differentially exposed to this type of pay policy.

Column 1 of Appendix Table E1 documents that, roughly 80% of workers are exposed to individual bargaining. Column 2 of Appendix Table E1 shows that, without controlling for any covariates, women are less likely to be in positions where their firms sets pay via bargaining. This reflects two opposing factors: men are more likely to be in managerial positions (where bargaining is more common) but, due to a variety of gender norms, full-time work is more common among women in East Germany (where bargaining is less common). These factors explain why the gender gap reverses once we control only for occupation fixed effects (Column 4). The gender gap in exposure disappears completely once we control for occupation-sector fixed effects (Column 5). This suggests that, within a labor market, women are not more likely to sort into firms with rigid pay policies. Panel B reports similar results for the subset of surveyed workers at surveyed firms.

E.2 Gender Differences in Earnings Rank

Previous research has documented that there are gender and race gaps in the positions workers fall in the earnings distribution (Blau and Kahn 2017; Bayer and Charles 2018). We estimate gender gaps in earnings ranks by running regressions of the following form:

$$rank_i = \beta \text{Female}_i + \delta \text{age}_\text{i} + \alpha \text{exp}_i + \gamma \text{exp}_i^2 + \zeta_{educ(i)} + \lambda_{o(i),est(i)} + \epsilon_i. \quad (3)$$

where $rank_i$ is the percentile rank of the individual i's daily pay within their employee group (i.e., job entrant, experienced non-manager, manager) and establishment. Appendix Table E2 presents the results separately for workers who are and are not exposed to individual bargaining. Our

Table E1: Exposure to Bargaining Strategies

	Overall Mean	Female-Male Difference			
	(1)	(2)	(3)	(4)	(5)
		A. Workers at Surveyed Firms			
Bargaining Definition					
Strategy for New Hires	0.80	-0.031***	0.003	0.016***	0.002
		(0.002)	(0.002)	(0.002)	(0.001)
		251275	251275	251275	249387
Strategy for Incumbent Workers	0.63	-0.031**	-0.020	-0.048***	-0.007
		(0.013)	(0.013)	(0.013)	(0.009)
		7038	7038	7038	6266
		B. Surveyed Workers			
Bargaining Definition					
Strategy for New Hires	0.77	-0.018	-0.001	0.014	0.001
		(0.012)	(0.011)	(0.011)	(0.008)
		6937	6937	6937	6166
Strategy for Incumbent Workers	0.63	-0.031**	-0.020	-0.048***	-0.007
		(0.013)	(0.013)	(0.013)	(0.009)
		7038	7038	7038	6266
Demographic Controls		No	Yes	Yes	Yes
Fixed Effects		---	---	Occ	Occ-Sector

Note: This table compares the exposure of men and women to individual bargaining. Column 1 presents the overall level of exposure (pooling men and women). The remaining columns present the coefficient on a female dummy from regressions of indicators for whether an individual is exposed to bargaining on a dummy for whether they are female, on demographic controls (Columns 2-5), and on occupation fixed effects (Column 4) or occupation-sector fixed effects (Column 5). The demographic controls include age, a quadratic in experience, and education dummies. Panel A includes all workers at surveyed firms. Panel B includes only those who participated in the worker survey. Each panel presents results for two definitions of exposure, indicated at the far left: (1) whether a firm bargains with new hires and (2) whether a firm bargains with incumbent workers. Robust standard errors are presented in parentheses. Levels of significance: *10%, ** 5%, and *** 1%.

Table E2: Gender Differences in Earnings Rank

	Without Individual Bargaining			With Individual Bargaining		
	(1)	(2)	(3)	(4)	(5)	(6)
	A. Workers at Surveyed Firms					
Female	-4.842***	-4.033***	-4.043***	-5.414***	-6.706***	-6.643***
	(1.106)	(0.689)	(0.650)	(1.084)	(0.883)	(0.869)
p-value for equality	0.671	0.001	0.001	0.671	0.001	0.001
Adjusted R-Squared	0.205	0.446	0.455	0.269	0.515	0.523
Clusters	223	179	178	485	458	456
Observations	49115	47155	46763	202160	195847	194127
	B. Surveyed Workers					
Female	-2.172	-1.542	-1.253	-4.424***	-5.954***	-5.583***
	(1.927)	(1.821)	(1.932)	(1.206)	(1.913)	(1.829)
p-value for equality	0.288	0.071	0.095	0.288	0.071	0.095
Adjusted R-Squared	0.111	0.362	0.367	0.135	0.423	0.432
Clusters	90	32	32	307	132	126
Observations	1617	1226	1181	5320	3820	3620
Fixed Effects	---	Occ-Est	Level-Occ-Est	---	Occ-Est	Level-Occ-Est

Note: This table examines gender differences in workers' earnings rank. Columns 1-3 include workers in positions at firms which do not engage in individual bargaining, while Columns 4-6 include those whose pay is set by individual bargaining. Each column presents results from a separate regression of the workers' percentile in the earnings distribution in their employee group at their establishment on a female dummy, age, a quadratic in experience, education dummies, and on the fixed effects indicated in each column. Panel A focuses on all workers at surveyed firms. Panel B includes only workers at surveyed firms who participated in the worker survey. Standard errors are clustered at the firm level. Levels of significance: *10%, ** 5%, and *** 1%.

preferred specification (Columns 2 and 5) controls for occupation-establishment fixed effects. We cluster the standard errors at the firm level.

We find that women have lower earnings ranks than men in the same occupation and establishment. This gender gap is significantly higher for workers who are exposed to individual bargaining (Column 5 versus Column 2 of Appendix Table E2, Panel A).

E.3 Gender Differences in Risk Tolerance and Outside Options

Next, we test for potential gender differences in risk tolerance and outside options, which could explain why men and women differ in their bargaining actions. Appendix Table E3 shows that we find a statistically significant and economically meaningful gender gap in risk tolerance. This gap persists even when we control for fine level-occupation-establishment fixed effects and arises

across different subsamples of workers. Similarly, we find significant gender differences in three complementary measures of outside options: whether workers perceived it would be easy for them to get a better job, whether they received a job offer in the previous six months, and the extent of their geographic search radius. Appendix Table E4 shows that despite the correlation of risk tolerance and outside options with gender, the documented gender gap in worker bargaining persists even after we control for their risk tolerance and their outside options.

E.4 Reasons Workers Do Not Ask for More

There are many reasons workers may not ask for more. In order to best understand workers' rationale, we asked workers who did not negotiate their pay why they failed to do so. Appendix Tables E5 and E6 describe respondents' stated reasons for why they did not attempt to negotiate either at the beginning of or during an employment spell. We allowed respondents to select multiple reasons. Appendix Table E5 includes workers who joined their firm in the previous three years and report they did not ask for more when they initially negotiated. Appendix Table E6 includes incumbent workers who report they did not receive an outside offer or ask for a raise in the preceding six months.[43]

At the Beginning of an Employment Spell. There are several plausible reasons a worker may not ask for more. For instance, someone may not ask for more if they are satisfied with the offered salary (first row) or if they do not think that asking for more will pay off (second row). Indeed, these are the most highly cited reasons among men who did not negotiate. Seventy percent of men who did not negotiate say they did not do so because they were satisfied with the offered salary (first entry in Appendix Table E5); 34% say that they did not think that asking for more would have resulted in a meaningful increase.

Women are much less likely to cite these financial factors as driving their decision not to ask for more. Relative to men in the same occupation, women are 11 percentage points less likely to say that they did not negotiate because they were satisfied with the offered salary. We see a similar pattern when we compare men and women in the same occupation-establishment (Column 3), or when we add controls for workers' perceived outside options. Adding controls for whether a worker has children or is married closes the gap somewhat (Column 5), but an 11 percentage point gap remains. The second row shows that women are, if anything, less likely to say that the reason they did not negotiate was that they did not think it would pay off.

A related reason workers may not negotiate is that they do not think that it is possible at their firm. While Section E.1 documents that we do not find gender differences in exposure to bargaining, it is possible that workers have imperfect information about their firms' policies. However, the fourth row of Appendix Table E5 suggests this is not a plausible driver of gender differences in behavior.

Our results are most supportive of the idea that women fail to negotiate because they find it uncomfortable to do so. While only 15% of men say that this deterred them from asking for more, 24% of women (after adjusting for occupation fixed effects) say that this deterred them. Across all

[43] Given the length of the questionnaire for workers who received an outside offer (we elicited a complete bargaining history for these workers), we did not ask workers who received an outside offer why they did not ask for a raise in the previous six months.

Table E3: Gender Differences in Risk Tolerance and Outside Options

				Bargaining Samples			
	Male Mean	All Workers		New Hire		Raise	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Risk Tolerance							
Binary	.32	-0.090***	-0.104***	-0.116***	-0.100*	-0.090***	-0.104***
		(0.015)	(0.021)	(0.029)	(0.052)	(0.015)	(0.021)
		7054	5158	1694	851	7029	5138
Continuous (0-10)	6.27	-0.482***	-0.524***	-0.514***	-0.401**	-0.485***	-0.530***
		(0.068)	(0.086)	(0.119)	(0.196)	(0.068)	(0.086)
		6981	5104	1680	848	6959	5085
Perceived Outside Options: How Easy is it to Get a Better Job							
Binary	.44	-0.061***	-0.065***	-0.041	0.002	-0.060***	-0.064***
		(0.015)	(0.014)	(0.031)	(0.049)	(0.015)	(0.014)
		7013	5121	1677	846	6992	5103
Continuous (0-3)	1.42	-0.114***	-0.125***	-0.049	-0.083	-0.114***	-0.124***
		(0.024)	(0.022)	(0.048)	(0.071)	(0.023)	(0.022)
		7013	5121	1677	846	6992	5103
Received A Job Offer in Previous Six Months							
Binary	.41	-0.080***	-0.068***	-0.060**	-0.039	-0.080***	-0.068***
		(0.012)	(0.013)	(0.026)	(0.035)	(0.012)	(0.013)
		7034	5141	1687	849	7013	5123
Continuous (0-2)	0.96	-0.226***	-0.218***	-0.219***	-0.275**	-0.226***	-0.218***
		(0.031)	(0.033)	(0.064)	(0.105)	(0.031)	(0.033)
		7015	5124	1678	847	6994	5106
Geographic Search Radius							
Kilometers	68	-12.961***	-8.242	-20.050**	-3.227	-12.936***	-8.290
		(4.234)	(5.020)	(9.358)	(15.603)	(4.233)	(5.037)
		6930	5054	1662	827	6908	5035
Fixed Effects		Occ	Occ-Est	Occ	Occ-Est	Occ	Occ-Est

Note: This table examines gender differences in risk tolerance and outside options. Column 1 presents the male mean. Columns 2-7 report estimates of the coefficient on a female dummy from regressions of different measures of workers' risk tolerance or outside options (as indicated in each row) on a female dummy, on demographic controls, and on the fixed effects indicated at the bottom of the table. The demographic controls include age, a quadratic in experience, and education dummies. Standard errors are clustered at the firm level. Columns 4-5 (6-7) include workers who recently joined their firm (incumbents who asked for a raise) in the previous six months. Levels of significance: *10%, ** 5%, and *** 1%.

Table E4: Gender Differences in Worker Bargaining Behavior

	(1)	(2)	(3)	(4)
A. Asked for and Received More at the Start of the Spell				
Female	-0.073	-0.066	-0.073	-0.066
	(0.050)	(0.047)	(0.051)	(0.048)
Easy to Find a Better Job			0.066*	0.063*
			(0.035)	(0.033)
High Risk Tolerance		0.075*		0.073*
		(0.038)		(0.037)
Observations	843	843	843	843
B. Asked for and Received a Raise in the Previous Six Months				
Female	-0.066***	-0.058***	-0.062***	-0.055***
	(0.015)	(0.015)	(0.015)	(0.015)
Easy to Find a Better Job			0.074***	0.067***
			(0.011)	(0.012)
High Risk Tolerance		0.081***		0.073***
		(0.015)		(0.015)
Observations	5057	5057	5057	5057
C. Provided Salary Expectations (Hypothetical)				
Female	-0.020***	-0.020***	-0.020***	-0.020***
	(0.007)	(0.007)	(0.007)	(0.007)
Easy to Find a Better Job			-0.000	-0.000
			(0.007)	(0.007)
High Risk Tolerance		0.000		0.000
		(0.007)		(0.007)
Observations	5075	5075	5075	5075
C. Salary Expectations are Above Range (Hypothetical)				
Female	-0.057***	-0.055***	-0.057***	-0.055***
	(0.008)	(0.008)	(0.008)	(0.008)
Easy to Find a Better Job			-0.003	-0.005
			(0.006)	(0.006)
High Risk Tolerance		0.021		0.021
		(0.014)		(0.014)
Observations	5001	5001	5001	5001

Note: This table reports regressions that shed light on gender differences in worker bargaining behavior. Each entry provides the coefficient on the variable indicated in the row from a model which regresses the outcome indicated in the panel on the row characteristic, and on an individual's level of education, a quadratic in experience, age, and three-digit occupation-establishment fixed effects. Standard errors, presented in parentheses, are clustered at the firm level. Panel A focuses on whether the worker asked for and received a higher wage at the start of the spell. Panel B focuses on whether a worker successfully negotiated a higher wage in the previous six months. Panels C and D examine how workers respond to a hypothetical scenario which asks them to provide their salary expectations in response to a stated salary range. Panel C focuses on whether an individual did provide their expectation. Panel D focuses on whether the level workers provided is above the stated range. Levels of significance: *10%, ** 5%, and *** 1%.

Table E5: Reasons for Not Asking A Firm to Improve Its Initial Offer

	Male Mean	Female-Male Difference				
	(1)	(2)	(3)	(4)	(5)	(6)
I was satisfied with the offered salary						
	.7	-0.117***	-0.165***	-0.165***	-0.111**	-0.066*
		(0.028)	(0.051)	(0.052)	(0.051)	(0.038)
I did not think I would receive a meaningful increase						
	.34	-0.074**	-0.045	-0.049	-0.065	0.027
		(0.036)	(0.063)	(0.063)	(0.059)	(0.039)
I did not think to ask						
	.08	0.052**	0.060**	0.057*	0.045	0.007
		(0.021)	(0.029)	(0.029)	(0.033)	(0.024)
I did not think the company typically negotiated						
	.21	-0.017	0.025	0.024	-0.113***	0.042
		(0.024)	(0.051)	(0.052)	(0.039)	(0.032)
I wanted to avoid a potentially uncomfortable situation						
	.15	0.086**	0.114*	0.116*	0.080	0.089***
		(0.034)	(0.059)	(0.059)	(0.052)	(0.032)
Fixed Effects		Occ	Occ-Est	Occ-Est	Occ-Est	Occ
Outside Options Controls		No	No	Yes	Yes	Yes
Family Status Controls		No	No	No	Yes	Yes
Including Non-Surveyed Firms		No	No	No	Yes	Yes
Observations		1076	445	442	407	1845

Note: This table analyzes workers' stated reasons for not negotiating. The sample includes workers who joined their firm in the previous three years, and report they did not ask the firm to improve its initial offer at the time they joined. Column 1 reports the mean among male workers. The remaining columns report regression-adjusted gender gaps. Each regression controls for demographic characteristics and for the fixed effects indicated at the bottom of each column. The demographic controls include age, a quadratic in experience, and education dummies. The outside options controls are dummies for whether a worker said it would be "difficult", "easy", or "very easy" to find a job they preferred more. The family status controls include dummies for whether a worker is married and has children; we elicited this information in the follow-up survey. We allowed workers to select multiple reasons they failed to ask for more. Standard errors are clustered at the firm level. Levels of significance: *10%, ** 5%, and *** 1%.

columns of Appendix Table E5 we see evidence that women are more likely to say they did not ask for more because it would have been uncomfortable to ask.

In the Previous Six Months. We see a similar pattern among incumbent workers: men are most likely to say they did not ask for a raise either because they were satisfied with their pay (32%), because they did not think it would result in a meaningful increase (28%) or because not enough time had lapsed since they had last done so (38%). As at the beginning of the spell, women are more likely to state that it did not occur to them to ask. They are much less likely to say that they did not think that their company typically re-negotiated pay, suggesting that information is not a plausible reason women fail to negotiate.

Discussion. Together these results suggest that women do not fail to negotiate because they think that they will be unsuccessful or because they are more likely to think that their firm does not negotiate. Rather, they are less likely to ask for more because they find it uncomfortable to do so or because they do not think to ask. The results suggest that increasing the salience of negotiations, or increasing workers' comfort in negotiations, may be effective ways to close the gender gap in asking for more. Future work could do more to tease apart the different mechanisms.

E.5 Vignette Experiment in the Follow-Up Survey

In order to understand whether women are hesitant to negotiate because they anticipate they will be less successful, we embedded a series of vignettes into the follow-up survey. The results of these experiments are consistent with workers' stated reasons for not negotiating: we find no evidence that either men or women think that women are more likely to face backlash if they ask for more. If anything, women are more likely to suggest that the hypothetical worker should negotiate (regardless of gender).

Vignettes. Following the methodology in Haegele (2024), we prompted respondents that we were interested in the career advice they would give others and then randomized whether we asked them about "Sophie" or "Matthias", which are common female and male names. We chose to ask about Sophie or Matthias instead of asking about the workers themselves in order to avoid concerns relating to desirability bias. All vignettes focused on on-the-job renegotiation because, as documented in Section 4.4, workers are more likely to receive and reject an outside offer than they are to receive an outside offer and move to that firm.

The first vignette told workers:

> "Imagine you are approached by {Sophie/Matthias} who has been working at a similar company and in a similar position as you. {Sophie/Matthias} tells you that {she/he} received an offer from another company that is {10%/20%} above {her/his} current wage.
>
> Suppose {Sophie/Matthias} would prefer to stay at their current company, what do you think they should do?"

Workers could select from four options: (a) Nothing, (b) Tell their employer about this without explicitly asking about a raise, (c) Bring up the possibility of a salary increase, aiming for a partial

Table E6: Reasons for Not Asking for a Raise in the Previous Six Months

	Male Mean	Female-Male Difference				
	(1)	(2)	(3)	(4)	(5)	(6)
I was satisfied with my salary						
	.32	-0.030	0.019	0.014	-0.035	-0.031
		(0.023)	(0.024)	(0.022)	(0.034)	(0.027)
I did not think I would receive a meaningful increase						
	.28	0.046**	0.020	0.016	0.054	0.006
		(0.020)	(0.023)	(0.025)	(0.035)	(0.030)
I did not think to ask						
	.14	0.033**	0.057***	0.057***	0.008	-0.027
		(0.013)	(0.015)	(0.015)	(0.017)	(0.023)
I did not think the company typically negotiated						
	.18	-0.071***	-0.095***	-0.091***	-0.084***	-0.062***
		(0.014)	(0.017)	(0.017)	(0.023)	(0.021)
I wanted to avoid a potentially uncomfortable situation						
	.1	0.014	0.026	0.030	0.001	-0.013
		(0.014)	(0.022)	(0.023)	(0.018)	(0.024)
Not enough time had elapsed since my last salary increase						
	.38	-0.053***	-0.017	-0.016	-0.095***	-0.025
		(0.020)	(0.026)	(0.028)	(0.035)	(0.030)
Fixed Effects		Occ	Occ-Est	Occ-Est	Occ-Est	Occ
Outside Options Controls		No	No	Yes	Yes	Yes
Family Status Controls		No	No	No	Yes	Yes
Including Non-Surveyed Firms		No	No	No	Yes	Yes
Observations		3024	1935	1909	1097	4225

Note: This table analyzes workers' stated reasons for not asking for a raise in the previous six months. The sample includes workers who did not receive an outside offer in the previous six months and report they did not ask for a raise. Column 1 reports the mean among male workers. The remaining columns report regression-adjusted gender gaps. Each regression controls for demographic characteristics and for the fixed effects indicated at the bottom of each column. The demographic controls include age, a quadratic in experience, and education dummies. The outside options controls are dummies for whether a worker said it would be "difficult", "easy", or "very easy" to find a job they preferred more and an indicator for whether the worker reported that, in the previous six months, someone reached out to them to provide them with information on job opportunities. The family status controls include dummies for whether a worker is married and has children; we elicited this information in the follow-up survey. We allowed workers to select multiple reasons. Standard errors are clustered at the firm level. Levels of significance: *10%, ** 5%, and *** 1%.

match with the outside offer, (d) Definitely request a salary increase, aiming for a full match with the outside offer.

In order to avoid the concern that workers may make different inferences about Sophie and Matthias' outside offers, we specified the gap in wages to be either 10% or 20% above the worker's current wage. We set a maximum of 20% as our initial results revealed that workers rarely ask for wage increases of more than this amount. In order to avoid the concern that workers may believe there are gender differences in willingness to move, we specified that both Sophie and Matthias want to stay at the incumbent firm.

After workers provided their advice, we informed them that Sophie/Matthias had decided to ask their firm to match the {10%/20%} increase associated with the outside offer. To test whether workers believe there are gender differences in the likelihood of success, we then asked:

> "If {Sophie/Matthias} asks {her/his} current employer to adjust {her/his} current salary to match the outside offer, how large do you think is the probability that the company would match the request? "

We prompted workers to type in a number between 0% and 100%.

Finally, we elicited whether workers believe that asking for more has negative repercussions by asking: "Suppose {Sophie/Matthias} asks {her/his} current employer to adjust {her/his} current salary to their outside offer. How likely do you think it is that their current employer will perceive this negotiation attempt negatively?" Workers could select from four options: (a) Very unlikely, (b) Unlikely, (c) Likely, (d) Very likely.[44]

Randomization Assessment and Validity. Appendix Table E7 confirms that the randomization of both the wage offer and the provided name was successful. Appendix Table E8 suggests that the variation we introduced in the scenarios was indeed salient to respondents: workers are more hesitant to ask and are more negative about success probabilities and potential repercussions when we prompt them with a higher offer (20% vs 10% of the current wage).

Empirical Results. Appendix Table E8 summarizes the results of this vignette experiment. Columns 1-4 report results which pool workers who saw the Sophie and Matthias vignettes; Column 5 reports results for workers who saw the Sophie vignette; and Column 6 reports results for workers who saw the Matthias vignette.

Panel A shows that most workers think that Sophie or Matthias should bring up the possibility of a salary increase, asking for a partial or full match (89%), and that workers give the same advice, regardless of the gender of the hypothetical worker. Panel B shows that a reasonable share of workers believe that Sophie or Matthias should explicitly ask for a full salary match; workers are somewhat less likely to recommend this if the vignette specifies that the outside offer is 20% above Sophie/Matthias' current salary. This does not reflect the fact that workers think that it would be less likely the worker's request would be successful (Panel C). Rather, Panel D shows that workers are more likely to say that the larger ask (matching an outside offer with a 20% raise) is more likely to be perceived in a negative light (relative to the smaller ask).

[44] In order to avoid priming workers, we randomized the order of the second and third vignette in the survey. We did not see significant differences across randomization groups.

Table E7: Vignette Experiment: Randomization Assessment

	Outside Offer Wage	Sophie	N
	(1)	(2)	(3)
Demographics			
Female	0.92	0.83	3692
Age	0.30	0.48	3692
German Citizen	0.51	0.65	3692
College Degree	0.92	0.09	3692
Apprenticeship	0.71	0.26	3692
Employment			
Daily Wage (Allocated)	0.93	0.85	3690
Hours (Survey)	0.82	0.07	3692
CBA Covered (Survey)	0.63	0.39	3585
Manufacturing Sector	0.78	0.62	3692
Retail Sector	0.04	0.70	3692
Professional Sector	0.70	0.29	3692

Note: This table assesses the randomization of (1) the provided wages and (2) the provided name within the vignette included in the follow-up survey. We separately regress each characteristic indicated in the left column on either (1) an indicator for whether the worker saw that the fictional individual received a 20% (rather than 10%) offer from the outside firm or (2) an indicator for whether the worker saw Sophie rather than Matthias. We then test whether the included indicator is equal to zero. This table reports the p-values from these tests.

There is no evidence that women are less likely to recommend negotiation (either overall or to Sophie in particular) or that men and women think that Sophie will be less successful in her attempts to increase her salary. Panel A shows that women are significantly more likely to say that the worker should ask for a raise than men (Column 3 shows a 5 percentage point gap). Panel B shows that this is also true when considering whether to advise the worker to explicitly ask for a full match. Panel C shows that neither men nor women think that Sophie has a lower probability of success if she were to ask. Panel D further shows that neither men nor women think that Sophie is more likely to have her request seen in a negative light.

Discussion. These results are consistent with workers' stated reasons for not negotiating. In particular, we found that women were not more likely (if anything they were less likely) to say that they chose not to negotiate because they thought they would be unsuccessful. The vignette experiments confirm that men and women do not think that Sophie will be less successful, and that women are not generally more pessimistic about the probability of success. If anything, women are more likely to suggest that negotiation is the best course of action. The fact that many fail to negotiate, due to a desire to avoid "uncomfortable" situations, suggests that efforts to change how bargaining interactions occur or efforts to teach workers how to negotiate may be effective. Such interventions would need to be targeted at workers for whom bargaining is relevant: workers who are not at the start of their careers. This is an interesting direction for future work.

Table E8: Experimental Results from the Vignette Experiment

	Pooled Vignettes				Sophie	Matthias
	(1)	(2)	(3)	(4)	(5)	(6)
	A. Bring Up Possibility of a Salary Increase or Ask for a Match (0/1)					
1{20% Outside Offer}	0.010			0.010	0.000	0.019
	(0.010)			(0.010)	(0.014)	(0.014)
1{Sophie}		-0.000		-0.000		
		(0.010)		(0.010)		
Female			0.048***	0.048***	0.055***	0.041***
			(0.010)	(0.010)	(0.013)	(0.014)
Constant	0.894***	0.900***	0.884***	0.879***	0.882***	0.876***
	(0.007)	(0.007)	(0.006)	(0.010)	(0.012)	(0.012)
Observations	3655	3655	3655	3655	1871	1784
	B. Ask Employer to Match the Outside Offer (0/1)					
1{20% Outside Offer}	-0.030**			-0.030**	-0.019	-0.041**
	(0.013)			(0.013)	(0.018)	(0.019)
1{Sophie}		0.022*		0.022*		
		(0.013)		(0.013)		
Female			0.042***	0.042***	0.029	0.056***
			(0.015)	(0.015)	(0.020)	(0.022)
Constant	0.221***	0.195***	0.192***	0.197***	0.195***	0.220***
	(0.010)	(0.009)	(0.008)	(0.012)	(0.014)	(0.015)
Observations	3655	3655	3655	3655	1871	1784
	C. Probability of Success if Ask for a Match (0-100)					
1{20% Outside Offer}	-0.885			-0.892	-0.897	-0.890
	(0.840)			(0.839)	(1.166)	(1.210)
1{Sophie}		-0.052		-0.062		
		(0.840)		(0.840)		
Female			1.926**	1.929**	2.137*	1.712
			(0.894)	(0.895)	(1.231)	(1.302)
Constant	44.125***	43.702***	43.071***	43.552***	43.490***	43.558***
	(0.598)	(0.583)	(0.511)	(0.789)	(0.933)	(0.953)
Observations	3641	3641	3641	3641	1862	1779
	D. Asking for a Match Will be Perceived Negatively (0/1)					
1{20% Outside Offer}	0.039**			0.039**	0.037	0.041*
	(0.017)			(0.017)	(0.023)	(0.024)
1{Sophie}		-0.026		-0.025		
		(0.017)		(0.017)		
Female			0.008	0.008	0.011	0.005
			(0.018)	(0.018)	(0.025)	(0.025)
Constant	0.461***	0.493***	0.478***	0.471***	0.471***	0.445***
	(0.012)	(0.012)	(0.010)	(0.015)	(0.018)	(0.019)
Observations	3652	3652	3652	3652	1869	1783

Note: This table presents regressions which analyze the vignette experiment included in the follow-up survey. The outcome variable varies across panels, and is indicated in the title of each panel. The regressions include only the indicated covariates. Robust standard errors are in parentheses. Levels of significance: *10%, ** 5%, and *** 1%.

F Survey Instruments

F.1 Firm Survey

F.1.1 English Translation of Questionnaire

We'll begin by asking you general questions about compensation strategies at your company. For the entire survey, please focus your responses on full-time positions only.

1. Are there some positions at your company that are covered by a collective bargaining agreement?

   (a) Yes
   (b) No

2. When your company advertises a job, what type of compensation information is usually included in the public job posting?

   (a) No information is provided
   (b) Compensation level (e.g. CBA group)
   (c) Compensation range (in Euros)
   (d) Exact compensation amount (in Euros)

3. When your company advertises a job, what type of compensation information is usually included in the internal job posting?

   (a) Not applicable: we do not have a separate internal job board
   (b) No information is provided
   (c) Compensation level (e.g. CBA group)
   (d) Compensation range (in Euros)
   (e) Exact compensation amount (in Euros)

4. Are external candidates usually asked to specify their salary expectations in the application/interview process?

   (a) Yes, it is mandatory for candidates to specify their salary expectations
   (b) Yes, but it is optional for candidates to specify their salary expectations
   (c) No

   Companies use different compensation strategies to determine the fixed compensation for external candidates.

   First, we are interested in how your company usually determines the first salary offer made to a candidate for a specific position. We are only interested in positions not covered by collective bargaining agreements.

5. Can you make a higher-than-usual first salary offer if the person has high qualifications/fit for the position?

   (a) Yes
   (b) No

6. Can you make a higher-than-usual first salary offer if the recruitment appears difficult (e.g. because the person states high compensation expectations or has offers from other companies) ?

   (a) Yes
   (b) No

7. Is there usually scope for negotiation after your company has made the first offer

   (a) Yes
   (b) No

8. Now, please think back to the last 10 external candidates that you have knowledge of and to whom your company made offers. What do you guess is the share of these external candidates who ultimately received a final compensation offer that was higher than your company's first offer?

   (a) 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Now we'll focus on how your company conducts salary negotiations.

We are interested in four specific employee groups:

1. Job entrants with no or little prior work experience
2. Employees with work experience, but without managerial responsibility
3. Managers
4. Employees in hard-to-fill bottleneck occupation (excluding top executives)

9. Since the definition of group 4 is very company-specific, we would like to know which position in your company is most likely to represent a hard-to-fill bottleneck occupation (e.g. IT specialists, sales management).

   (a) Please indicate the job title of that position: _____

We ask you to answer the following four questions separately for each group. Please focus your answers only on full-time positions.

We are first interested in the scope of salary negotiations with external candidates.

10. How much more could a person maximally receive compared to the fixed compensation you would have offered based on the person's qualification/fit for the position alone?

	0% No adjustment possible	1-10%	11-20%	31-40%	More than 40%
Labor market entrants					
Employees without managerial responsibility					
Managers					
Employees in bottleneck occupations([Q9])					

11. Now, we are interested in how much wage offers for a given position differ at your company.

For each employee group, imagine 10 candidates. All of the candidates have the same qualification and fit. However, they differ in their stated salary expectations and in offers from other companies.

What is the most your company could possibly offer in terms of an additional special payment to recruit external candidates (e.g. bonus, stock grant)? Please exclude any such special payments that are typically provided to all candidates. Please indicate the maximum amount of the special payment in percent, compared to the annual fixed compensation of the position.

	0% No special payment	1-10%	11-20%	31-40%	More than 40%
Labor market entrants					
Employees without managerial responsibility					
Managers					
Employees in bottleneck occupations([Q9])					

12. What do you think the gap would be between the highest and lowest final offer your company would make to these candidates (i.e. after incorporating potential negotiations)?

	0% All offers are the same	Highest offer is 1-10% higher than the lowest	Highest offer is 11-20% higher than the lowest	Highest offer is 21-30% higher than the lowest	Highest offer is more than 30% higher than the lowest
Labor market entrants					
Employees without managerial responsibility					
Managers					
Employees in bottleneck occupations([Q9])					

13. What do you think the gap would be between the highest and lowest final compensation offer your company would make to these candidates?

	0% All offers are the same	Highest offer is 1-10% higher than the lowest	Highest offer is 11-20% higher than the lowest	Highest offer is 21-30% higher than the lowest	Highest offer is more than 30% higher than the lowest
Labor market entrants					
Employees without managerial responsibility					
Managers					
Employees in bottleneck occupations([Q9_Job_title])					

14. In your opinion, what contributes the most to the differences between final compensation offers for

equally qualified candidates? We are only interested in experienced employees without managerial responsibility. The majority of differences in final offers result ...

(a) from differences in first offers
(b) from negotiations following the first offer
(c) equally from differences in first offers and from negotiations
(d) There usually are no differences in final offers.

15. At your company, are the following job benefits more negotiable than fixed compensation? If a benefit is not relevant for your company, please choose "Not applicable."

	Yes, more negotiable than fixed compensation	No, not more negotiable than fixed compensation	Not applicable
Flexible work/ vacation days			
Commute and moving costs/ company car			
Further education and training			
Childcare subsidy			

Now we'll focus on salary negotiations with existing employees.

16. Suppose an employee at your company receives an external offer from another company and requests a salary increase. What is the maximum percentage by which your firm could possibly increase the fixed compensation (without changing the person's tasks) in order to retain the person?

	0% No adjustment possible	1-10%	11-20%	31-40%	More than 40%
Labor market entrants					
Employees without managerial responsibility					
Managers					
Employees in bottleneck occupations([Q9])					

In the final part of the survey, we are interested in how your company adjusts compensation in practice.

17. Suppose your company's financial situation has not changed relative to the preceding year, but prices are rising relatively quickly (i.e. inflation is high). In this situation, how would your company adjust the fixed compensation for employees not covered by collective bargaining agreements? Fixed compensation is ...

(a) not adjusted
(b) adjusted at the next date specified in a pre-determined schedule
(c) adjusted as soon as possible
(d) only adjusted if other firms in your sector/region adjust their compensation

18. When determining compensation for new hires, how much information do decision makers at your company have about how much your competitors pay? The decision makers ...

(a) do not know how our compensation ranges compare to competitors
(b) have information on whether our compensation ranges are high or low relative to the market
(c) have information on whether our compensation ranges are high or low relative to specific competitors
(d) have detailed information on compensation ranges for specific competitors

19. Which sources does your company regularly use to collect information on compensation paid in your industry or region? Please select all that apply.

- We do not compare our compensation to other companies
- Informal discussions with previous coworkers or industry contacts
- Free sources (e.g. Glassdoor, kununu)
- Paid sources (e.g. consulting companies)
- Internal research

20. Which of the following describes common practices at your company? Please select all that apply.

- Employees are asked to treat their salary as confidential (e.g. in interactions with colleagues)
- At the request of employees, HR provides information about the procedures / rules used to determine compensation in the company
- At the request of employees, HR provides information on the compensation structure in the company (e.g. compensation amount in certain salary ranges)
- At the request of employees, HR provides specific figures on compensation in certain positions

21. Does your company have a company-wide compensation structure used to systematically grade positions?

(a) Yes
(b) No

22. Does your company regularly evaluate the internal compensation structure?

(a) Yes
(b) No, not yet but planned
(c) No, and also not planned

23. In order to complete the information collected, the Ifo Institute would like to include data in the evaluation of the survey that is already available at the Institute for Employment Research (IAB) in the form of company and personal data. The IAB is a special department of the Federal Employment Agency (BA) which, as part of its statutory mandate, examines the functioning of the labor market, as well as employment opportunities and living conditions in a dynamically changing world from a purely scientific point of view. The linking of the data shortens the scope of this survey. All information is treated with strict confidentiality and statutory data protection is fully guaranteed at all times, even when the data is linked. I agree to the linking of my details with company and personal data available at the Institute for Employment Research (IAB).

(a) Yes
(b) No

24. If you have any suggestions or criticism about the survey, you can insert them here: : _____

F.1.2 Original German Questionnaire

Wir beginnen mit allgemeinen Fragen zu Vergütungsstrategien in Ihrem Unternehmen. Bitte beachten Sie, dass sich die gesamte Umfrage ausschließlich auf Vollzeitstellen bezieht.

1. Gibt es Stellen in Ihrem Unternehmen, die eine Tarifbindung haben?

   (a) Ja
   (b) Nein

2. Wenn Ihr Unternehmen eine Stelle ausschreibt, welche Art von Vergütungsinformationen enthält die öffentliche Stellenausschreibung üblicherweise?

   (a) Es werden keine Informationen bereitgestellt
   (b) Vergütungsstufe (z.B. Tarifgruppe)
   (c) Vergütungsspanne (in Euro)
   (d) Konkrete Vergütung (in Euro)

3. Wenn Ihr Unternehmen eine Stelle ausschreibt, welche Art von Vergütungsinformationen enthält die interne Stellenausschreibung üblicherweise?

   (a) Nichtzutreffend: Wir haben keine interne Jobbörse
   (b) Es werden keine Informationen bereitgestellt
   (c) Vergütungsstufe (z.B. Tarifgruppe)
   (d) Vergütungsspanne (in Euro)
   (e) Konkrete Vergütung (in Euro)

4. Werden in Ihrem Unternehmen externe Kandidat*innen in der Regel im Bewerbungs-/Interviewprozess gebeten, ihre Gehaltsvorstellungen anzugeben?

   (a) Ja, die Angabe von Gehaltsvorstellungen ist verpflichtend
   (b) Ja, aber die Angabe von Gehaltsvorstellungen ist optional
   (c) Nein

   Unternehmen verfolgen unterschiedliche Strategien, um die feste Vergütung für externe Kandidat*innen zu bestimmen.

   Zunächst interessiert uns, wie Ihr Unternehmen in der Regel das erste Vergütungsangebot ermittelt, das einer Person für eine bestimmte Stelle gemacht wird. Wir interessieren uns hierbei nur für Stellen ohne Tarifbindung.

5. Ist es möglich, ein überdurchschnittliches erstes Vergütungsangebot zu machen, falls die Person eine hohe Qualifikation/Eignung für die Stelle hat?

   (a) Ja
   (b) Nein

6. Ist es möglich, ein überdurchschnittliches erstes Vergütungsangebot zu machen, falls die Rekrutierung schwierig erscheint (z.B. weil die Person hohe Gehaltserwartungen äußert oder der Person Angebote anderer Unternehmen vorliegen).

(a) Ja
(b) Nein

7. Besteht nach dem ersten Angebot Ihres Unternehmens in der Regel noch Verhandlungsspielraum? Wir interessieren uns hierbei nur für Stellen ohne Tarifbindung.

   (a) Ja
   (b) Nein

8. Denken Sie nun bitte an die letzten 10 externen Kandidat*innen, von denen Sie Kenntnis haben und denen Ihr Unternehmen ein Angebot gemacht hat. Was schätzen Sie, welcher Anteil der externen Kandidat*innen hat letztendlich ein finales Vergütungsangebot erhalten, das höher war als das erste Angebot Ihres Unternehmens?

   (c) 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Jetzt geht es darum, wie Ihr Unternehmen Gehaltsverhandlungen führt.

Wir interessieren uns dabei für vier bestimmte Mitarbeitergruppen:

1. Berufsanfänger ohne oder mit wenig vorheriger Berufserfahrung
2. Mitarbeiter mit Berufserfahrung, aber ohne Führungsverantwortung
3. Führungskräfte
4. Mitarbeiter in schwer besetzbaren Engpassberufen (außer Top Management)

9. Da die Definition von Gruppe 4 sehr unternehmensspezifisch ist, möchten wir gerne wissen, welche Stelle in Ihrem Unternehmen am ehesten einen schwer besetzbaren Engpassberuf darstellt (z.B. Fachinformatik, Vertriebsleitung).

   (a) Bitte geben Sie den Job-Titel dieser Stelle an: _____

Wir bitten Sie, die folgenden vier Fragen separat für jede Gruppe zu beantworten. Bitte beziehen Sie Ihre Antworten dabei ausschließlich auf Vollzeitstellen.

10. Wie viel mehr könnte eine Person maximal erhalten, verglichen mit der festen Vergütung, die Sie allein aufgrund der Qualifikation/Eignung der Person für die Stelle angeboten hätten?

	0% Keine Anpassung möglich	1-10%	11-20%	31-40%	Mehr als 40%
Berufsanfänger					
Mitarbeiter ohne Führungsverantwortung					
Führungskräfte					
Mitarbeiter in Engpassberufen ([Q9])					

11. Was könnte Ihr Unternehmen maximal als zusätzliche Sonderzahlung (z.B. Bonus, Aktienpaket) bieten, um externe Kandidat*innen zu rekrutieren? Bitte beziehen Sie nicht solche Sonderzahlungen mit ein, die üblicherweise allen Kandidat*innen angeboten werden. Bitte geben Sie die maximale Höhe der Sonderzahlung in Prozent, bezogen auf die jährliche feste Vergütung der Stelle, an.

	0% Keine Anpassung möglich	1-10%	11-20%	31-40%	Mehr als 40%
Berufsanfänger					
Mitarbeiter ohne Führungsverantwortung					
Führungskräfte					
Mitarbeiter in Engpassberufen ([Q9])					

Nun interessiert uns, wie sehr sich Vergütungsangebote für eine bestimmte Stelle in Ihrem Unternehmen unterscheiden.

Stellen Sie sich bitte 10 Kandidat*innen pro Mitarbeitergruppe vor. Alle Kandidat*innen haben die gleiche Qualifikation und Eignung. Sie unterscheiden sich jedoch in den angegebenen Gehaltsvorstellungen und in Angeboten anderer Unternehmen.

12. Wie groß wäre Ihrer Meinung nach wohl der Abstand zwischen dem höchsten und niedrigsten ersten Vergütungsangebot, das Ihr Unternehmen diesen Kandidat*innen machen würde?

	0% All Angebote sind gleich hoch	Das höchste Angebot ist 1-10% höher als das niedrigste	Das höchste Angebot ist 11-20% höher als das niedrigste	Das höchste Angebot ist 21-30% höher als das niedrigste	Das höchste Angebot ist mehr als 30% höher als das niedrigste
Berufsanfänger					
Mitarbeiter ohne Führungsverantwortung					
Führungskräfte					
Mitarbeiter in Engpassberufen ([Q9])					

13. Wie groß wäre Ihrer Meinung nach der Abstand zwischen dem höchsten und niedrigsten finalen Vergütungsangebot, das Ihr Unternehmen diesen Kandidat*innen machen würde (d.h. nach Abschluss potentieller Verhandlungen)?

	0% All Angebote sind gleich hoch	Das höchste Angebot ist 1-10% höher als das niedrigste	Das höchste Angebot ist 11-20% höher als das niedrigste	Das höchste Angebot ist 21-30% höher als das niedrigste	Das höchste Angebot ist mehr als 30% höher als das niedrigste
Berufsanfänger					
Mitarbeiter ohne Führungsverantwortung					
Führungskräfte					
Mitarbeiter in Engpassberufen ([Q9])					

14. Welche Ursachen sind Ihrer Meinung nach für den Großteil der Unterschiede zwischen finalen Vergütungsangeboten für gleichermaßen geeignete Kandidat*innen verantwortlich? Wir interessieren uns

hierbei nur für erfahrene Mitarbeiter ohne Führungsverantwortung. Der Großteil der Unterschiede in finalen Angeboten entsteht ...

(a) durch Unterschiede zwischen den Erstangeboten
(b) durch Verhandlungen im Anschluss an das Erstangebot
(c) gleichermaßen durch Unterschiede zwischen den Erstangeboten und durch Verhandlungen
(d) Es gibt normalerweise keine Unterschiede zwischen finalen Angeboten.

15. Sind folgende sonstige Vergütungsbestandteile und Nebenleistungen in Ihrem Unternehmen verhandelbarer als die feste Vergütung? Wenn ein Bestandteil für Ihr Unternehmen nicht relevant ist, wählen Sie bitte "Nicht zutreffend".

	Ja, verhandelbarer als feste Vergütung	Nein, nicht verhandelbarer als feste Vergütung	Nicht zutreffend
Flexible Arbeitszeiten/ Urlaubstage			
Fahrt- und Umzugskosten/ Firmenwagen			
Fort- und Weiterbildung			
Kinderbetreuungszuschuss			

- Jetzt geht es um Gehaltsverhandlungen mit bestehenden Mitarbeiter*innen.

16. Angenommen, ein Mitarbeiter oder eine Mitarbeiterin Ihres Unternehmens erhält ein externes Angebot eines anderen Unternehmens und fordert eine Gehaltserhöhung. Um wie viel Prozent könnte Ihr Unternehmen die feste Vergütung maximal erhöhen (ohne die Aufgaben der Person zu ändern), um die Person zu halten?

	0% Keine Anpassung möglich	1-10%	11-20%	31-40%	Mehr als 40%
Berufsanfänger					
Mitarbeiter ohne Führungsverantwortung					
Führungskräfte					
Mitarbeiter in Engpassberufen ([Q9])					

Im letzten Teil der Umfrage interessieren wir uns dafür, wie Ihr Unternehmen Vergütung in der Praxis anpasst.

17. Angenommen, die finanzielle Situation Ihres Unternehmens hat sich im Vergleich zum Vorjahr nicht verändert, aber die Preise steigen relativ schnell (d.h. die Inflation ist hoch). Wie würde Ihr Unternehmen in dieser Situation die feste Vergütung für Mitarbeiter*innen ohne Tarifbindung anpassen? Die feste Vergütung wird ...

(a) nicht angepasst
(b) zum nächsten Termin im vorgegebenen Zeitplan angepasst

(c) so schnell wie möglich angepasst
(d) nur angepasst, falls andere Unternehmen in der Branche/Region ihre Vergütung anpassen

18. Wenn die Vergütung für Neueinstellungen festgelegt wird, wie viele Informationen haben Entscheidungsträger*innen in Ihrem Unternehmen darüber, wie viel Ihre Wettbewerber bezahlen? Die Entscheidungsträger*innen ...

(a) wissen nicht, wie unsere Vergütungsspannen im Vergleich zu Wettbewerbern abschneiden
(b) wissen, ob unsere Vergütungsspannen im Verhältnis zum Markt hoch oder niedrig sind
(c) wissen, ob unsere Vergütungsspannen im Vergleich zu spezifischen Wettbewerbern hoch oder niedrig sind
(d) haben detaillierte Informationen zu Vergütungsspannen spezifischer Wettbewerber

19. Welche Quellen nutzt Ihr Unternehmen regelmäßig, um Informationen über Vergütung in Ihrer Branche oder Region zu sammeln? Bitte wählen Sie alle zutreffenden Antworten aus.

- Wir vergleichen unsere Vergütung nicht mit anderen Unternehmen
- Informelle Gespräche mit früheren Mitarbeiter*innen oder Branchenkontakten
- Kostenlose Quellen (z.B. Glassdoor, kununu)
- Kostenpflichtige Quellen (z.B. Beratungsunternehmen)
- Interne Recherche

20. Welche Aussagen beschreiben gängige Praktiken in Ihrem Unternehmen? Bitte wählen Sie alle zutreffenden Antworten aus.

- Mitarbeiter*innen werden gebeten, ihre Vergütung vertraulich zu behandeln (z.B. im Umgang mit Kollegen)
- Auf Anfrage teilt HR Informationen mit Mitarbeiter*innen darüber, mit welchen Verfahren/Regeln Vergütung im Unternehmen festgelegt wird
- Auf Anfrage gibt HR Mitarbeiter*innen Auskunft zur Vergütungsstruktur im Unternehmen (z.B. Informationen zu Gehaltsspannen)
- Auf Anfrage stellt HR Mitarbeiter*innen konkrete Zahlen zur Verfügung, wie hoch Gehälter für bestimmte Stellen sind

21. Existiert in Ihrem Unternehmen eine unternehmensweite Vergütungsstruktur, mit der Stellen systematisch bewertet werden?

(a) Ja
(b) Nein

22. Führt Ihr Unternehmen regelmäßig Bewertungen der internen Vergütungsstruktur durch?

(a) Ja
(b) Nein, noch nicht, aber geplant
(c) Nein, und auch nicht geplant

23. Zur Vervollständigung der erhobenen Informationen möchte das ifo Institut Betriebs- und Personendaten einbeziehen, die bereits am Institut für Arbeitsmarkt- und Berufsforschung (IAB) vorliegen.

Das IAB ist dabei eine besondere Dienststelle der Bundesagentur für Arbeit (BA), die im Rahmen ihres gesetzlichen Auftrags die Funktionsweise des Arbeitsmarkts, sowie die Erwerbschancen und Lebensbedingungen in einer sich dynamisch verändernden Welt aus rein wissenschaftlicher Sicht untersucht. Durch die Verknüpfung der Daten verkürzt sich der Umfang dieser Befragung. Alle Angaben werden streng vertraulich behandelt und der gesetzliche Datenschutz ist auch bei Verknüpfung der Daten zu jedem Zeitpunkt in vollem Umfang gewährleistet. Ich stimme der Verknüpfung meiner Angaben mit Betriebs- und Personendaten, die am Institut für Arbeitsmarkt- und Berufsforschung (IAB) vorliegen, zu.

(a) Ja
(b) Nein

24. Was möchten Sie uns noch mitteilen? Hier finden Sie Platz für Anregungen oder Kritik zur Befragung: _____

F.2 Worker Bargaining Modules

F.2.1 English Translation of Questionnaire

Background Questions [The following questions were asked of individuals who reported they were not self-employed or non/un-employed]

1. When did you first join your current company?

   (a) In the past 6 months
   (b) 6-12 months ago
   (c) 1-2 years ago
   (d) 2-3 years ago
   (e) >3 years ago

2. Is your current position covered by a CBA agreement (i.e. are you paid according to CBA)?

   (a) Yes
   (b) No
   (c) I don't know

3. How many hours do you work in a typical week?

   (a) {fill in}

4. During the past six months ...

   ... have you done any of the following? Please select all that apply.

   (a) Looked at job postings
   (b) Updated public resume or employment information (e.g. Xing, LinkedIn)
   (c) Reached out to people in my network for information about potential job opportunities
   (d) Applied to a job at another company

5. During the past six months ...

   ... did anyone reach out to you to provide information about potential job opportunities (e.g. sent

you a job opening or offered to provide a referral)?

(a) Yes
(b) No

6. During the past six months ...

   ... did you receive any job offers from other companies?

   (a) Yes
   (b) No

7. During the past six months ...

   ... did your company offer you a salary increase without you asking?

   (a) Yes
   (b) No

8. During the past six months ...

   ... did you actively ask for an increase in salary?

   (a) Yes
   (b) No

9. Finally, we would like to ask you to assess yourself. Are you generally a person who is willing to take risks or do you try to avoid taking risks?

   Please choose a value on the scale below, where the value 0 means "not at all willing to take risks" and the value 10 means "very willing to take risks".

   (a) 0 (Not at all willing to take risks) 1 2 3 4 5 6 7 8 9 10 (Very willing to take risks)

New Hire Module [The following questions were asked of individuals who reported they were not self-employed or non/un-employed and who had been in their current company for 3 or fewer years.]

We are now interested in how you started your **first** position at your **current** company.

1. During the application and hiring process, who suggested a concrete salary first?

   (a) I mentioned my salary expectations first without the company asking me to
   (b) I mentioned my salary expectations after the company asked me to
   (c) The company suggested a concrete salary first

2. [Q1==a | Q1==b] Once the company made a first offer, how did the offer compare to your salary expectations?

   (a) Lower
   (b) The same
   (c) Higher

3. After the company made you a salary offer, did you ask them to increase the salary?

   (a) Yes

(b) No

4. [Q3 == Yes] By how much did you ask them to increase the salary (compared to the company's offer)?

   (a) 1-5%
   (b) 6-10%
   (c) 11-20%
   (d) More than 20%

5. [Q3 == Yes]Did the company implement the salary increase you asked for?

   (a) Yes, fully
   (b) Yes, but only partially
   (c) No

6. [Q3 == No]Why didn't you ask for a salary increase? Please select all that apply.

   (a) I haven't thought about asking for a salary increase
   (b) I had the impression that the company does not typically negotiate
   (c) I was pretty sure I would not have been successful in getting a meaningful salary increase
   (d) I wanted to avoid a potentially uncomfortable situation
   (e) I was satisfied with the offered salary

7. Did your company improve your position in other ways (relative to the company's first offer)? Please select all that apply

   (a) Vacation days or remote work
   (b) Company car or commuting subsidy
   (c) Training
   (d) Childcare subsidy
   (e) Bonus payment or stock options
   (f) **No**, my position was not improved

Outside Offer Module [The following questions were asked of individuals who were not self-employed or non/-unemployed and who reported they had received an outside offer in the previous six months.]

1. How many job offers from other companies did you receive in the past six months?

   (a) 1
   (b) 2
   (c) 3 or more

2. Think about the most recent offer from another company that you received. Who suggested a specific salary first?

   (a) I mentioned my salary expectations first without the company asking me to
   (b) I mentioned my salary expectations after the company asked me to
   (c) The company made the first salary offer

3. [Q2==a | Q2==b] How did the first offer the company made you compare to your salary expectations?

   (a) Lower

(b) The same
(c) Higher

4. How did the first offer compare to your salary at the time?

   (a) Lower
   (b) The same
   (c) Higher

5. After that company made you a salary offer, did you ask them to increase the salary?

   (a) Yes
   (b) No

6. [Q5 == Yes] By how much did you ask them to increase the salary (compared to the company's offer)?

   (a) 1-5%
   (b) 6-10%
   (c) 11-20%
   (d) More than 20%

7. [Q5 == Yes] Did the company implement the salary increase you asked for?

   (a) Yes, fully
   (b) Yes, but only partially
   (c) No

8. Did you ask your employer at the time to increase your salary?

   (a) Yes
   (b) No

9. [Q8==Yes] Did that company then increase your salary?

   (a) Yes, my employer at the time offered more than the other company
   (b) Yes, my employer at the time matched the offer of the other company
   (c) Yes, but my employer at the time offered less than the other company
   (d) No

Hypothetical Module [The following was asked of all workers. The range was randomized across workers.]

1. Suppose you wanted to change jobs and were applying to a new position in a different company. The job ad lists a salary range, which goes from {90/110}% to {120/140}% of your current salary.

   You are asked for your salary expectations. Relative to your salary, what do you say?

   (a) {fill in}%
   (b) I would not provide my salary expectations, even if asked

F.2.2 Original German Questionnaire

Background Questions [The following questions were asked of individuals who reported they were not self-employed or non/un-employed]

1. Seit wann sind Sie in Ihrem jetzigen Unternehmen beschäftigt?

   (a) Seit weniger als 6 Monaten
   (b) Seit 6-12 Monaten
   (c) Seit 1-2 Jahren
   (d) Seit 2-3 Jahren
   (e) Seit mehr als 3 Jahren

2. Ist Ihre Stelle tarifgebunden (d.h. werden Sie nach Tarifvertrag bezahlt)?

   (a) Ja
   (b) Nein
   (c) Ich weiß nicht

3. Wie viele Stunden arbeiten Sie in einer typischen Woche?

   (a) {fill in}

4. In den vergangenen sechs Monaten...

   ... haben Sie Folgendes getan? Bitte wählen Sie alle zutreffenden Antworten aus.

   (a) Stellenausschreibungen angesehen
   (b) Aktualisierten Lebenslauf oder Beschäftigungsinformationen online gestellt (z.B. über Xing, LinkedIn)
   (c) Personen in meinem Netzwerk kontaktiert, um Informationen zu potentiellen Jobangeboten zu erhalten
   (d) Sich auf eine Stelle in einem anderen Unternehmen beworben

5. In den vergangenen sechs Monaten ...

   ... hat Sie jemand mit Informationen zu potentiellen Jobangeboten kontaktiert (z.B. Stellenausschreibungen zugeschickt oder Ihnen angeboten, eine Empfehlung für Sie auszusprechen)?

   (a) Ja
   (b) Nein

6. In den vergangenen sechs Monaten ...

   ... haben Sie Stellenangebote von anderen Unternehmen erhalten?

   (a) Ja
   (b) Nein

7. In den vergangenen sechs Monaten ...

   ... hat Ihr Unternehmen Ihnen eine Gehaltserhöhung angeboten, ohne dass Sie danach gefragt haben?

   (a) Ja
   (b) Nein

8. In den vergangenen sechs Monaten ...

... haben Sie proaktiv nach einer Gehaltserhöhung gefragt?

(a) Ja
(b) Nein

9. Abschließend interessiert uns Ihre Selbsteinschätzung. Sind Sie generell ein risikobereiter Mensch oder versuchen Sie Risiken zu vermeiden?

   Verwenden Sie dazu bitte eine Skala von 0 bis 10. Der Wert 0 bedeutet „gar nicht risikobereit“ und der Wert 10 „sehr risikobereit“. Mit den Werten dazwischen können Sie Ihre Einschätzung abstufen.

   (a) 0 (gar nicht risikobereit) 1 2 3 4 5 6 7 8 9 10 (sehr risikobereit)

New Hire Module [The following questions were asked of individuals who reported they were not self-employed or non/un-employed and who had been in their current company for 3 or fewer years.]

Jetzt geht es darum, wie Sie Ihre **erste** Stelle in Ihrem **jetzigen** Unternehmen angetreten haben.

1. Wer hat im Bewerbungs- und Einstellungsprozess zuerst ein konkretes Gehalt vorgeschlagen?

   (a) Ich habe zuerst Gehaltsvorstellung geäußert, **ohne** dass mich das Unternehmen darum gebeten hat.
   (b) Ich habe Gehaltsvorstellung geäußert, **nachdem** mich das Unternehmen darum gebeten hat.
   (c) Das Unternehmen hat zuerst ein konkretes Gehalt vorgeschlagen.

2. [Q1==a | Q1==b] Als das Unternehmen Ihnen ein erstes Angebot gemacht hat, wie hoch war das Angebot im Vergleich zu Ihren Gehaltsvorstellungen?

   (a) Niedriger
   (b) Gleich hoch
   (c) Höher

3. Nachdem das Unternehmen Ihnen ein Gehaltsangebot gemacht hat, haben Sie nach einem höheren Gehalt gefragt?

   (a) Ja
   (b) Nein

4. [Q3 == Ja] Wie hoch war die Gehaltserhöhung, nach der Sie gefragt haben (im Vergleich zum Angebot des Unternehmens)?

   (a) 1-5%
   (b) 6-10%
   (c) 11-20%
   (d) Mehr als 20%

5. [Q3 == Ja] Hat das Unternehmen die Gehaltserhöhung umgesetzt, nach der Sie gefragt haben?

   (a) Ja, vollständig
   (b) Ja, aber nur teilweise
   (c) Nein

6. [Q3 == Nein] Warum haben Sie nach keiner Erhöhung des Gehalts gefragt? Bitte wählen Sie alle zutreffenden Antworten aus.

(a) Ich habe nicht darüber nachgedacht, nach einer Gehaltserhöhung zu fragen.
(b) Mein Eindruck war, dass das Unternehmen normalerweise nicht verhandelt.
(c) Ich war mir ziemlich sicher, dass ich keine wesentliche Erhöhung bekommen hätte.
(d) Ich wollte eine womöglich unangenehme Situation vermeiden.
(e) Ich war mit dem angebotenen Gehalt zufrieden.

7. Hat das Unternehmen Ihre Stelle in anderer Weise verbessert (im Vergleich zum ersten Angebot des Unternehmens)? Bitte wählen Sie alle zutreffenden Antworten aus.

(a) Urlaubstage/Homeoffice
(b) Firmenwagen/Fahrtkostenzuschuss
(c) Training/Weiterbildung
(d) Zuschuss zur Kinderbetreuung
(e) Bonuszahlung/Aktienoptionen
(f) **Nein,** meine Stelle wurde nicht verbessert.

Outside Offer Module [The following questions were asked of individuals who were not self-employed or non/-unemployed and who reported they had received an outside offer in the previous six months.]

1. Wie viele Stellenangebote von anderen Unternehmen haben Sie in den vergangenen sechs Monaten erhalten?

(a) 1
(b) 2
(c) 3 oder mehr

2. Denken Sie nun an das letzte Stellenangebot, das Sie von einem anderen Unternehmen erhalten haben. Wer hat zuerst ein konkretes Gehalt vorgeschlagen?

(a) Ich habe zuerst Gehaltsvorstellung geäußert, **ohne** dass mich das Unternehmen darum gebeten hat.
(b) Ich habe Gehaltsvorstellung geäußert, **nachdem** mich das Unternehmen darum gebeten hat.
(c) Das Unternehmen hat zuerst ein konkretes Gehalt vorgeschlagen.

3. [Q2==a | Q2==b] Wie hoch war das erste Angebot des Unternehmens im Vergleich zu Ihren Gehaltsvorstellungen?

(a) Niedriger
(b) Gleich hoch
(c) Höher

4. Und wie hoch war das erste Angebot des Unternehmens im Vergleich zu Ihrem damaligen Gehalt?

(a) Niedriger
(b) Gleich hoch
(c) Höher

5. Nachdem das Unternehmen Ihnen ein Gehaltsangebot gemacht hat, haben Sie nach einem höheren Gehalt gefragt?

(a) Ja
(b) Nein

6. [Q5 == Ja] Wie hoch war die Gehaltserhöhung, nach der Sie gefragt haben (im Vergleich zum Angebot des Unternehmens)?

   (a) 1-5%
   (b) 6-10%
   (c) 11-20%
   (d) Mehr als 20%

7. [Q5 == Ja] Hat das Unternehmen die Gehaltserhöhung umgesetzt, nach der Sie gefragt haben?

   (a) Ja, vollständig
   (b) Ja, aber nur teilweise
   (c) Nein

8. Haben Sie Ihren damaligen Arbeitgeber nach einer Gehaltserhöhung gefragt

   (a) Ja
   (b) Nein

9. [Q8==Ja] Konnten Sie eine Gehaltserhöhung bei Ihrem damaligen Arbeitgeber erreichen?

   (a) Ja, mein damaliger Arbeitgeber hat das andere Unternehmen überboten.
   (b) Ja, mein damaliger Arbeitgeber hat gleichviel geboten wie das andere Unternehmen.
   (c) Ja, aber mein damaliger Arbeitgeber hat weniger geboten als das andere Unternehmen.
   (d) Nein

Hypothetical Module [The following was asked of all workers. The range was randomized across workers.]

1. Angenommen, Sie wollten den Job wechseln und bewerben sich auf eine neue Stelle in einem anderen Unternehmen. Die Stellenanzeige listet eine Gehaltsspanne, die von {90/110}% bis {120/140}% Ihres aktuellen Gehalts reicht.

   Sie werden nach Ihren Gehaltsvorstellungen gefragt. Was geben Sie an, relativ zu Ihrem aktuellen Gehalt?

   (a) {fill in}%
   (b) Ich würde meine Gehaltsvorstellungen nicht angeben, auch wenn ich danach gefragt werde.