Bargaining and Inequality in the Labor Market

Sydnee Caldwell UC Berkeley & NBER Ingrid Haegele LMU Munich & IAB Joerg Heining IAB

April 16, 2025

Motivation

Imperfect competition creates the scope for bargaining over rents (Manning 2011)

A firm's choice of wage-setting protocol can therefore lead to winners and losers

- Collective Bargaining: Union members vs. non-members
- Posting: who get jobs at high wage vs. low wage firms
- Individual Bargaining: who has better outside options (or ability to leverage those options)

Little empirical evidence on how bargaining works in the labor market as a whole

- Difficult to empirically identify whether a firm bargains
- > Rare to have data on both sides (firm and worker), outside of specific contexts

How Does Bargaining Work in the Labor Market?

1. Firm Bargaining Policies: How common is individual level bargaining?

- Developed and validated a survey instrument to measure firm bargaining strategies
- Elicited strategies from 772 German firms across different sectors
- 2. Dynamics of Bargaining: How do typical worker-firm bargaining events unfold?
 - $\blacktriangleright\,$ Surveyed \sim 10,000 workers (over-sampling those at surveyed firms) through the IAB
 - > Elicited detailed histories of bargaining events that occurred in the previous six months
- 3. Inequality: What does this mean for wage inequality?
 - ► Link firm and worker surveys to administrative Social Security records.
 - ▶ Focus on 3 dimensions of heterogeneity: gender, risk preferences, and outside options.
 - Examine differences in real and hypothetical bargaining actions
 - Use Social Security records to compare pay gaps in firms with and without bargaining.

Caldwell, Haegele and Heining (2025) Summary

1. Firm Bargaining Policies: Which firms employ bargaining strategies (and for whom)?

- Most firms have at least some flexibility for workers with at least 3 years of experience
- There is systematic variation across worker groups, but not across observable firm characteristics
- 2. Dynamics of Bargaining: How do typical worker-firm bargaining events unfold?
 - Most bargaining events begin with workers stating their expectations
 - Most bargaining is over wages and most offers are rejected
- 3. Inequality: What does this mean for wage inequality?
 - There is systematic between-group heterogeneity in bargaining behavior (outside options, gender)
 - > When bargaining is possible, a person's former firm continues to influence her pay
 - >3pp larger gender wage gap when bargaining is possible

Background: How Do Firms Set Wages?

Most organizations use formal wage structures that establish pay ranges (e.g., hay grades)

Many German workers are still covered by CBAs, which set these pay ranges

- ▶ West German CBA-coverage went from 70% of workers in 1996 to 45% in 2021
- Non-trivial fraction of workers at covered firms are not covered (e.g., Fitzenberger et al., 2013; Blien et al., 2013)
- Firms can top up individual pay by law for a variety of reasons

Base wages represent 88% of compensation for non-managers (hkp 2021)

Eliciting Firm Bargaining Strategies

Survey of German HR professionals and managers fielded by the ifo Institute

Ideal population: Involved or aware of decision-making on wage-setting

Designed questions based on piloting with ${\approx}100~\text{HR}$ professionals

Developed wording that elicits answers in line with economists' definitions

Logistics

- Firms invited to participate in either September 2021 and January 2022
- Complete responses from 772 firms (51% response rate)
- Non-respondents and respondents are similar on observable characteristics

Link Responses to Administrative Data and a Worker Survey

Firm Datasets

Obtain financial information from ORBIS (match rate: 99%)

Social Security Records (IEB data)

- > 72% of firms provide consent to link to German Social Security records
- Match 531 (96%) of 552 firms who we are allowed to link
- Spell-level data with information on earnings, occupation, industry, demographics

Worker Survey (Caldwell, Haegele, and Heining 2025)

- Fielded by the IAB to 135,000 full-time workers in 2022 (82,500 at surveyed firms)
- ▶ Randomized incentives (2x financial, encouragement, & reminders) to respond
- Response rate: 11.4% (excluding undeliverable letters)

Summary Statistics of Covered Firms

	German Labor Market				
		Business			
	Survey	Register	Orbis	BHP	
	(1)	(2)	(3)	(4)	
Sector					
Manufacturing	0.34	0.06	0.07	0.06	
Retail	0.17	0.17	0.16	0.16	
Professional Services	0.09	0.15	0.17	0.09	
Information Services	0.07	0.04	0.04	0.03	
Transport	0.06	0.03	0.03	0.03	
Real Estate	0.05	0.06	0.08	0.07	
Administration	0.05	0.07	0.08	0.05	
Finance	0.04	0.02	0.07	0.03	
Number of Employees					
1-9	0.07	0.87	0.81	0.79	
10-49	0.28	0.11	0.16	0.17	
50-249	0.38	0.02	0.03	0.03	
250+	0.27	0.00	0.01	0.01	
Other Firm Characteristics					
Based in Eastern Germany	0.12	0.19	0.17	0.17	
25 Years or Younger	0.33		0.76	0.79	
Stock Corporation	0.09		0.01		
Have a CBA	0.41				
First Year in Survey Panel	2014				
Observations	772	3435478	1801989	2961920	

Coverage and External Validity

- 1. Cover all states + major sectors and employ \sim 2 million workers \checkmark
- 2. Over-represent medium and large firms
 - Most German firms are small (83% have <10 employees)</p>
 - Large firms cover most employees (45% in firms with >249 employees)
 - Among large publicly listed firms, our sample covers 38%
- 3. Manufacturing firms are similar to those surveyed in World Management Survey 💴
- 4. Respondents are similar to non-respondents
- 5. Respondents who provide consent to link to IAB are similar to those who do not

Defining Individual Bargaining

Definition: Strategy to differentiate pay between workers the firm perceives to have the same productivity

Analogous to standard definitions of price discrimination in IO (Tirole, 1988)

Somewhat broader than standard definition in labor (e.g., Manning, 2003)

- Incorporate wage variation that occurs via either
 - tailoring (variation in first offers)
 - back-and-forth negotiations (gaps between first and final offer)

Elicit strategies both for new external hires and for incumbent workers

Focus on policies for full-time workers

Eliciting Bargaining Strategies for New Hires

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?

1. Labor market entrants

2. Employees without managerial responsibility

3. Managers

/	
0% No adjustment possible	ļ
1-10%	h
11-20%	
21-30%	
31-40%	-
More than 40%	

Eliciting Bargaining Strategies for Incumbent Workers

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 position's tasks) in order to retain the person?

1. Labor market entrants

2. Employees without managerial responsibility

3. Managers



-

Validating the Firm Survey

- 1. Stable across different parts of the firm
- 2. Reliable within respondent
 - ▶ Reported bargaining policy ≥ reported incidence
 - CBA-covered firms report less bargaining
- 3. High level of accuracy
 - Aligned with public use data
 - Aligned with worker responses

How Prevalent is Bargaining?

How Prevalent Is Bargaining?

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





14/30

Implications

- 1. Bargaining is standard practice for managers, but little scope for job entrants
- 2. Announcing pay in job ads is rare, even for firms with rigid wage strategies
 - ▶ 48% report rigid wages for some workers, but only 12% announce pay in external job ads
 - \blacktriangleright \Rightarrow Hard to infer bargaining protocols from pay information in job ads
- 3. Initial stage represents meaningful dimension of bargaining
 - ▶ 42% report bargaining at initial stage \geq final stage, 92% elicit candidate's expectations
 - ► ⇒Higher bargaining prevalence relative to previous work that elicits back-and-forth negotiations (Hall and Krueger 2012, Brenzel et al. 2013)

Where Does Bargaining Occur?

- 1. Innate firm characteristics
 - Firm productivity (e.g., Doniger, 2015; Postel-Vinay and Robin, 2004; Flinn and Mullins, 2021)
 - Management style (e.g., Hjort et al., 2020; Acemoglu et al., 2022)
- 2. Market factors (e.g., Ellingsen and Rosen, 2003; Michelacci and Suarez, 2006)

Innate Firm Characteristics

				Bargain wi	th Experienc	ed Non-				
	Bargain wi	ith Recent E	ntrants	0	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	1041.92	191.89	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	727.42	138.72	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										
Year of Incorporation	1969.20	1973.97	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)		
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	
Stock Corporation	0.06	0.11	0.03	0.04	0.10	0.07	0.05	0.09	0.38	
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		
First Year in ifo Panel	2013.77	2013.78	0.98	2013.34	2013.84	0.37	2013.41	2013.80	0.66	
(std.dev)	(5.25)	(5.52)		(5.49)	(5.39)		(5.95)	(5.38)		
Observations	341	399		112	627		39	691		

17/30

Market Factors

- 1. Bargaining is most common for hard-to-fill bottleneck positions
- 2. Employee groups are better than firm characteristics at explaining variation

	Fixed Effects Only Gro			roup Effects a	oup Effects and Firm Characteristics				
									Size, Productivity,
						Size,	Size,	Size,	Norms,
			Group +	Size,		Productivity,	Productivity,	Productivity,	Group
	Group	Firm	Firm	Productivity	Norms	Norms	Norms	Norms	Interactions
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	A. Bargaining with New Hires (Protocol Ouestion)								
R-Squared	0.33	0.40	0.73	0.36	0.34	0.34	0.36	0.50	0.50
Adjusted R-Squared	0.33	0.19	0.63	0.35	0.34	0.34	0.35	0.44	0.44
			B	. Bargaining w	ith New	Hires (Inciden	ce Question)		
R-Squared	0.25	0.44	0.70	0.27	0.26	0.26	0.28	0.44	0.44
Adjusted R-Squared	0.25	0.26	0.59	0.27	0.26	0.26	0.27	0.38	0.38
	C. Renegotiating with Incumbent Workers								
R-Squared	0.19	0.50	0.69	0.22	0.20	0.21	0.22	0.39	0.39
Adjusted R-Squared	0.19	0.33	0.58	0.22	0.19	0.20	0.22	0.32	0.32
Industry Dummies							1-digit	4-digit	4-digit

Dynamics of Worker-Firm Bargaining

Dynamics of Worker-Firm Bargaining

Sample: Workers at surveyed firms who report bargaining event in prior 6 months

- Elicit detailed histories of 2,926 real bargaining events
 - Did you provide your salary expectations?
 - How did the firm's initial offer compare to these expectations?
 - Did you ask the firm to improve its offer?

. . .

- Observe events that do and do not lead to a transition
 - Denote offers "accepted" if worker transitioned to the firm that made an offer

Bargaining Events

Rejected	Accepted					
Offers	Offers					
(1)	(2)					
2651	275					
Offer						
57%	74%					
52%	64%					
B. Between Firm's Initial and Final Offers						
31%	39%					
42%	45%					
21%	28%					
	24%					
	21%					
	11%					
	13%					
	4%					
	Rejected Offers (1) 2651 Offer 57% 52% al Offers 31% 42% 21%					

С.	On-	The-J	ob R	enegotiation
----	-----	-------	------	--------------

Worker Attempts to Renegotiate with Incumbent

33%

Dynamics Place Restrictions on Models Appropriate for the Labor Market

- 1. Firms differentiate the initial salary offers they make to new hires
 - Likely reflects the widespread use of "salary expectation" questions
- 2. Back-and-forth dynamics imply imperfect information on both sides
 - Many offers are rejected only after several rounds of negotiation
 - Suggests both firms and workers have imperfect information about their counterparty
- 3. Outside offer renegotiation is empirically important
 - Most outside offers are rejected
 - More common to receive & reject an outside offer (but use it to negotiate) than to start a new job

Heterogeneity in Worker Bargaining Behavior

Focus on heterogeneity highlighted by theoretical literature

- 1. Outside options (elicited in survey)
- 2. Risk preferences (elicited in survey following Dohmen et al., 2011)
- 3. Gender (in administrative data)
- 4. AKM person effects (estimated in population data 2010-2017 by Bellman et al. 2020)
- 5. Patience (elicited in a follow-up survey following Falk et al. 2023) [in paper]

Specification

$$action_i = \beta group_i + \delta age_i + \alpha exp_i + \gamma exp_i^2 + \lambda_{educ(i)} + \lambda_{o(i),est(i)} + \epsilon_i$$

Occupation-establishment fixed effects ensure workers are subject to the same policies

Cluster standard errors at the firm level

Differences in Realized Responses to Bargaining

		Outside	Options	Risk To	lerance		AKM
	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	0.24	0.000***	0.0000000	0.070***	0.0224444	0.050484	0.022
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

Hypothetical Bargaining Scenario

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 110% to 140% of your current salary.

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

Differences in Realized Responses to Bargaining

		Outside Options		Risk Tolerance		-	AKM
		D'		D.'		F 1	Worker
-	(1)	Binary (2)	(2)	Binary	Level (5)	Female (6)	Effect (7)
A Bargaining at the Start of the Spall	(1)	(2)	(5)	(4)	(5)	(0)	0
A. Darganning at the Start of the Spen	0.22	0.002	0.018	0.005	0.000	0.062*	0.027
Negotiated Bonuses of Stock Opward	0.23	-0.002	(0.020)	(0.005	(0.009	-0.065+	-0.027
		840	840	851	851	854	608
Negotiated over Non-Wage Amenities		049	049	0.51	0.51	0.54	008
Vacation Days or Remote Work	0.27	0.037	0.022	-0.023	-0.002	0.018	-0.076
vacation buys of remote work	0.27	(0.040)	(0.022)	(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
commung	0107	(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

Robustness of Documented Heterogeneity

Separating productivity and behavior •••

- Observe same heterogeneity in a hypothetical bargaining scenario
- Same workers are not more likely to receive a raise w/o asking
- > No meaningful heterogeneity with respect to bargaining for non-wage amenities

Patterns are robust to alternative specifications

- When using finer FEs
- When including workers at non-surveyed firms

Bargaining and Wage Inequality

Does Bargaining Translate into Wage Inequality?

Three pieces of evidence that bargaining has a meaningful impact on pay inequality

- 1. High AKM effect individuals bargain more, even in hypothetical scenarios
- 2. When pay is set by bargaining, a worker's previous firm continues to influence her pay
- 3. Examine gender pay gap associated with bargaining

Origin and Destination Effects in Pay-Setting

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

	All W	orkers	Surveyed	Workers	
	Without	With	Without	With	
	Bargaining	Bargaining	Bargaining	Bargaining	
	(1)	(2)	(3)	(4)	
		A.Current	Daily Pay		
Prior Firm Effect	0.006	0.049***	-0.082	0.081***	
	(0.018)	(0.010)	(0.060)	(0.025)	
Clusters	172	434	26	111	
Observations	36117	118233	1030	2879	
p-value	0.016		0.008		
		D. G. J			

	B. Starting Daily Pay						
Prior Firm Effect	0.094***	0.234***	0.182	0.377***			
	(0.032)	(0.055)	(0.149)	(0.109)			
Clusters	172	434	26	111			
Observations	36117	118233	1030	2879			
p-value	0.010		0.237				

Does Bargaining Translate into Wage Inequality? The Case of Gender

$$\log w_i = \beta \text{Female}_i + \delta age_i + \alpha \exp_i + \gamma \exp_i^2 + \lambda_{educ(i)} + \epsilon_i$$

		Weighted		
	Unweighted	All	Full-Time	
	(1)	(2)	(3)	
	A. I	Daily Pay (Occ-E	st)	
Without Individual Bargaining	0.008	0.060	0.006	
	(0.032)	(0.052)	(0.029)	
With Individual Bargaining	-0.053**	-0.221***	-0.198 * * *	
	(0.023)	(0.069)	(0.058)	
	B. Daily Pay (C	Occ-Est), Controll	ing for Hours	
Without Individual Bargaining	0.020	0.069	0.014	
	(0.034)	(0.050)	(0.021)	
With Individual Bargaining	-0.045**	-0.204***	-0.182 * * *	
	(0.021)	(0.064)	(0.055)	
	C. Dai	ly Base Pay (Occ	-Est)	
Without Individual Bargaining	0.008	0.060	0.006	
	(0.032)	(0.052)	(0.029)	
With Individual Bargaining	-0.049**	-0.156***	-0.148***	
	(0.022)	(0.046)	(0.040)	

Note: cluster standard errors at the firm level

Bargaining and Wage Inequality



Conclusion

- 1. New survey tool to measure firms' individual bargaining strategies
- 2. Describe dynamics of how bargaining works in the labor market
 - Most events begin with a worker's salary expectations
 - Between-group differences in stated expectations may not close simply with information
 - Most negotiation is on-the-job
- 3. In presence of bargaining between-group differences arise
 - ▶ In our sample, 78% of workers face bargaining; gender pay gap >3pp
 - When firms bargain, the pay policy of a worker's previous firm continues to influence their pay