









# The Role of Wages and Fringe Benefits in Job Search Evidence from a Large-Scale Online Field Experiment

#### Preliminary – please do not circulate

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Pregistration: AEARCTR-0011023

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## This paper

How do wages and job benefits influence job seekers' likelihood to apply for a job?

- How responsive are job seekers' clicks and applications to posted wages?
- What is job seekers' willingness to pay for different fringe benefits?
- Do benefits exacerbate or reduce inequality between firms and workers?

Information treatment on *jobchannel*, operator of various private job platforms in Switzerland

- For 3 months, we randomly provided ~150k job seekers with additional information on (i) wages and (ii) 12 fringe benefits for the jobs they saw on the platform.
- Information sourced from *kununu*, the market-leading employer review platform.
- We use click data to study how jobseekers react to this information.

## Source of wage and benefit information

Ideal experiment: Randomly vary wage and benefit information on job ads

#### At least two problems:

- 1. Unethical to provide wrong information.
- 2. Jobseekers might not believe random information.

Wage and benefit information stem from *kununu*, the market-leading employer review platform in the German-speaking area.

 kununu collects employee reviews on firms' wages, fringe benefits, job satisfaction and firm culture

#### We focus on the

- firm-level wage for a given job title (if no. of wage reviews≥3)
  - Close relationship with <u>official wage data</u>
- fraction of reviewers confirming that the firm provides certain fringe benefits

## Fringe benefit data

Reviewers indicate the availability of fringe benefits at a firm.

#### We focus on

- 1. Flexible working hours
- 2. Home office
- 3. Childcare facilities
- 4. Good transportation connections
- 5. Company car
- 6. Parking spot
- 7. Employee events
- 8. Coaching
- 9. Health measures
- 10. Company doctor
- 11. Canteen
- 12. Food allowance

### Job platform data

Between March 6 and May 31, 2023 we added the wage/benefit information to job ads on the job platforms of jobchannel (market share in Switzerland: ~15-20%)

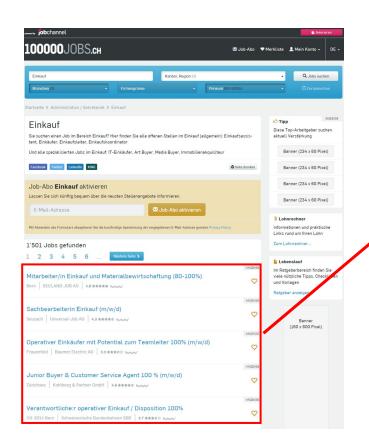
Coverage of benefits and a wages during study period:

- 10.3% of the 316k job ads had wage information
- 58.8% of the 316k job ads had benefit information

We track job seekers' behavior using Google Analytics. We observe...

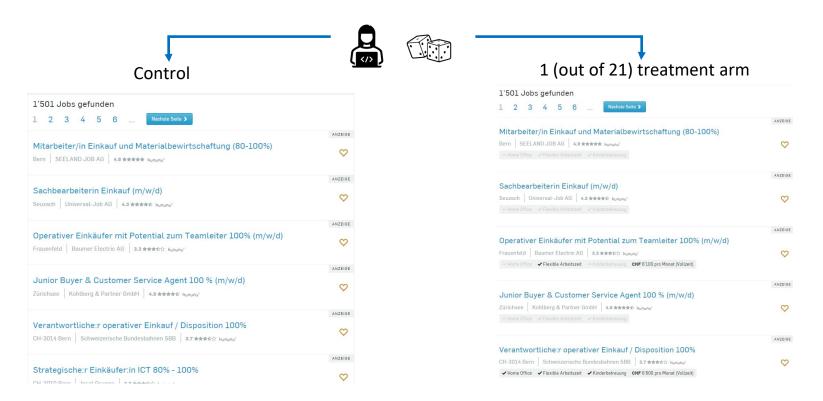
- **impressions** of job ads (ads displayed on screen in a search session).
- views of job ads.
- actions on job ads (print, save, share and apply to vacancy).
- -> 271k users (~150k job seekers) that saw 8.6 mio. ad impressions.

## Visualization of the platform: Result list





# Illustration of the experiment



# Illustration of the experiment



Ad-view

**Example March** 

## **Overview over experimental conditions**

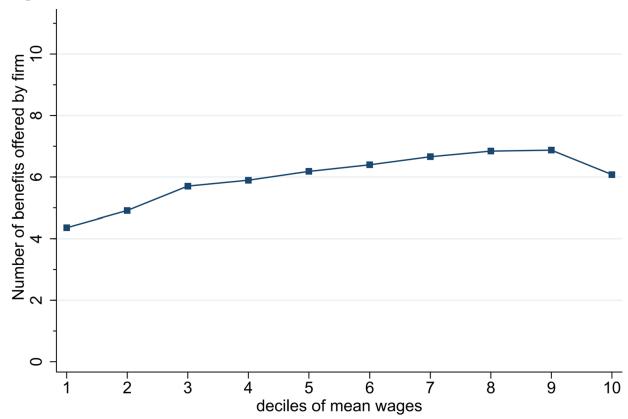
#### 8 treatment arms (including control group) in each month -> 24 in total

- Control group in every month: no additional information (business-as-usual)
- Wage only treatment groups:
  - Two groups displaying average or median wage (in March and April)
  - > This gives us experimental variation in the wage displayed within the same job posting.
- Benefit treatment groups:
  - 17 groups showing different combinations of 3 benefits (together with wages)
    - E.g. Flexible working hours, Home office, and Childcare facilities
  - Varying threshold above which a benefit is reported to be available: at least 20% / 50% of reviewers report that benefit is present
  - > This gives us experimental variation in the benefits displayed within the same job posting.
- User characteristics are balanced across treatment arms due to randomization

#### **Individual benefits**

## **Distribution of fringe benefits:**

### **Better-paying firms offer more benefits**



	Log Nr. impress. (1)	$\begin{array}{c} {\rm Log~Session} \\ {\rm Length} \\ {\rm (2)} \end{array}$	Nr. ads open (3)	Ad open rate (4)	Nr. Ad actions (5)	Ad action Rate (6)	Nr. Appl. (7)	Appl. Rate (8)
Control	0.040***							
Control	3.349***							
	(0.008) -0.020**	$\neg$						
wage								
. 1 64	(0.009)							
wage + benefits	-0.046***							
	(0.007)							
Control group mean	57.925	525.135	2.519	0.079	0.283	0.009	0.099	0.004
R-squared	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observations	270952	270952	270952	270952	270952	270952	270952	270952

Notes: This table shows the coefficients of a regression of different outcomes on the user level on dummies for each treatment arm.

• Users see fewer ads when assigned to wage and benefit treatment arms

	$ \begin{array}{c} \text{Log Nr.} \\ \text{impress.} \\  \end{array} $	$\begin{array}{c} {\rm Log~Session} \\ {\rm Length} \\ {\rm (2)} \end{array}$	Nr. ads open (3)	$\begin{array}{c} \text{Ad open} \\ \text{rate} \\ (4) \end{array}$	Nr. Ad actions (5)	Ad action Rate (6)	Nr. Appl. (7)	$\begin{array}{c} \text{Appl.} \\ \text{Rate} \\ (8) \end{array}$
Control	3.349***	5.129***						
	(0.008)	(0.009)						
wage	-0.020**	0.021*						
	(0.009)	(0.011)						
wage + benefits	-0.046***	0.053***						
	(0.007)	(0.009)						
Control group mean	57.925	525.135	2.519	0.079	0.283	0.009	0.099	0.004
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- Users see fewer ads when assigned to wage and benefit treatment arms
- Session length increases

	$\begin{array}{c} { m Log~Nr.} \\ { m impress.} \\ { m (1)} \end{array}$	$\begin{array}{c} {\rm Log~Session} \\ {\rm Length} \\ {\rm (2)} \end{array}$	Nr. ads open (3)	$\begin{array}{c} \text{Ad open} \\ \text{rate} \\ \text{(4)} \end{array}$	$ \begin{array}{c} \text{Nr.} \\ \text{Ad actions} \\ (5) \end{array} $	Ad action Rate (6)	Nr. Appl. (7)	Appl. Rate (8)
	0.040***	F 100***	0.501***	0.050***				
Control	3.349***	5.129***	2.531***	0.079***				
	(0.008)	(0.009)	(0.033)	(0.001)	1			
wage	-0.020**	0.021*	-0.042	0.001				
	(0.009)	(0.011)	(0.040)	(0.001)				
$\mathrm{wage} + \mathrm{benefits}$	-0.046***	0.053***	-0.030	0.003***				
	(0.007)	(0.009)	(0.032)	(0.001)				
Control group mean	57.925	525.135	2.519	0.079	0.283	0.009	0.099	0.004
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Notes: This table shows the coefficients of a regression of different outcomes of the user level on dummies for each treatment arm.

- Users see fewer ads when assigned to wage and benefit treatment arms
- Session length increases
- No significant difference in nr. of ads opened -> Ad open rate increases slightly

	Log Nr. impress. (1)	$\begin{array}{c} {\rm Log~Session} \\ {\rm Length} \\ {\rm (2)} \end{array}$	Nr. ads open (3)	Ad open rate (4)	Nr. Ad actions (5)	Ad action Rate (6)	$     \begin{array}{c}       \text{Nr.} \\       \text{Appl.} \\       \end{array} $	Appl. Rate (8)
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Control	(0.008)	(0.009)	(0.033)	(0.001)	(0.009)	(0.000)	(0.005)	(0.000)
wage	-0.020**	0.021*	-0.042	0.001	0.003	0.001*	0.005	0.000
	(0.009)	(0.011)	(0.040)	(0.001)	(0.011)	(0.000)	(0.006)	(0.000)
wage + benefits	-0.046***	0.053***	-0.030	0.003***	$0.004^{'}$	0.001**	0.003	0.000
	(0.007)	(0.009)	(0.032)	(0.001)	(0.009)	(0.000)	(0.005)	(0.000)
Control group mean	57.925	525.135	2.519	0.079	0.283	0.009	0.099	0.004
R-squared	0.000	0.000	0.000	0.000	0.000	0.000	<b>6.000</b>	0.000
Observations	270952	270952	270952	270952	270952	270952	270952	270952

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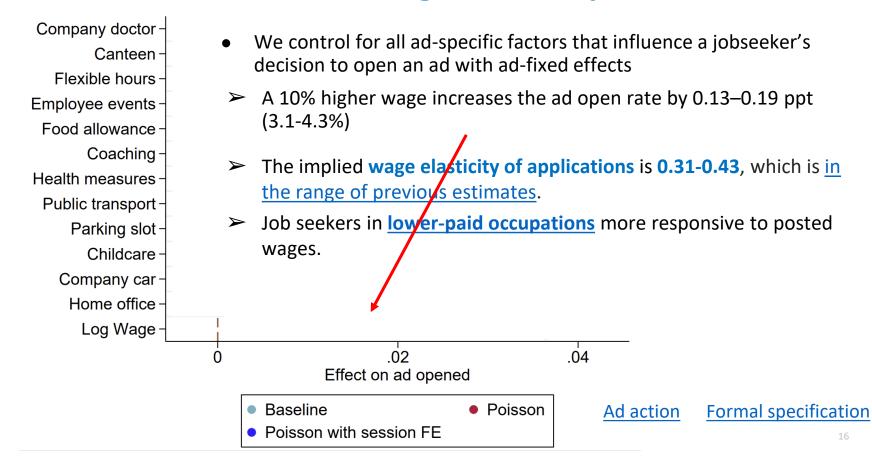
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- Positive, but often insignificant effect on likelihood that users perform an action

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wage	(0.008) $-0.020**$	$(0.009) \ 0.021^*$	(0.033) $-0.042$	$(0.001) \\ 0.001$	$(0.009) \\ 0.003$	$(0.000) \\ 0.001*$	$(0.005) \\ 0.005$	$(0.000) \\ 0.000$
wage + benefits	(0.009) -0.046***	$(0.011) \\ 0.053***$	(0.040) $-0.030$	(0.001) $0.003***$	$(0.011) \\ 0.004$	(0.000) $0.001**$	(0.006) $0.003$	(0.000) $0.000$
Control group mean	(0.007) $57.925$	(0.009) $525.135$	(0.032) $2.519$	0.001 $0.079$	(0.009) $0.283$	0.000)	0.005)	0.000 $0.004$
R-squared Observations	$0.000 \\ 270952$	$0.000 \\ 270952$	$0.000 \\ 270952$	$0.000 \\ 270952$	$0.000 \\ 270952$	$0.000 \\ 270952$	$0.000 \\ 270952$	$0.000 \\ 270952$

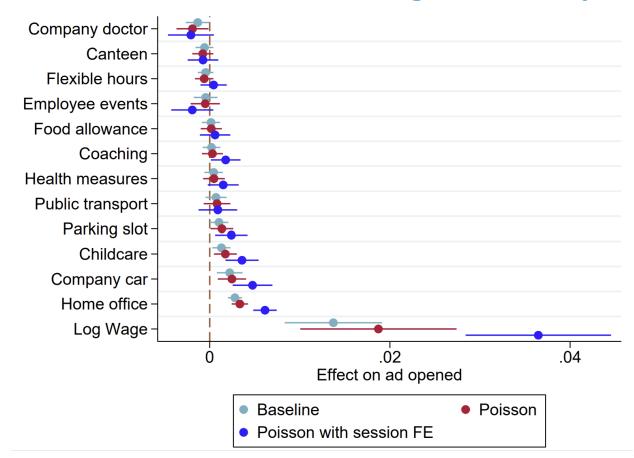
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- Users see fewer ads when assigned to wage and benefit treatment arms
- Session length increases
- No significant difference in nr. of ads opened -> Ad open rate increases slightly
- Positive, but often insignificant effect on likelihood that users perform an action
- Within treatment arms, jobseekers are directed away from ads without wage and benefit information towards ads with the information (see here)

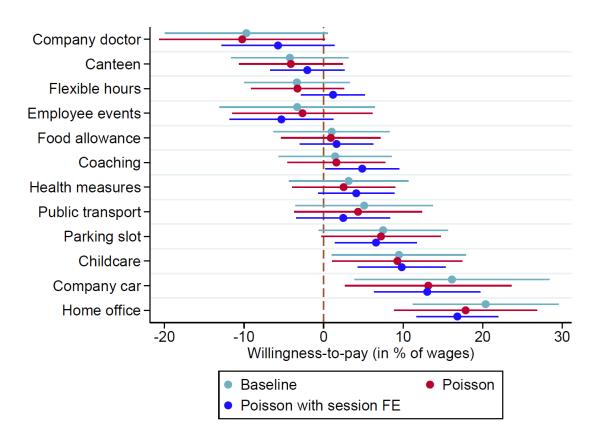
## Effect of benefits and wage on ad open rate



# Effect of benefits and wage on ad open rate



## Willingness-to-pay for fringe benefits



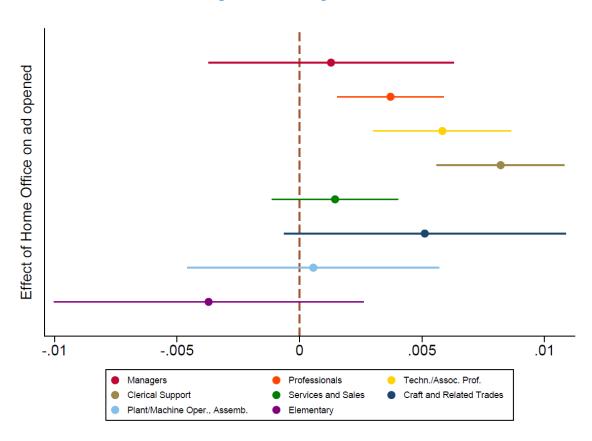
On average, job seekers are willing to forgo ...

- a 18% higher wage for the opportunity to work from home
- 14% for a company car
- 9% for access to firm-sponsored childcare facilities.

# ➤ Estimates not unusually large compared to the literature

- 36% lower wage for sociallyoriented work
- 20% lower wage for discretion over schedule
- WTP for home-office larger than in previous studies

# Home office effect by occupation



# **Preliminary conclusions**

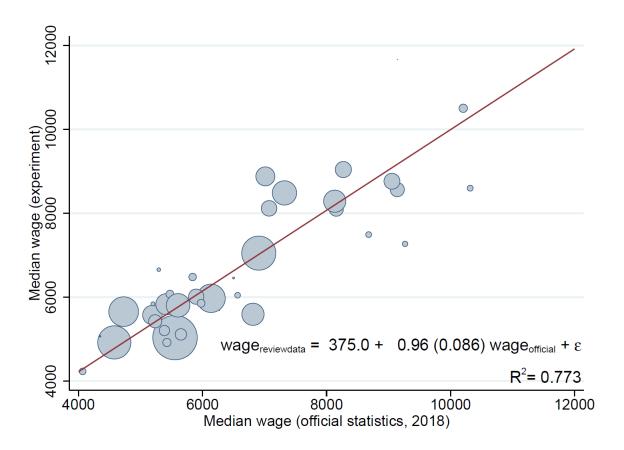
- Job seekers exhibit a positive but small responsiveness to posted wages.
  - A 10% higher wage increases job seekers' probability to view and apply to an ad by 3-5%.
  - Suggests a firm labor supply elasticity of 0.6-1.
  - Job seekers in lower-paying occupations are more sensitive to wages.
- Job seekers have a substantial willingness to pay for 5 of the 12 fringe benefits in the experiment. On average, they are willing to forgo
  - a 18% higher wage for the opportunity to work from home
  - a 14% higher wage for a company car
  - a 9% higher wage for firm-sponsored childcare facilities.



## **KOF**

Comments are welcome kopp@kof.ethz.ch

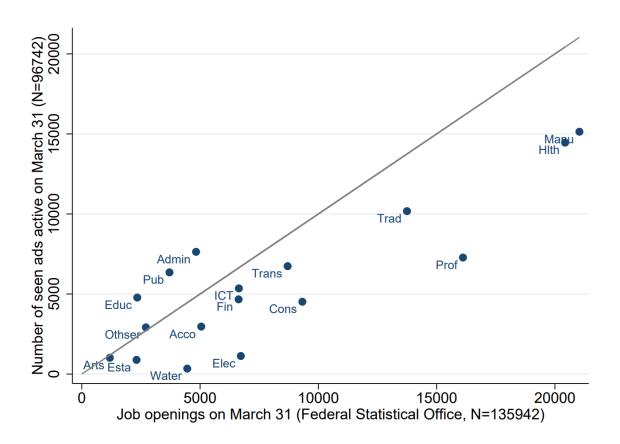
## Wage data corresponds well with official wage data



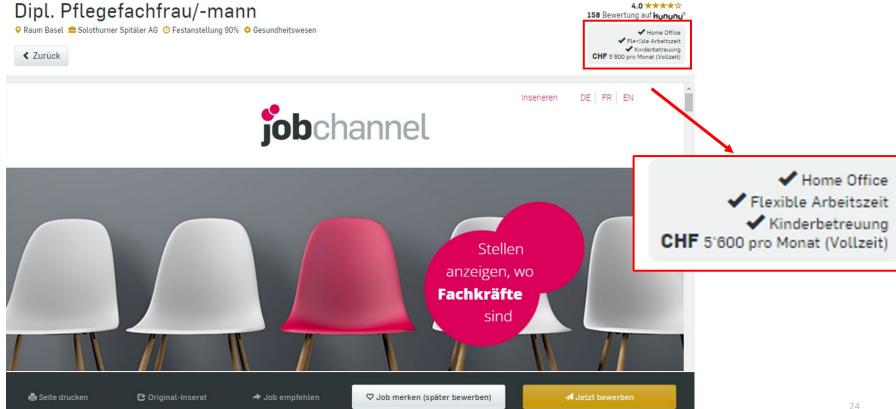


## **Coverage of experiment**

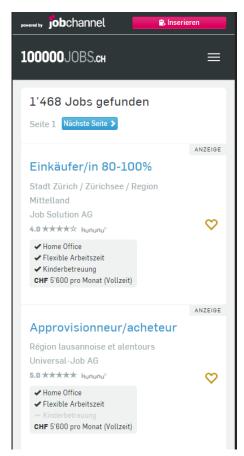
Job ads viewed during experiment vs. job openings in Switzerland on March 31, by industry

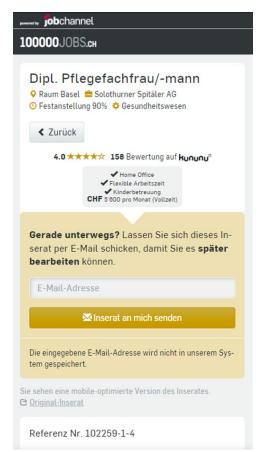


# Visualization of experiment: Ad view



# Visualization of experiment: Smartphone





Condition	Wage	Fringe Benefit 1	Fringe Benefit 2	Fringe Benefit 3	%	Users	
Control Group	no additio	additional information (business-as-usual)					
Average wage	Average					19,446	
Median wage	Median					19,728	
Family	Average	Flexible working hours	Home office	Childcare	20%	19,280	
Commute	Average	Parking spot	Good transportation	Company car	20%	19,233	
Nutrition	Average	Canteen	Food allowance	Coaching	20%	19,226	
Health	Average	Childcare	Health services	Company doctor	20%	19,421	
Work environment	Average	Flexible working hours	Coaching	Employee events	20%	19,191	

Treatment arms: 8 in each month (March, April, and May) → 24 in total

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- Control group in each of the three months
  - > This allows us to estimate month fixed effects

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- Control group in each of the three months
- Two groups displaying average or median wage (also in April)
  - > This gives us experimental variation in the wage displayed within the same job posting.

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- Control group in each of the three months
- Wage treatment groups displaying average or median wages (also in April)
- Benefits treatment groups displaying average wages and availability of benefits using a threshold of 20% (at least 20% of reviewers report that benefit is present)

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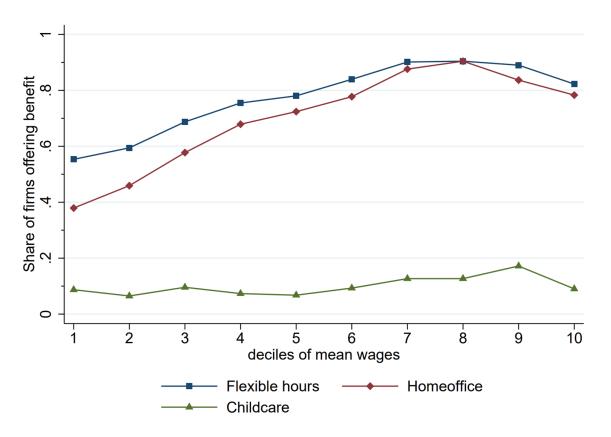
- Control group in each of the three months
- Wage treatment groups displaying average or median wages (also in April)
- Benefits treatment groups displaying average wages and availability of benefits using a threshold of 20% (at least 20% of reviewers report that benefit is present).
  - o 12 benefits in total grouped in different combinations by theme (other groupings: May)
  - o In April, the <u>threshold was 50%</u> in some treatment arms

# **Balancing tests - March**

	0	1	2	3	4	5	6	7	p-value
Share in Zurich	0.222	0.220	0.220	0.215	0.217	0.220	0.213	0.213	0.535
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	
Share in Switzerland	0.529	0.524	0.520	0.518	0.514	0.522	0.514	0.515	0.203
	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)	(0.005)	(0.004)	(0.005)	
Share in Germany/France/Italy/Austria	0.055	0.057	0.056	0.053	0.055	0.054	0.054	0.054	0.897
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	
mobile	0.584	0.585	0.593	0.586	0.584	0.583	0.586	0.583	0.795
	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	
desktop	0.396	0.395	0.389	0.396	0.398	0.400	0.398	0.398	0.776
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	
Language: DE	0.837	0.836	0.840	0.837	0.839	0.841	0.844	0.840	0.792
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	
Hour of the first session: 8-14	0.369	0.363	0.372	0.375	0.377	0.370	0.366	0.369	0.339
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	
Hour of the first session: 14-20	0.346	0.348	0.349	0.340	0.338	0.338	0.343	0.344	0.431
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	
Probability of opening an ad cond. on impression	0.055	0.053	0.060	0.059	0.056	0.056	0.060	0.059	0.614
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	
Probability of applying for an ad cond. on view	0.118	0.122	0.119	0.124	0.129	0.119	0.100	0.113	0.343
	(0.007)	(0.008)	(0.007)	(0.008)	(0.008)	(0.007)	(0.006)	(0.007)	
Number of Users	11,879	12,304	12,471	12,266	12,311	12,219	12,341	12,212	
Number of users active in Feb	1,016	1,089	1,033	1,012	1,059	1,056	1,050	1,068	

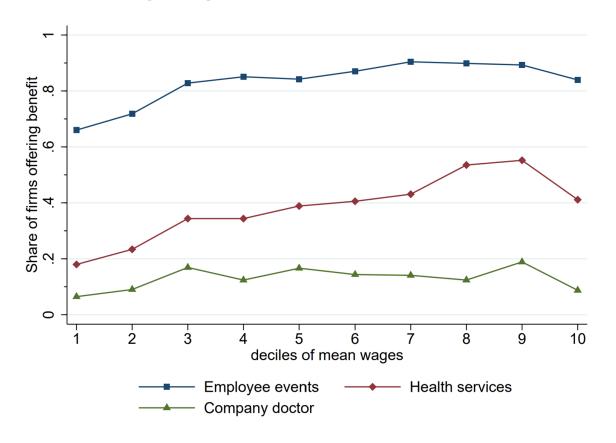
## **Distribution of fringe benefits:**

### Share of firms offering time flexibility, home office, and childcare



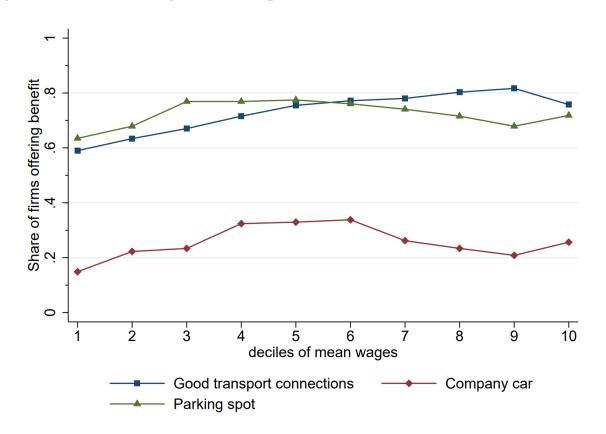


# Share of firms offering employee events, health services, and company doctors



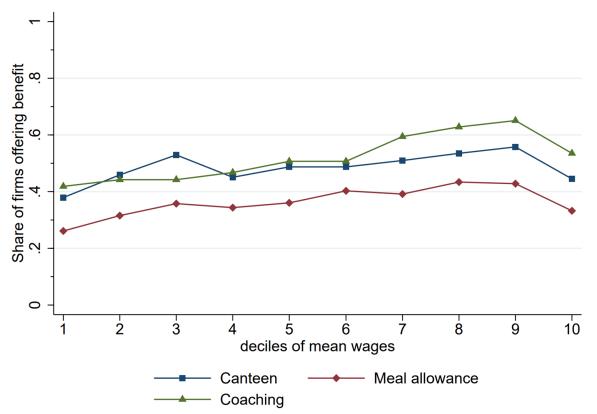


# Share of firms offering good transport connections, company cars, and parking slots





# Share of firms offering a canteen, meal allowances, and coaching



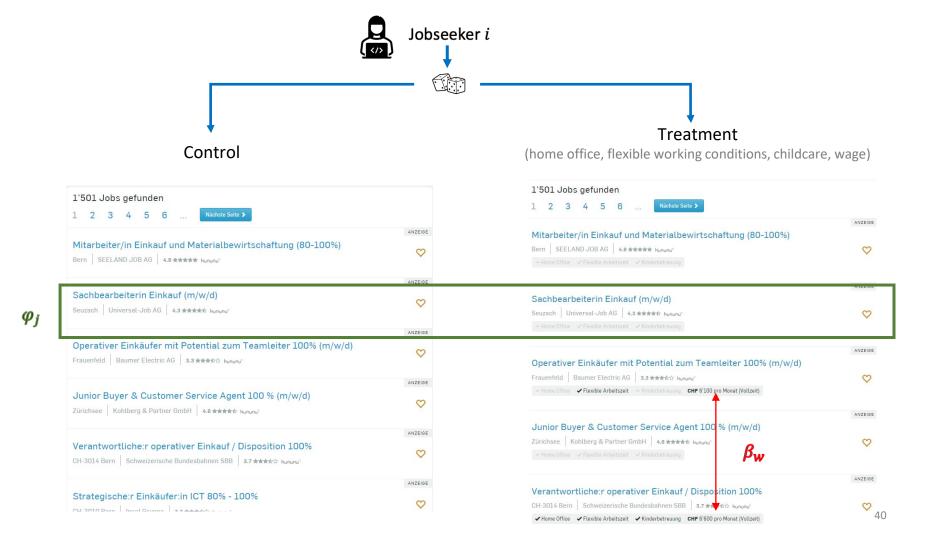


	Bene	efit Info Avail	lable	No Benefit Info Available			
	Log Nr. impress. (1)	Ad open rate (2)	Appl. Rate (3)	Log Nr. impress. (4)	Ad open rate (5)	Appl. Rate (6)	
Control	$2.787^{***}$	0.074***	0.004***	2.499***	$0.072^{***}$	0.004***	
	(0.008)	(0.001)	(0.000)	(0.008)	(0.001)	(0.000)	
wage	-0.027***	0.003**	0.000	-0.014	-0.001	0.000*	
	(0.010)	(0.001)	(0.000)	(0.009)	(0.001)	(0.000)	
wage + benefits	-0.052***	0.006***	0.001**	-0.027***	-0.001	0.000	
	(0.008)	(0.001)	(0.000)	(0.007)	(0.001)	(0.000)	
Control group mean	2.789	0.075	0.004	2.502	0.072	0.004	
R-squared	0.000	0.000	0.000	0.000	0.000	0.000	
Observations	262452	262452	262452	258471	258471	258471	

### Regression model: Wage treatments + Control

$$y_{ij} = \varphi_j + \pi_r + \gamma_w T_{ij}^w + \beta_w \log(\widetilde{w}_{ij}) \times T_{ij}^w + \varepsilon_{ij}$$

- y<sub>ii</sub>: outcome of jobseeker i on vacancy j (e.g., opening an ad conditional on seeing it)
- $\varphi_i$ : vacancy fixed effect (controls for observed and unobserved constant ad characteristics)
- $\pi_r$ : rank fixed effect
- T<sub>ij</sub><sup>w</sup>: indicator whether job seeker i sees a wage at firm posting vacancy j
- $\widetilde{w}_{ij}$ : wage shown to *i* for job title at firm posting vacancy *j*, centered around the mean
- $\gamma_w$ : effect of showing a mean wage vs. no information
- $\beta_w/100$ : effect of a 1% change in the wage



## Regression model: General case

$$y_{ij} = \varphi_j + \pi_r + \frac{\gamma_w}{T_{ij}^w} + \beta_w \log(\widetilde{w}_{ij}) \times T_{ij}^w + \sum_{f=1}^F \frac{\gamma_f}{T_{ij}^f} + \sum_{f=1}^F \beta_f F B_{ij}^f \times T_{ij}^f + \varepsilon_{ij}$$

- $y_{ij}$ : outcome of jobseeker i on vacancy j (e.g., opening an ad conditional on seeing it)
- $\varphi_i$ : vacancy fixed effect (controls for observed and unobserved constant ad characteristics)
- $\pi_r$ : rank fixed effect
- $T_{ij}^{w}$ : indicator whether job seeker i sees a wage at firm posting vacancy j
- $\widetilde{w}_{ij}$ : wage shown to i for job title at firm posting vacancy j, centered around the mean
- $\gamma_w$ : effect of showing a mean wage vs. no information
- $\beta_w/100$ : effect of a 1% change in the wage
- $T_{ij}^f$ : indicator whether job seeker i gets information on fringe benefit f at firm posting vacancy j
- $FB_{ij}^f$ : indicator whether job seeker i sees that fringe benefit f is available at firm posting vacancy j
- $\gamma_f$ : effect of showing that fringe benefit f is *not* available vs. no information
- $\beta_f$ : effect of showing that fringe benefit f is available vs. showing it is not available

# Wage effects: Actions on ad

	(1)	(2)	(3)	(4)	(5)
	Apply	$\frac{(2)}{\text{Print}}$	Show original ad	Share ad	Add to watchlist
Log Wage	013	.0007	.01	.00033	.015*
	(.0096)	(.0023)	(.0076)	(.0004)	(.0082)
Flexible hours	.00032	.00096**	0041**	00019	.00036
	(.0019)	(.00042)	(.0018)	(.00017)	(.0017)
Home office	0016	00067*	.00071	000057	.0015
	(.0016)	(.00037)	(.0015)	(.00015)	(.0015)
Childcare	0031	.00068	.0027	.00003	0017
	(.002)	(.00065)	(.0018)	(.00019)	(.0021)
			. •••.		
Mean dependent variable	.032504	.002172	.029723	.000208	.029051
Ad fixed effects	Yes	Yes	Yes	Yes	Yes
Person fixed effects	No	No	No	No	No
Rank fixed effects	Yes	Yes	Yes	Yes	Yes
Session fixed effects	No	No	No	No	No
Observations	422,192	422,192	422,192	422,192	422,192

• No wage effect on probability to apply/act conditional on viewing.

## **Comparison to existing estimates**

The implied wage elasticity of applications is 0.31-0.43, which is in the range of previous estimates.

#### **Experimental studies**

- Dal Bo et al. (2013): **0.8** (civil servants working in rural Mexico)
- Dube et al. (2020): 0.1 (rewards for Amazon Mechanical Turk tasks)
- Abebe et al. (2021): 0.45 (clerical positions in Ethiopia)
- Belot et al. (2023): 0.7-0.9 (mostly lower-skilled jobs for 300 unemployed in UK)
- He et al. (2023): **0.6-1.1** (white-collar jobs for an IT firm in China)

#### Observational studies

- Banfi and Villena-Roldán (2019): 0.22 (Chilean job board)
- Marinescu and Wolthoff (2020): 0.74 (large US job board)

## Wage effects by average wage in occupation

**Back** 

	(1)	(2)	(3)	(4)			
	Full sample	1. tercile	2. tercile	3. tercile			
Log Wage	.014***	.028***	.025***	.0077			
	(.0027)	(.0034)	(.0044)	(.0063)			
		•••					
Mean dependent variable	.04453	.04734	.047122	.038131			
Ad fixed effects	Yes	Yes	Yes	Yes			
Month fixed effects	Yes	Yes	Yes	Yes			
Observations	7,901,360	2,917,675	2,636,939	2,343,428			

Job seekers in lower-paid occupations are more responsive to posted wages.

# Willingness to pay: Comparison to estimates in the literature

In line with previous research, the estimates suggest that benefits play a key role in the job market.

- Large WTP estimates are common in the literature. For instance, job seekers accept a
  - 36% lower wage for socially-oriented work (Hedman et al., 2019)
  - 23% lower wage for 20 days of paid time off (Maestas et al., 2023)
  - 20% lower wage to avoid employer discretion over the schedule (Mas and Pallais, 2017)
- The willingness-to-pay for home office is larger than in previous studies (Mas and Pallais, 2017: 8.9%; Maestas et al., 2023: 4.2%; Nagler et al., 2022: 7.7%)