Improving Job Matching among Youth

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Motivation - I

- Online job search channel increasing in importance in developing countries, including Middle East and North Africa (MENA)
  - Internet access highest among youth and highly-educated

Job-search methods of unemployed youth (%)

	Egypt	OPT
Asked friends, relatives, acquaintances	76.1	87.5
Searched online	**31.2**	**44.0**
Placed, answered job advertisements	24.0	2.8
Registered at an employment center	23.2	25.1
Inquired directly at factories, farms, shops	14.5	59.1
Took a test or attended an interview	10.3	19.3

Source: ILO (International Labour Office) (2016).

Motivation - II

- Opportunity to learn about an increasingly prevalent channel, and shed light on barriers to youth employment more broadly
  - Allows for rich data on behavior and easier cross-country data collection
- Unemployment, especially among youth, major problem in developing countries, particularly MENA
  - MENA youth: Unemployment 28%
  - Concerning given "youth bulge": $>$50% under 24 yrs old
  - Destabilizing force; potential contributor to Arab Spring

Motivation - III

- MENA unemployment rate higher among more-educated youth: $>$2X higher for tertiary ed. than primary ed.
  - Anecdotally, one contributing factor is a tendency to wait for jobs that match aspirations
    - Related to changing labor market (youth bulge, changing meaning credentials), inaccurate expectations?
    - Historical reliance on public sector $\rightarrow$ Most unemployed youth seek public sector jobs, but only 25% jobs in public sector
    - Poorly targeted search may contribute to job seeker discouragement, a large policy concern
- Overlap between the unemployed and internet-using populations highlights potential impact of online interventions

Research agenda and status

Project conducted with 2 partner websites that constitute the largest online job presence in the MENA region

- Over 12 million registered users, presence in 40 countries, mainly MENA

Overview

- Analyze existing job seeker and employer data
- Conduct randomized experiment(s) on website to evaluate effect of modifications, shed light on job matching barriers

Status

- Launched experiment on one website portal in Iraq in September 2015: Present results today
- Expansion to more countries, much larger sample underway, data collection in progress (potential other treatments going forward)

Research questions

1. Do online job seekers effectively target their search efforts?
   - Babcock et al. (2012): "Looking for work is... a substantial information problem. Workers have to understand labor market conditions, ... possess an accurate understanding of their own skill level and how firms and markets might value those [skills]"
   - Information problems may be exacerbated by changing job market, use of new online channel (qualitative evidence)
2. Does providing information on job seekers' competitiveness change their application behavior?
3. Do groups that have lower employment rates (e.g., young, highly-educated) respond more to information?
   - End outcome: Applications, not employment. Why matters?
     - Frictions at application stage likely hinder full process
     - Improving job search may $\downarrow$ search duration, discouragement, $\uparrow$ employment, effort ▸ Detail

Research design

1. Conduct descriptive analysis of job seeker behavior
    - Provide suggestive evidence that job seekers may not be targeting effort efficiently

2. Conduct experiment providing information to job seekers on their competitiveness for different jobs
    - Randomize information on applicant's ranking relative to other applicants

Overview of experimental results

- Information has limited effect on the volume of applications, but retargets applications towards job postings where applicants are higher-ranked

- Overall treatment effects primarily driven by entry-level workers and those with bachelors degrees
  - worse baseline targeting
  - higher baseline unemployment rates
  - (less accurate expectations due to labor market changes?)

  $\Rightarrow$ Consistent with information frictions (potentially reflecting changes over time in the labor market) hindering labor market matching

Contributions

- Extensive theoretical and empirical literature on job search behavior (e.g., Mortensen, 1977; Krueger and Mueller, 2008)
  - Recent work focused on inefficiencies in online job search on U.S.-based platforms (Gee, 2015; Pallais, 2014)
- In contrast, MENA region research remains focused on traditional active labor market interventions (e.g., McKenzie, 2015)
- We focus on the importance of inaccurate beliefs about jobseekers' relative competitiveness
  - Developing countries: often more rapidly changing labor markets, less information-rich (e.g., Dizon-Ross, 2016)
- Previous literature on inaccurate beliefs about job seeker competitiveness only theoretical and lab-experimental (Falk et al., 2006, Falk et al., 2006; Spinnewijn, 2015)

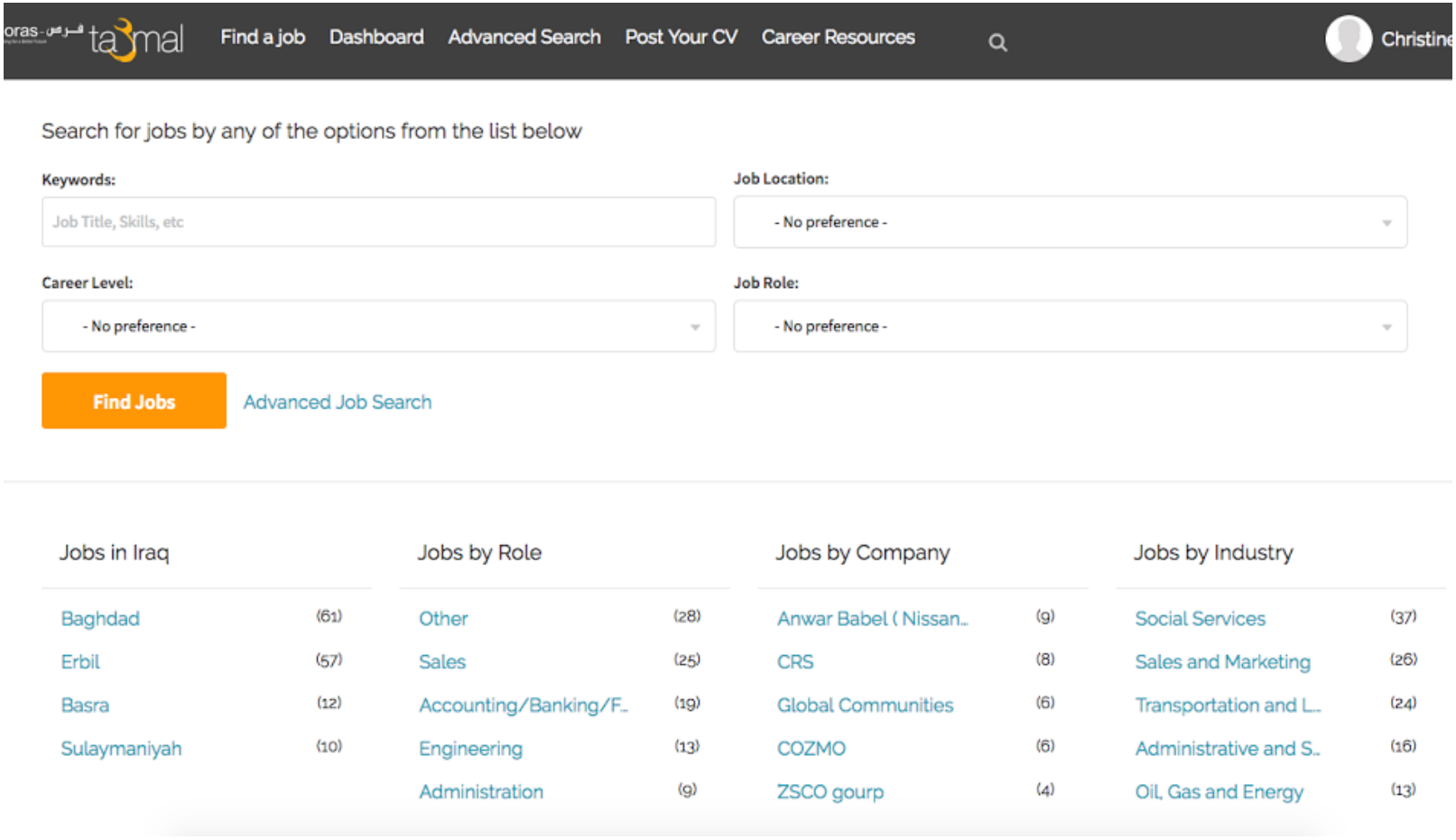
Outline

- Context
  - Website overview
  - Data
  - Observational results
- Experimental design
- Experimental results
- Conclusion

Overview website

- Working with 2 partner websites, jointly have over 12 million registered users and largest presence across MENA
  - Together have several different portals
- Experimental results today come from web portal in Iraq targeted towards youth (marketed as part of nonprofit effort to promote youth employment in Arab countries) : Nonprofit that runs an online "employability portal" with goal of promoting youth employment in Arab countries
  - Established 2013, largest online web portal in Iraq with over 100,000 registered users (fewer active now)
  - Roughly 40% users younger than 25, 75% younger than 30

Website from job seeker perspective



Filter Your Results

Now filtering by:

Date Posted:
Any

To further narrow your search, use the filters below:

Job Location

- Baghdad, Iraq (59)

Job Role

- Accounting/Banking/Finance (7)
- Administration (2)
- Customer Service and Call Center (2)
- Design, Creative, and Arts (1)
- Engineering (3)
- Hospitality - Food & Beverage Services (2)
- Hospitality - Food production (Chef) (1)
- Human Resources and Recruitment (2)
- Information Technology (1)
- Legal (2)
- Logistics and Transportation (3)
- Management (5)

Job Search Results

Showing **1** - **20** of **59** results

Page 1 ›

Sort by: Job Title (A-Z)

Summary View - Detail View

Accountant

GSP/TAQADUM Project - Baghdad, Iraq

- **Job Role:** Accounting/Banking/Finance
- **Company Industry:** Consulting Services
- **Career Level:** Mid Career

The project Accountant is responsible for managing the financial and accounting operations of GSP project field transactions to ensure compliance with USAID, Chemonics and generally accepted financial

Ref. JB3609194 Date Posted: 2017-01-10 More Details Email to Friend

Job source: *Foras*

Administrative Assistance

Elsuhdnet Ltd Co. - Baghdad, Iraq

- **Job Role:** Accounting/Banking/Finance
- **Company Industry:** Information Technology
- **Career Level:** Mid Career

To work at Information center, and accounting center

Ref. JB3616595 Date Posted: 2017-02-02 More Details Email to Friend

Job source: *Foras*

Architect Engineer

Wisam Al Attar Consulting Engineering - Baghdad, Iraq

- **Job Role:** Design, Creative, and Arts
- **Company Industry:** Consulting Services; Engineering

Apply Now | Email to Friend | More from This Company | Print | Report Abuse

Date Posted: 2017/04/07 06:00:45

Expiry Date: 2017/06/06

Ref. JB3635711

Share Tweet

Consumer Sales - Customer service representative – Sulaymaniya Rand Gallery ROS- Iraq
Zain Group

Job Description

WHAT:

The job holder in this level are responsible for handling the day-to-day requests from customers' and ensuring resolution of complaints in an efficient and timely manner whilst ensuring a high level of customer satisfaction. The jobs are also responsible for direct interaction with current and potential customers within Zain IQ outlets with regards to sales or information on products/services.

Skills

HOW:

* You will be required to Understand Direct Sales Strategy and plans and participate in the achievement of objectives and targets
* You will be required to Implement Direct Sales policies and procedures
* You will be required to Handle e-mails and follow-up with customers concerning different requests / complaints ensuring fulfillment of their needs and requirements
* You will be required to Coordinate with billing and collection control to re-activate accounts / update account status to ensure up-to-date customer information at all times
* You will be required to Coordinate new outlets needs in terms of manpower, logistics, equipment, maintenance and other needs to ensure efficient launching and operations

▸ Job Details Section ▸ Job application page

Administrative data from portal

- **Job seeker info:** Name, age, gender, education, career level, experience level
- **Job seeker search behavior:** Jobs viewed, applications submitted, search terms entered
- **Employer search behavior:** CVs viewed, CVs where requested contact details, search terms entered
- **Job info:** Job characteristics (sector, level) (normally no salary)
- **Employer info:** Size, name
- Do not see interviews, employment outcomes

Summary statistics: job seekers

Variable	Control group mean	N
Female	0.228	2340
Gender info missing	0.031	2340
High school	0.063	2340
Diploma	0.101	2340
Bachelor	0.581	2340
Master or PhD	0.071	2340
Education info missing	0.184	2340
Age	27.064	2340
Age info missing	0.045	2340
Entry level	0.144	2340
Mid career	0.412	2340
Management	0.171	2340
Executive	0.041	2340
Senior executive	0.006	2340
Career level info missing	0.224	2340

Summary statistics: jobs

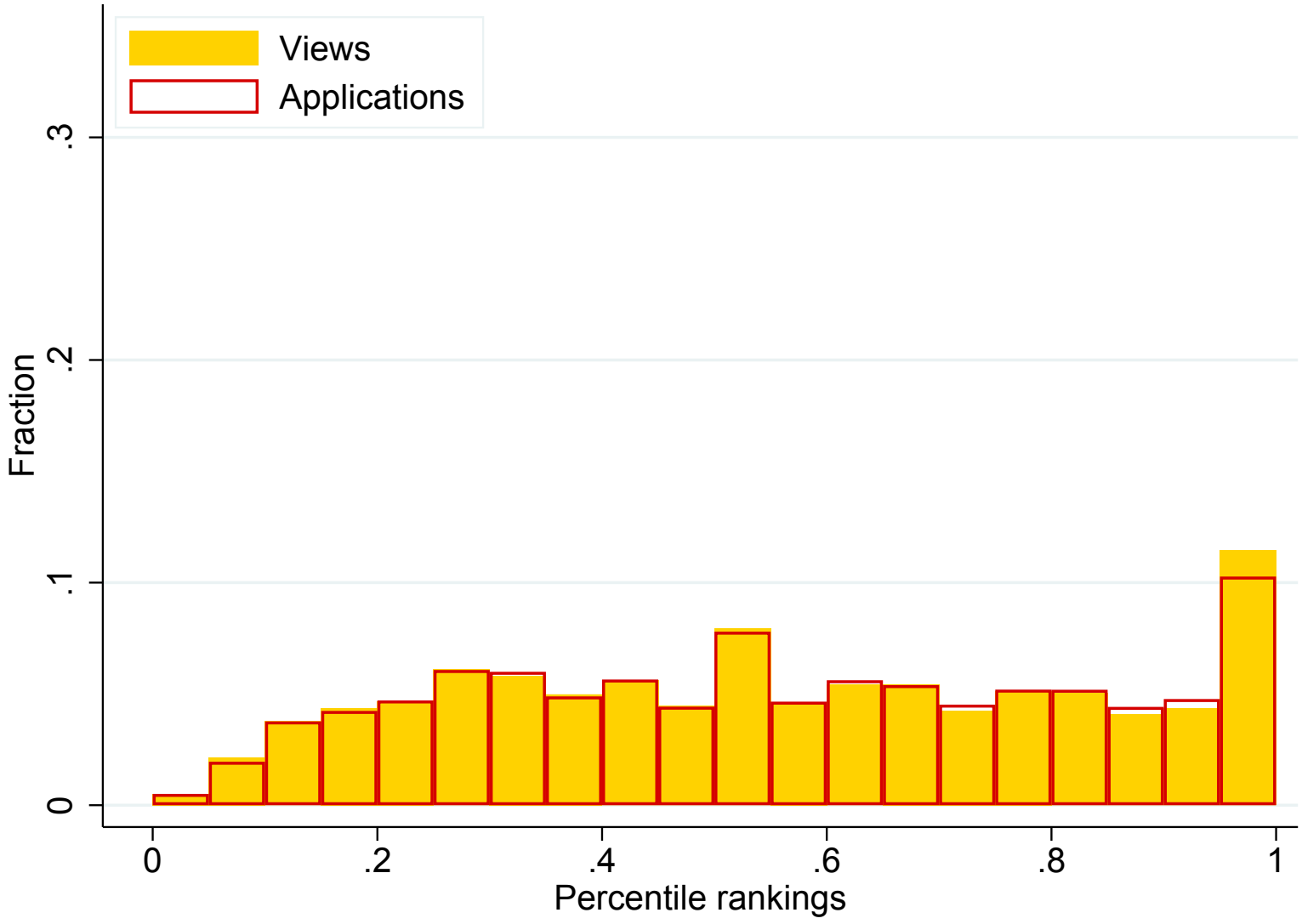
	Mean	SD	N
Number of vacancies	2.23	7.00	3,241
Career level:			
Entry level	0.17	0.37	3,241
Management	0.17	0.38	3,241
Mid career	0.61	0.49	3,241
Executive	0.02	0.13	3,241
Senior executive	0.00	0.04	3,241
Career level missing	0.03	0.18	3,241
Employment status:			
Full time	0.57	0.49	3,241
Part time	0.03	0.17	3,241
Emp. status missing	0.40	0.49	3,241

Not ideal applicant job targeting

Observational results

- Identified as issue in qualitative interviews with partner and employers
- Potentially suggestive: 5th hit on Google for Bayt.com is quora article titled *Has anyone ever found real jobs from Bayt?*
- Some quantitative evidence from portal
  - 66% of job applications by entry-level applicants are to non-entry level jobs
  - Evidence from internal ranking algorithm based on CV and job characteristics (e.g., experience match, career level match)
    - Info not received by applicant; when firms view applicants, the applicants are sorted by ranking
    - Rankings "matter": predict whether employer views CV or requests contact details ▸ Clicks by ranking ▸ Correlates of ranking

Applicant job targeting (or lack thereof)



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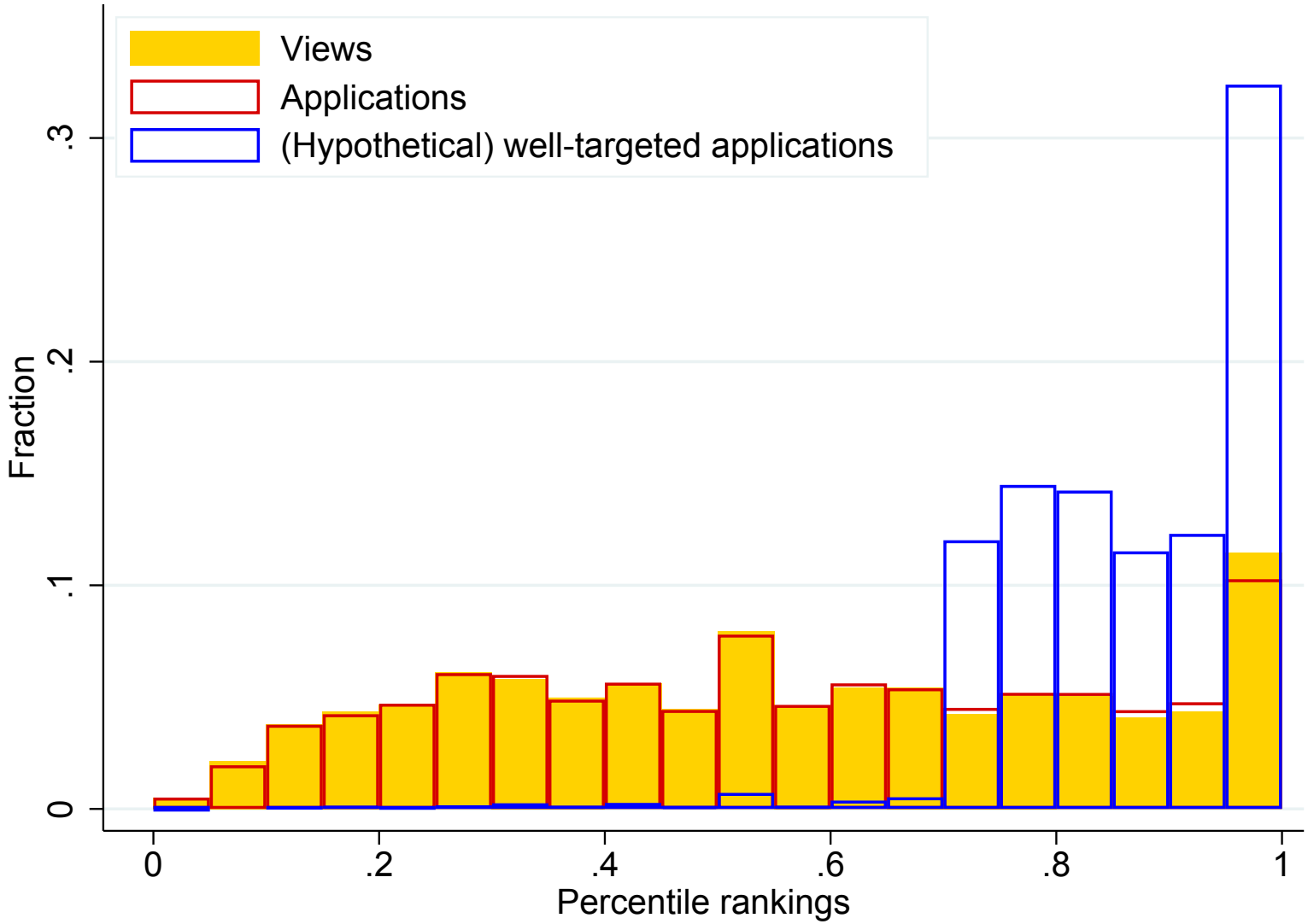

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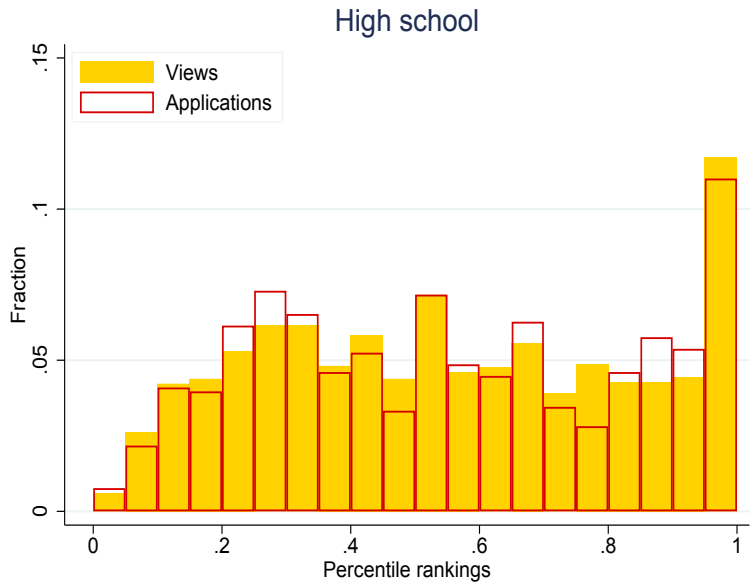

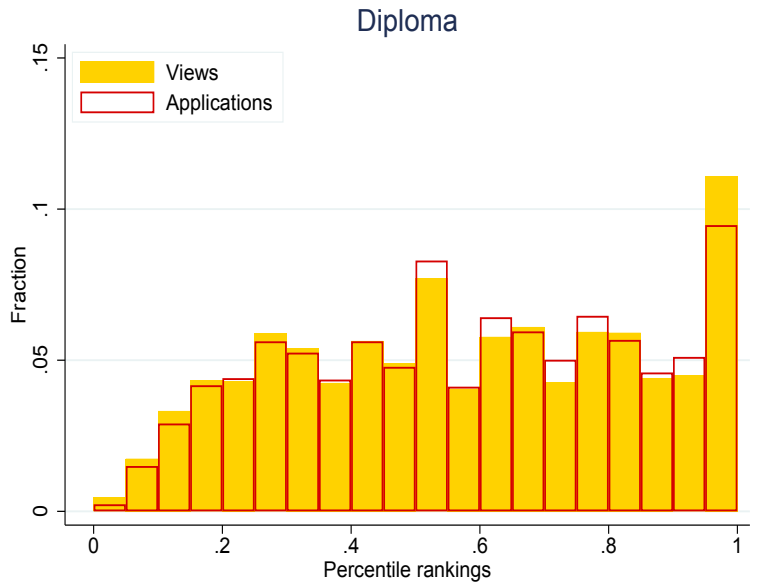

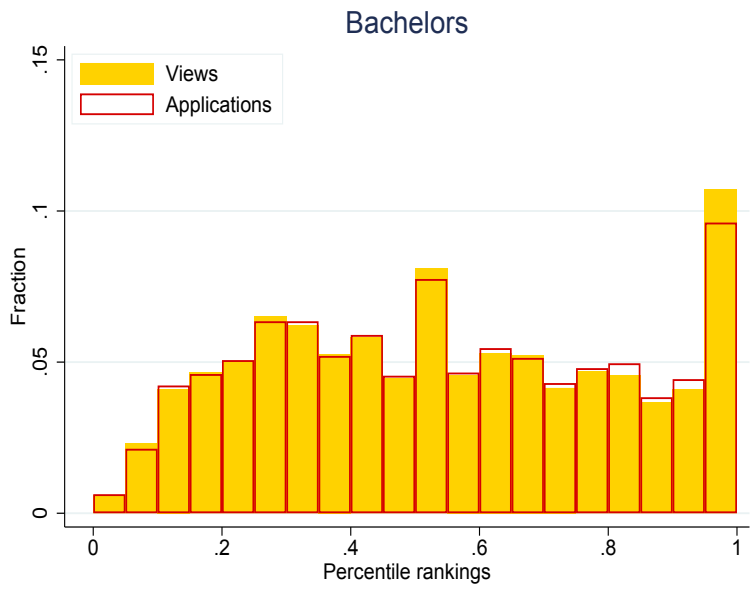

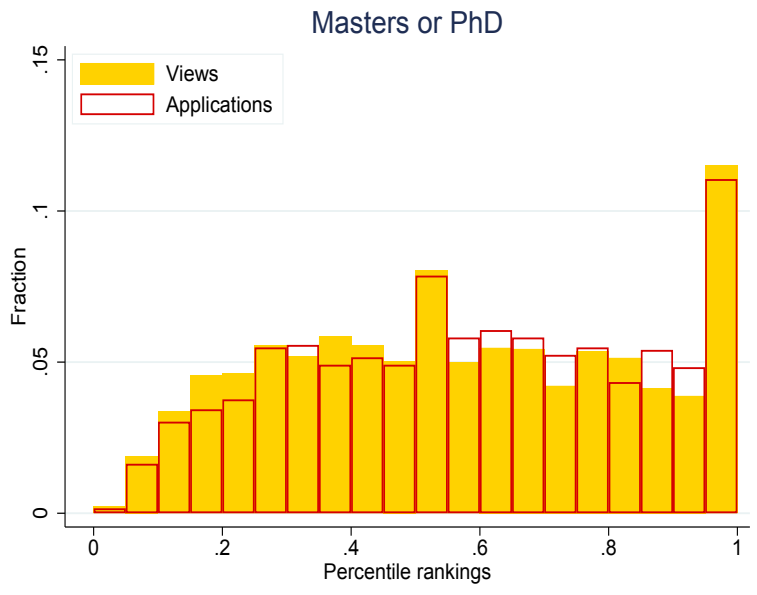

Summary statistics for targeting

	Different from *hypothetical rule*	Applied whereas *rule* wouldn't	Didn't apply whereas *rule* would
Whole	.51	.351	.159
High School	.455	.249	.206
Diploma	.519	.368	.151
Bachelors	.522	.382	.14
Masters or PhD	.467	.27	.197
Age less than 25	.531	.378	.153
Age 25-29	.492	.336	.156
Age 30-39	.499	.321	.178
Age more than 40	.498	.343	.155

Note: Hypothetical rule is to apply when percentile is above 0.7 or when the number of applicants is smaller than the number of vacancies.

Targeting patterns

- Somewhat worse in middle of education distribution (Bachelors vs. High school or Masters/PhD)
  - Related to changing job market and changing demand for credentials over time?
- Marginally worse among those below 25 and entry level
  - Related to general lack of experience with job search and labor market?
- Consistent with worse targeting among those with greater employment hurdles in labor market

Poor targeting: Potential channels and implications

- Why might applicants not target well?
  1. Mistakes due to limited experience with platform or inaccurate expectations about job market
  2. Individually-optimal: Applications low-cost, some low-ranked CV's do get viewed
     - Note: individually-optimal may be socially sub-optimal
- Potential downsides of too many low-ranked applications
  - Wasted effort if cost non-trivial and don't understand bad fit
  - Discouragement on part of job seekers
  - Congestion could slow match process and lead to more rule-of-thumb / discriminatory hiring (externality to applicant)
- Potential downsides of not submitting high-ranked app's
  - Potential missed opportunities for job seekers (although jobs limited so may have limited impact if everyone targets better (GE effects))
  - Potential lower-quality matches (if currently not enough high-quality applicants - which employers suggest)
  - Potential discouragement among employers

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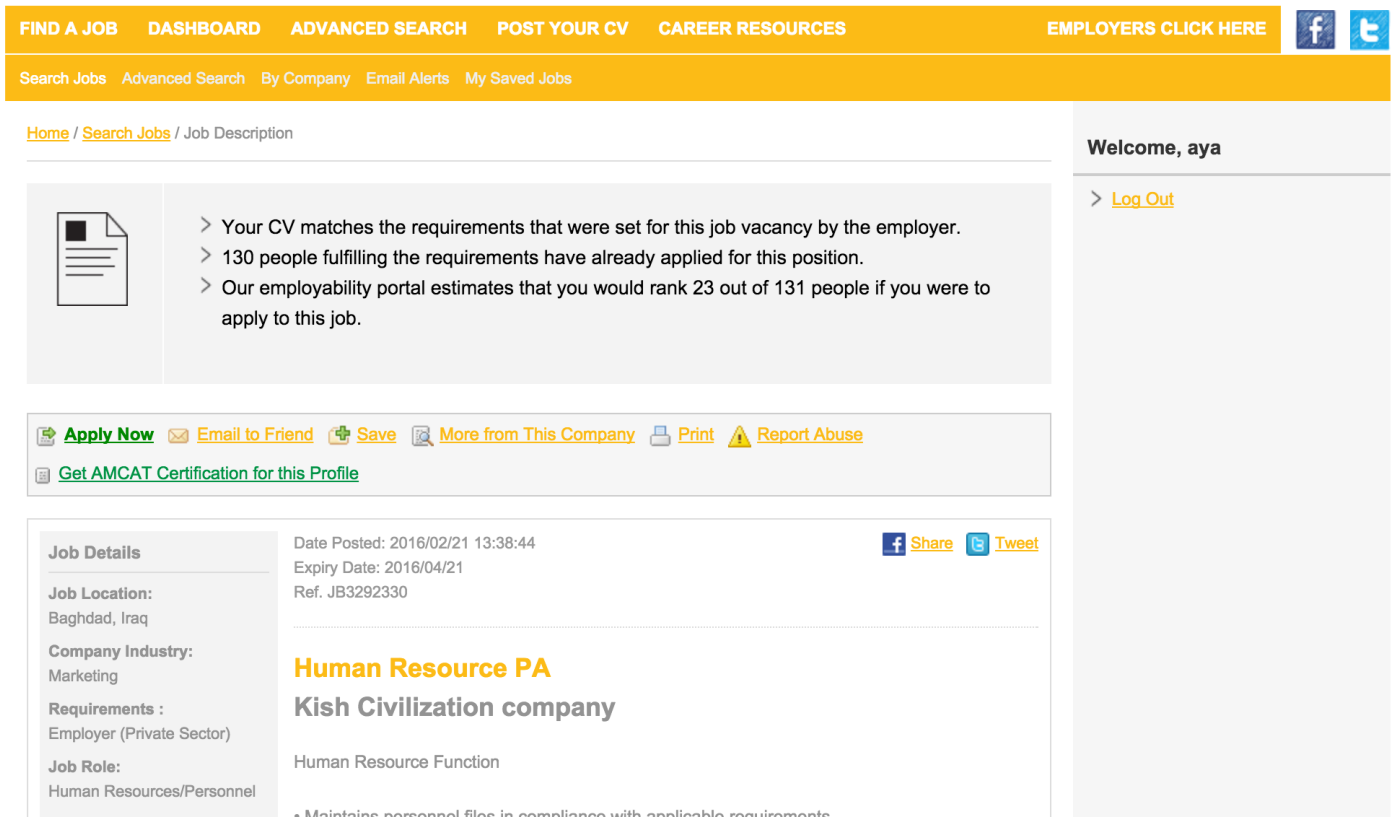
Conduct experiment providing information to job seekers

- **Goal:** Evaluate the effect of providing information about job seeker competitiveness (ranking)

- Randomized treatments at the individual level:
  - Pure Control (C1): Status quo (told whether CV fulfills job requirements)
  - Treatment 1 (T1, plays role of control): C+ told how many applications have been received for the job
  - Treatment 2 (T2): Told how many applications have been received and ranking relative to existing applicants (e.g., "ranked X out of Y")

Sample job view window from "T2" (Provide info on ranks)



▸ Sample job browsing window ▸ C1 user interface ▸ T1 user interface ▸ T2 user interface

Text from "T2" Treatment (Provide info on ranks)

> Your CV matches the requirements that were set for this job vacancy by the employer.
> 130 people fulfilling the requirements have already applied for this position.
> Our employability portal estimates that you would rank 23 out of 131 people if you were to apply to this job.

- For each job viewed: See information *after* choose to view job but *before* choose to apply

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Regression specification

$$Y_{ij} = \alpha + \beta_1 AnyTreat_i + \beta_2 T2_i + \epsilon_{ij}$$

- $AnyTreat_i$: indicator equal to 1 if jobseeker i is assigned to either of the two treatment arms (T1 or T2)
- $T2_i$: indicator for whether individual i is assigned to T2
- Main coefficient of interest: β_2 (effect of T2 relative to T1)
- Unit of obs: some outcomes at the jobseeker level, some at lower level (e.g., at the job application level)
- Standard errors: clustered by jobseeker
- Analysis sample: all jobseekers who viewed a job (were exposed to treatment) and completed basic information in profile (could be ranked)

No meaningful selection into analysis sample

Dependent variable ↓	C1 mean	Any treat-ment	T2	Obs
Had CV incomplete (=1)	0.061	0.000	0.008*	14329
		(0.005)	(0.005)	
Viewed any job (=1)	0.564	-0.007	0.016	14329
		(0.010)	(0.010)	
Main sample (=1)	0.499	-0.007	0.009	14329
		(0.010)	(0.010)	

Notes: Significance levels: * 10%, ** 5%, *** 1%. SE's in parentheses.

Balance table

in main analysis sample

Dependent variable ↓	C1 mean	C1 vs. T1	T2 vs. T1
Female	0.228	-0.004	-0.001
Gender info missing	0.031	-0.006	0.002
High school	0.063	0.002	0.006
Diploma	0.101	0.004	-0.018*
Bachelor	0.581	-0.011	0.008
Master or PhD	0.071	0.005	0.004
Education info missing	0.184	0.009	-0.005
Age	27.064	0.216	-0.048
Age info missing	0.045	-0.001	-0.006
Entry level	0.144	-0.017	-0.003
Mid career	0.412	0.003	0.001
Management	0.171	0.015	0.011
Executive	0.041	-0.002	-0.006
Senior executive	0.006	0.001	-0.004
Career level info missing	0.224	0.007	-0.003
Proportion of observations	0.328	0.327	0.344
P-value for joint test	–	0.656	0.234

Notes: There are 7130 users. Significance levels: * 10%, ** 5%, *** 1%.

▸ Whole sample

Outcomes examined

1. Number of jobs viewed and applications submitted
   - No clear prediction that information would affect it

2. Targeting of applications: Share of high-ranked vs. low-ranked applications
   - If there are information frictions, providing information should shift distribution applications towards higher-ranked applications

No significant effect on volume of views or applications

Dependent variable ↓	C1 mean	Any treat-ment	T2	Obs
Number of jobs viewed, unconditional	15.805	-0.386 (0.784)	0.688 (0.836)	7130
Applied to any job	0.810	0.000 (0.011)	0.017 (0.011)	7130
Number of jobs applied to, unconditional	8.401	-0.168 (0.520)	0.091 (0.522)	7130

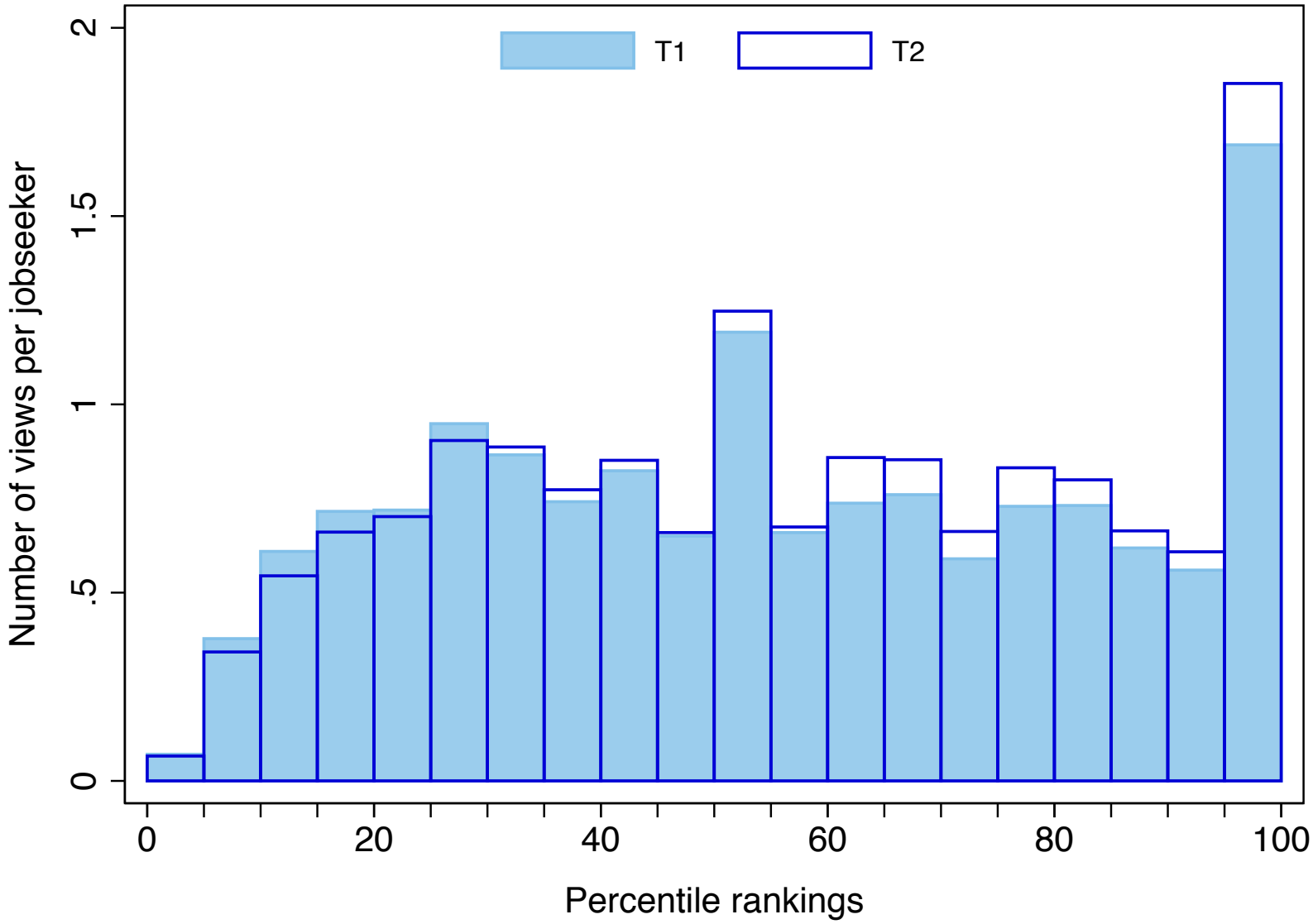
Notes: Significance levels: * 10%, ** 5%, *** 1%. SE's in parentheses.

Now turn to effects on distribution of jobs viewed

How can treatment affect job views since info not shown until *after* job viewed?

- After job seekers see information on first/early job views, may adjust how they search for jobs
- Could use different search terms to browse jobs, or adjust method for choosing which jobs from list to view

Treatment effects: Views



Treatment groups: Views

Dependent variable:	Without controls		With controls	
	Above median	Percentile	Above median	Percentile
	(1)	(2)	(3)	(4)
T2	0.016*	0.029**	0.015*	0.026*
	(0.0086)	(0.014)	(0.0084)	(0.014)
Any treatment	-0.010	-0.019	-0.0074	-0.014
	(0.0086)	(0.014)	(0.0083)	(0.014)
Control mean	0.562	0.539		
Observations	106,210	106,210	106,210	106,210

Notes: Significance levels: * 10%, ** 5%, *** 1%.

Controls: Age, education, career level. SE's in parentheses, clustered by jobseeker.

▸ T2: above vs below

Notes on treatment effects

- 2 potential channels for T2 to improve distribution
  1. "Traditional" treatment effect on individual activity: T2 improves ability to find good jobs to view
  2. Selection into activity across individuals: T2 causes "good" searchers to search more

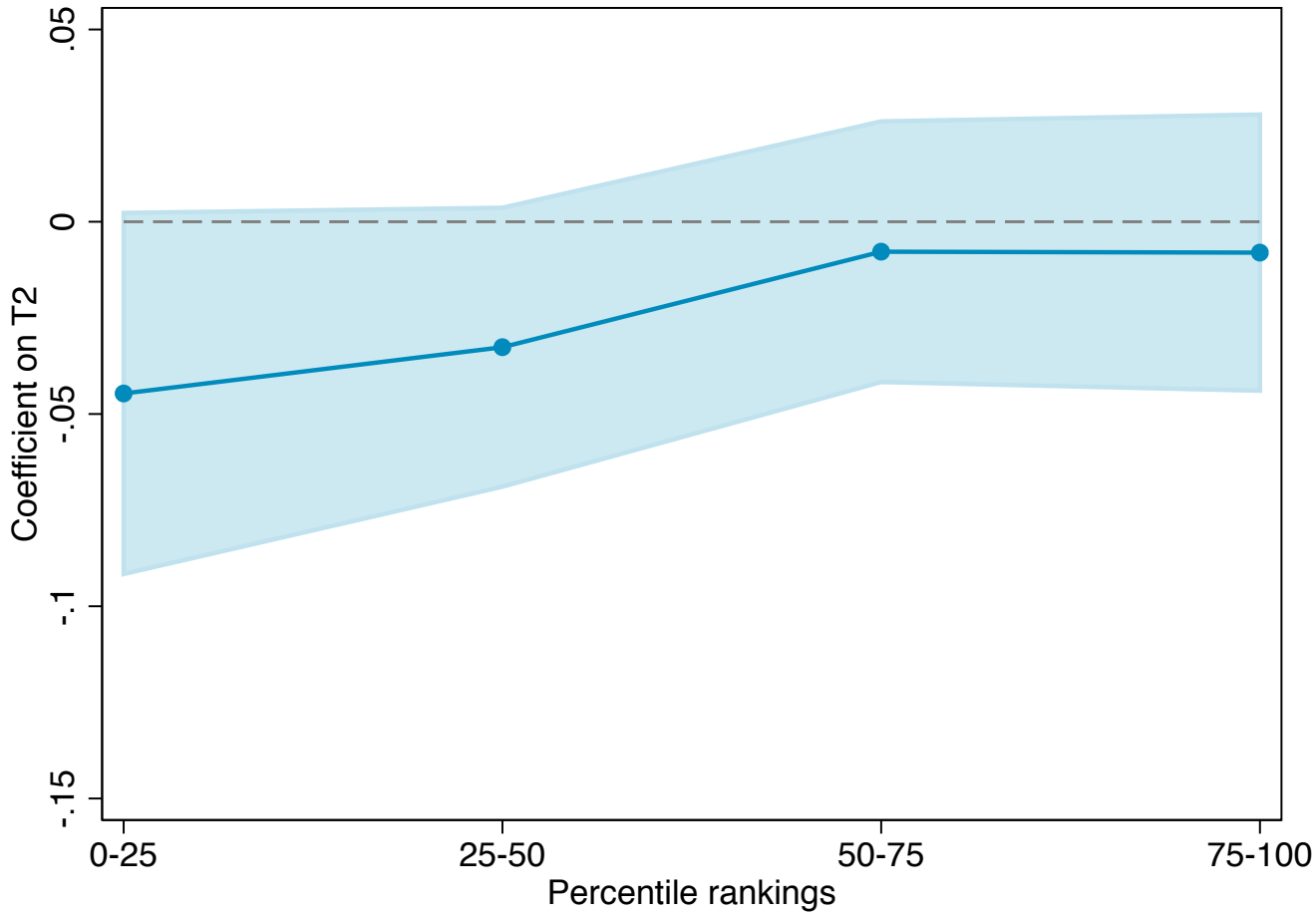
- Both are valid treatment effects, representing exogenous shifts in the distribution, but different interpretations

- No evidence that T2 affected selection into activity
  - No differential selection into viewing by characteristics
    ▸ Predictors of viewing ▸ Selection into view ▸ Histogram of views
  - Robustness to controls also suggestive that not selection
  - Using percentile on first job viewed as proxy for "searching ability": No evidence that T2 shifts # jobs viewed by "ability"

- Turn now to application decision after view (econometrically-nonstandard)

Effect on application decision after view

(Econometrically non-standard)



- T2 coeff's at lower vs. higher percentiles significantly different (e.g., below- vs. above-median: -.030*[.016]) ▸ Table

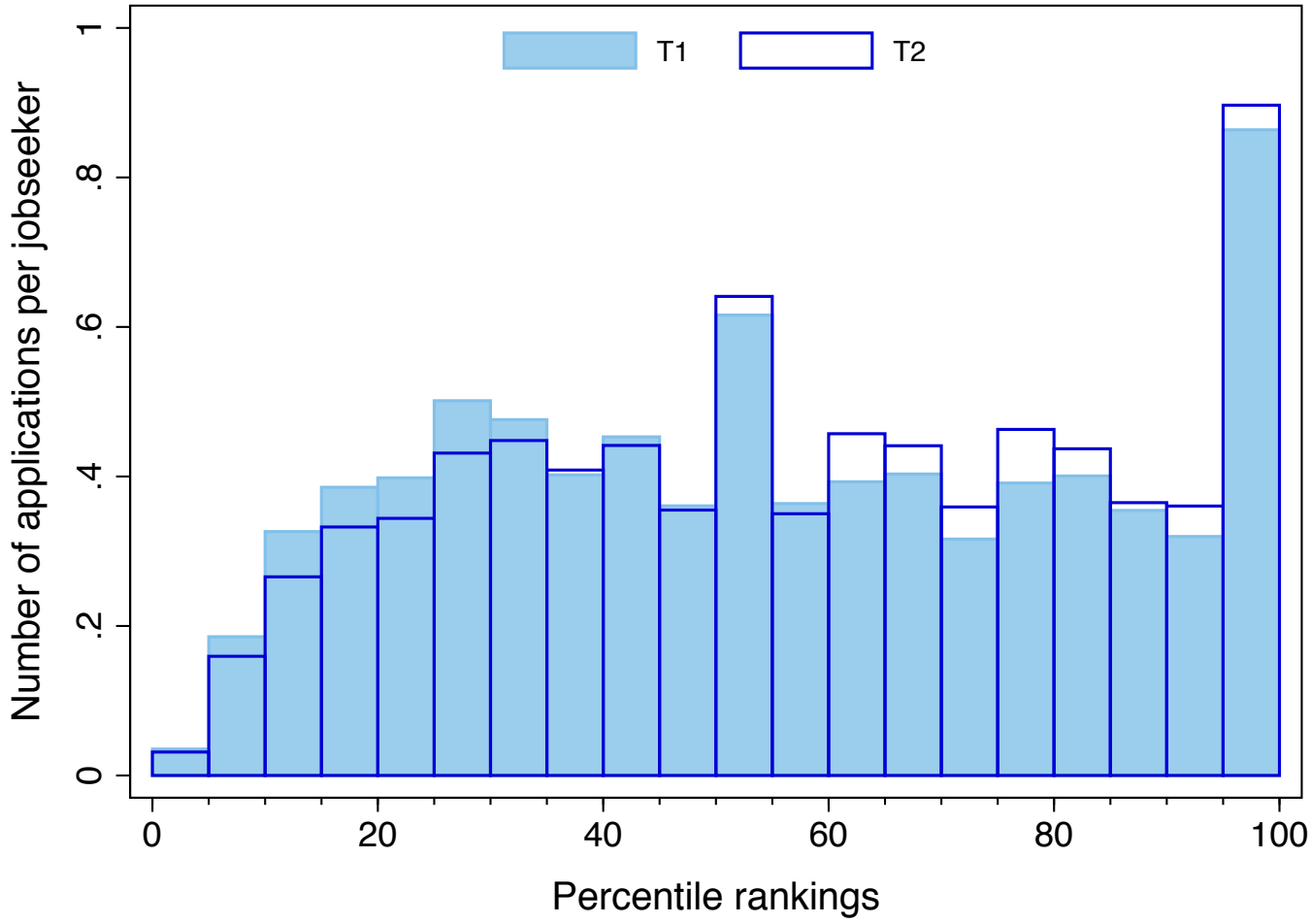
Effect on application decision after view

"Mistakes" measure

Dependent variable:	Application decision different from rule (1)	Applied whereas rule wouldn't (2)	Did not apply whereas rule would (3)
T2	-0.018*	-0.027**	0.009
	(0.009)	(0.014)	(0.009)
Any treatment	0.002	0.004	-0.003
	(0.009)	(0.014)	(0.008)
Control mean	0.512	0.348	0.164
Observations	106,210	106,210	106,210
R-squared	0.000	0.001	0.000

Notes: Significance levels: * 10%, ** 5%, *** 1%. SE's in parentheses.
Hypothetical rule is to apply when they are above 0.7 or when the number of applicants is smaller than the number of vacancies. Rule would say that should apply in 34% of views. Currently apply in 53%.

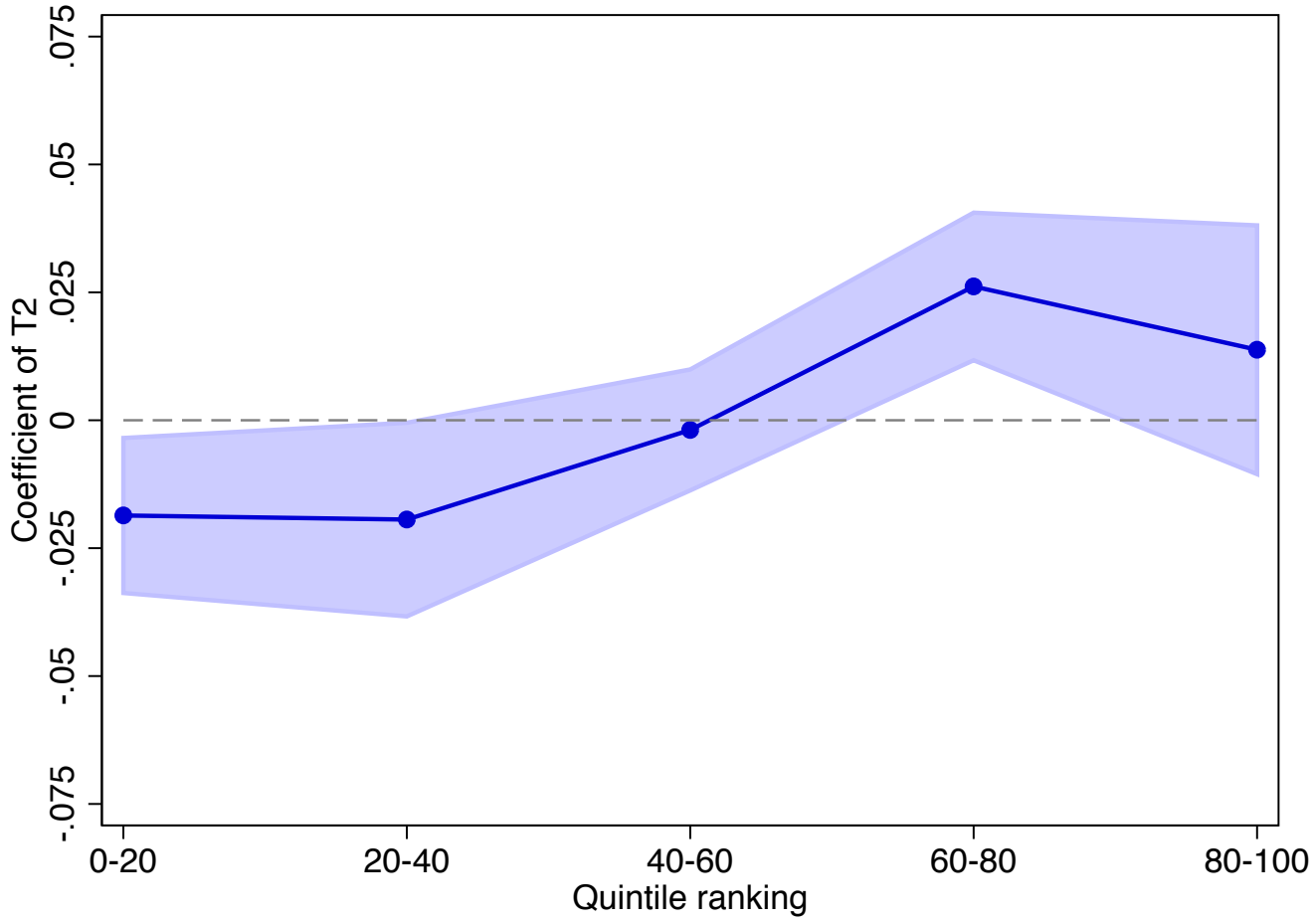
Treatment groups: Applications



Kolmorogov-Smirnov test:

- $F_{T2} = F_{T1}$: D: 0.06, $p < .001$. $F_{T2} = F_{C1}$: D: 0.04, $p < .001$

Treatment effects: Applications

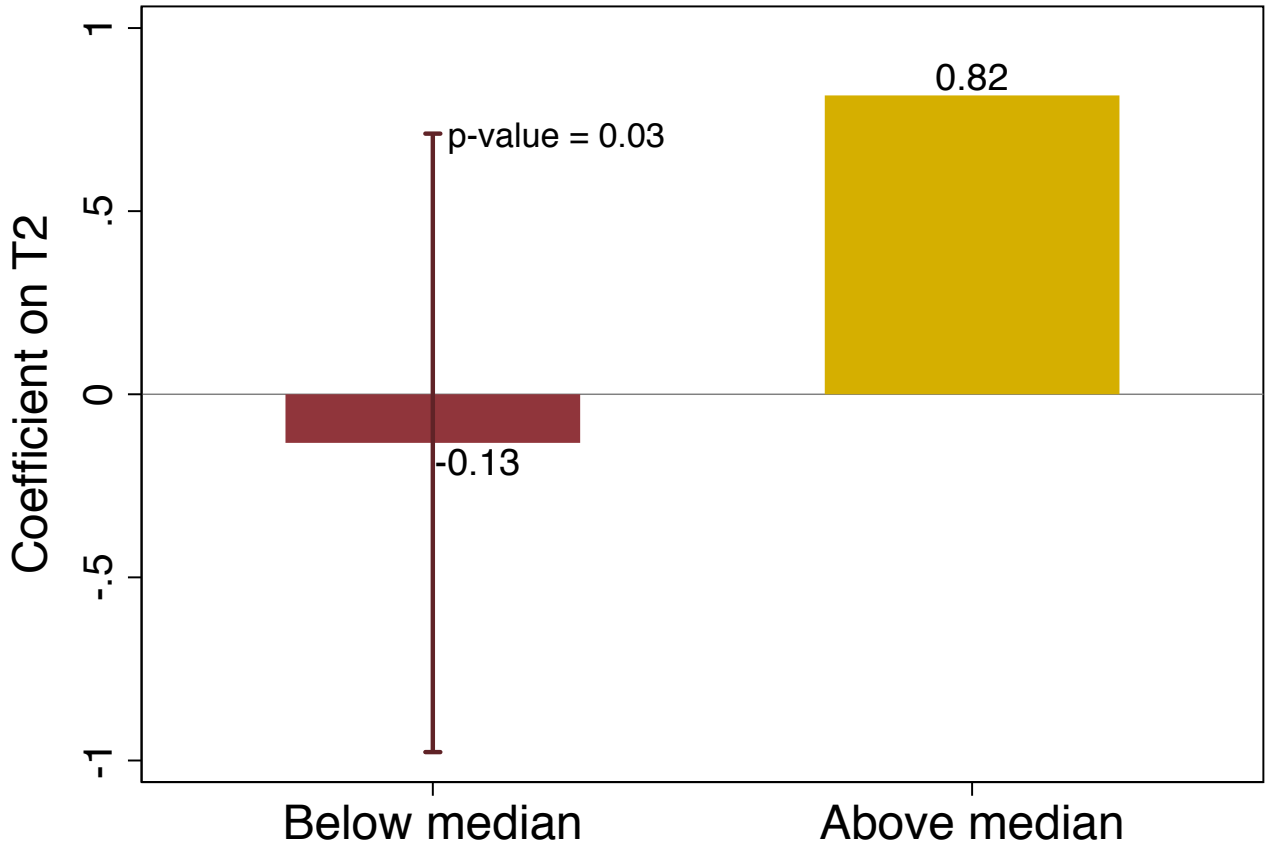


- T2 ↑ avg. percentile of views by .040**[.018] and ↑ % views with above-median-ranking by .022**[.010] ▸ Table

Treatment effects: Number applications submitted

Jobseeker-level

Dependent variable: Number of applications



Control mean: below median = 6.69; above median = 7.81

▸ Table

Results so far

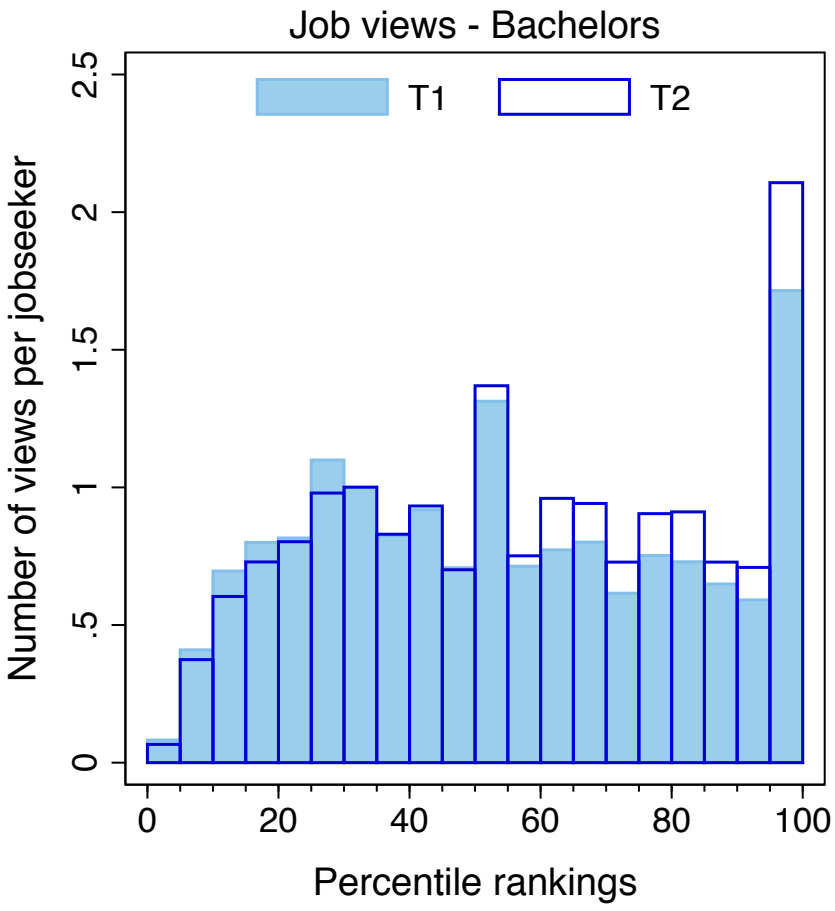
- Information about competitiveness shifts distribution of applications towards ones where job-seeker higher-ranked
  - Small decrease in low-ranked applications driven by fewer views and fewer applications conditional on view
  - Larger increase in high-ranked applications driven by viewing more high-ranked
  - Move now to heterogeneity based on education and age/career level

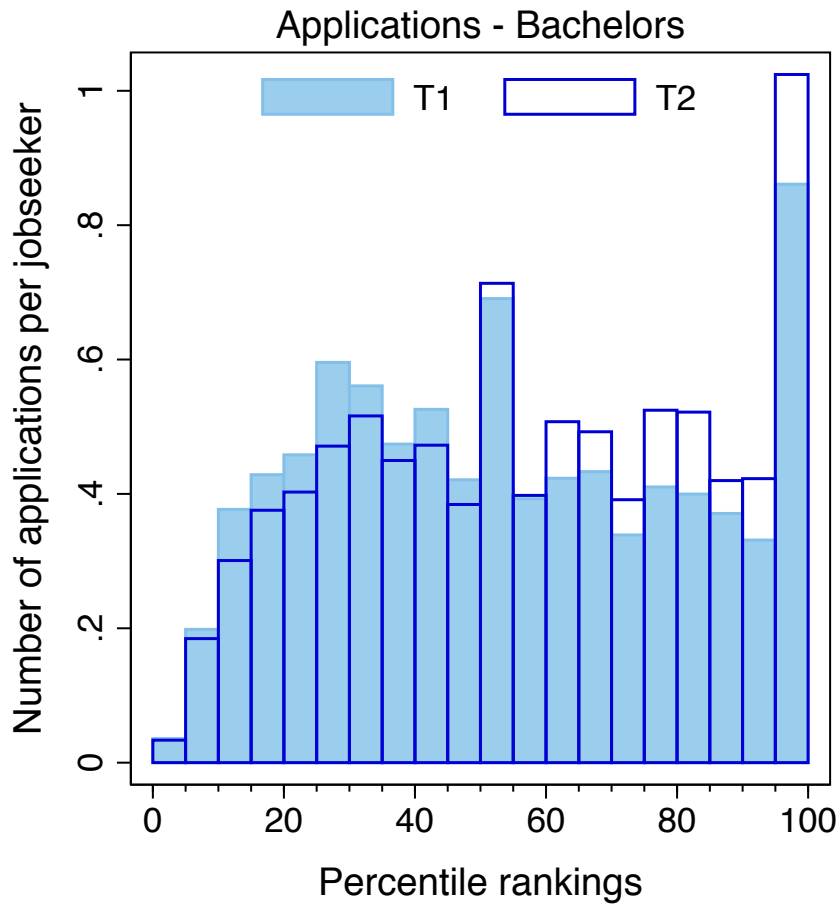
T2 shifted distribution applications towards higher-ranked

Are magnitudes meaningful?

- From policy evaluation perspective effects not huge, but costs minimal
- Relatively low-touch, not everyone likely "treated" (ITT, not TOT) $\rightarrow$ more intensive intervention could have larger effects
- Effects could grow over time, scale beyond what we see here
- Mechanism perspective: results suggest that information frictions may play role in search
- Look now at whether populations with lower employment rates and worse baseline targeting (bachelors, entry-level) respond more

Treatment effects in subsamples





Treatment effects: applications

Heterogeneity by education

Dependent variable:	Above median ranking (=1)		
	(1)	(2)	(3)
T2	-0.011	0.071***	-0.030
	(0.040)	(0.022)	(0.060)
Any treatment	-0.059	-0.020	0.047
	(0.041)	(0.022)	(0.055)
Control mean	0.569	0.516	0.584
Observations	9,340	36,494	3,900
Sample	High school or Diploma	Bachelors	Masters or PhD

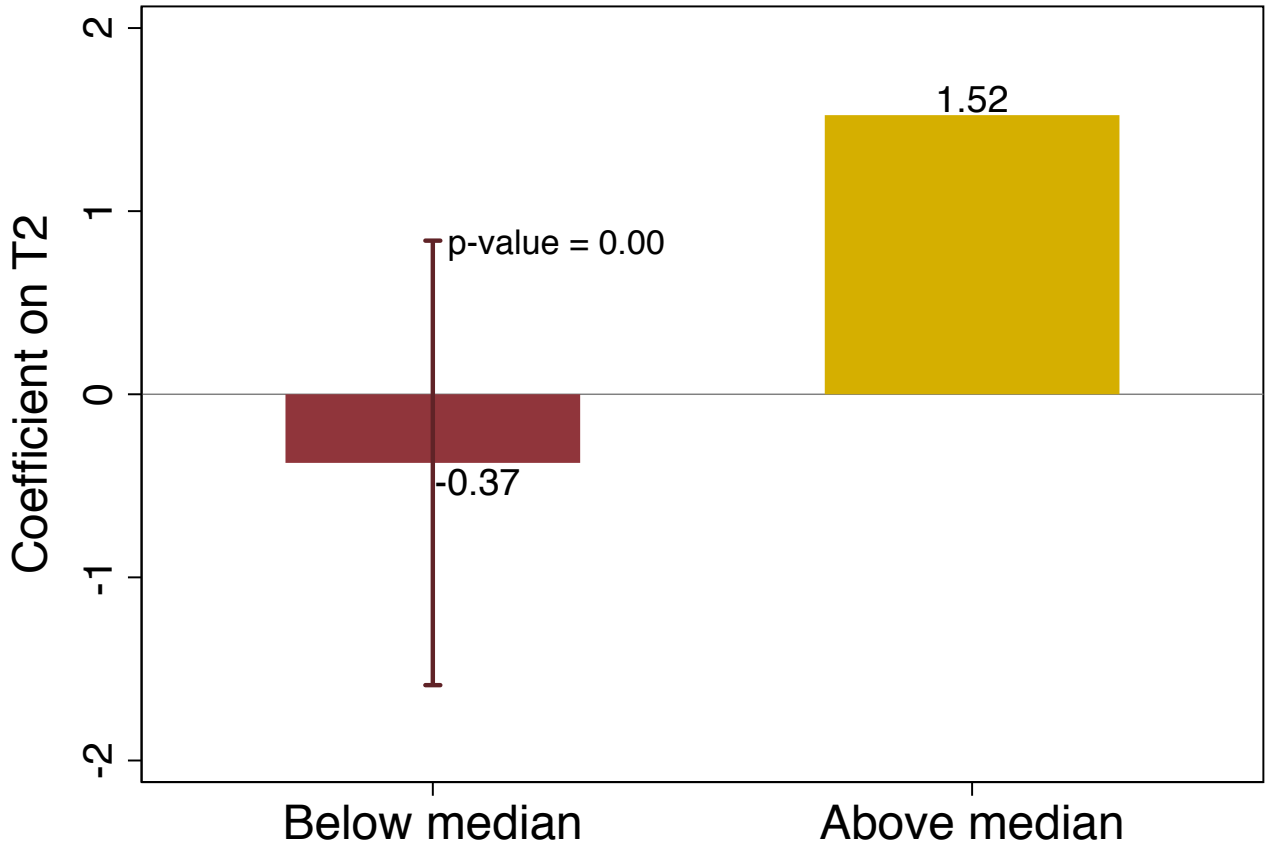
Notes: Significance levels: * 10%, ** 5%, *** 1%. SE's in parentheses.

- Difference bachelors vs. others statistically significant ▸ Table

Treatment effects: Number applications submitted

Jobseeker-level

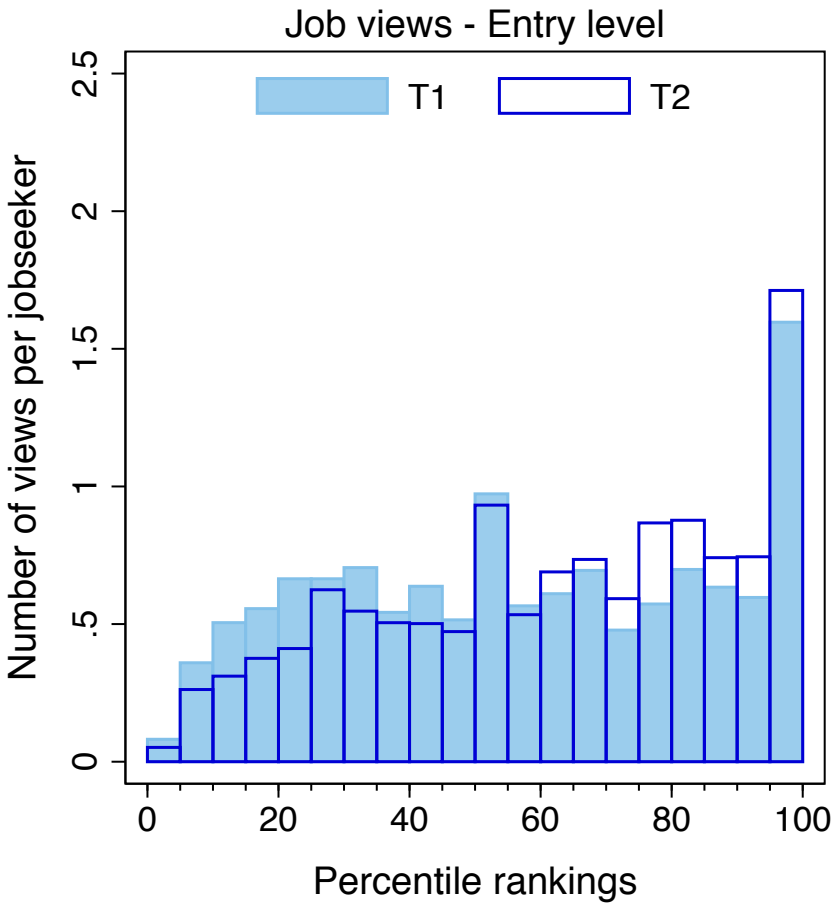
Sample: Bachelors

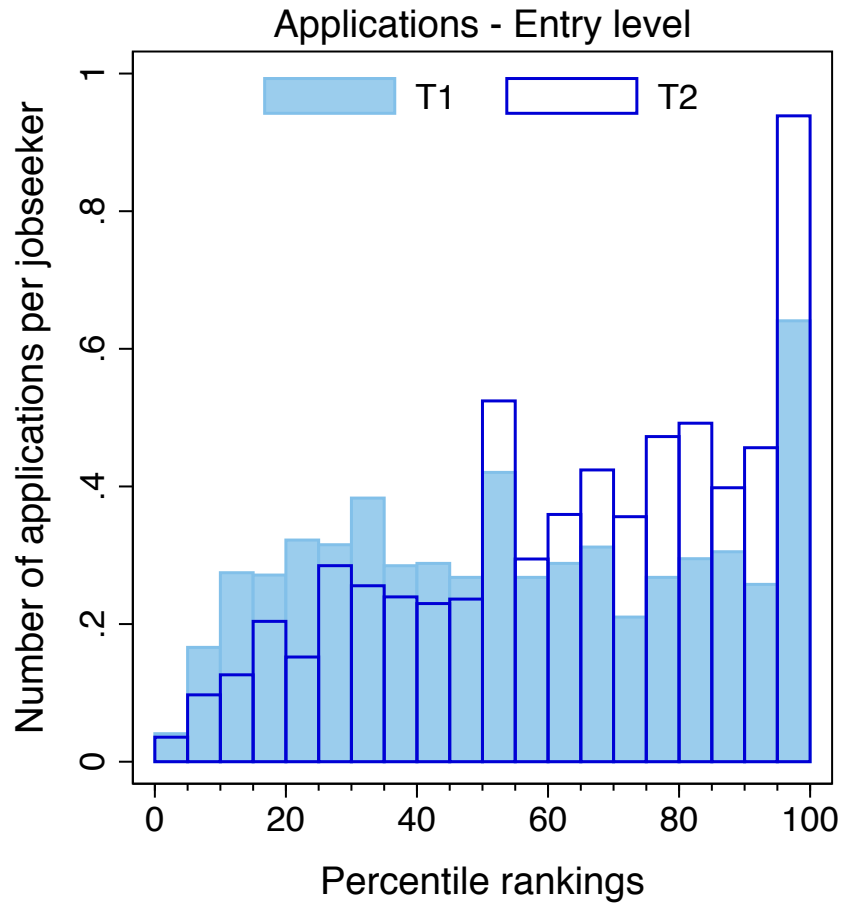


Control mean: below median = 7.72; above median = 8.14

▸ Table

Treatment effects in subsamples





Heterogeneous effects

Career level

Dependent variable:	Job views		Job applications	
	Above median	Percentile	Above median	Percentile
	(1)	(2)	(3)	(4)
T2 × Entry level	0.062	0.036	0.11**	0.069**
	(0.041)	(0.025)	(0.051)	(0.031)
T2	0.023	0.012	0.024	0.012
	(0.016)	(0.0099)	(0.020)	(0.012)
Entry level	0.058**	0.032**	0.034	0.016
	(0.023)	(0.014)	(0.029)	(0.017)
Observations	84,933	84,933	45,849	45,849

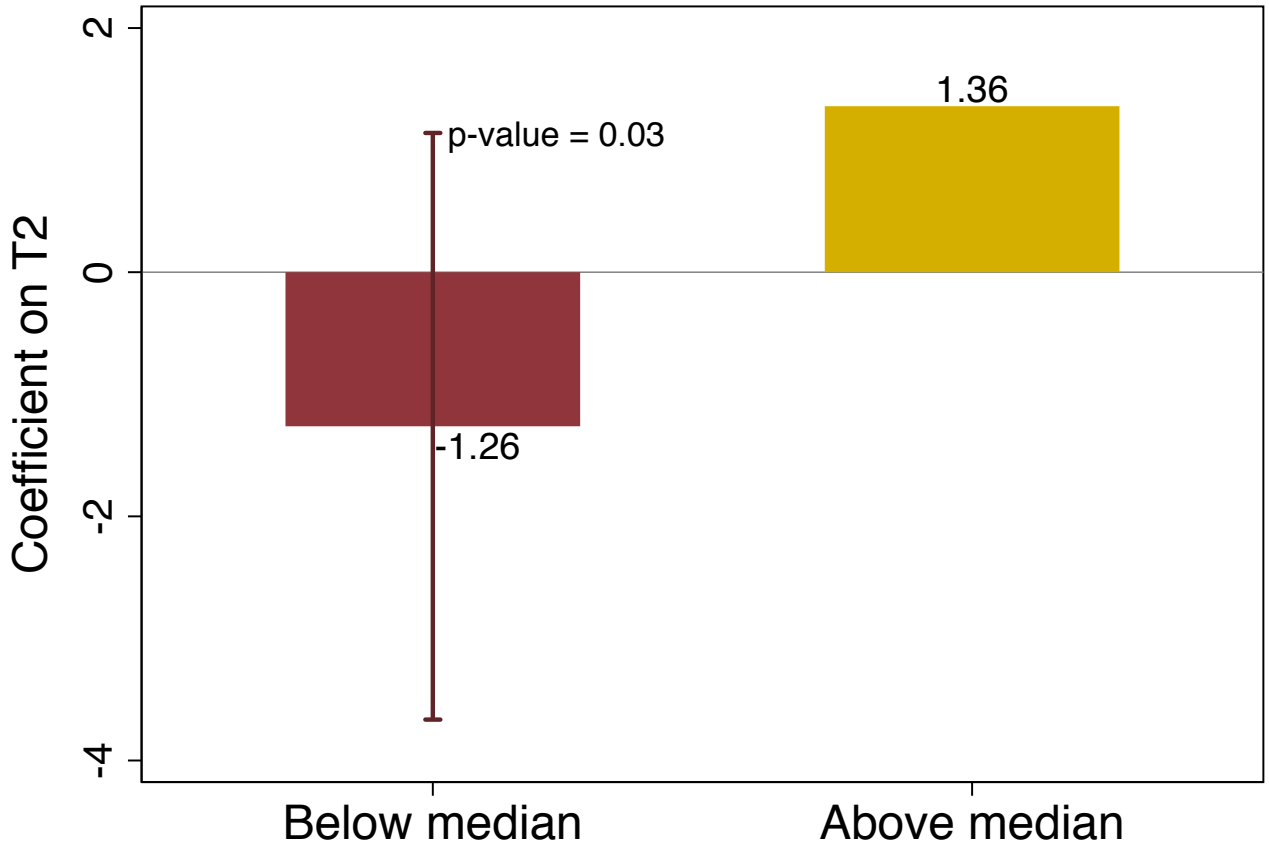
Notes: Significance levels: * 10%, ** 5%, *** 1%. SE's in parentheses.

▸ Age ▸ Results shown by subsample ▸ TE on mistakes, by subsample

Treatment effects estimates at the jobseeker level

Jobseeker-level

Sample: Entry level



Control mean: below median = 5.75; above median = 8.31

▸ Table

Trends over time

Job level

Dependent variable:	Percentile	
	Views	Apps
	(1)	(2)
Number of views	-0.00044***	-0.00054***
	(0.00015)	(0.00019)
T2 × Numb views	0.00059***	0.00067***
	(0.00016)	(0.00020)
T2	-0.0025	-0.00060
	(0.0072)	(0.0085)
Any T × Numb views	-0.00015	-0.000094
	(0.00020)	(0.00025)
Any Treatment	-0.0044	-0.0059
	(0.0073)	(0.0088)
Observations	106,210	56,338

Notes: Significance levels: * 10%, ** 5%, *** 1%.

SE's in parentheses.

Do changes to search behavior explain shifts in viewing?

			Job seeker search filters used:						
	Any Search	Number Searches	Career Level	Job Role	Key Words	Job Location	Job Category	Employment Type	Career Level = Entry
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
T2	-0.0078	-1.08	-0.0075	-0.0018	0.010	-0.0013	-0.026	0.011	-0.0078
	(0.011)	(2.17)	(0.014)	(0.022)	(0.014)	(0.025)	(0.039)	(0.014)	(0.0061)
Any T	0.013	-3.06	-0.0096	-0.034	-0.016	0.010	0.016	-0.038**	0.012**
	(0.011)	(2.53)	(0.017)	(0.030)	(0.015)	(0.036)	(0.039)	(0.017)	(0.0057)
Control mean	0.681	13.835	0.130	0.227	0.130	0.656	0.481	0.122	0.021
Obs	2,548	2,548	63,164	63,164	63,164	63,164	63,164	63,164	63,164

Notes: Significance levels: * 10%, ** 5%, *** 1%.

SE's in parentheses.

Conclusion

- Intervention improved job targeting
- Largest impacts on entry-level workers and those with bachelors degrees
  - Those groups also face the highest unemployment rates in the region
  - Consistent with the hypothesis that inaccurate expectations due to changing labor market may provide one channel contributing to unemployment
- Highlights potential of online interventions to reach unemployed groups in MENA region (young, highly-educated)

Future directions

- Try to shed more light on where information frictions come from
  - Expand to different locations to be able to shed light on where information frictions come from
  - Conduct baseline beliefs survey
- Does decreasing congestion matter from the employer side?
  - Randomization at employer level
- What other interventions could further improve search?
  - Potentials: Recommended jobs, CV view notification
- More data linking applications to employment outcomes