LEAD LEVERAGING EVIDENCE FOR ACCESS AND DEVELOPMENT
KREA UNIVERSITY

STATISTICAL INDIAN INSTITUTE UNITY IN DIVERSITY

JOB SEARCH BEHAVIOR AND LABOR MARKET OUTCOMES OF URBAN YOUTH

Final report on job information study

Digital Platforms and Women's Economic Empowerment (DP-WEE)

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1 Executive Summary

- **High Aspirations and Expectations**: At baseline, respondents, especially men and youth, held high aspirations for salaried positions with unrealistic salary expectations. Men relied more on informal networks (e.g., friends and family) for job search, while women used formal channels (e.g., educational institutions).

- **Job Platform Registration and Interest**: Approximately 65% of participants in both treatment arms (in-person job search platform session with **non-personalized** phone messages **(T1)**; in-person session with **personalized** phone messages **(T2)**) expressed interest in registering on the collaborating job search platform, with women showing 10 percentage points higher interest than men. Registration rates reached 65%, with 70% of women and 60% of men registering.

- **Job Search Behavior**: Men exhibited a significant decline in job search activity following the intervention, particularly in online platform usage, intensifying from 6 to 12 months post-intervention, driven by reduced search among male youth. Conversely, women in both treatment arms showed a persistent increase in online and digital job search methods up to 12 months post-intervention, with no significant differences between T1 and T2.

- **Labor Market Outcomes**: No significant employment impacts were observed on the extensive margin due to the intervention. However, women in T2 earned significantly higher labor market earnings than those in T1 nine months post-intervention and outperformed T2 men. Male youth saw temporary earnings improvements in the first six months, which diminished by 12 months. Women in T2 transitioned from wage labor to salaried work over time, while men showed no systematic occupational shifts.

- **Aspirations and Expectations**: The intervention corrected overly optimistic baseline aspirations, particularly among men, who revised salary expectations downward and

shifted away from aspiring to salaried positions. Women showed more muted responses, with increased aspirations for nonparticipation and modest gains in non-monetary job satisfaction. T2's personalized messages amplified these effects, particularly discouraging men from pursuing salaried careers.

- **Impact of Personalized Messages**: Personalized WhatsApp messages led to quicker belief correction and more intensive job search, particularly on government job portals, compared to non-personalized messages. Job applications on the partner platform increased from 4.7% after the first message to 60% after the last, with stronger engagement in T2 group.

- **Heterogeneous Effects**: Positive intervention effects were primarily driven by women and older participants. Men and youth were either unresponsive or experienced negative impacts, with men reconciling with current jobs or deferring labor force entry through education, while women achieved occupational mobility and earnings gains, particularly in T2.

2 Introduction

There is a dire need for expanding employment opportunities for populations in low-income settings, who exhibit low rates of labor force participation and high levels of precarious, informal work (Bandiera *et al.*, 2021). Youth unemployment in low- and middle-income countries (LMICs) remains persistently high inspite of supply side interventions (viz. vocational skilling (McKenzie, 2017; Carranza & McKenzie, 2024). Meta-analyses of these programs in LMICs reveal modest employment gains (∼5 percentage points) and highlight systemic mismatches between the supply and demand for labor (Agarwal & Mani, 2024). Do new technologies, such as digital labor platforms and phone messages, have the potential to improve labor market outcomes by addressing labor market information asymmetries, and enabling more efficient matching of workers and jobs at scale?

In this study we aim to ascertain whether and how providing information on job opportunities through digital mediums, such as Apps and online portals, can enhance employment prospects, bridging the gap between opportunity and access in a context where there is high unemployment. Specifically, we design a cluster-randomized intervention to ease search and employment frictions by offering men and women, with at least high school level education, information on the potential of job matching platforms, along with assisting them in registering on a nation-wide grey collar job matching platform. We randomly vary the nature of labor market information provided to these individuals to study impacts on take-up, usage of digital modes of job search and subsequent labor market outcomes.

Our field-experiment is implemented in Delhi, India with more than 3000 young men and women between May 2023 and January 2025. We partner with the digital platform of one of the largest grey-collar staffing companies in India. 130 clusters of urban residential neighborhoods are randomly assigned to one of three groups – (T1) in-person information and assistance on registering on our partner platform plus up to 6 non-personalized phone messages to increase usage of digital platforms; (T2) same in-person information and assistance (as in T1 above) plus up to 6 personalized phone messages based on job preferences, education

and other characteristics measured at baseline; and (3) a control group, that neither receives the in-person information and assistance nor the phone messages. We study the impact of the intervention on the job search behavior, employment status and the nature of work undertaken approximately 6 months, and again over a year, post intervention.

In the following chapter we elaborate on the experiment design and the intervention. Chapter 4 discusses the data and methodology. The initial findings are outlined in chapter 5. We discuss mechanisms in chapter 6 and conclude in chapter 7.

3 Experiment Design

We utilize a cluster random sampling technique to sample households across six districts in the state of Delhi. First, drawing on data from the State Election Commission, we sample 15 assembly constituencies (ACs) across the six districts of Delhi. 130 randomly selected polling stations within the sampled ACs form our primary sampling units or clusters. From each of these polling stations, 25-28 households are selected randomly for the survey. Households with a member aged between 18-40 years, currently looking for work or planning to work in the near future, with atleast high school level of education, and with access to a smartphone are considered eligible for the survey. Our baseline data consist of a sample of over 3000 men and women, surveyed between May and August 2023. Appendix Figure 1 shows the map of Delhi with the districts in the study shaded in and the sampled polling stations by treatment groups.

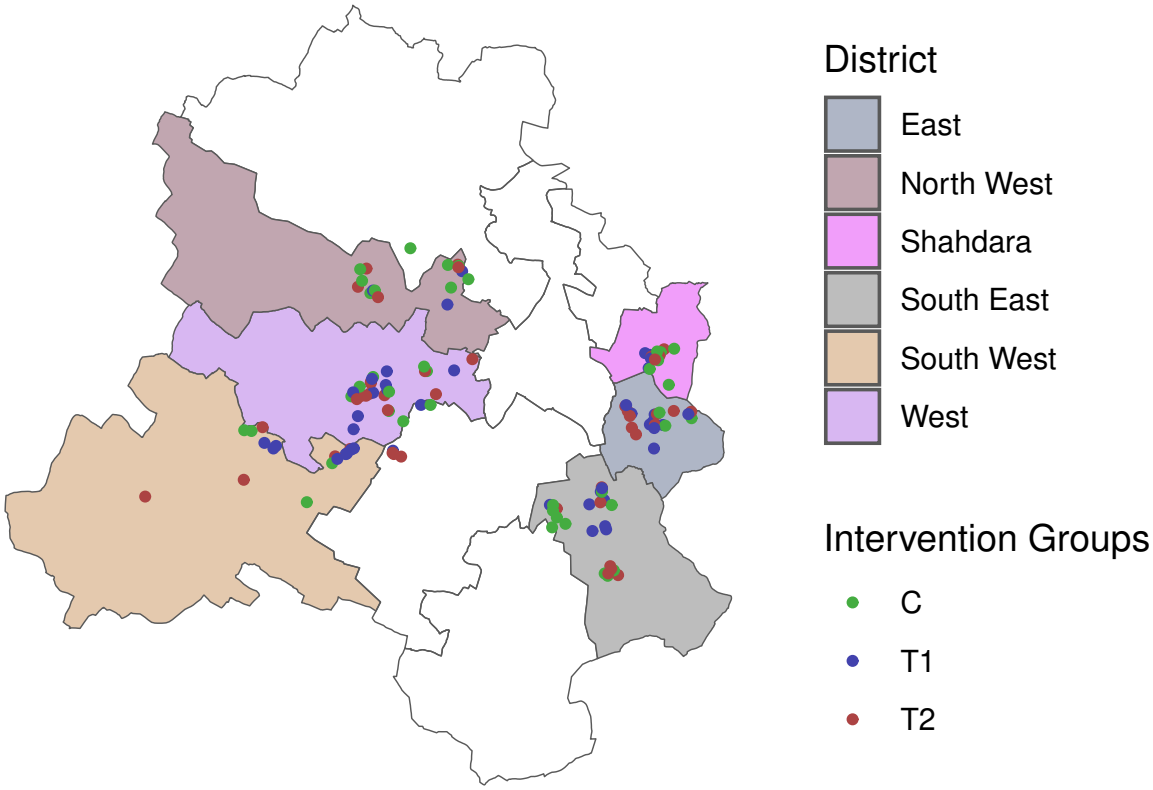
We collaborated with a Mobile App & Web based job aggregation platform that advertises job openings, matches job seekers with employers and also provides opportunities for up-skilling on its platform, detailed below.

3.1 Job matching platform

We partnered with a leading digital job search platform in India, boasting a subscriber base of 6.5 million, making it the second-largest job matching platform in the country. The platform specializes in connecting blue and grey-collar workers with employers across various sectors, offering a user-friendly mobile app for streamlined job searches.

The platform's mobile app enables users to create profiles by uploading resumes and entering personal details, work experience, and educational qualifications. Its hyperlocal search feature allows job seekers to filter opportunities by specific localities within a city, catering to those prioritizing proximity to home. The app supports a diverse range of job types:

Figure 1: Sampled districts and polling stations of Delhi (by treatment)



- *Blue-Collar Jobs*: Roles in logistics, retail, delivery, and security (e.g., delivery drivers, warehouse workers).
- *Grey-Collar Jobs*: Positions in IT, finance, and administration (e.g., accounts keeper, data entry), often requiring higher education or specialized skills.
- *Flexible and Work-from-Home Jobs*: Opportunities in digital marketing, graphic design, and customer service, with skill validation through app-based tests.

3.2 Randomization and Intervention

Following the baseline survey, the 130 clusters are randomized into three groups:

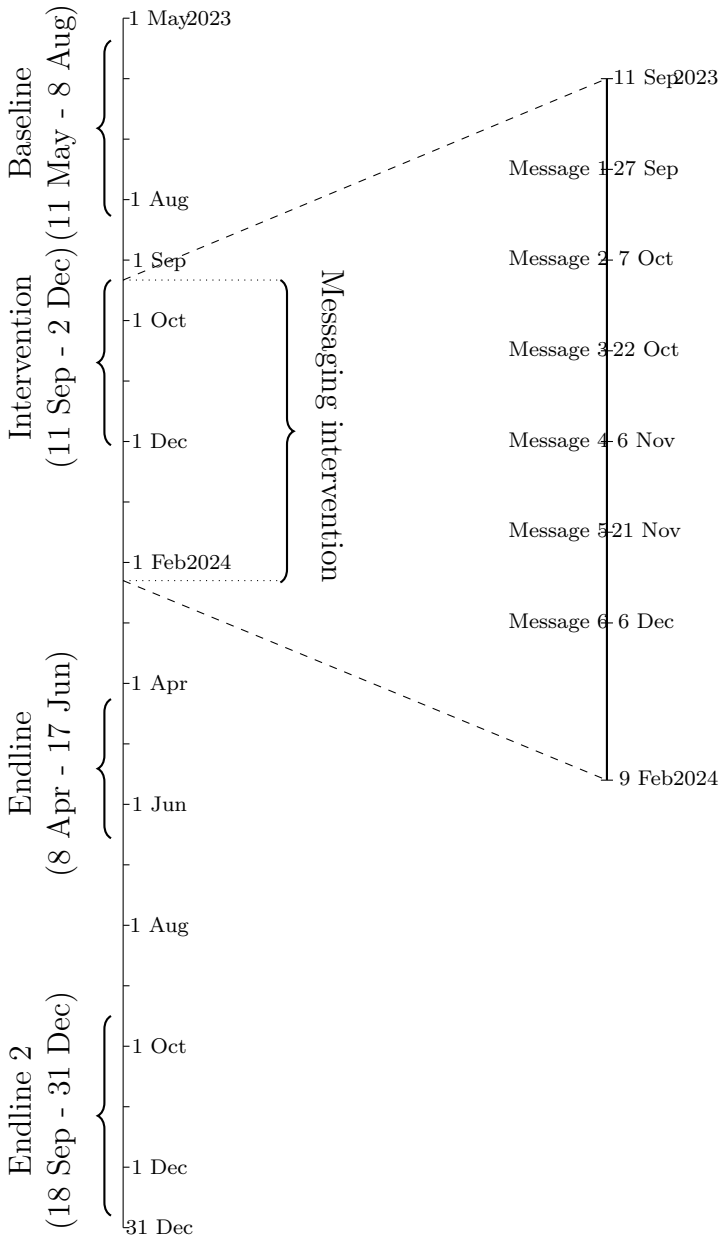
T1 (non-personalized treatment) in which we offered in-person information and assistance on job search/skilling via digital resources plus up to 6 non-personalized phone messages to increase usage of digital platforms (44 clusters)

T2 (personalized treatment) wherein we provided the same in-person information and assistance (as in group T1 above) plus up to 6 personalized phone messages based on job preferences, education and other characteristics measured at baseline (44 clusters)

C (control group), that neither receives the in-person information and assistance nor the phone messages (42 clusters).

The in-person sessions in T1 and T2 explained the benefits of digital job search platforms, provided registration assistance, and offered guidance on up-skilling and job searching. Six phone messages (text and WhatsApp) were sent at 10-day intervals starting 10 days post-session, nudging individuals toward platform registration and skilling opportunities. T2 messages were customized based on baseline preferences. The intervention ran from September 2023 to February 2024. Follow-up surveys at 6 months (Endline 1) and 12 months (Endline 2) collected work history data. See Figure 2 for the study timeline.

Figure 2: Timeline of study



Note: A total of six messages (via SMS and WhatsApp) were sent to the participants' mobile phones at equal intervals of 15 days. The first message to all the treated individuals in a cluster was initiated 10 days after 90% of the respondents in that cluster received the intervention.

4 Data and Methodology

4.1 Data

We utilize two sources of data in the analysis – survey data and data obtained on the individuals who registered from the platform.

4.1.1 Baseline survey data

Our sample consists of relatively young population with an average age of about 24 years, as shown in Appendix Table A1. 52% of our sample is female, and only 28% are married. 61% have completed high school or higher level of education. 77% of the sample is either currently looking or planning to look for work in the near future.[1] About 34% had previously used digital/online modes to search for jobs, with insignificant gender difference. But the probability of a woman being employed is half of that of men (25% vs 50%). Amongst those currently looking for work, an average of over 8 hours per day are spent on job search, majority of which (89%) is offline. Appendix Table A2 shows that the sample is balanced across the three treatment arms at both the household and individual levels, overall (columns 1 – 6) as well as separately for females (columns 7 – 12) and males (columns 13 – 18).

Note that there is high and significant correlation (0.58, $p< 0.001$) between belonging to the younger age group (18 - 24 years) and the probability of being currently enrolled in an educational institution (at baseline), for both men and women. Furthermore, younger age groups, but women only, are also less likely to be actively looking for work (0.03, $p< 0.01$). However, male youth are looking for work or actively searching for jobs (at baseline), irrespective of their enrollment status.

Next, we summarize the job aspirations, perceptions about the labor market and job search behavior of our sample across different demographic groups.

[1]The intention to search for jobs in the future is evidenced by the fact that while over 46% of individuals were enrolled in an education institution at baseline, only 3% were enrolled after 12 months.

Job Aspirations: At baseline, respondents expressed high aspirations for salaried positions with significant expected salary growth, with 74% believing they were on their ideal career path (Table A3, Panel A). Women showed stronger preferences for salaried jobs (0.81 vs. 0.67 for men, $p = 0.00$) but lower interest in self-employment (0.14 vs. 0.31, $p = 0.00$). Youth (18-25 years) and enrolled individuals also favored salaried work (0.78 vs. 0.69, $p = 0.00$; 0.80 vs. 0.70, $p = 0.00$) over self-employment. These aspirations contrast with India's labor market, where only 26% of urban individuals aged 18-40 with high school education hold salaried jobs, dropping to 14% for women (PLFS, 2020-21).

Labor Market Beliefs: Respondents overestimated salaries for salaried white and grey-collar jobs, with men showing greater over-optimism than women (7123.38 vs. 5994.45, $p = 0.00$) (Table A3, Panel B). Youth and enrolled individuals also held higher salary misperceptions, reflecting limited labor market experience.

Job Search Behavior: Over 40% of the sample was actively job searching at baseline, with 35% using online platforms. Men were more likely to search and apply for jobs, relying on informal networks (e.g., friends, family) ($p = 0.001$), while women depended more on formal channels like educational institutions or digital platforms ($p = 0.05$) (Table A4). Women were less likely to be employed (26% vs. 49%) and used smartphones 30 minutes less daily than men.

Overall, while the entire sample exhibited high job aspirations and expectations, the salary mis-perceptions are higher amongst men, and the youth – those who are more likely to be enrolled in educational institutions and have less experience with job search. Furthermore, women have lower access to traditional sources of job information and are less likely to search and apply for jobs than men. This suggests that women are more likely to utilize digital modes of job search if their social connections are less amenable to providing job information or references.

4.1.2 Intervention take-up

We have two sources of data at the intervention stage: (1) survey data and (2) platform data.

Survey Data: Approximately 65% of participants in treatment groups (T1 and T2) expressed interest in registering on the job search platform, with women showing 10 percentage points higher interest than men in both arms. Nearly all interested individuals registered, yielding an overall registration rate of 65% (Table A5). Women's registration rates were 8–10 percentage points higher than men's in both T1 and T2, with T2 showing slightly higher (but insignificant) registration rates than T1 (2–4 percentage points). Youth (18–24 years) had higher interest and registration rates than the full sample, with young women registering at rates 10 percentage points higher than young men.

Platform Data: From September 17, 2023, to May 30, 2024, platform data tracked job search and application behavior for registered treatment group participants. Data included job preferences, applications submitted, job categories, HR interactions, job offers, proposed salaries, and skill enhancement courses. Event study analysis (Figure A1) shows that job applications increased from 1.84 at baseline to 4.7% after the first message ($p < 0.1$), 15% after the second ($p < 0.01$), and up to 60% by the sixth message ($p < 0.001$), reaching 89% by week 14. Effects plateaued after the fourth message. T2 showed earlier significant effects (Week 0, $p < 0.1$), while T1 had larger but later significant increments (Week 3, $p < 0.01$). Women exhibited larger, though insignificant, application increases than men, with T1 women showing slightly larger increments than T2 women.

4.2 Estimation strategy

We estimate the impact of the intervention on labor market outcomes, including job search, employment, earnings, occupational choice, and aspirations. The treatment effects[2] are

[2]The treatment effects measure the difference in outcomes (e.g., job search activity, earnings) between the treatment groups (T1 or T2) and the control group, after accounting for baseline characteristics and local labor market conditions. A positive effect indicates improved outcomes (e.g., more job applications or higher earnings) due to the intervention, while a negative or insignificant effect suggests no improvement or a decline compared to the control group. Comparing T1 and T2 effects reveals whether personalized messages (T2)

assessed by comparing outcomes between treatment groups (T1: in-person session with non-personalized messages; T2: in-person session with personalized messages) and the control group. Outcomes are measured monthly post-intervention for up to 12 months, with job search behavior reported for the three months prior to surveys. To ensure comparability, we align outcomes by assigning a hypothetical intervention date to the control group, approximately 4 months after the baseline survey, matching the treatment groups' timeline.

The analysis controls for baseline characteristics, including household factors (asset index, number of children, household size, caste, religion, years at location) and individual factors (gender, age, marital status, job search status, education, smartphone usage, employment status, online platform use, and skill training). District or neighborhood fixed effects account for local labor market variations. Standard errors are clustered at the polling station level.

had a stronger impact than non-personalized messages (T1).

5 Initial Findings

5.1 Labor market outcomes

5.1.1 Job search behavior

The intervention's impact on job search behavior was assessed at 6 months (Endline 1) and 12 months (Endline 2) post-intervention, focusing on two outcomes: ever searched for work using any mode and ever searched using digital/online modes in the prior three months. Treatment effects compare outcomes in treatment groups (T1: in-person session with non-personalized messages; T2: in-person session with personalized messages) to the control group, expressed as percentage changes relative to the control group's baseline mean.

- *Overall Impact*: The intervention reduced job search using any mode by 3.5% at Endline 1 and 5.7% at Endline 2, with no significant effect on digital/online search. Effects were similar across T1 and T2 (Figure 3).

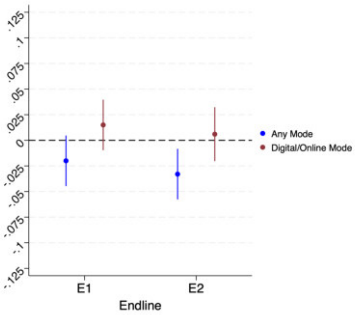
- *Gender Differences*: Women showed no significant change in overall job search but increased digital/online search by 13.8% at Endline 1 and 16.3% at Endline 2, driven by T1 at Endline 1 and both T1 and T2 at Endline 2. Men reduced overall job search by 6.6% and digital/online search by 12.5% at Endline 2, with no differences between T1 and T2.

- *Youth (18–24 years)*: Youth reduced overall job search by 6.5% at Endline 1 and 7.4% at Endline 2, driven by young men (12.8% reduction in overall search and 17.2% in digital search at Endline 2). Young women showed no significant changes.

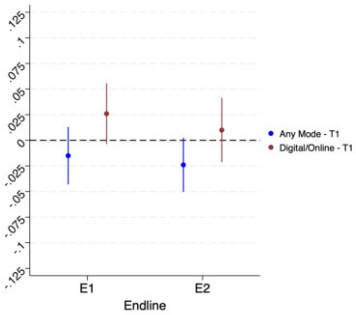
- *Inactive Job Searchers*: Men not actively searching at baseline reduced overall search by 19.1% and digital search by 64.4% at Endline 2, while inactive women showed no reduction.

- *Currently Enrolled*: Enrolled individuals, particularly men, reduced overall job search by 12.2% and digital search by 16.6% at Endline 2. Non-enrolled women increased digital search by 25.8% at Endline 1 and 35.3% at Endline 2.

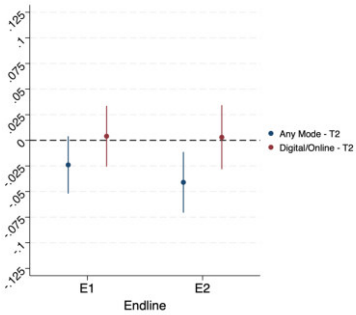
Figure 3: Treatment Effect on Job Search Outcomes: Full Sample



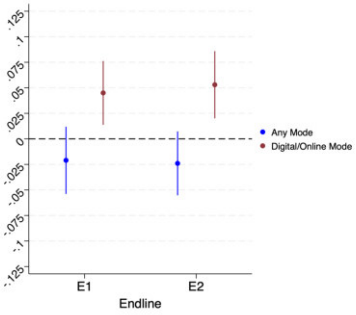
(a) Overall - Treatment



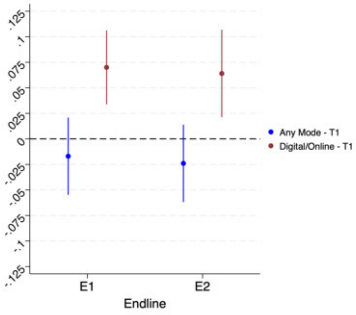
(b) Overall - T1



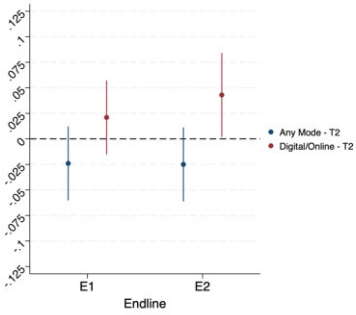
(c) Overall - T2



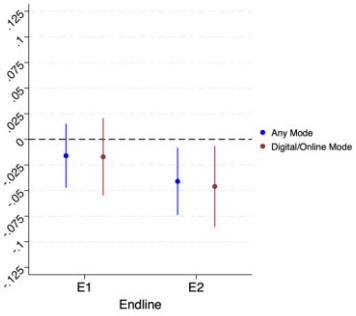
(d) Female - Treatment



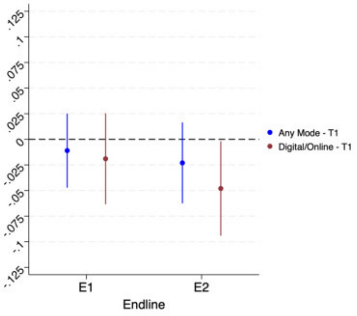
(e) Female - T1



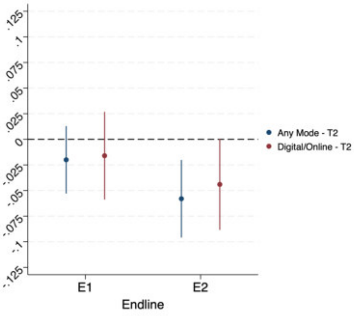
(f) Female - T2



(g) Male - Treatment



(h) Male - T1



(i) Male - T2

5.1.2 Employment and earnings

The intervention's impact on employment status, work intensity (hours/day, days/month), and earnings was assessed over 12 months post-intervention, comparing treatment groups to the control group. Treatment effects are expressed as percentage changes relative to the control group's baseline mean.

- *Employment Status*: No significant effects on employment were observed for the full sample or by gender across T1 and T2, indicating the intervention did not increase job acquisition.

- *Work Intensity*: Hours worked and days worked per month showed no significant overall effects. Men in T1 had fewer hours worked near the intervention compared to women, while T2 men showed a temporary increase relative to T1 men, fading after 4–5 months. No notable gender differences were found for days worked.

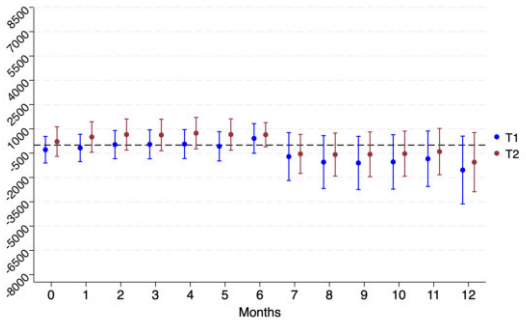
- *Earnings*: Women in T2 had significantly higher earnings than T1 women in Months 9–11 (29.5–34.7%, $p < 0.10$) and outperformed T2 men in Month 10 ($p = 0.079$). Men's earnings showed negative trends in later months, with no significant T1 vs. T2 differences (Figure 4).

- *Youth (18–24 years)*: No employment effects were observed. Earnings in T2 increased temporarily by 28.4–29.1% ($p < 0.10$) in Months 2–6 but faded later.

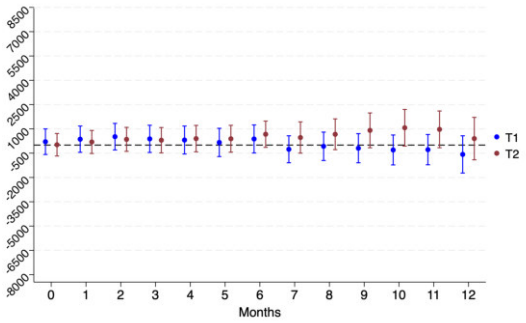
- **Inactive Job Searchers**: T2 increased male employment by 6 percentage points until Month 5, but effects diminished later. Earnings declined for men, with significant gender gaps in Months 8–11 ($p < 0.10$).

- *Currently Enrolled*: Enrolled individuals saw reduced employment by 35.9–37.0% ($p < 0.10$) in Months 8 and 12. Men's earnings increased temporarily (Months 3–5) but turned negative by Month 10 (122.9%, $p < 0.10$), while women's earnings rose consistently from 75.8% in Month 4 to 147.7% in Month 12 ($p < 0.10$).

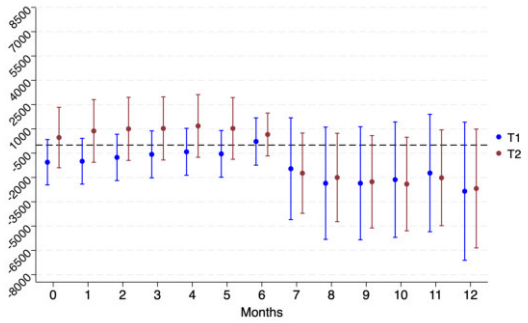
Figure 4: Impact of treatment on monthly earnings (in Rs.) (Full sample and Youth)



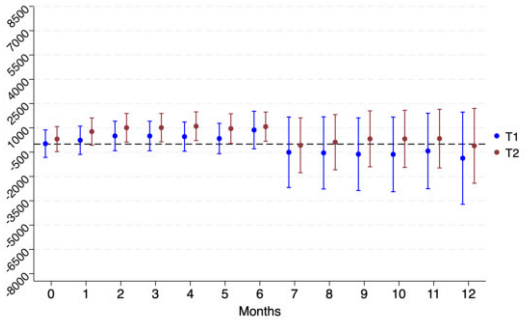
(a) Overall



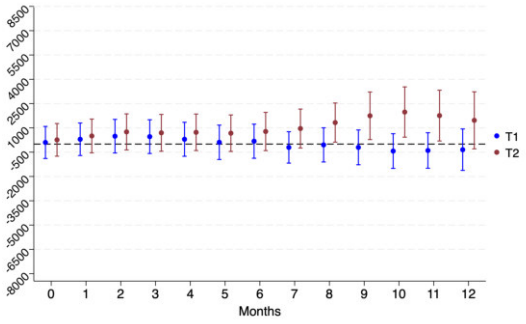
(b) Female



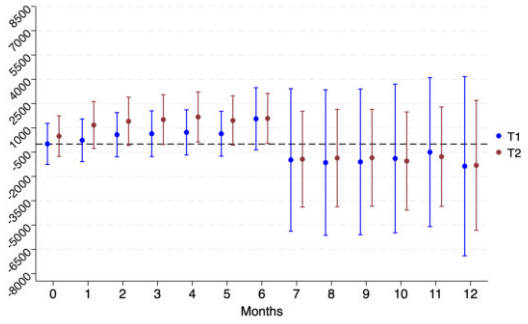
(c) Male



(d) Youth - Overall



(e) Youth - Female



(f) Youth - Male

Note: The classification of youth is as per the baseline age of 18-24 years. 90% confidence bands are plotted around the regression coefficients for the two color-coded treatment groups. Standard errors clustered at the polling-station level.

5.1.3 Occupational choice

The intervention's impact on occupational choice (salaried work, wage labor, self-employment) was assessed over 12 months post-intervention, comparing treatment groups to the control group. Treatment effects are expressed as percentage changes relative to the control group's baseline mean (Figure 5).

- *Overall Impact*: No significant effects on salaried employment or self-employment were observed for the full sample. T2 reduced wage labor by 69.2–79.2% ($p < 0.10$) in Months 0, 1, and 4, with no significant differences between T1 and T2.

- *Gender Differences*: T2 increased women's salaried employment by 28.4–35.0% ($p < 0.10$) in Months 4, 5, 9–11, while men showed no significant effects. Women's wage labor decreased by 145.3% ($p < 0.10$) up to Month 4 in T2, and men's wage labor fell by 72.4% ($p < 0.10$) in some months. No effects on self-employment were found for either gender.

- *Youth (18–24 years)*: No effects on salaried work. T2 reduced young men's wage labor by 227.5–308.8% ($p < 0.05$) in Months 7–11. Young women showed persistent wage labor declines in both T1 and T2. T2 male youth had positive (insignificant) self-employment effects compared to T1's negative effects in later months.

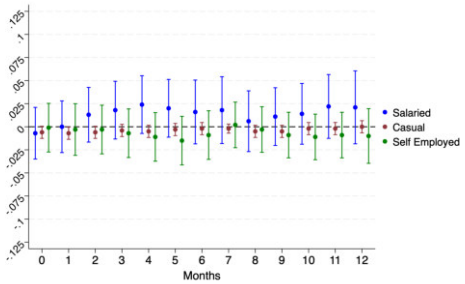
- *Inactive Job Searchers*: T2 increased salaried employment for active job-seeking women by 41.8–66.3% ($p < 0.01$–0.10) in Months 0–6. T2 reduced male wage labor by 175.2–233.6% ($p < 0.05$–0.10) in Months 8–10. T2 increased male self-employment by 17.0–19.4% ($p < 0.05$) in Months 0–6, with significant gender differences ($p < 0.10$).

- *Currently Enrolled*: T2 increased women's salaried employment by 57.8% ($p < 0.10$) in Month 4 and reduced men's by 47.9% ($p < 0.10$) in Month 10. Non-enrolled men saw increased salaried employment by 13.9–16.6% ($p < 0.10$) in Months 7–12. Wage labor

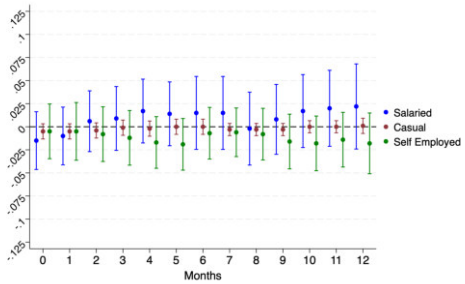
effects were minimal, and T1 reduced women's self-employment by 7.0% ($p < 0.10$) in Months 3–4.

Figure 5: Impact of treatment on occupational choice (Full sample)

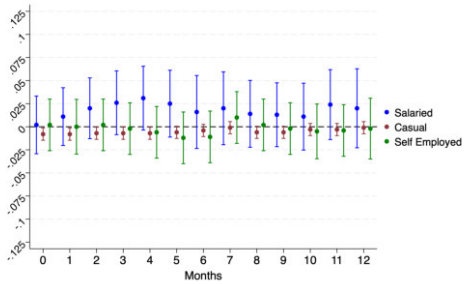
Panel A: Overall



(a) Treatment

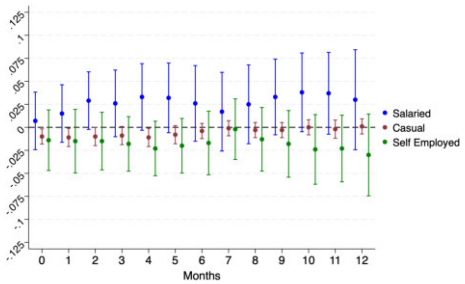


(b) T1

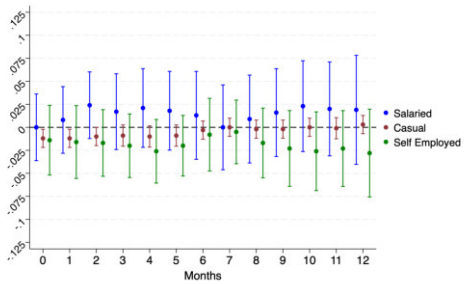


(c) T2

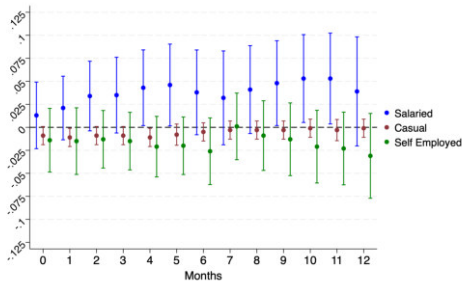
Panel B: Female



(d) Treatment

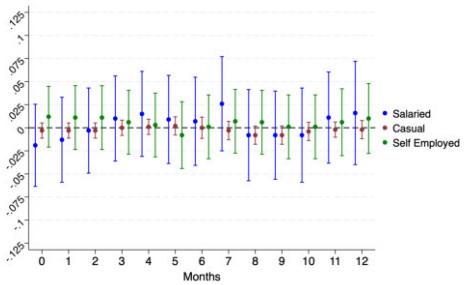


(e) T1

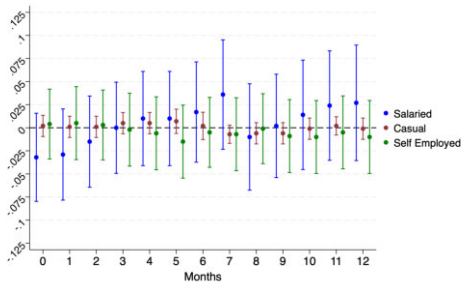


(f) T2

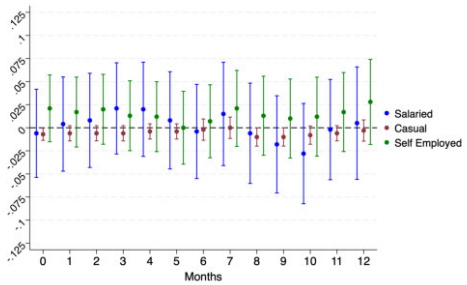
Panel C: Male



(g) Treatment



(h) T1



(i) T2

Note: We plot the 90% confidence bands around the regression coefficients for the three color-coded occupational choices. Standard errors clustered at the polling-station level.

5.2 Aspirations, expectations and beliefs

The intervention's impact on labor market aspirations, expectations, and job satisfaction was assessed at Endline 1 (6 months) and Endline 2 (12 months), comparing treatment groups to the control group. Treatment effects are expressed as percentage changes relative to the control group's baseline mean.

- *Ideal Job Expectations*: T2 reduced the likelihood of reporting working in or toward an ideal job by 9.2% ($p < 0.05$) at Endline 1 and 7.5% ($p < 0.05$) at Endline 2, with stronger effects among men. T2 men also lowered perceived salary gains in ideal jobs ($p < 0.05$), while women's perceptions remained unchanged.

- *Occupational Aspirations*: The intervention shifted aspirations away from salaried work by 3.9% ($p < 0.10$) toward non-participation in the labor force by 61.0% ($p < 0.10$) at Endline 2. T2 women initially reduced self-employment aspirations but rebounded by Endline 2, reflecting flexibility recognition. Both genders in T2 shifted from salaried to self-employment aspirations by Endline 2 (Figure 6).

- *Job Satisfaction*: T2 increased overall job satisfaction by 0.12–0.24 standard deviations ($p < 0.01$–0.05), particularly in monetary, non-monetary, flexibility, environment, and location dimensions. Women in both T1 and T2 reported higher non-monetary satisfaction (0.22–0.24 SD, $p < 0.05$), while T2 men saw broader satisfaction gains (0.18–0.25 SD, $p < 0.05$).

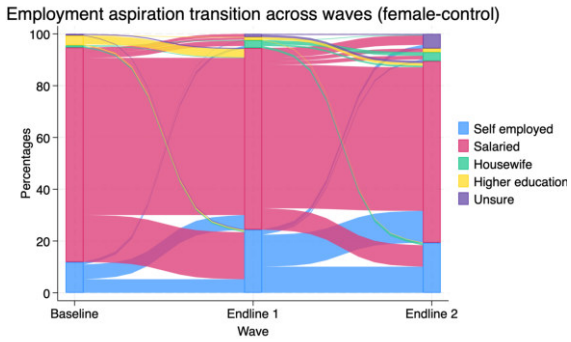
- *Youth (18–24 years)*: T2 reduced ideal job attainment reports for men at Endline 1 and women at Endline 2, with no changes in optimism or earnings expectations. Young T2 women aspired more to non-participation at Endline 1. T2 youth reported higher satisfaction (0.21–0.28 SD, $p < 0.05$), but T1 young women had reduced flexibility satisfaction (0.24 SD, $p < 0.05$).

- *Inactive Job Searchers*: T2 men reported not working toward ideal jobs at Endline

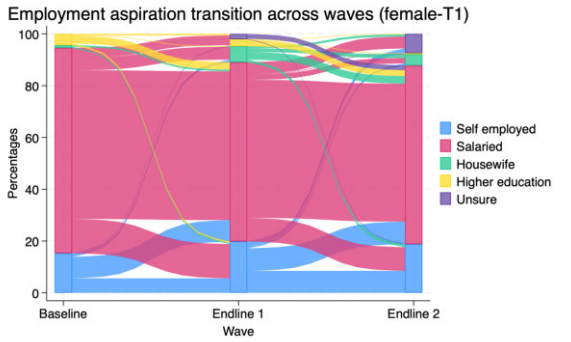
1, with no lasting effect. T1 women lowered self-employment aspirations at Endline 1, while T2 women increased them by Endline 2. T2 men saw significant satisfaction gains across multiple dimensions, unlike women.

- **Currently Enrolled**: At Endline 1, T2 men reported lower ideal job attainment, and women in both arms aspired more to be housewives, fading by Endline 2. T1 reduced satisfaction in work flexibility and location for enrolled individuals, driven by men.

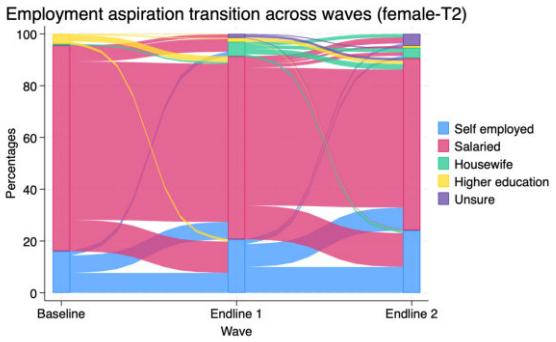
Figure 6: Transitions in labor market aspirations (by gender and treatment group)



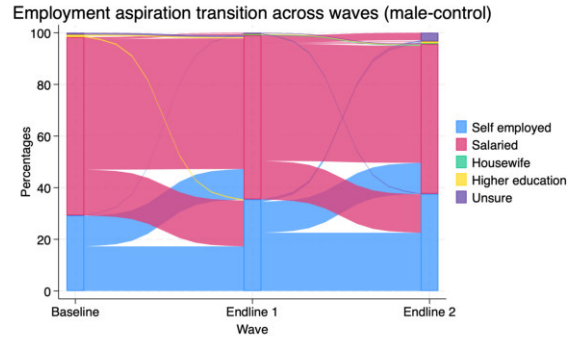
(a) Female - Control



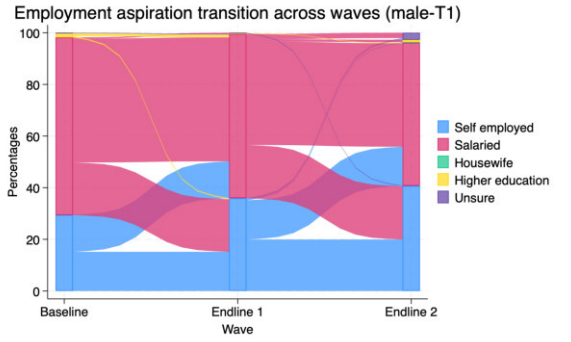
(b) Female - T1



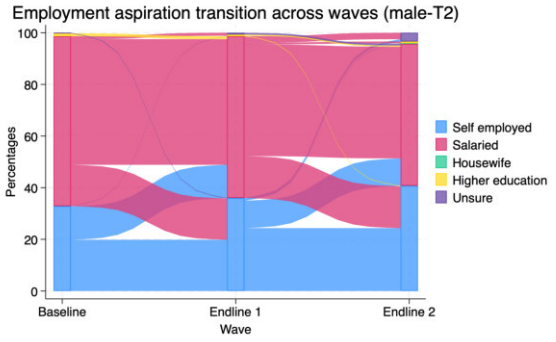
(c) Female - T2



(d) Male - Control



(e) Male - T1



(f) Male - T2

6 Discussion and mechanisms

What explains the observed impacts, including non-impacts, of the intervention? We attempt to explain the impact of the intervention by assessing the respondents' beliefs about the labor market and their employment aspirations, along with the nature of the information provided through the intervention. We discuss the possible pathways for each of our three main findings below.

- *Women Increased Job Search, Men Reduced It*: Women, with lower baseline labor market exposure (69% applied for jobs vs. 74% for men), relied less on social networks and more on digital platforms. The intervention's credible job information reduced search costs, increasing women's platform interest (10 pp higher) and registration (9 pp higher) compared to men. T1 women increased digital platform use by Endline 1, extending to T2 by Endline 2, aligning with their salaried job aspirations. This led to transitions from casual to salaried work in T2, boosting earnings. Men, with overoptimistic salary expectations, reduced job search (4.4 pp at Endline 1, 7.5 pp at Endline 2), especially younger men, due to corrected expectations, resulting in no occupational transitions except a marginal decline in casual work.

- *Personalized Messages Improved Women's Outcomes*: T2's six personalized messages, tailored by gender, education, and job preferences, provided targeted guidance on vacancies, skilling, and government portals over two months. Unlike T1's generic messages, T2 enabled women to access relevant opportunities, viewing more private jobs on government portals ($p<0.05$ vs. T1 women, $p<0.01$ vs. T2 men) and accepting over twice as many jobs by Endline 2 (107%, $p<0.10$). This drove T2 women's shift to salaried work and higher earnings, unlike T1 women or men.

- *Personalized Messages Impacted Beliefs*: T2's targeted messages corrected misaligned expectations more effectively. Men, with greater baseline overoptimism, reduced ideal job perceptions (11%, $p<0.05$) and salary expectations in T2, increasing job satisfaction

(2.9 SD, $p<0.05$) for working men and deferring labor market entry for younger men (5–6 pp more likely to stay enrolled). Women, with limited access to traditional job information, used T2's tailored messages to overcome search frictions, entering salaried jobs with higher satisfaction. Some women shifted aspirations toward non-participation (61.0%, $p<0.10$), reflecting corrected beliefs.

Therefore, the six personalized messages in T2 over the two months of intervention resulted in exposure to relevant and tailored job market information. While men reduced job search and deferred entry into the job market, women leveraged the relevant information to overcome search frictions and move into better jobs. Thus, personalized messaging may have higher potential to correct any mis-alignment and mis-perceptions about the labor market, accelerating belief updation that would otherwise have occurred more slowly through labor market experience.

7 Conclusion

This randomized controlled trial (RCT) in Delhi, India, evaluated a messaging intervention combining in-person information sessions with digital nudges (T1: non-personalized, T2: personalized) to enhance job search behavior, employment, work intensity, and occupational choice among urban job seekers. The findings reveal distinct impacts, underscoring the role of tailored information in addressing labor market frictions.

- *Reduced Job Search, Gender Differences*: The intervention decreased overall job search, particularly among younger men, due to corrected overoptimistic expectations. Conversely, women, especially non-enrolled, increased digital platform use, reducing the gender gap in online job search.

- *Limited Employment Effects, Targeted Gains*: Aggregate employment impacts were minimal, but T2's personalized nudges boosted employment for older and non-enrolled men. Women in T2 saw significant earnings increases in later months and transitioned from casual to salaried work, unlike T1.

- *Belief Correction via Personalization*: Personalized messages in T2 were more effective in aligning mismatched labor market aspirations, particularly for men, who adjusted expectations downward, and for women, who leveraged tailored information to access better jobs.

This study highlights the transformative potential of digital technologies in correcting labor market misperceptions and reducing information frictions. Personalized interventions can drive meaningful outcomes, particularly for women, but require careful design to avoid discouraging job search among youth.

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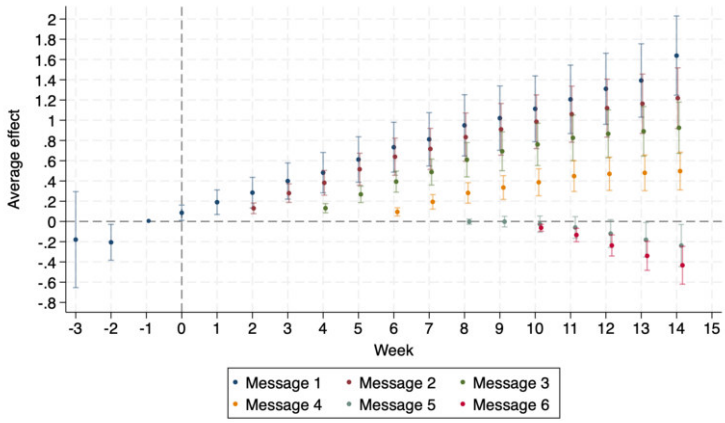
Carranza, Eliana, & McKenzie, David. 2024. Job training and job search assistance policies in developing countries. *Journal of Economic Perspectives*, **38**(1), 221–244.

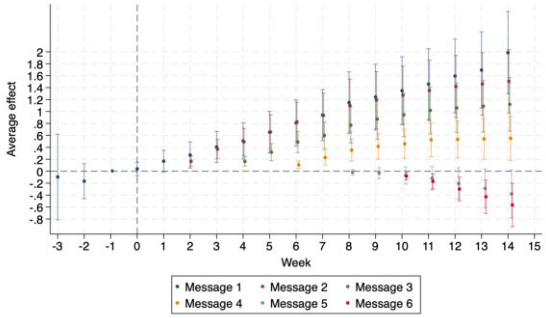
McKenzie, David. 2017. How effective are active labor market policies in developing countries? a critical review of recent evidence. *The World Bank Research Observer*, **32**(2), 127–154.

A Appendix

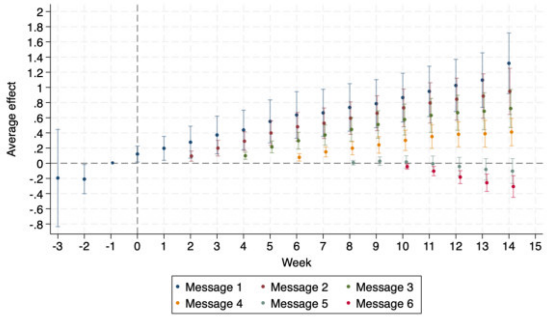
Figure A1: Number of job appllications on the platform by phone message and treatment



(a) **Overall**



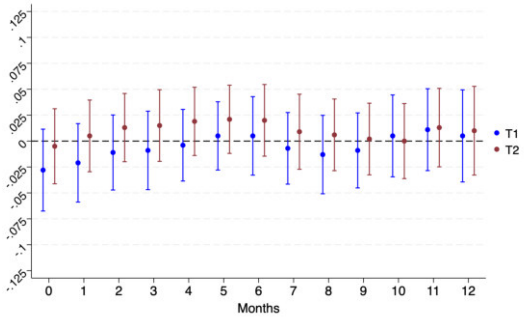
(b) **T1**



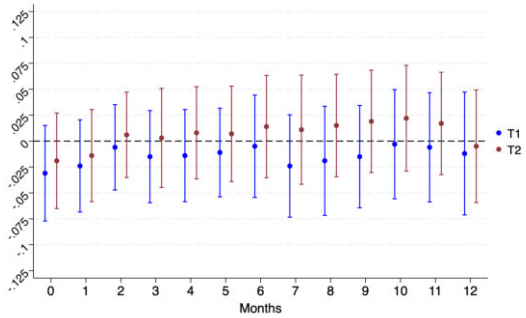
(c) **T2**

Source: Platform data
Note: The event study plots represent the number of jobs applied on the Grey-collared digital platform. Figure (a) reports the overall estimates for all respondents on the platform (N=70,388, Respondents=2299), Figures (b) and (c) report the two treatment groups T1 (N=34,796, Respondents=1144) and T2 (N=35,592, Respondents=1155), respectively. Each of the six messages is treated as a separate event and have been represented with color coded average estimates and 90% confidence bands around these estimates. For the ease of visualisation of the results, we have pooled all the event study plots together by the timing of each message. All specifications control for individual fixed effects and week of observation by default and plot the event-time path. The coefficient for the $t-1$ week is normalised to zero, implying that the plotted coefficients are the estimated effects relative to t period before the first message was received. If we focus on the interpretation of the coefficients for the events plot of the first message (*Message 1* plotted in blue color), the blue colored dots and 90% confidence bands corresponding to the zeroth and first week's observations ($Week = 0\&1$) will capture the effect of the first message. The the bars corresponding to the second and third observations ($Week = 2\&3$) will capture the cumulative effect of the first and the second message as the second message was sent after two weeks of the first message, i.e. at $Week = 2$, and so on for the rest of the messages. On the tenth week from the start of the platform data collection, everyone has received all the six messages. Thus, the blue coefficients from $Week = 10$ onwards will capture the net cumulative effect of all the messages taken together.

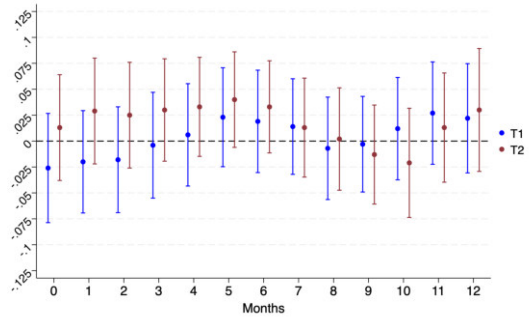
Figure A2: Impact of treatment on current employment (Full sample and Youth)



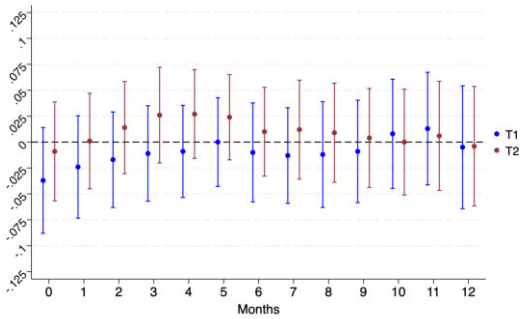
(a) Overall



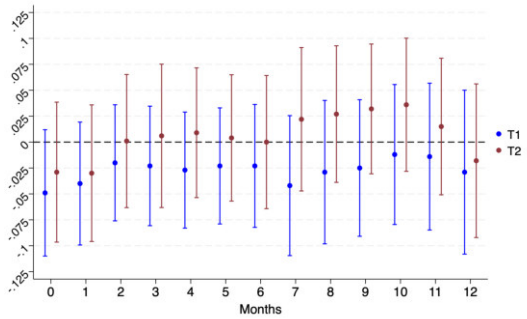
(b) Female



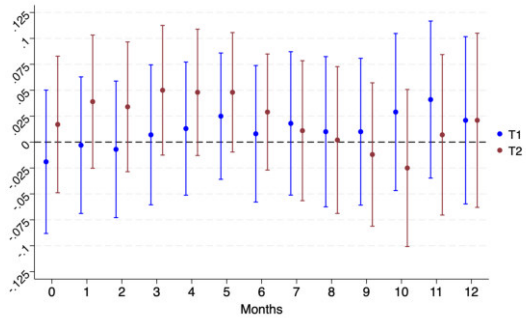
(c) Male



(d) Youth - Overall



(e) Youth - Female

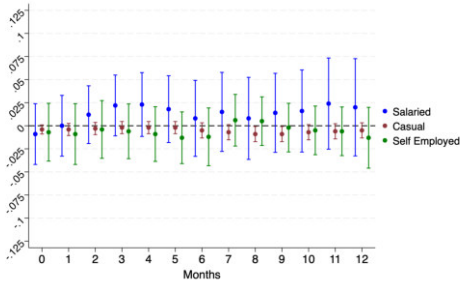


(f) Youth - Male

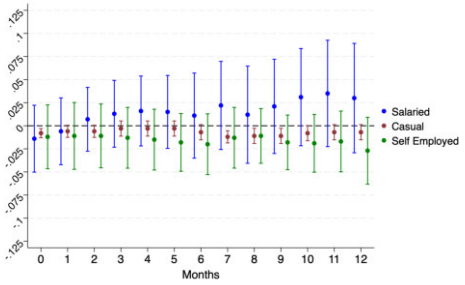
Note: The classification of youth is based on the baseline age of 18-24 years. 90% confidence bands are plotted around the regression coefficients for the two color-coded treatment groups. Standard errors clustered at the polling-station level.

Figure A3: Impact of treatment on occupational choice of Youth Sample (by treatment groups)

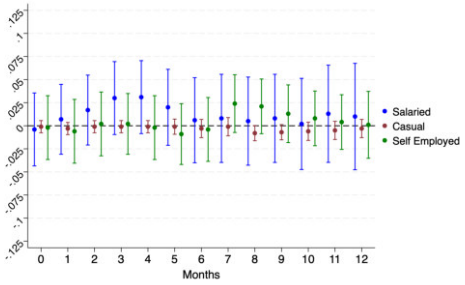
Panel A: Overall



(a) Treatment

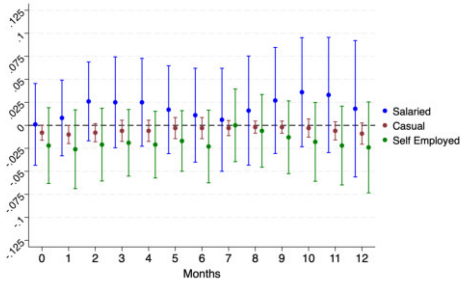


(b) T1

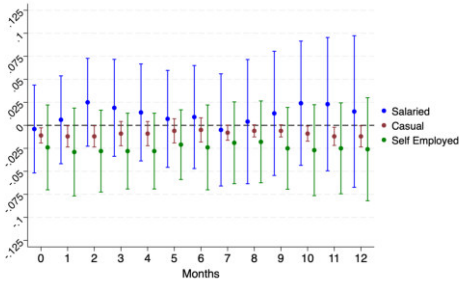


(c) T2

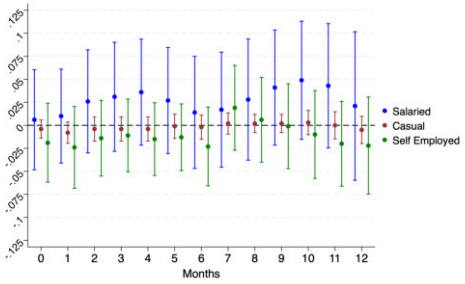
Panel B: Female



(d) Treatment

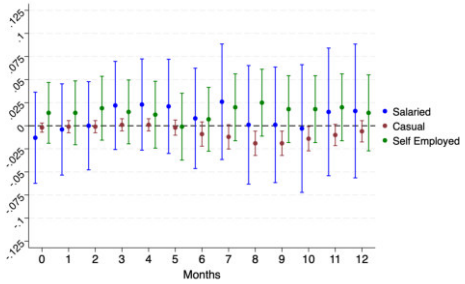


(e) T1

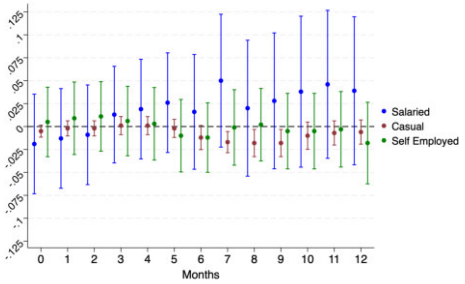


(f) T2

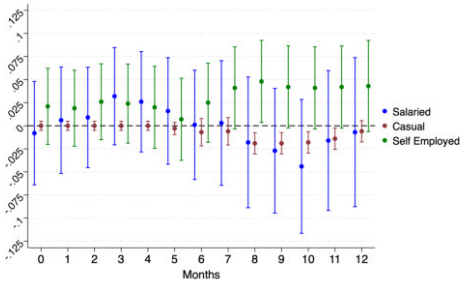
Panel C: Male



(g) Treatment



(h) T1



(i) T2

Note: The classification of youth is based on the baseline age of 18-24 years. 90% confidence bands are plotted around the regression coefficients for the three color-coded occupational choices. Standard errors clustered at the polling-station level.

Table A1: Summary statistics at baseline

Variable	N	Mean	S.D.	Definitions
Panel A: Household Characteristics				
Household Size	3391	4.84	1.68	number of household members
Young Children	3391	0.47	0.81	number of children below 10 years of age
SC/ST	3349	0.29	0.45	=1 if the household belongs to scheduled tribe or caste, 0 otherwise
Hindu	3391	0.87	0.33	=1 if household identifies as Hindu, 0 otherwise
Asset Index	3391	0.00	1.00	PCA of assets
Panel B: Individual Characteristics				
Age	3391	24.07	5.37	years
Female	3391	0.52	0.50	=1 for females, 0 otherwise
Married	3391	0.28	0.45	=1 if married, 0 otherwise
Education	3391	0.61	0.49	=1 if education is above 12th standard, 0 otherwise
Smartphone usage	3391	3.72	2.06	in hours per day
Employed	3391	0.37	0.48	=1 if currently employed, 0 otherwise
Currently looking for work	3391	0.41	0.49	=1 if currently looking for work, 0 otherwise
Uses/used online job platforms	3391	0.34	0.47	=1 if uses/used online job platforms for job search, 0 otherwise
Skill trained	3387	0.32	0.47	=1 if previously acquired skill training, 0 otherwise
Native of Delhi	3389	0.70	0.46	=1 if native of Delhi, 0 otherwise
Years in Delhi	3391	20.46	8.96	number of years stayed in Delhi
Hours worked per day	3391	2.79	4.06	hours per day worked
Days worked per month	3391	9.42	12.64	days per month worked
Monthly earnings (INR)	3391	6157.20	11755.81	monthly income

Note: The *Asset Index* is constructed using principal components analysis (PCA) on the households' ownership of assets (LCD TV, fridge, generator, stove, mixer, sewing machine, washing machine, bike, car, AC, credit card, smartphone, computer, internet, flat, agricultural land, residential land, and commercial land).

Table A2: Balance of individual and household characteristics (at baseline)

	Overall						Female						Male					
	Control	Treatment		Difference			Control	Treatment		Difference			Control	Treatment		Difference		
	C (N=1,088)	T1 (N=1,146)	T2 (N=1,157)	C-T1	C-T2	T1-T2	C (N=581)	T1 (N=589)	T2 (N=598)	C-T1	C-T2	T1-T2	C (N=507)	T1 (N=557)	T2 (N=559)	C-T1	C-T2	T1-T2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Currently looking for work	0.422	0.409	0.398	0.883	0.557	0.609	0.415	0.469	0.432	0.181	0.674	0.319	0.429	0.345	0.363	0.072	0.104	0.786
	(0.494)	(0.492)	(0.490)				(0.493)	(0.499)	(0.496)				(0.495)	(0.476)	(0.481)			
Education level above 12th standard	0.410	0.375	0.398	0.298	0.789	0.462	0.438	0.416	0.438	0.666	0.859	0.578	0.377	0.330	0.354	0.259	0.593	0.516
	(0.492)	(0.484)	(0.490)				(0.497)	(0.493)	(0.497)				(0.485)	(0.471)	(0.479)			
Married	0.286	0.260	0.289	0.244	0.771	0.200	0.363	0.344	0.381	0.647	0.482	0.270	0.198	0.169	0.191	0.307	0.856	0.476
	(0.452)	(0.439)	(0.454)				(0.481)	(0.476)	(0.486)				(0.399)	(0.375)	(0.394)			
Age (in years)	23.966	24.031	24.235	0.813	0.330	0.469	24.331	24.373	24.841	0.901	0.243	0.292	23.546	23.664	23.587	0.736	0.737	0.990
	(5.338)	(5.247)	(5.531)				(5.645)	(5.439)	(5.682)				(4.935)	(5.011)	(5.293)			
Female	0.535	0.517	0.517	0.199	0.273	0.848	-	-	-	-	-	-	-	-	-	-	-	-
	(0.499)	(0.500)	(0.500)				.	.	.	.	.	.	.	.	.	.	.	.
Smartphone usage in a day (in hours)	3.779	3.621	3.759	0.279	0.966	0.325	3.517	3.336	3.556	0.246	0.744	0.195	4.082	3.926	3.977	0.372	0.563	0.737
	(2.050)	(2.058)	(2.088)				(1.927)	(1.929)	(2.158)				(2.145)	(2.148)	(1.988)			
Employed	0.370	0.360	0.375	0.788	0.867	0.662	0.261	0.241	0.272	0.489	0.807	0.368	0.496	0.486	0.486	0.935	0.861	0.922
	(0.483)	(0.480)	(0.484)				(0.440)	(0.428)	(0.445)				(0.500)	(0.500)	(0.500)			
Uses/used online job platforms for job search	0.349	0.328	0.344	0.589	0.933	0.666	0.326	0.336	0.341	0.696	0.678	0.963	0.375	0.319	0.348	0.171	0.555	0.488
	(0.477)	(0.470)	(0.475)				(0.469)	(0.473)	(0.474)				(0.485)	(0.467)	(0.477)			
Skill trained	0.336	0.319	0.323	0.632	0.727	0.877	0.345	0.344	0.344	0.954	0.995	0.943	0.325	0.292	0.301	0.353	0.573	0.717
	(0.472)	(0.466)	(0.468)				(0.476)	(0.476)	(0.475)				(0.469)	(0.455)	(0.459)			
Asset Index	0.036	0.027	-0.046	0.964	0.372	0.425	0.058	-0.037	-0.093	0.416	0.151	0.598	0.010	0.095	0.003	0.365	0.958	0.344
	(1.022)	(1.017)	(0.969)				(1.036)	(0.976)	(0.934)				(1.007)	(1.056)	(1.003)			
Number of children below 10 years of age	0.477	0.442	0.505	0.391	0.411	0.084	0.573	0.589	0.663	0.694	0.089	0.152	0.367	0.284	0.336	0.090	0.617	0.250
	(0.802)	(0.795)	(0.836)				(0.858)	(0.882)	(0.890)				(0.718)	(0.654)	(0.738)			
Number of household members	4.807	4.808	4.922	0.968	0.234	0.196	4.937	5.009	5.115	0.590	0.159	0.351	4.657	4.593	4.717	0.578	0.588	0.228
	(1.723)	(1.641)	(1.703)				(1.726)	(1.772)	(1.771)				(1.709)	(1.459)	(1.603)			
SC/ST	0.268	0.278	0.316	0.769	0.305	0.441	0.280	0.286	0.319	0.855	0.419	0.518	0.254	0.270	0.312	0.714	0.257	0.426
	(0.443)	(0.448)	(0.465)				(0.449)	(0.452)	(0.466)				(0.436)	(0.444)	(0.464)			
Hindu	0.873	0.888	0.865	0.668	0.847	0.597	0.874	0.896	0.847	0.512	0.460	0.227	0.871	0.879	0.884	0.860	0.674	0.796
	(0.334)	(0.316)	(0.342)				(0.332)	(0.306)	(0.361)				(0.336)	(0.327)	(0.320)			
Years in Delhi	20.147	20.840	20.441	0.261	0.498	0.610	19.532	20.374	20.025	0.260	0.411	0.710	20.855	21.340	20.887	0.479	0.791	0.598
	(9.120)	(8.788)	(8.995)				(9.094)	(9.043)	(9.663)				(9.108)	(8.486)	(8.206)			
Native of Delhi	0.681	0.709	0.698	0.327	0.584	0.702	0.680	0.688	0.676	0.744	0.982	0.737	0.683	0.730	0.722	0.180	0.328	0.760
	(0.466)	(0.455)	(0.459)				(0.467)	(0.464)	(0.468)				(0.466)	(0.444)	(0.448)			
Test of joint significance	-	-	-	[0.294]	[0.622]	[0.397]	-	-	-	[0.528]	[0.563]	[0.126]	-	-	-	[0.268]	[0.581]	[0.975]

Note: T1 denotes treatment where the in-person information session and general phone messages was provided; T2 represents treatment in which the in-person information session as well as tailored phone messages were provided and C denotes the control group where no such service was offered. t-test p-values are derived from linear regression, with the variable of interest as the dependent variable and the treatment indicator as an independent variable with standard errors clustered at the PS level (Control group is base for column (4), (5), (10), (11), (16) & (17) and T1 is base for column (6), (12) & (18)). Standard Error is reported in parenthesis. The p-values of joint significance reported in the last row of the table correspond to F-test of joint significance of individual characteristics in determining the treatment status in a linear probability model.

Table A3: Job aspirations, expectations and beliefs (at baseline)

Variable	Gender			Age			Enrollment Status			Job Search Status		
	Female	Male	*p*-value	25 & below	Above 25	*p*-value	N. Enrolled	Enrolled	*p*-value	N. Looking	Looking	*p*-value
	Panel A: Job Aspirations											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Ideal Job	0.74	0.75	0.48	0.76	0.73	0.13	0.72	0.77	0.00	0.76	0.72	0.01
Salaried	0.81	0.67	0.00	0.78	0.69	0.00	0.70	0.80	0.00	0.72	0.78	0.00
Self-employed	0.14	0.31	0.00	0.19	0.28	0.00	0.28	0.16	0.00	0.24	0.20	0.00
Not in labor force	0.05	0.02	0.00	0.04	0.03	0.03	0.02	0.05	0.00	0.04	0.03	0.01
	Panel B: Deviation of Salary Expectation from Actual (INR)											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
All	3466.50	4591.24	0.00	3757.58	4308.58	0.09	3455.21	4545.56	0.00	4125.42	3778.35	0.27
Salaried	5994.45	7123.38	0.00	6338.43	6745.62	0.32	5837.45	7208.87	0.00	6801.21	6121.60	0.09
Accounts keeper	4545.40	7033.34	0.00	5477.59	6197.00	0.36	5045.05	6393.87	0.07	7395.02	3910.11	0.00
Teacher in primary school	10188.50	13957.32	0.00	11401.56	11829.68	0.67	10802.36	12378.68	0.11	12257.23	10821.35	0.15
Data entry operator	1146.22	2716.66	0.02	1842.21	1974.64	0.85	1391.14	2382.08	0.15	1871.73	1908.23	0.96
Hospital attendant/nurse	9187.00	6972.24	0.09	7641.47	9615.60	0.13	7396.69	9606.26	0.08	8265.30	8547.12	0.82
Casual	-378.91	1099.13	0.11	205.67	911.70	0.44	185.28	906.98	0.43	44.20	885.02	0.36
Worker in garment factory	-4019.03	-2133.08	0.01	-2397.70	-3769.33	0.05	-3690.50	-1777.88	0.01	-3304.36	-2715.75	0.40
Electrician/Fitter	4760.23	6991.03	0.42	5222.65	8204.41	0.26	6350.35	6242.45	0.97	5390.82	6989.25	0.53
Obs	1768	1623		2050	1341		1824	1567		2007	1384	

Note: **Panel A** shows the proportion of respondents selecting an employment category, *Self-employed* or *Salaried* or to *Not in labor force* at baseline, disaggregated by gender (columns 1 - 2), age (columns 4 - 5), enrollment status (columns 7 - 8) and Job search status (columns 10 -11). Proportions are based on responses to the question: "What is the career goal that you envisage for yourself?" with original response options recoded into two categories: *Self-employed* includes options 1 (Start your own business), 6 (Work for own or family farm) and 8 (Work for family business); *Salaried* includes options 2 (Work for government or public sector), 3 (Work for an MNC), 4 (Work for a private company), 5 (Work for nonprofit organization), 7 (Work on someone else's farm), and 9 (Professional doctor, lawyer, certified public accountant, etc.)); *Not be in labor force* includes options 10 (Be a housewife) and 11 (Pursue higher education). The *Ideal Job* variable is derived from the binary response (Yes=1, No=0) to "Is the type of job you have now or the job opportunity you are looking for now aligned with your ideal career path?" **Panel B** subtracts the mean mid-point of actual salary ranges (from the platform data) from respondents' expected salaries elicited from baseline survey responses for a job category/type. *All* represents the aggregate across all job types; *Salaried* includes accounts keeper, teacher in primary school, data entry operator, and hospital attendant/nurse; *Casual* worker in garment factory and electrician/fitter.

Table A4: Job search and application behavior (at baseline)

Panel A: Full Sample				
	All (N=3,391) (1)	**Female** (N=1,768) (2)	**Male** (N=1,623) (3)	**Female - Male** (4)
% Ever searched for job	58.478	56.500	60.600	-4.100**
% Ever applied for job (full sample)	41.994	39.200	45.000	-5.800***
% Ever applied (if ever searched)	71.81	69.400	74.300	-4.900**
No. of jobs applied (full sample)	2.747	2.972	2.503	0.469
No. of jobs applied (if ever searched)	4.698	5.259	4.128	1.131
No. of jobs applied (if ever searched and applied)	6.542	7.582	5.557	2.025
Panel B: If ever applied for a job				
	All (N=1,424) (1)	**Female** (N=693) (2)	**Male** (N=731) (3)	**Female - Male** (4)
Family, neighbours and peers				
Prop. applied using this mode	0.549	0.504	0.592	-0.089***
No. of jobs applied	1.871	1.654	2.078	-0.424***
No. of calls to HR	1.346	1.193	1.490	-0.296**
Prop. of interviews received	0.705	0.669	0.736	-0.067
Prop. of job offers received	0.577	0.561	0.590	-0.029
Prop. of offers accepted	0.617	0.562	0.659	-0.097**
Offline job ads				
Prop. applied using this mode	0.029	0.033	0.025	0.008
No. of jobs applied	0.178	0.250	0.111	0.139
No. of calls to HR	0.072	0.095	0.049	0.046
Prop. of interviews received	0.546	0.550	0.541	0.010
Prop. of job offers received	0.320	0.327	0.311	0.017
Prop. of offers accepted	0.500	0.367	0.654	-0.287
Online or app-based platforms				
Prop. applied using this mode	0.345	0.373	0.319	0.054**
No. of jobs applied	4.257	5.411	3.163	2.248
No. of calls to HR	1.756	1.781	1.732	0.049
Prop. of interviews received	0.550	0.524	0.577	-0.053
Prop. of job offers received	0.393	0.411	0.375	0.036
Prop. of offers accepted	0.502	0.228	0.781	-0.553
Educational institutions				
Prop. applied using this mode	0.064	0.077	0.052	0.025**
No. of jobs applied	0.206	0.247	0.167	0.080*
No. of calls to HR	0.173	0.190	0.156	0.035
Prop. of interviews received	0.738	0.657	0.855	-0.197
Prop. of job offers received	0.599	0.560	0.654	-0.094
Prop. of offers accepted	0.571	0.624	0.504	0.120

Note: The table shows self-reported survey data on respondents on job search behavior and modes of search at baseline. Panel A shows the avergae responses for the full sample. In Panel B the sample is conditional on respondents who report having every search for work and applied for work, at baseline. Responses to questions on calls to HR, interviews, job offers and offers accepted are conditional on having applied to at least one job in total or through the respective mode. The values for 'applied using this mode' are in proportions. The difference column shows female - male differences. $***p < 0.01, **p < 0.05, *p < 0.10$.

Table A5: Summary of registration rates on the platform

	All	Female			Male			Female - Male	
Variable		T1	T2	T1 vs. T2	T1	T2	T1 vs. T2	T1	T2
	Panel A: Full Sample								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Interested	64.52	68.59	69.73	[0.885]	57.27	61.90	[0.289]	[0.002]	[0.057]
	(1,486)	(404)	(417)		(319)	(346)			
Registered	99.80	99.75	99.52	[0.582]	100	100	[1.000]	[0.375]	[0.198]
(Conditional)	(1,483)	(403)	(415)		(319)	(346)			
Registered	65.00	68.76	70.57	[0.897]	57.99	62.08	[0.395]	[0.004]	[0.030]
(Unconditional)	(1,497)	(405)	(422)		(323)	(347)			
	Panel B: Youth Sample								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Interested	68.07	72.06	75.23	[0.509]	61.30	64.41	[0.685]	[0.012]	[0.006]
	(936)	(245)	(246)		(217)	(228)			
Registered	99.89	100	99.59	[0.319]	100	100	[1.000]	[1.000]	[0.336]
(Conditional)	(935)	(245)	(245)		(217)	(228)			
Registered	68.58	72.35	76.25	[0.380]	61.86	64.69	[0.752]	[0.015]	[0.003]
(Unconditional)	(943)	(246)	(249)		(219)	(229)			

Note: Individuals in the treatment group (N=2303) were offered the opportunity to register on the platform. The first row reports the *Interest rate* of the respondents to join the platform. The second and third row report the Conditional and Unconditional *Registration rates*, respectively. The former conditions registration (including already registered before treatment) on being interested in on-boarding the platform while the latter is unconditional. The registration rates (unconditional) in Panel A are slightly greater than the interest rates due to 14 individuals (T1: 6 & T2: 8) who expressed no interest in registering but registered on the platform anyway. Columns (1)-(9) list the sign-up rates for the respondents who were treated- overall (column (1)), for the treated women (columns (2)-(4)) and treated men (columns (5)-(7)). Columns (4) and (7) report T1 vs. T2 p-values within gender groups. Columns (8)-(9) report Female-Male p-values for T1 and T2 respectively. The number of respondents per category is in parentheses.