

CAN TECHNOLOGY FREE TIME? EXPERIMENTAL EVIDENCE FROM AN AI CHATBOT HELPING CASEWORKERS SOLVE EMPLOYERS' HIRING DIFFICULTIES

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MOTIVATION

- In most instances, the hiring process is asymmetric
 - Employers post job ads / Workers apply / Employers screen applicants and make offers
- Several types of frictions:
 - **Job seeker inattention** may cause hiring firms to receive **too few applications**
 - **Wrong perceptions** about jobs could lead to **too many / unsuitable applications**
- Recruiters take an active role to alleviate these issues
 1. **Screen applications** (filter out unsuitable applicants)
 2. **Source applications** (browse CV bank)
- **Sourcing applications is costly:** recruiters need to check interest and availability
- Question: Can **technology designed to reduce the costs of acquiring information about potential candidates** help improve hiring?

THIS PAPER

- **Randomised intervention:** SMS chatbot to contact job seekers and ask about interest/suitability
- For a given vacancy, **ask a large number of workers** (up to 50) about: interest in the job, salary, location, and tasks
- What is the impact on hiring and hiring speed?
 - **15% more hires via the PES platform**
 - **Effect strongest 30–45 days after recruitment start**, but persists for at least 90 days
- Suggestive evidence on channels:
 - **Reduced sourcing costs** seem to **also improve screening**

CONTRIBUTION TO THE LITERATURE

- **Information frictions in hiring:** Pallais 2014; Abel, Burger, and Piraino 2020; Carranza, Garlick, Orkin, and Rankin 2022; Algan, Crépon, and Glover 2022
- **The role of caseworkers in the matching process:** Schiprowski 2020; Cederlöf, Söderström, and Vikström 2025
- **AI to help the matching process** (so far mostly about recommender systems): Bied et al. 2023; Behaghel, Dromundo, Gurgand, Hazard, and Zuber 2025; Le Barbanchon, Hensvik, and Rathelot 2023
- **AI tools at the workplace: productivity and time gains:** Agarwal, Moehring, Rajpurkar, and Salz (2023); Noy and Zhang (2023); Brynjolfsson, Li, and Raymond (2025); Dell'Aqua et al. (2026); Cui, Demirer, Jaffe, Musolff, Peng, and Salz (2026); Humlum and Vestergaard (2025); Dillon, Jaffe, Immorlica, and Stanton (2025)
- **The performance of HR officers and civil servants:** Dal Bo, Finan, and Rossi (2013); Hoffman, Kahn, and Li (2018); Muñoz and Prem (2024); Muñoz and Otero (2025)

INTERVENTION

BACKGROUND: PES RECRUITMENT SERVICES

- French PES offers extensive, free-of-charge recruitment services to firms (Algan et al., 2020)
 - Find suitable, interested candidates in the PES CV bank (*sourcing*)
 - Pre-filter jobseeker-initiated applications (*screening*)
 - ⇒ Present shortlists of 5–10 pre-screened candidates ("Preselection")
- Preselection services offered on ads posted with a flag indicating that the firm wants help from the PES
- The flag can be set by the firm or recommended to the firm by the caseworker

VACANCY POSTING

The screenshot displays a web application interface for managing job offers. At the top, there are browser tabs for 'APPLICATION DUNE ENVIRONNE' and 'NOUVELLES OFFRES | PORTEFE'. Below the browser tabs is a navigation bar with links: 'Accueil', 'Etablissement', 'Offres et candidatures', 'Recherches', 'Plans d'Actions', and 'Activités & Pilotage Etab.'. A green banner message states: 'Cette offre d'emploi ne comporte aucune donnée personnelle du recruteur susceptible d'être diffusée.' Below this, a link reads 'Rechercher des offres et rapprocher : Détail de l'offre 184BMCW'. The main content area is titled 'Récapitulatif de l'offre' and contains three sub-tabs: 'Descriptif de l'offre', 'Suivi des candidatures', 'Gestion de l'offre', and 'Journal de l'Offre'. The 'Descriptif de l'offre' tab is active, showing a 'Description' section with a 'Score' column. The job details include: 'Emploi proposé', 'ROME (Fusion) : K1202', 'Appellation ROME : Educateur / Éducatrice de jeunes enfants', 'Intitulé personnalisé : Educateur / Éducatrice de jeunes enfants -Réfèrent technique H/F', 'Nombre de postes initial : 1', 'Nombre de postes restants : 1', and 'Autre(s) compétence(s) :'. A link 'Voir les 4 savoirs et savoir-faire renseignés' is provided. The 'Descriptif du poste' section lists 'Vos principales missions seront les suivantes :', followed by a list of responsibilities: 'Encadrement/ management d'équipe (4 personnes) : - participer à l'élaboration du projet d'établissement et êtes chargé(e) de son application ; - accompagner et coordonner de l'activité des professionnel (le)s chargé(e)s de l'encadrement des enfants, encadrement d'une équipe de 4 personnes.', 'l'encadrement des enfants, encadrement d'une équipe de 4 personnes ; - mener des projets avec son équipe, en collaboration avec les autres micros crèches ; - gérer les plannings de l'équipe, gestion des congés ; - participer aux entretiens de recrutement', 'travailler avec une équipe pluridisciplinaire : Psychologue, EJE, réfèrent santé..', and '7h de temps administratif par semaine'. The 'Accompagnement des enfants et de leurs familles' section includes 'Accueillir et informer les familles'. At the bottom, there are three buttons: 'Retour à la liste des résultats', 'Accéder à la liste des profils pour cette offre', and 'Effectuer la mise en contact'.

APPLICATION DUNE ENVIRONNE x NOUVELLES OFFRES | PORTEFE x +

Accueil | Etablissement | Offres et candidatures | Recherches | Plans d'Actions | Activités & Pilotage Etab.

✓ Cette offre d'emploi ne comporte aucune donnée personnelle du recruteur susceptible d'être diffusée.

Rechercher des offres et rapprocher : Détail de l'offre 184BMCW

Récapitulatif de l'offre

Descriptif de l'offre | Suivi des candidatures | Gestion de l'offre | Journal de l'Offre

Description Score

Emploi proposé

ROME (Fusion) : **K1202**

Appellation ROME : **Éducateur / Éducatrice de jeunes enfants** [Voir les 4 savoirs et savoir-faire renseignés](#)

Intitulé personnalisé : **Éducateur / Éducatrice de jeunes enfants -Réfèrent technique H/F**

Nombre de postes initial : **1**

Nombre de postes restants : **1**

Autre(s) compétence(s) :

Savoir-être professionnel(s) :

Descriptif du poste

Vos principales missions seront les suivantes :

Encadrement/ management d'équipe (4 personnes) :

- participer à l'élaboration du projet d'établissement et êtes chargé(e) de son application ;
- accompagner et coordonner de l'activité des professionnel (le)s chargé(e)s de l'encadrement des enfants, encadrement d'une équipe de 4 personnes.

l'encadrement des enfants, encadrement d'une équipe de 4 personnes ;

- mener des projets avec son équipe, en collaboration avec les autres micros crèches ;
- gérer les plannings de l'équipe, gestion des congés ;
- participer aux entretiens de recrutement
- travailler avec une équipe pluridisciplinaire : Psychologue, EJE, réfèrent santé..
- 7h de temps administratif par semaine

Accompagnement des enfants et de leurs familles :

- Accueillir et informer les familles

Retour à la liste des résultats | Accéder à la liste des profils pour cette offre | Effectuer la mise en contact

Screenshot: vacancy posting in caseworkers' digital portal

CANDIDATE LIST: CONTROL

[← Retour à l'offre](#)

 **Offre N°184BMCW - Éducateur / Éducatrice de jeunes enfants -Réfèrent technique H/F**
64 - Serres-Castet

▼

 **Candidats correspondant à l'offre**

Ces candidats ont déclaré rechercher ce poste et possèdent tout ou partie des critères/compétences indiqués par le recruteur.

Type de profils ?

- ☒ Tous les profils (98)
- ☐ Tous les inscrits (60)
- ☐ Inscrits du bassin (0)
- ☐ Inscrits de l'agence (0)

DISPONIBILITÉ ▼

LIEU DE RECHERCHE DU CANDIDAT ▼

MÉTHODE DE RECRUTEMENT ▼

ÉLIGIBILITÉ ▼

DATE DE MISE À JOUR DU PROFIL ▼

MÉTIERS EN TENSION ▼

Critères de l'offre :

-  CDI ×
-  35H / semaine ×
-  2100 € mensuel ×
-  Expérience de 3 ans ×
-  Bac+3, Bac+4 ou équivalents (exigé) ×
-  Bac+3, Bac+4 ou équivalents (exigé) ×

Compétences de l'offre :

-  Accompagner l'enfant dans l'apprentissage des gestes de la vie quotidienne et des règles de vie en collectivité ×
-  Aménager le lieu de vie, d'accueil des enfants et vérifier la sécurité des équipements ×
-  Concevoir un projet éducatif ×
-  Organiser et animer des activités ludiques et d'éveil ×

98 profils pour ces critères

EXPORT EXCEL

Screenshot: control vacancy view, candidate list in caseworkers' digital portal

CANDIDATE LIST: CONTROL II

 Éducateur / Éducatrice de jeunes enfants	64 - Morlaàs	CV	 Comparatif de compétences	100 %	>
 Éducateur / Éducatrice de jeunes enfants	65 - Gez	Aucun CV	 Comparatif de compétences	100 %	>
 Éducateur / Éducatrice de jeunes enfants	64 - Gelos	CV	 Comparatif de compétences	100 %	>
 Éducateur / Éducatrice de jeunes enfants	64 - Cescou	CV	 Comparatif de compétences	100 %	>

Screenshot: control vacancy view, candidate list in caseworkers' digital portal

CANDIDATE LIST: TREATMENT

[← Retour à l'offre](#)

Offre N°190DMPV - Auxiliaire de vie (H/F)
45 - Saint-Jean-De-Braye

NOUVEAU

[Préqualification de candidats](#)[Candidats correspondant à l'offre](#)[Recherche via les Aires de mobilité](#)[Recherche par Mots clés](#)[Recherche par ROME ou domaine](#)

Retrouvez ici une liste de candidats que vous pouvez préqualifier par SMS pour vérifier certains prérequis de l'offre.

Type de profils ? :

☒ Tous les profils (463)☐ Inscrits (304)☐ Inscrits du bassin (0)☐ Inscrits de l'agence (0)

État de la préqualification ? :

☒ Tous les profils (463)☐ Profils avec préqualification (0)☐ En cours (0)☐ Terminée - tous les prérequis validés (0)
☐ Terminée - prérequis validés partiellement (0)☐ Terminée - aucun prérequis validé (0)☐ Sans réponse (0)☐ Profils préqualifiables

Candidats correspondant à l'offre (463)

Choisissez l'action que vous souhaitez réaliser [Préqualifier](#) [Mettre en contact](#)

☐ Sélection des 50 premiers candidats préqualifiables de la liste de résultats i

☐	Melissa Auxiliaire de vie	45 - Saint-Jean-de-Braye	Aucun CV	100 %	>
☐	Virginie Auxiliaire de vie	45 - Saint-Jean-de-Braye	Aucun CV	100 %	>

Screenshot: treated vacancy view, candidate list in caseworkers' digital portal

SEND SMS

LANCER LA PRÉQUALIFICATION

FERMER

1 candidat sélectionné pour la préqualification par SMS

Sélectionnez les prérequis à valider pour cette offre

- | | |
|---|-------------------------------------|
| ☒ Intérêt | ☐ Salaire |
| ☐ Disponibilité | ☐ Expérience |
| ☐ Mobilité | ☐ Missions |
| ☐ Horaires | |

PRÉVISUALISER

Screenshot: content of inquiry

SMS CONVERSATION EXAMPLE

Bonjour ZACHARIE, je suis l'assistant virtuel du conseiller France Travail MIRAMAS qui vous propose un poste de Serveur / Serveuse de restaurant (H/F) (lieu: Miramas; réf: 180JQSD) et souhaite confirmer avec vous quelques informations. Toute réponse ou absence de réponse n'aura aucune conséquence sur votre inscription à France Travail ou sur vos allocations. Êtes-vous intéressé(e) par cette offre ? Envoyez STOP pour ne plus recevoir ce type de sollicitation par SMS.

C'est qui ?

Je suis l'assistant virtuel du conseiller France Travail. Je suis là pour vous aider à valider votre qualification pour l'offre d'emploi de Serveur / Serveuse de restaurant à Miramas. Êtes-vous intéressé(e) par cette offre ?

Oui

Parfait, merci pour votre intérêt. Pouvez-vous me confirmer que vous êtes mobile pour vous rendre sur le lieu de travail à Miramas ?

Oui

Merci pour votre réponse. Enfin, l'offre implique certaines tâches comme l'accueil des clients, la prise de commandes, le dressage et le débarrassage des tables, ainsi que l'entretien et le nettoyage de la salle, des douches et des toilettes. Êtes-vous d'accord avec ces tâches ?

Qu'est-ce que le dressage ?

Le dressage de table dans le contexte de la restauration fait référence à la préparation et à la mise en place de la table avant l'arrivée des clients. Cela inclut la disposition des couverts, des verres, des serviettes, etc. Êtes-vous d'accord avec ces tâches ?

SMS CONVERSATION EXAMPLE (OWN TRANSLATION)

Hello ZACHARIE, I am the virtual assistant of the France Travail caseworker from MIRAMAS who is offering you a position as a Restaurant Server (M/F) (location: Miramas; ref: 180JQSD) and would like to confirm some information with you. Any response or lack of response will have no consequence for your registration with France Travail or for your benefits. Are you interested in this offer? Send STOP to no longer receive this type of request by SMS.

Who is this?

I am the virtual assistant of the France Travail caseworker. I am here to help you confirm your qualifications for the Restaurant Server job in Miramas. Are you interested in this offer?

Yes

Great, thank you for your interest. Can you confirm that you are able to travel to the workplace in Miramas?

Yes

Thank you for your reply. Finally, the offer involves certain tasks such as welcoming customers, taking orders, setting and clearing tables, as well as maintaining and cleaning the dining area, showers, and toilets. Are you comfortable with these tasks?

What does “setting” mean?

Setting the table, in the context of restaurants, refers to preparing and arranging the table before the customers arrive. This includes laying out the cutlery, glasses, napkins, etc. Are you comfortable with these tasks?

SCREENING INTERFACE

Comparer l'offre et le profil du candidat

	 Offre n°205JRRJ Voir le détail de l'offre	 Profil de M. [REDACTED] Voir le détail du profil
Intitulé du poste	Encadrant(e) technique d'insertion socioprofessionnelle	Pas de correspondance dans le profil
Lieu de travail	28 - CHARTRES	BAILLEAU-ARMENONVILLE (28) + 30 km
Expérience	3 ans d'expérience exigée - encadrement en ACI	Pas de correspondance dans le profil
Formation(s)	Bac ou équivalent - Encadrement technique insertion exigé	Pas de correspondance dans le profil
Permis	B - Véhicule léger exigé	B - Véhicule léger
Type de contrat	CDI (CDI)	CDI (Contrat à durée indéterminée)
Durée hebdomadaire	39 heures	Temps plein
Salaire	2300€ à 2500€ Mensuel, sur 12 mois Complémentaire santé, CSE	1900€ mensuel

Screenshot: screening interface in caseworkers' digital portal

EXPERIMENTAL ROLL-OUT

- Randomised controlled trials in three French regions
- Eligible: ads posted with a flag indicating that they want help from the PES ("preselection")
- We do not know in advance who will post vacancies:

randomise at the establishment level among all firms with 1+ job posting since 2019

- NB: A caseworker can have treated and non-treated establishments in their portfolio
- Staggered roll-out
 - **Sep 12 2024:** Pilot deployment in a few employment agencies
 - Nov 21 2024: deployed in first batch of employment offices, 50/50 treatment
 - Dec 12 2024: deployed in second batch of employment offices
 - Feb 6 2025: treatment-control split switched to 75/25. Newly treated establishments: random draw of half of previously control-group establishments
 - May 2025: scale-up to all ads
- Stratification: deciles of predicted vacancy posting probability

SAMPLE DESCRIPTION

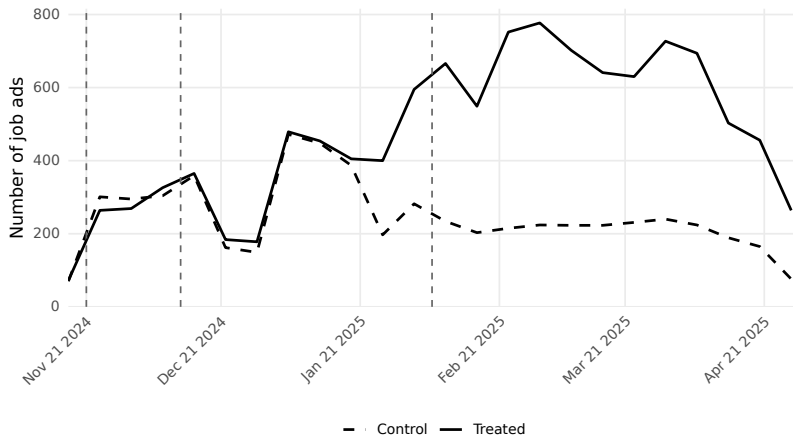
SAMPLE SIZE/RESTRICTIONS

- Sample restrictions
 - Job ads with preselection
 - Geography: three regions where the experiment was deployed
 - Time: ads posted between Nov 21 2024 (RCT start) and May 1 2025 (scale-up)
 - Filter out ads posted between January 21 2025 and Feb 6 2025 in establishments that switched treatment status on Feb 6, as their treatment status is ambiguous due to IT constraints
- Sample size
 - 17,225 ads; 5,873 control, 11,352 treated
 - Posted by 8,487 establishments
 - Assigned to 618 caseworkers
 - In 87 unemployment offices

MAIN OUTCOME

- We measure hires from a matched employer-employee dataset, matched to unemployment registers at the employer $\times$ worker level
- We can link hires to a particular ad, leveraging the fact that we know the exact set of applicants that was delivered to the employer by caseworkers
- We can trace whether the hire came from screening, sourcing, and whether MatchFT was used
- Caveats:
 - Firms can post multiple job openings (and workers can apply to more than one)
 - Firms can, in theory, hire from other platforms at the same time

EXPERIMENTAL SAMPLE: WEEKLY INFLOW OF JOB ADS



Notes: Weekly number of job ads entering preselection mode, by treatment status. Vertical dashed lines mark the roll-out dates: November 21, 2024 (first batch), December 12, 2024 (second batch), and February 6, 2025 (treatment share increased from 50% to 75%).

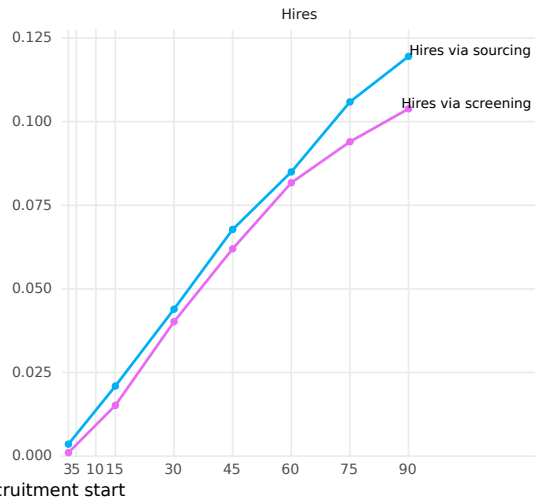
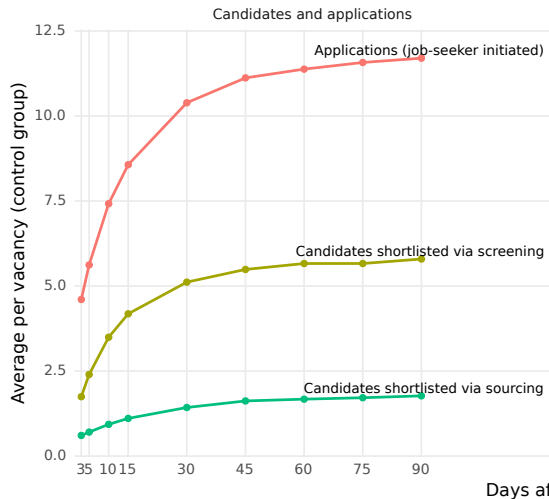
BALANCE ON PRE-DETERMINED COVARIATES

	Model	Control mean	Treatment
Ad characteristics			
Predicted vacancy filling score (IEE)	OLS	0.464	0.005 (0.003)
Min. salary (annual FTE)	OLS	23837.769	13.400 (104.286)
Max. salary (annual FTE)	OLS	28994.785	-815.929 (501.963)
Posting firm size			
Size: 10 or less	OLS	0.381	0.002 (0.011)
Size: 11–25	OLS	0.138	-0.002 (0.007)
Size: 26–50	OLS	0.160	0.005 (0.008)
Size: more than 50	OLS	0.243	-0.013 (0.008)
Size: missing	OLS	0.078	0.008 (0.006)
Posting firm industry			
Sector: Construction	OLS	0.053	-0.001 (0.005)
Sector: Manufacturing	OLS	0.099	0.008 (0.007)
Sector: Commerce	OLS	0.142	-0.008 (0.008)
Sector: Services	OLS	0.146	0.015** (0.008)
Sector: Health	OLS	0.195	-0.004 (0.008)

	Model	Control mean	Treatment
Pre-period hire rates			
Hires via portal per ad — all (45d)	OLS	0.117	0.009 (0.007)
Hires via portal per ad — all (90d)	OLS	0.190	-0.000 (0.009)
Hires via portal per ad — sourcing (45d)	OLS	0.069	-0.001 (0.006)
Hires via portal per ad — sourcing (90d)	OLS	0.118	-0.015** (0.007)
Hires via portal per ad — screening (45d)	OLS	0.052	0.011** (0.005)
Hires via portal per ad — screening (90d)	OLS	0.083	0.014** (0.006)
Pre-period counts			
Ads posted (pre-period)	Poisson	23.228	-0.197 (0.245)
Ads in preselection (pre-period)	Poisson	3.726	-0.003 (0.126)
Referrals per ad — all (45d)	Poisson	6.682	0.011 (0.037)
Referrals per ad — sourcing (45d)	Poisson	1.919	0.030 (0.045)
Referrals per ad — screening (45d)	Poisson	4.764	0.002 (0.045)
Applications per ad (45d)	Poisson	8.792	0.015 (0.044)
Total hires — DPAE	Poisson	20.606	-0.081 (0.079)

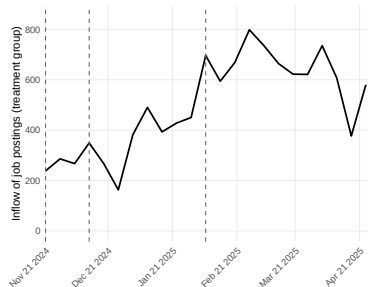
Notes: One observation is one ad in the experimental sample. Treatment effects from OLS with adjusted SEs for continuous and binary outcomes, and from Poisson regressions with strata $\times$ sub-experiment and agency $\times$ sub-experiment fixed effects for count outcomes (standard errors clustered at the establishment level). Pre-period: Sept 2023–Aug 2024. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

RECRUITMENT PROCESS: CONTROL GROUP

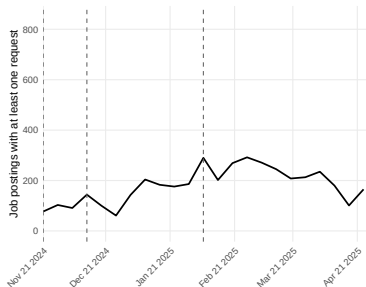


Notes: Average counts per vacancy in the control group, by days after recruitment start.

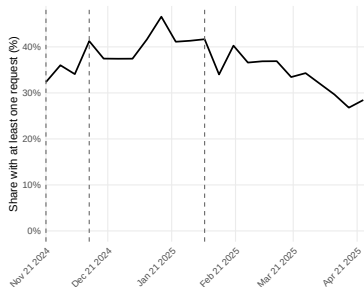
TAKE-UP OVER TIME



(a) Weekly number of ads posted by treated firms.



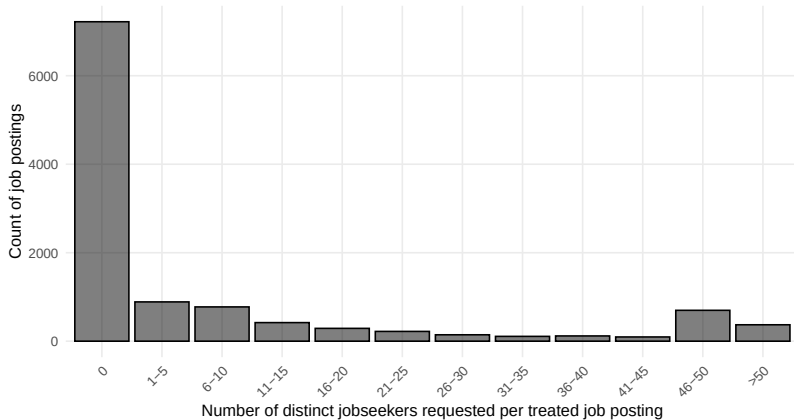
(b) Number of job ads with at least one MatchFT request.



(c) Share of treated ads that receive at least one MatchFT request.

Notes: The date refers to the day on which the preselection process started for the ad. Vertical dashed lines mark the roll-out dates: November 21, 2024 (first roll-out in a subset of agencies), December 12, 2024 (roll-out in the remainder of agencies), and February 6, 2025 (increase of treatment share to 75%).

DISTRIBUTION OF MATCHFT REQUESTS ACROSS (TREATED) JOB ADS



Notes: Average for those with non-zero requests: 27 requests

USAGE, RESPONSE RATE, AND SELECTIVITY

Criteria	Asked in N ads	Share	N requests	Positive answers	Referrals among pos. answers	Referrals among neg. answers
Interest	4'139	100.0%	108'842	5.1%	42.4%	1.5%
Availability	3'452	83.4%	87'662	4.1%	49.9%	1.8%
Tasks	2'621	63.3%	67'346	3.7%	53.7%	1.9%
Mobility	2'520	60.9%	67'317	3.6%	50.2%	1.7%
Experience	2'369	57.2%	63'254	3.4%	52.0%	1.9%
Working hours	1'592	38.5%	35'336	3.6%	49.2%	2.1%
Wage expectations	1'417	34.2%	33'548	3.6%	48.1%	2.0%

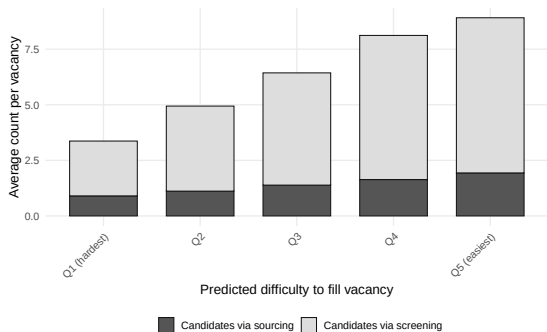
Notes: Summary statistics for job postings in the treatment group with at least one MatchFT request. No answers ('Answer pending') are counted as negative answers.

1-2 SOURCED CANDIDATES PER AD STEM FROM THE TECHNOLOGY

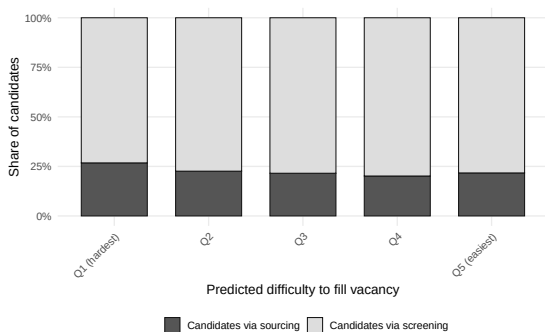
	All postings		Postings with MatchFT req.	
	Mean	Median	Mean	Median
Total candidates per posting	7.7	5.0	7.6	5.0
Via sourcing	2.2	1.0	2.2	2.0
- out of which after MatchFT request	0.7	0.0	1.2	1.0
Via screening	5.6	3.0	5.3	3.0

Notes: Summary statistics for job postings in the treatment group with at least one referral.

COMPOSITION OF SHORTLISTED CANDIDATES (CONTROL GROUP)



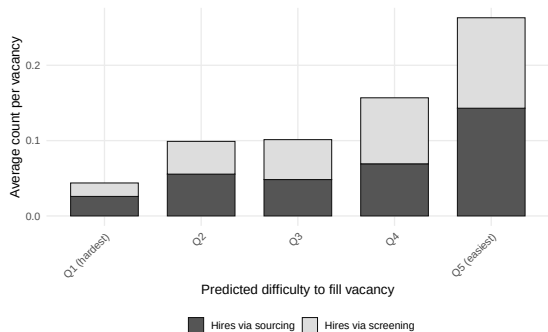
(a) Average number of candidates per vacancy.



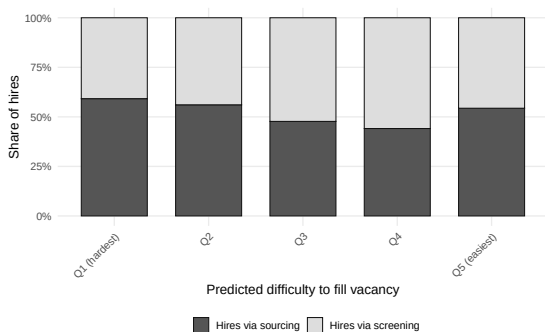
(b) Share of candidate types.

Notes: By quintile of predicted vacancy filling difficulty (IEE score). Candidates measured within 30 days. Control group only.

COMPOSITION OF HIRES (CONTROL GROUP)



(a) Average number of hires per vacancy.



(b) Share of hire types.

Notes: By quintile of predicted vacancy filling difficulty (IEE score). Hires measured within 45 days. Control group only.

METHODOLOGY

METHODOLOGY

- Baseline: ad-level analysis
 - For all ads in preselection: has a hire from the platform been made within X days?
 - Challenges
 - Filling rate might vary over time, and so does the treatment roll-out
 - Account for stratification and redraw for the treatment roll-out
- ⇒ Add strata FE interacted with an indicator for two periods, before and after the treatment-share increase (Feb 6 2025)

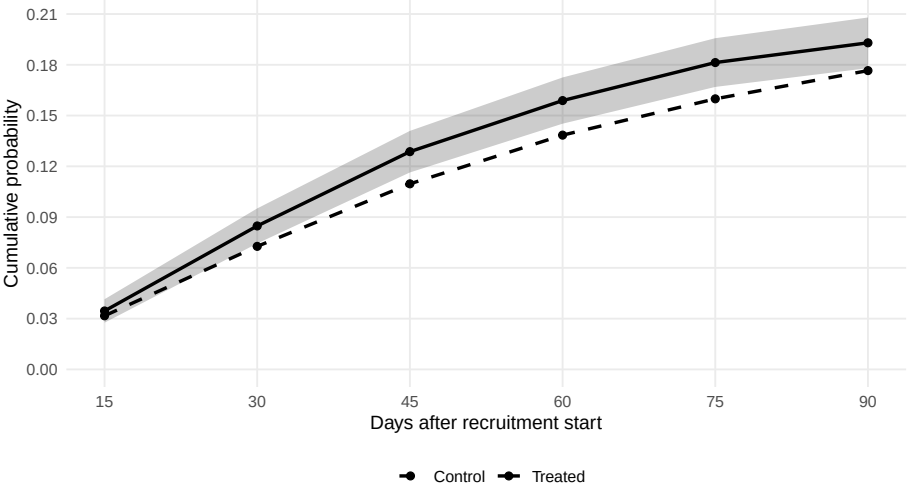
$$Y_i = \beta D_{e(i)} + \theta_{s(i), p(i)} + \varepsilon_i$$

STANDARD ERRORS

- Bugni et al. (2018): if treatment share $\neq 0.5$, strata FE lead to conservative standard errors
- Apply proposed correction using the `sreg` package
- Estimator not designed for clustering
- Aggregate data at the establishment $\times$ post-Feb-6 level

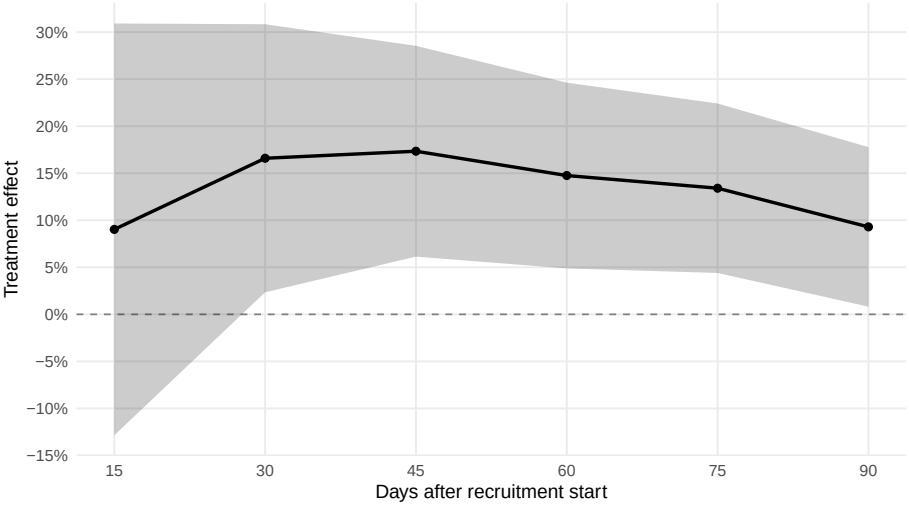
RESULTS

IMPACT ON HIRES



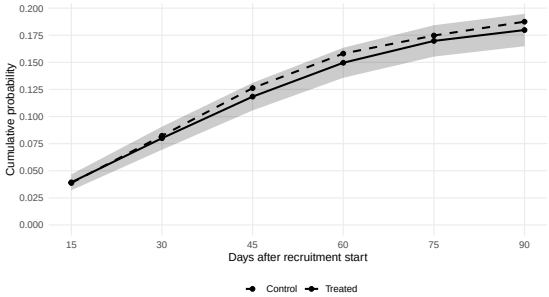
Notes: Results from horizon-specific linear regressions. Outcome: binary indicator of hire through the PES for the job posting. One observation is one establishment; if an establishment has posted more than one job ad, the filling rates are averaged at the horizon level. Subexperiment denotes an indicator variable for whether the preselection process for the vacancy started after Feb 6 2025, when the treatment share was increased from 50 to 75%. The outcome is averaged at the establishment $\times$ subexperiment level and the standard errors are adjusted following Bugni et al. (2018).

IMPACT ON HIRES

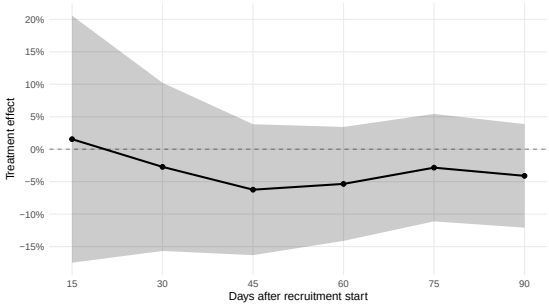


Notes: Results from horizon-specific linear regressions. Outcome: binary indicator of hire through the PES for the job posting. One observation is one establishment; if an establishment has posted more than one job ad, the filling rates are averaged at the horizon level. Subexperiment denotes an indicator variable for whether the preselection process for the vacancy started after Feb 6 2025, when the treatment share was increased from 50 to 75%. The outcome is averaged at the establishment $\times$ subexperiment level and the standard errors are adjusted following Bugni et al. (2018).

PLACEBO: YEAR BEFORE



(a) Levels



(b) Percentage

Notes: The placebo test includes job postings from Nov 21 2023 to April 30 2024. Postings with preselection process start dates between Nov 21 and Feb 6 2024 are assigned their establishment's treatment status from the experiment's 50/50 draw, and postings with a preselection process starting on Feb 6 or later are assigned the 75/25 treatment status.

ROBUSTNESS

- + unemployment office FE
- + past-outcome controls
- Outcome: all indicated positions filled (instead of at least one)
- Outcome: N hires using Poisson regression

CHANNELS

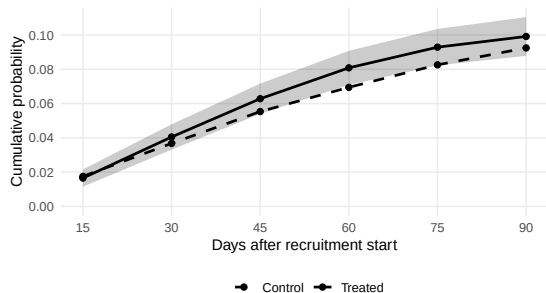
TESTING MECHANISMS

- Caseworkers provide two services:
 - (A) **Sourcing**: find suitable, interested candidates in the PES CV bank
 - (B) **Screening**: filter job-seeker-initiated applications
 - (A) + (B) exhaustively account for all on-platform hires
- Two main ways in which the treatment could work
- Candidate selection mechanism
 - Either more or better-selected (A).
 - More outside options from (A) $\Rightarrow$ more selective with (B)
- Bureaucratic efficiency mechanism
 - More time for (B). *For this vacancy and others*

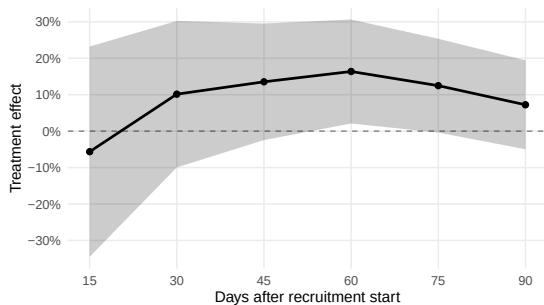
TESTING MECHANISMS, EMPIRICAL STEPS

- Split the on-platform hires into whether they come from sourcing or screening
 - (A) Sourcing: caseworker contacts candidates from the CV bank
 - (B) Screening: caseworker filters job-seeker-initiated applications
- For both channels, look at treatment effects on
 - Quantity
 - Quality (success probability of sourced / screened candidates)
 - Overall: hires from sourcing / screening
 - Spillovers from time gains *across* ads
 - ★ Use high-frequency fluctuations in the share of treated ads per caseworker
 - ★ Compute share 7 days around ad posting date

EFFECT ON HIRES FROM SOURCING



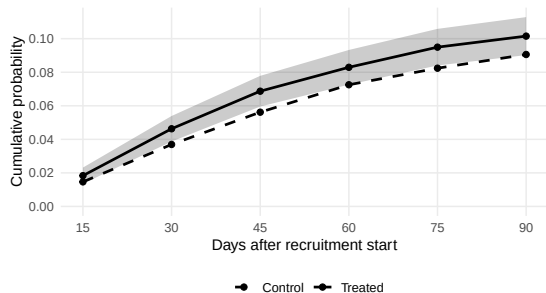
(a) Levels



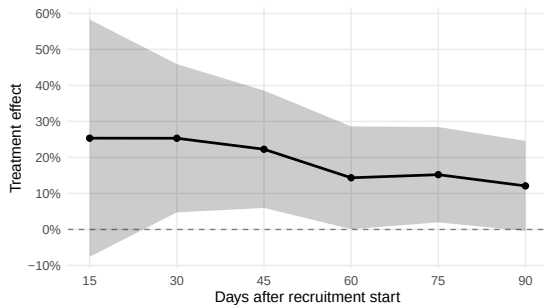
(b) Percentage treatment effect

Notes: The outcome is a binary indicator of hire via sourcing (caseworker-initiated referral). One observation is one establishment; if an establishment has posted more than one job ad, the filling rates are averaged at the horizon level. Corrected SEs following Bugni et al. (2018).

EFFECT ON HIRES FROM SCREENING



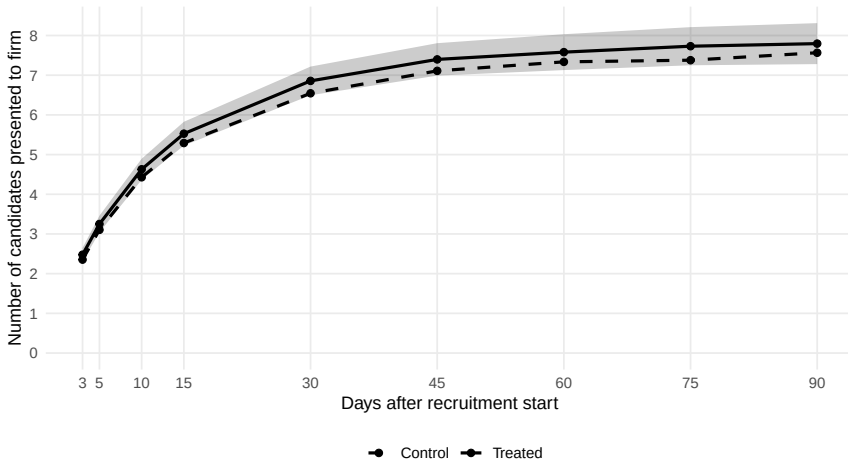
(a) Levels



(b) Percentage treatment effect

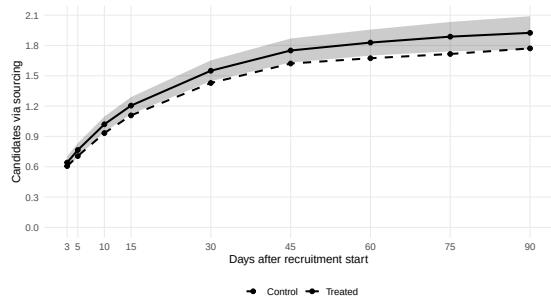
Notes: The outcome is a binary indicator of hire via screening (job-seeker-initiated referral approved by the caseworker). One observation is one establishment; if an establishment has posted more than one job ad, the filling rates are averaged at the horizon level. Corrected SEs following Bugni et al. (2018).

EFFECT ON NUMBER OF SHORTLISTED CANDIDATES

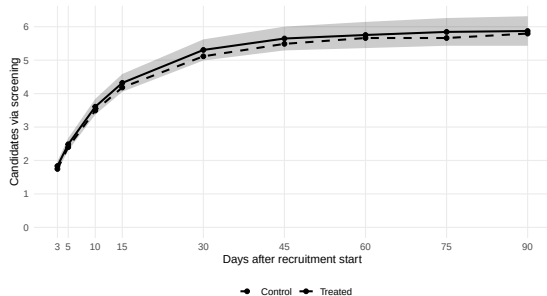


Notes: Estimates from PPML regressions of the number of shortlisted candidates on treatment status. Specifications include strata $\times$ sub-experiment and agency $\times$ sub-experiment fixed effects. Standard errors clustered at the establishment level.

EFFECT ON NUMBER OF CANDIDATES SHORTLISTED BY CHANNEL



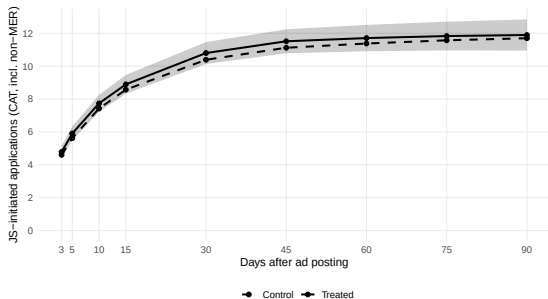
(a) Sourcing
+8% ** at day 45



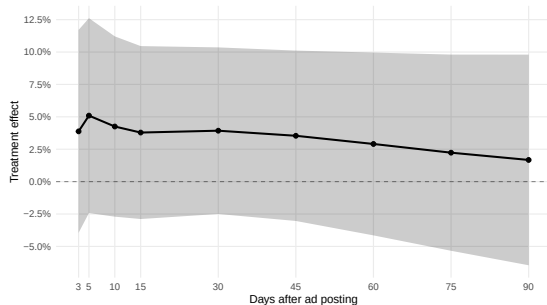
(b) Screening
+3% at day 45

Notes: The outcome is the cumulative number of candidates shortlisted per vacancy posting within the specified number of days after recruitment start. Sourcing refers to caseworker-initiated referrals (including those following a *MatchFT* recommendation); screening refers to job-seeker-initiated referrals approved by the caseworker. One observation is one job posting. Estimates from PPML regressions with strata $\times$ subexperiment and agency $\times$ subexperiment fixed effects. Shaded areas represent 95% confidence intervals computed using the delta method, clustered at the establishment level.

SCREENING: EFFECT ON JOB-SEEKER-INITIATED APPLICATIONS



(a) Levels



(b) Percentage treatment effect

Notes: Poisson regression of cumulative number of JS-initiated applications (CAT) on treatment, with strata $\times$ sub-experiment and agency $\times$ sub-experiment FE. Clustering at the establishment level. CAT includes all applications regardless of MER approval status. Caseworker-initiated CATs (MatchFT exception) excluded. Horizon measured relative to ad posting date (not preselection start).

SCREENING: EFFECT ON WHICH CANDIDATES ARE SHORTLISTED?

	All candidates			Sourcing			Screening		
	N	Control mean	Coef. (q-value)	N	Control mean	Coef. (q-value)	N	Control mean	Coef. (q-value)
Job title match	134,495	0.145	0.002 (0.699)	38,419	0.221	0.002 (0.831)	96,076	0.115	0.000 (0.982)
Distance (log km)	126,614	2.626	-0.030 (0.240)	36,404	2.365	-0.018 (0.502)	90,210	2.727	-0.030 (0.336)
Meets experience requirement	122,192	0.859	0.006 (0.394)	37,210	0.888	0.006 (0.502)	84,982	0.846	0.006 (0.554)
Meets education requirement	49,194	0.353	0.004 (0.662)	13,497	0.396	0.010 (0.564)	35,697	0.337	-0.000 (0.982)
Meets driver's licence requirement	119,414	0.998	0.000 (0.662)	34,538	0.998	0.000 (0.741)	84,876	0.999	0.000 (0.702)
Contract type matches	134,495	0.541	-0.006 (0.662)	38,419	0.596	-0.014 (0.502)	96,076	0.519	-0.004 (0.982)
Working hours compatible	134,495	0.833	-0.006 (0.240)	38,419	0.879	0.010 (0.138)	96,076	0.815	-0.014*** (0.006)
Log absolute wage gap	29,997	0.322	-0.043* (0.054)	9,791	0.308	-0.047 (0.138)	20,204	0.329	-0.047** (0.030)

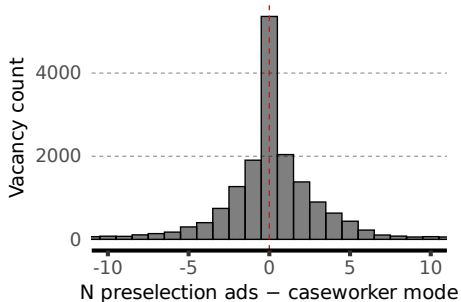
Notes: OLS regressions of match quality indicators on the treatment indicator with strata $\times$ sub-experiment and agency $\times$ sub-experiment fixed effects. Each row is a separate regression. The unit of observation is a caseworker referral. Column (1) pools all referrals. Column (2) restricts to caseworker-initiated referrals (sourcing channel). Column (3) restricts to job-seeker-initiated referrals approved by the caseworker (screening channel).

SOURCING VS. SCREENING: TAKEAWAYS

- Results on hires and shortlisted candidates
 - Hires: both an increase in hires via sourcing (15%) and via screening (15%)
 - Shortlisted candidates:
 - ★ Sourcing: 8% increase
 - ★ Screening: not much
 - Job-seeker-initiated applications: not much
- Is it about quality?
 - Indirect evidence: yes, if hiring probability conditional on number of applicants increases
 - Not visible on observable dimensions (which makes sense)

ANALYSING SPILLOVERS

SPILLOVER ANALYSIS: DISTRIBUTION OF CASELOAD DEVIATIONS FROM CASEWORKER MODE



(a) Weekly workload fluctuation



(b) Fluctuation among treated ads

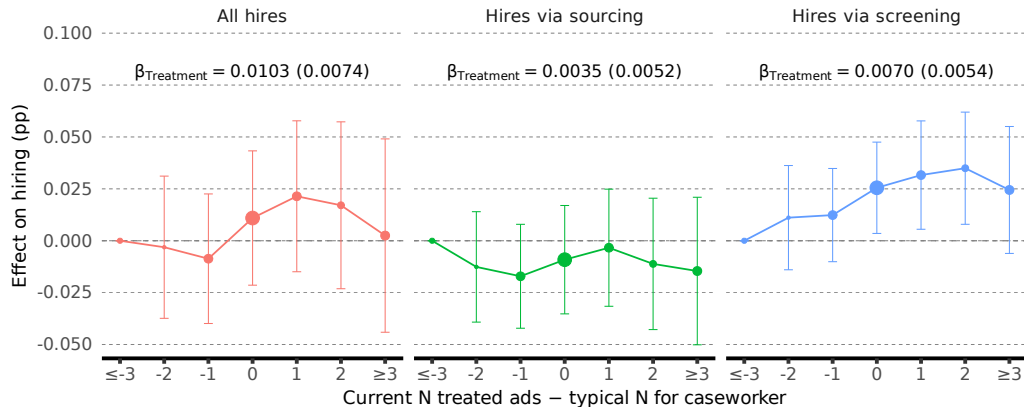
Notes: For each ad, the graphs show the number of other ads assigned to the same caseworker in a 7-day window centered around the focal ad's recruitment start date. The quantities are shown as deviations from a typical week for the caseworker, to account for potential differences in hours worked and other tasks between caseworkers. This is done by subtracting the caseworker-level mode.

SPILOVERS: HOW MANY OF A CASEWORKER'S WEEKLY ADS ARE TREATED

$$Y_i = \beta D_{e(i)} + \mathbf{f}\left(\tilde{\mathbf{N}}_i^{\text{treated}}\right) + f\left(\tilde{N}_i^{\text{presel}}\right) + f\left(\tilde{N}_i^{\text{other}}\right) + \theta_{s(i), p(i)} + \phi_{c(i), p(i)} + \varepsilon_i$$

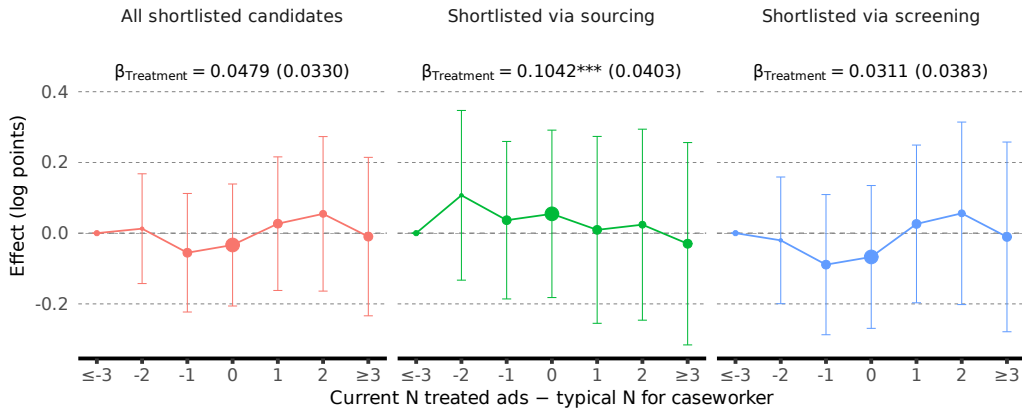
- Y_i : vacancy filled within 45 days: a) via either channel; b) via sourcing; c) via screening
- β : ad-level treatment effect
- $\tilde{\mathbf{N}}_i^{\text{treated}}$: treated ads with same caseworker in the 7 days around ad i 's recruitment start date, centered around the mode
- $f(\tilde{N}_i^{\text{presel}})$ and $f(\tilde{N}_i^{\text{other}})$: flexible controls for the caseworker's total preselection and non-preselection caseload in the same window.
- FE: strata and caseworker, each interacted with $p(i)$, an indicator for the treatment-share increase
- SEs two-way clustered at the establishment and caseworker levels.

EFFECT IF MORE OF THE WORKLOAD IS TREATED



Notes: Coefficient estimates from OLS regressions of vacancy filling outcomes on dummies for the deviation of the number of concurrent treated vacancies from the caseworker's mode (top- and bottom-coded at ± 3 , reference: zero), and a treatment indicator. All specifications absorb the number of preselection ads in the caseworker's weekly portfolio $\times$ sub-experiment, the number of non-preselection ads $\times$ sub-experiment, strata $\times$ sub-experiment, agency $\times$ sub-experiment, and caseworker $\times$ sub-experiment fixed effects. Standard errors two-way clustered at the establishment and caseworker levels. $\beta_{\text{Treatment}}$ reported above each panel. Dot size proportional to cell count. Error bars: 95% CI.

SCREENING EFFECT COMES FROM QUALITY, NOT QUANTITY



Notes: Coefficient estimates from Poisson pseudo-maximum-likelihood regressions of the number of shortlisted candidates within 45 days on dummies for the deviation of the number of concurrent treated vacancies from the caseworker's mode (top- and bottom-coded at ± 3 , reference: ≤ -3), and a treatment indicator. All specifications absorb the number of preselection ads in the caseworker's weekly portfolio (mode-subtracted, winsorised), the number of non-preselection ads (mode-subtracted, winsorised), strata $\times$ sub-experiment, agency $\times$ sub-experiment, and caseworker $\times$ sub-experiment fixed effects. Coefficients are in log points. Standard errors two-way clustered at the establishment and caseworker level. $\beta_{\text{Treatment}}$ reported above each panel. Dot size proportional to cell count. Error bars: 95% CI.

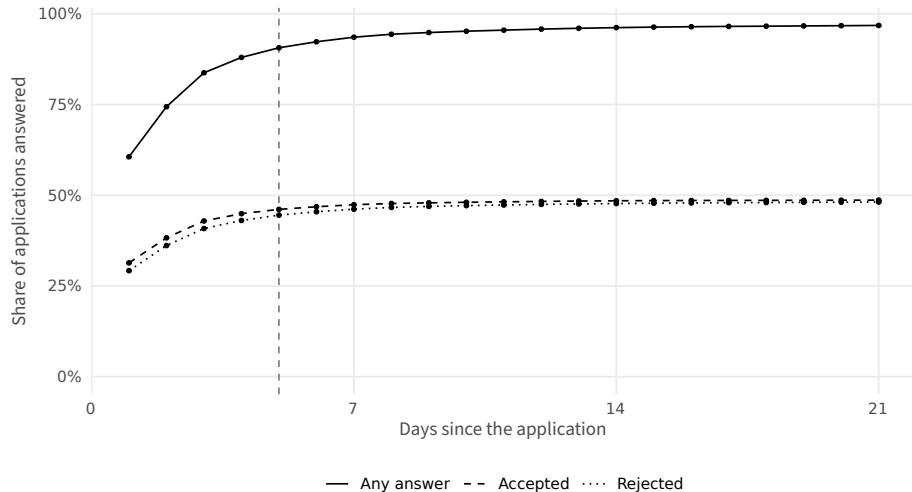
HOW LONG IT TAKES TO SCREEN A JOBSEEKER APPLICATION

- This is about the screening effects
- We have shown that there is no major change in candidate observables of the screened candidate
- What are other potential channels?
- Candidate quality not captured by observables displayed to CW
- Screening speed: check how long it takes from the jobseeker applying to the caseworker passing the application to the firm or filtering it out

HOW LONG IT TAKES TO SCREEN A JOBSEEKER APPLICATION

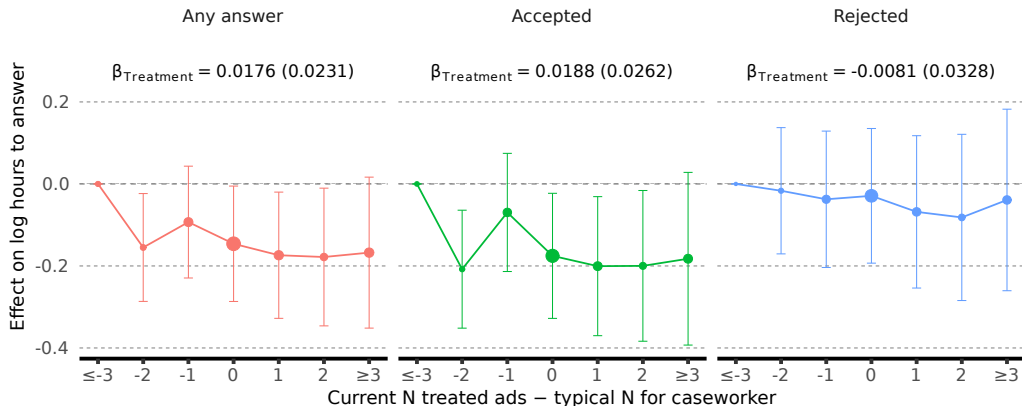
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DESCRIPTIVE: HOW LONG DOES IT TAKE THEM USUALLY



Notes: One observation is a job seeker's application (CAT) to an experiment ad, created after the ad entered preselection and not originating from a MatchFT request. An application is *answered* when the caseworker either accepts it, i.e. refers the candidate to the employer, or rejects the profile; the clock starts at the application. Cumulative share answered by day since the application, on applications observed for at least 21 days. The dashed line marks the 5-day window used in the regressions: within 5 days, 46.2% of applications are accepted, 44.4% rejected and 9.3% still unanswered.

DESCRIPTIVE: SPILLOVER EFFECTS



Notes: Coefficient estimates from OLS regressions of the log of calendar hours from a job seeker's application (CAT) to the caseworker's answer, on dummies for the deviation of the number of concurrent treated vacancies from the caseworker's mode (top- and bottom-coded at ± 3 , reference: ≤ -3), and a treatment indicator. One observation is one ad (application-level outcomes averaged within ad); an application counts as answered when the caseworker refers the candidate to the employer (*Accepted*) or rejects the profile (*Rejected*) within 5 days, and the time outcomes condition on that answer. All specifications absorb the number of preselection ads in the caseworker's weekly portfolio (mode-subtracted, winsorised), the number of non-preselection ads (mode-subtracted, winsorised), strata $\times$ sub-experiment and caseworker $\times$ sub-experiment fixed effects. Standard errors two-way clustered at the establishment and caseworker level. $\beta_{\text{Treatment}}$ reported above each panel. Dot size proportional to cell count. Error bars: 95% CI.

DESCRIPTIVE: SPILLOVER EFFECTS

- We condition here on being answered within 5 days as this is where the action is going on
- So we also look at whether it's answered: there is an effect of being treated but very small: 1pp at a baseline of 0.90. No spillover effect

HETEROGENEITY ACROSS CASEWORKERS

HETEROGENEITY BY CASEWORKER TENURE

	Tool use	Hires via portal (45d)		
		All	Sourcing	Screening
New caseworker	0.0542** (0.0271)	-0.0121 (0.0179)	0.0148 (0.0149)	-0.0251** (0.0110)
Treated		0.0135** (0.0062)	0.0061 (0.0044)	0.0093** (0.0045)
Treated × New caseworker		0.0161 (0.0221)	-0.0192 (0.0171)	0.0315** (0.0152)
Observations	11,350	17,221	17,221	17,221
R2	0.13512	0.01847	0.01858	0.01625
Strata × sub-experiment FE	X	X	X	X
Agency × sub-experiment FE	X	X	X	X
Control mean for experienced	0.3610	0.1103	0.0545	0.0576
% effect — experienced		12.2%	11.3%	16.1%
% effect — new caseworkers		30.8%	-18.9%	136%

Notes: Column (1) reports an OLS regression of tool take-up on an indicator for new caseworkers (tenure < 1 year), estimated on treated vacancies only. Columns (2)–(4) report OLS regressions of vacancy filling outcomes within 45 days on the treatment indicator, the new-caseworker indicator, and their interaction. The reference category is a control vacancy handled by an experienced caseworker (tenure ≥ 1 year). Column (2): any hire via the portal; column (3): hires via sourcing; column (4): hires via screening. Effects are translated into a percentage of the relevant control mean. All specifications include strata × sub-experiment and agency × sub-experiment fixed effects. Standard errors clustered at the establishment level.

CASEWORKER VALUE ADDED: HOW WE COMPUTE IT

- Caseworker value added (CWVA), estimated on the pre-experiment year (21 Nov 2023 – 20 Nov 2024)
- Same outcome as in the experiment (filled by a referred job seeker within h days); two LPMs, with / without caseworker FE:

$$y_i = \alpha_{j(i)} + \beta s_i + \delta_{a(i)} + \gamma_{m(i)} + \varepsilon_i \quad \text{and} \quad y_i = \tilde{\beta} s_i + \tilde{\delta}_{a(i)} + \tilde{\gamma}_{m(i)} + u_i$$

- s_i : IEE score (PES predicted 30-day vacancy filling rate); δ_a, γ_m : agency and month FE
CWVA $_j = \mathbb{E}[y_i \mid \alpha_j, X_i] - \mathbb{E}[y_i \mid X_i]$ over j 's pre-period vacancies: how much more often than an identical vacancy in the same agency and month does j fill?
- Caseworkers with at least one year of tenure; CWVA winsorised at p1/p99, in SD units
- Leniency-design logic: estimated on a disjoint period, so the sampling error in the FE is not mechanically correlated with the outcome

HETEROGENEITY BY CASEWORKER VALUE ADDED

Outcome:	Tool use	Vacancy filled (45d)			
		All	All	Sourcing	Screening
Caseworker value added (SD)	-0.0112 (0.0073)	0.0222*** (0.0045)	0.0053 (0.0065)	0.0096** (0.0047)	-0.0022 (0.0046)
Treated		0.0137** (0.0062)	0.0139** (0.0062)	0.0049 (0.0044)	0.0103** (0.0045)
Treated $\times$ Caseworker value added			0.0255*** (0.0083)	0.0080 (0.0060)	0.0168*** (0.0060)
Observations	10,395	15,803	15,803	15,803	15,803
R2	0.14416	0.02410	0.02488	0.02396	0.01931
Strata $\times$ sub-experiment FE	X	X	X	X	X
Agency $\times$ sub-experiment FE	X	X	X	X	X
Control mean, CW with mean value added	0.361	0.110	0.110	0.055	0.057
CWVA p90 - p10 (SD)		2.12			

Notes: Caseworkers with tenure ≥ 1 year and a value added (CWVA), estimated on the pre-experiment year, in SD units and centred at its mean. Column (1): MatchFT take-up on CWVA, treated vacancies only. Columns (2)–(5): vacancy filled within 45 days; (2)–(3) any hire via the portal, (4) via sourcing, (5) via screening. Take-up and control means are predicted for a caseworker of mean CWVA. SE clustered at the establishment level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TAKING STOCK

- Main results
 - Chatbot **increased (and sped up)** job-filling rates
 - Impact went both through shortlisting **more** and **better** sourced candidates
 - Surprisingly, half of the impact went through screening **better** candidates
- Cross-job-ad spillovers?
 - Easiest explanation for an impact going through better screening?
 - Leveraging **randomness** in number of jobs treated: suggestive evidence for higher job-filling rates (via screening) when more jobs are treated
 - **Survey evidence:** 56% of caseworkers cite improved time efficiency
- **Positive spillovers** on platform: treatment effect likely underestimated?
- Recently hired caseworkers were more responsive to the introduction of new technology

CONCLUSION

- Technological support for caseworkers can have positive hiring impacts
- Large impacts at low cost
- Calls for more systematic analysis of tasks performed by caseworkers (and workers more generally)
- Screening and sourcing are used together
- Lower cost in one can positively affect the other
- Can we use the results to get more general insights on the optimal recruiting mix?
- Questions the asymmetry of the hiring process

Thank you

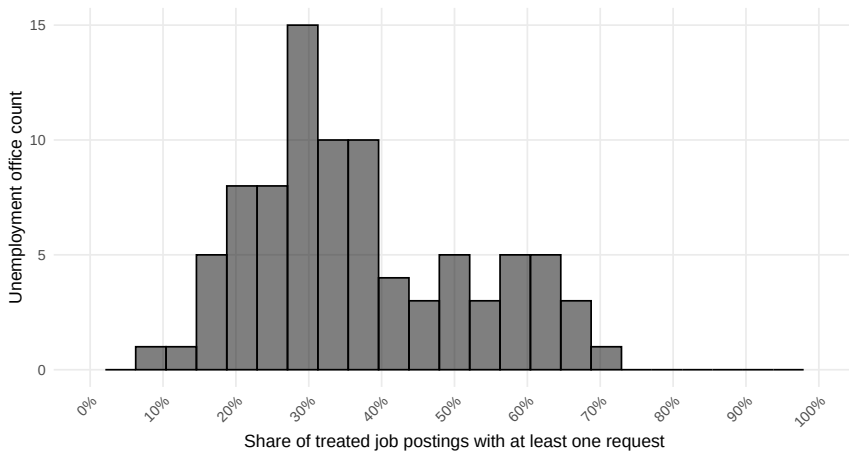
Looking forward to your feedback

STRATIFICATION

- **Population:** All French establishments with at least one job posting since 2019.
- **Target variable for stratification:** Number of job offers published in 2023.
- **Prediction:**
 - Predict expected job postings in 2023 using OLS
 - ★ Establishment age, sector, region, employment size category
 - ★ Number of ads published in 2022 and between July–December 2022
 - Missings in region or size: separate regressions excluding the missing covariates
- **Stratification:**
 - Establishments grouped into deciles based on predicted values.
 - Random assignment into treatment and control within each decile stratum.
 - Establishments with missings stratified within their respective decile groups.

TAKE UP OVER LOCAL EMPLOYMENT OFFICES

Take up by local unemployment office



BASELINE WITH BUGNI ET AL CORRECTION

	Vacancy filled					
Horizon:	15 days	30 days	45 days	60 days	75 days	90 days
Treated	0.0029 (0.0035)	0.0121** (0.0053)	0.0190*** (0.0063)	0.0204*** (0.0070)	0.0214*** (0.0073)	0.0164** (0.0076)
Strata × sub-experiment FE	X	X	X	X	X	X
Observations	10,166	10,166	10,166	10,166	10,166	10,166
Control mean	0.0317	0.0727	0.1097	0.1384	0.1599	0.1766

Notes: Results from a linear regression of a binary variable whether there was an on-platform hire for the job posting. One observation is one establishment; if an establishment has posted more than one posting, the filling rates are averaged at the horizon level. Subexperiment denotes an indicator variable whether the preselection process for the vacancy started after Feb 6 2025 when the treatment share was increased from 50 to 75%. The outcome is averaged at the establishment × subexperiment level and the standard errors are adjusted following Bugni et al. (2018).

SOURCING: REGRESSION TABLE

	Vacancy filled					
Horizon:	15 days	30 days	45 days	60 days	75 days	90 days
Treated	-0.0010 (0.0026)	0.0037 (0.0038)	0.0075* (0.0045)	0.0114** (0.0051)	0.0103* (0.0054)	0.0067 (0.0058)
Strata × sub-experiment FE	X	X	X	X	X	X
Observations	10,166	10,166	10,166	10,166	10,166	10,166
Control mean	0.0175	0.0368	0.0553	0.0695	0.0826	0.0925

Notes: Ad-level regression. Outcome: at least one hire from sourcing within X days. Corrected SE following Bugni et al. (2018).

SCREENING: REGRESSION TABLE

	Vacancy filled					
Horizon:	15 days	30 days	45 days	60 days	75 days	90 days
Treated	0.0037 (0.0025)	0.0094** (0.0039)	0.0125*** (0.0047)	0.0104** (0.0053)	0.0125** (0.0056)	0.0110* (0.0058)
Strata $\times$ sub-experiment FE	X	X	X	X	X	X
Observations	10,166	10,166	10,166	10,166	10,166	10,166
Control mean	0.0146	0.0369	0.0562	0.0725	0.0824	0.0906

Notes: Ad-level regression. Outcome: at least one hire from screening within X days. Corrected SE following Bugni et al. (2018).

TABLE FOR SPILLOVER REGRESSION GRAPH

	(1)	(2)	(3)
Outcome:	All hires	Hires via sourcing	Hires via screening
N treated ads – CW mode (capped ± 3) = -2	-0.0031 (0.0175)	-0.0126 (0.0136)	0.0111 (0.0128)
N treated ads – CW mode (capped ± 3) = -1	-0.0087 (0.0159)	-0.0171 (0.0128)	0.0124 (0.0115)
N treated ads – CW mode (capped ± 3) = 0	0.0109 (0.0165)	-0.0091 (0.0133)	0.0255** (0.0112)
N treated ads – CW mode (capped ± 3) = 1	0.0214 (0.0186)	-0.0034 (0.0144)	0.0316** (0.0133)
N treated ads – CW mode (capped ± 3) = 2	0.0171 (0.0205)	-0.0112 (0.0161)	0.0349** (0.0138)
N treated ads – CW mode (capped ± 3) = 3	0.0025 (0.0238)	-0.0146 (0.0181)	0.0245 (0.0156)
Treatment	0.0103 (0.0074)	0.0035 (0.0052)	0.0070 (0.0054)
N preselection ads (mode-subtracted, winsorised) FE	X	X	X
N non-preselection ads (mode-subtracted, winsorised) FE	X	X	X
Strata $\times$ sub-experiment FE	X	X	X
Caseworker $\times$ sub-experiment FE	X	X	X
Observations	17,025	17,025	17,025
R2	0.09348	0.09743	0.08229
F-test (dummies jointly)	1.68	0.79	1.93*

Notes: OLS regressions of vacancy filling outcomes (indicator for at least one hire within 45 days) on dummy indicators for the deviation of the current number of treated vacancies from the caseworker's modal number, and a treatment indicator. The deviation is top- and bottom-coded at ± 3 . The reference category is zero deviation (i.e. the caseworker's typical number of treated vacancies). All specifications include strata $\times$ sub-experiment, agency $\times$ sub-experiment, caseworker $\times$ sub-experiment, number of preselection ads $\times$ period, and number of non-preselection ads $\times$ period fixed effects. Standard errors two-way clustered at the establishment and caseworker level in parentheses. The F-test row reports the Wald statistic for joint significance of the deviation dummies (excluding the treatment indicator). Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

PLACEBO: YEAR BEFORE

		Vacancy filled					
		(1)	(2)	(3)	(4)	(5)	(6)
1	Horizon:	15 days	30 days	45 days	60 days	75 days	90 days
2							
3	Treated	0.0019 (0.0032)	0.0037 (0.0047)	-0.0003 (0.0058)	-0.0037 (0.0065)	-0.0005 (0.0068)	-0.0029 (0.0070)
5	Strata × sub-experiment FE	X	X	X	X	X	X
6	Agency × sub-experiment FE	X	X	X	X	X	X
7							
8	Observations	18,615	18,615	18,615	18,615	18,615	18,615
9	R2	0.01000	0.01333	0.01619	0.01602	0.01789	0.01889
10	Control mean	0.0387271089762834	0.0822575803062144	0.1262383668568	0.158060642449715	0.17472230561393	0.187481236865806

Notes: Results from a linear regression of a binary variable whether there was an on-platform hire for the job posting. One observation is one job posting. The placebo test includes job postings from Nov 21 2023 to April 30 2024. Postings with preselection process start dates between Nov 21 and Feb 6 2024 are assigned their establishment's treatment status from the experiment's 50/50 draw and postings with a preselection process starting on Feb 6 or later were assigned the 75/25 treatment status. Subexperiment denotes an indicator variable whether the preselection process for the vacancy started after Feb 6 2024 when the placebo treatment share was increased from 50 to 75%. Standard errors are clustered at the establishment level.

NO BIAS CORRECTION BUT OFFICE FE

		Vacancy filled					
		(1)	(2)	(3)	(4)	(5)	(6)
1	Horizon:	15 days	30 days	45 days	60 days	75 days	90 days
2							
3	Treated	0.0038 (0.0032)	0.0099** (0.0049)	0.0144** (0.0060)	0.0156** (0.0066)	0.0172** (0.0070)	0.0130* (0.0073)
5	Strata $\times$ sub-experiment FE	X	X	X	X	X	X
6	Agency $\times$ sub-experiment FE	X	X	X	X	X	X
7							
8	Observations	17,225	17,225	17,225	17,225	17,225	17,225
9	R2	0.01650	0.01749	0.01842	0.02216	0.02555	0.02618
10	Control mean	0.0316703558658267	0.0727056019070322	0.109654350417163	0.138430103865146	0.159884215903286	0.176570747488507

Notes: Results from a linear regression of a binary variable whether there was an on-platform hire for the job posting. One observation is one job posting. Subexperiment denotes an indicator variable whether the preselection process for the vacancy started after Feb 6 2025 when the treatment share was increased from 50 to 75%. Standard errors are clustered at the establishment level.

CONTROLLING FOR PRE-PERIOD OUTCOME AND COVARIATES

		Vacancy filled					
		(1)	(2)	(3)	(4)	(5)	(6)
1	Horizon:	15 days	30 days	45 days	60 days	75 days	90 days
2							
3	Treated	0.0025 (0.0032)	0.0078* (0.0048)	0.0121** (0.0057)	0.0133** (0.0063)	0.0149** (0.0067)	0.0107 (0.0070)
5	Strata $\times$ sub-experiment FE	X	X	X	X	X	X
6	Agency $\times$ sub-experiment FE	X	X	X	X	X	X
7	Controls	X	X	X	X	X	X
8							
9	Observations	17,225	17,225	17,225	17,225	17,225	17,225
10	R ²	0.04292	0.06040	0.06161	0.06682	0.07107	0.07122
11	Control mean	0.0316703558658267	0.0727056019070322	0.109654350417163	0.138430103865146	0.159884215903286	0.176570747488507

Notes: One observation is one ad in the experimental sample. OLS regressions of a binary indicator for at least one hire via referral within the specified horizon, on the treatment indicator and the full set of pre-determined controls from the balance table (ad-level: predicted vacancy filling score, min/max salary; establishment: size and sector dummies, pre-period ad and hire counts, pre-period referral and hire rates via portal). Missing values replaced with zero and matched with missing-indicator dummies. Standard errors clustered at the establishment level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

NO SE CORRECTION, NO AGGREGATION, ESTABLISHMENT-LEVEL CLUSTERED SE

Vacancy filled						
	(1)	(2)	(3)	(4)	(5)	(6)
1 Horizon:	15 days	30 days	45 days	60 days	75 days	90 days
2						
3 Treated	0.0027 (0.0032)	0.0092* (0.0050)	0.0137** (0.0061)	0.0153** (0.0068)	0.0166** (0.0072)	0.0134* (0.0075)
5 Strata × sub-experiment FE	X	X	X	X	X	X
6						
7 Observations	17,225	17,225	17,225	17,225	17,225	17,225
8 R2	0.00128	0.00198	0.00230	0.00254	0.00385	0.00445
9 Control mean	0.0316703558658267	0.0727056019070322	0.109654350417163	0.138430103865146	0.159884215903286	0.176570747488507

Notes: Results from a linear regression of a binary variable whether there was an on-platform hire for the job posting. One observation is one job posting. Subexperiment denotes an indicator variable whether the preselection process for the vacancy started after Feb 6 2025 when the treatment share was increased from 50 to 75%. Standard errors are clustered at the establishment level.

ALL INDICATED POSITIONS FILLED

		All positions filled via referral					
		(1)	(2)	(3)	(4)	(5)	(6)
1	Horizon:	15 days	30 days	45 days	60 days	75 days	90 days
2							
3	Treated	0.0047 (0.0031)	0.0119** (0.0048)	0.0160*** (0.0059)	0.0173*** (0.0065)	0.0184*** (0.0069)	0.0143** (0.0072)
5	Strata $\times$ sub-experiment FE	X	X	X	X	X	X
6	Agency $\times$ sub-experiment FE	X	X	X	X	X	X
7							
8	Observations	17,225	17,225	17,225	17,225	17,225	17,225
9	R ²	0.01639	0.01740	0.01859	0.02239	0.02575	0.02632
10	Control mean	0.0316703558658267	0.0727056019070322	0.109654350417163	0.138430103865146	0.159884215903286	0.176570747488507

Notes: Results from a linear regression of a binary variable whether the number of on-platform hires for the job posting was greater or equal to the number of jobs to fill indicated on the vacancy. One observation is one job posting. Subexperiment denotes an indicator variable whether the preselection process for the vacancy started after Feb 6 2025 when the treatment share was increased from 50 to 75%. Standard errors are clustered at the establishment level.

POISSON N HIRES, CONTROLLING FOR INDICATED N POSITIONS

		Number of hires via referral					
		(1)	(2)	(3)	(4)	(5)	(6)
1	Horizon:	15 days	30 days	45 days	60 days	75 days	90 days
2							
3	Treated	0.1499 (0.1169)	0.1393* (0.0815)	0.1132* (0.0664)	0.0978 (0.0608)	0.0633 (0.0574)	0.0297 (0.0549)
4	Number of positions (log)	0.9366*** (0.1894)	0.6435*** (0.1520)	0.6828*** (0.1293)	0.6230*** (0.1196)	0.6674*** (0.1134)	0.6820*** (0.1038)
6	Strata $\times$ sub-experiment FE	X	X	X	X	X	X
7	Agency $\times$ sub-experiment FE	X	X	X	X	X	X
8							
9	Observations	16,214	17,121	17,202	17,225	17,225	17,225
10	Control mean	0.0316703558658267	0.0727056019070322	0.109654350417163	0.138430103865146	0.159884215903286	0.176570747488507

Notes: PPML regression of the number of on-platform hires via referral on treatment status. Specifications include strata $\times$ sub-experiment and agency $\times$ sub-experiment fixed effects and control for the log number of positions advertised. One observation is one job posting. Subexperiment denotes an indicator variable whether the preselection process for the vacancy started after Feb 6 2025 when the treatment share was increased from 50 to 75%. Standard errors are clustered at the establishment level.

BALANCE TEST: SPILLOVERS

	Model	Reference	Coefficients		
		Mean	Treatment	F-test (dummies)	
Ad characteristics					
IEE score	OLS	0.478	0.008*	0.79	
Min. salary (annual FTE)	OLS	24040.789	-102.264	0.48	
Max. salary (annual FTE)	OLS	29982.086	-909.673*	0.57	
Posting firm size					
Size: 10 or less	OLS	0.422	0.002	1.54	
Size: 11–25	OLS	0.116	-0.011	1.50	
Size: 26–50	OLS	0.187	-0.000	3.13***	
Size: more than 50	OLS	0.212	-0.009	0.53	
Size: missing	OLS	0.063	0.019**	1.10	
Posting firm industry					
Sector: Construction	OLS	0.042	-0.002	0.96	
Sector: Manufacturing	OLS	0.138	0.007	0.69	
Sector: Commerce	OLS	0.123	-0.011	0.57	
Sector: Services	OLS	0.104	0.017	0.43	
Sector: Health	OLS	0.236	-0.003	1.75	
Pre-period hire rates					
Hires via portal per ad — all (45d)	OLS	0.081	0.015*	1.02	
Hires via portal per ad — all (90d)	OLS	0.150	0.002	0.81	
Hires via portal per ad — sourcing (45d)	OLS	0.044	0.007	0.83	
Hires via portal per ad — sourcing (90d)	OLS	0.088	-0.004	0.50	
Hires via portal per ad — screening (45d)	OLS	0.040	0.009	0.46	
Hires via portal per ad — screening (90d)	OLS	0.068	0.008	0.92	
Pre-period counts					
Ads posted (pre-period)	Poisson	18.380	-0.119	0.63	
Ads in preselection (pre-period)	Poisson	3.537	-0.026	1.40	
Referrals per ad — all (45d)	Poisson	5.287	-0.013	1.43	
Referrals per ad — sourcing (45d)	Poisson	1.661	0.038	0.60	
Referrals per ad — screening (45d)	Poisson	3.627	-0.036	1.86*	
Total hires among unemployed	Poisson	8.193	-0.015	1.17	
Total hires — DPAE	Poisson	15.588	-0.060	1.49	

Notes: Each row reports a separate regression of the row variable on dummy indicators for the deviation of the current number of treated vacancies from the caseworker's modal number (top- and bottom-coded at ± 3 , reference: zero)

CANDIDATE CHARACTERISTICS (FULL)

	All candidates			Sourcing			Screening		
	N	Control mean	Coef. (p)	N	Control mean	Coef. (p)	N	Control mean	Coef. (p)
<i>A. Occupation match</i>									
Job title match	135,323	0.144	0.002 (0.681)	38,441	0.221	0.002 (0.829)	96,882	0.115	0.000 (0.952)
<i>B. Municipality and distance</i>									
Municipality match	134,145	0.229	0.007 (0.261)	38,024	0.279	0.008 (0.397)	96,121	0.210	0.008 (0.247)
Distance (log km)	127,384	2.626	-0.030* (0.076)	36,426	2.366	-0.019 (0.306)	90,958	2.727	-0.030 (0.135)
<i>C. Experience</i>									
No exp. required × No experience	129,495	0.073	0.005* (0.087)	37,802	0.082	0.002 (0.725)	91,693	0.069	0.007** (0.035)
No exp. required × Has experience	129,495	0.364	0.011 (0.386)	37,802	0.420	0.011 (0.463)	91,693	0.342	0.011 (0.417)
Experience required × No experience	128,744	0.060	-0.001 (0.702)	37,870	0.045	-0.002 (0.481)	90,874	0.066	-0.000 (0.969)
Experience required × Has experience	128,744	0.456	-0.017 (0.204)	37,870	0.435	-0.009 (0.553)	90,874	0.465	-0.021 (0.138)
Experience duration meets requirement	122,916	0.858	0.006 (0.211)	37,231	0.888	0.006 (0.303)	85,685	0.846	0.006 (0.300)
<i>D. Formation</i>									
Education meets vacancy requirement	49,569	0.353	0.004 (0.548)	13,512	0.397	0.009 (0.453)	36,057	0.337	-0.000 (0.995)
Education missing (vacancy has requirement)	49,966	0.007	0.001 (0.542)	13,593	0.006	0.000 (0.858)	36,373	0.008	0.001 (0.446)
<i>E. Driving licence</i>									
No licence required × No licence	135,323	0.439	0.012 (0.267)	38,441	0.427	0.003 (0.804)	96,882	0.443	0.015 (0.193)
No licence required × Has licence	135,323	0.250	0.002 (0.729)	38,441	0.253	0.006 (0.421)	96,882	0.249	0.001 (0.937)
Licence desired × No licence	75,348	0.099	0.014* (0.080)	22,131	0.109	0.010 (0.307)	53,217	0.095	0.017* (0.066)
Licence desired × Has licence	101,085	0.058	-0.000 (0.934)	28,381	0.070	-0.005 (0.498)	72,704	0.053	0.001 (0.842)
Licence required × No licence	75,348	0.200	-0.017* (0.084)	22,131	0.171	-0.007 (0.474)	53,217	0.212	-0.019* (0.085)
Licence required × Holds required licence	120,161	0.104	-0.012* (0.090)	34,557	0.110	-0.008 (0.330)	85,604	0.101	-0.015* (0.064)
<i>F. Contract type</i>									
Wants CDI × Vacancy is CDI	127,737	0.503	-0.010 (0.495)	37,701	0.540	-0.022 (0.163)	90,036	0.488	-0.005 (0.748)
Wants CDD × Vacancy is CDD	131,635	0.053	0.005 (0.112)	38,044	0.059	0.006 (0.125)	93,591	0.051	0.004 (0.202)
Wants CDI × Vacancy is CDD	131,635	0.271	0.002 (0.896)	38,044	0.265	0.006 (0.686)	93,591	0.274	-0.000 (0.985)
<i>G. Working time</i>									
Working hours compatible	135,323	0.833	-0.006* (0.085)	38,441	0.879	0.010** (0.037)	96,882	0.815	-0.014*** (0.001)
<i>H. Salary</i>									
Job pays above reservation wage: log gap	22,310	0.182	-0.017* (0.060)	7,372	0.184	-0.030*** (0.004)	14,934	0.181	-0.013 (0.208)
Job pays below reservation wage: log gap	7,824	0.715	-0.097** (0.018)	2,411	0.693	-0.084 (0.180)	5,403	0.725	-0.112** (0.013)
Wage comparison missing	135,323	0.780	-0.010 (0.418)	38,441	0.737	0.009 (0.555)	96,882	0.797	-0.018 (0.155)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Notes: Characteristics of hired candidates by treatment status.

MATCHFT OVERLAP: JACCARD REGRESSION

	(1)	(2)
Dependent Var.:	Mean Jaccard index	Share of pairs with overlap
Deviation from expected treatment share	-0.0040 (0.0046)	0.0068 (0.0223)
Concurrent ads decile FE	X	X
Concurrent ads (preselection) decile FE	X	X
Strata <i>imes</i> sub-experiment FE	X	X
Agency <i>imes</i> sub-experiment FE	X	X
Caseworker FE	X	X
Observations	3,073	3,073
R2	0.58587	0.43142
Within R2	0.00055	0.00010
Sample mean	0.0042	0.0262

SURVEY EVIDENCE

SURVEY EVIDENCE ON CASEWORKER PRACTICES

- Survey of caseworkers in experiment agencies (Feb 2025, N=86)
- 88% have used MatchFT
- **Tool changes candidate selection:**
 - 57% propose vacancies to more candidates
 - 54% report reaching *different* candidates than before
 - 87% contact candidates with sparser dossiers, 82% more distant, 74% lower matching scores
- **Perceived benefits:**
 - **56%** cite improved time efficiency (most frequent)
 - 49% improved service quality for job seekers
 - 38% improved matching quality for employers
 - Only 4% report worsened service for job seekers
- **Most useful for:** 93% cite vacancies with few/irrelevant applications; only 22% for vacancies with

SURVEY RESULTS: EXPERIMENT REGIONS

Q1: Factors considered when deciding to offer preselection service [All resp.]

Nature of the vacancy (anticipated difficulty, specific prerequisites) ($N = 77$): Predominant role: 79% / Can influence: 19% / Not considered: 1%

Employer characteristics (client status, HR department presence) ($N = 77$): Predominant role: 36% / Can influence: 47% / Not considered: 17%

Agency objectives ($N = 77$): Predominant role: 22% / Can influence: 49% / Not considered: 29%

Agency capacity ($N = 77$): Predominant role: 25% / Can influence: 42% / Not considered: 34%

Q2: Types of vacancies for which you propose preselection [All resp.]

Vacancy with many expected applications ($N = 77$): Always propose: 60% / May propose: 34% / Never propose: 6%

Vacancy anticipated to be hard to fill ($N = 77$): Always propose: 22% / May propose: 58% / Never propose: 19%

SURVEY RESULTS: NON-EXPERIMENT REGIONS

Q1: Factors considered when deciding to offer preselection service [All resp.]

Nature of the vacancy (anticipated difficulty, specific prerequisites) ($N = 91$): Predominant role: 86% / Can influence: 12% / Not considered: 2%

Employer characteristics (client status, HR department presence) ($N = 91$): Predominant role: 53% / Can influence: 32% / Not considered: 15%

Agency objectives ($N = 91$): Predominant role: 24% / Can influence: 44% / Not considered: 32%

Agency capacity ($N = 91$): Predominant role: 24% / Can influence: 43% / Not considered: 33%

Q2: Types of vacancies for which you propose preselection [All resp.]

Vacancy with many expected applications ($N = 91$): Always propose: 55% / May propose: 43% / Never propose: 2%

Vacancy anticipated to be hard to fill ($N = 91$): Always propose: 21% / May propose: 63% / Never propose: 16%

ESTABLISHMENT-LEVEL OUTCOMES

ESTABLISHMENT-LEVEL OUTCOMES

- Firms' total number of hires irrespective of whether the job that was pre-selected.
- Firms' propensity to post a job in the future, and to post it in pre-selection
- Data sources: DSN (for hires of FT candidates), DPAE (for all hires)
- DSN: Restrict to candidates unemployed within 180 days before contract start

METHODOLOGY

- Challenges
 - Outcomes can't be tied to ads anymore and take time to realise
 - After ca. 2 months a lot of firms switch treatment status
- Employ stacked design using 3 'subexperiments'
- Compare establishments to always control establishments for the same time period
- Cumulate outcomes over 12 weeks after subexperiment start (longest possible)

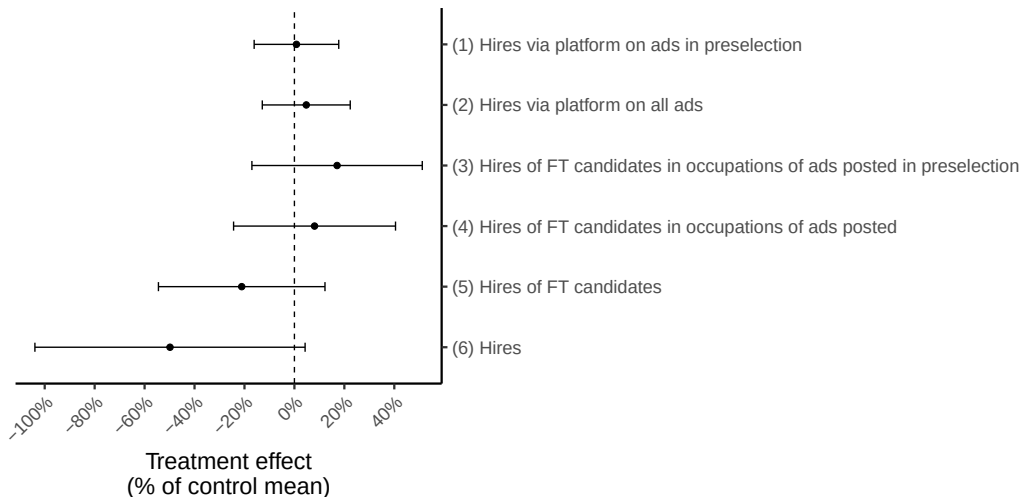
METHODOLOGY II

1. Nov 21 - 12w later, first treated vs always control
2. Dec 12 - 12w later, second treated vs always control
3. Feb 6- 12w later, switchers vs always control
 - Consider every strata, $s \times$ subexperiment, $x p$, combination as a stratum

$$Y_{i,s,xp} = \beta D_i + \theta_{s(i)} \times \phi_{xp} + \varepsilon_{i,s,xp}$$

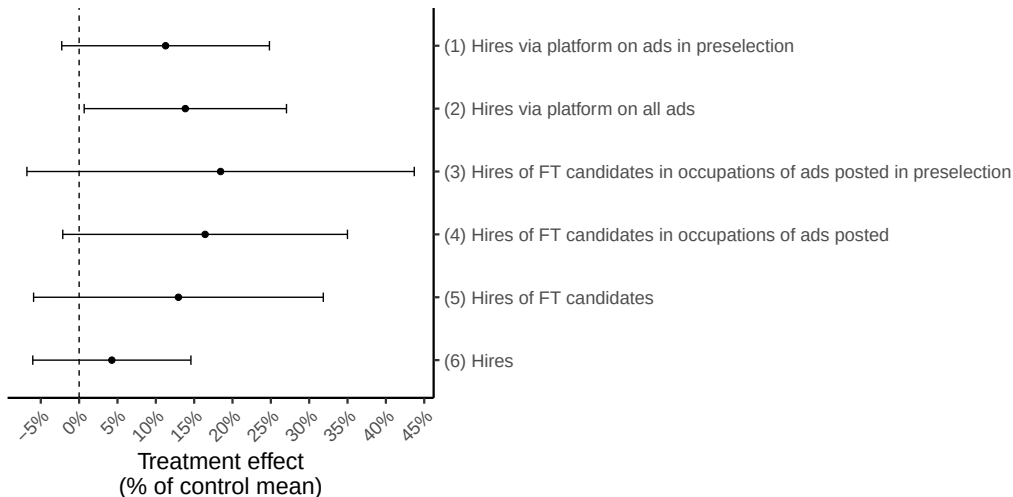
- Use OLS, apply Bugni et al. (2018) correction

RESULTS FOR DIFFERENT OUTCOMES



Notes: Results from linear regressions of different outcomes on a dummy for treatment and strata FE interacted with the subexperiment FE. The standard errors are robust and corrected using the method suggested by Bugni et al. (2018).

BROADER HIRING OUTCOMES (EXCL. 5% LARGEST FIRMS)



Notes: Results from linear regressions of different outcomes on a dummy for treatment and strata FE interacted with the subexperiment FE. The standard errors are robust and corrected using the method suggested by Bugni et al. (2018). Excluding 5% largest firms

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