

Who benefits from Remote Job Search Assistance?

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Abstract

Public Employment Services (PES) have long recognised the value of information and communication technology. As far back as the 1960s, many PES started digitising their information and storing records in mainframe computers. This initial step was followed by the introduction of personal computers, computer networks, the internet, and most recently Artificial Intelligence (AI). While there are few PES that are actually using AI or other advanced data analytics, more and more are planning to do so. For example, 76% of PES are now considering the adoption of AI based matching and little over half of PES are planning to use AI for labour market forecasting and other types of LMI.¹

Economists have been heavily involved in evaluating and even designing many features of the digitisation of PES. Bringing job search “into the 21st Century” through advanced digital technologies, can be considered a direct example of lowering informational frictions in job search.² Online job search and algorithmic recommendations might fundamentally improve the way workers and firms match. It allows individuals to sift through information more efficiently and receive helpful suggestions. Moreover, online information is cheap. However, it is likely that this shift towards the use of digital tools by the PES will not only improve average effectiveness of job search assistance, but also the heterogeneity in who is helped. This heterogeneity may manifest along two dimensions: i) take-up of assistance; and ii) effectiveness. Digitisation strategies by the PES may therefore contain implicit targeting of job seekers. For example, if digital strategies are mostly taken up by job seekers with good digital skills that have ex-ante higher job finding probabilities, assistance is more likely to reduce short-term rather than long-term unemployment.

This paper examines the use of digital tools by the Belgian-Flemish PES. We employ a staggered difference-in-differences design to estimate the impact of a caseworker’s encouragement to use an online job platform designed by the PES.³ As part of their remote assistance strategy called “the Serviceline”, the PES sends out a request to all

¹These shares and future trends are based on interviews taken with 25 PES representatives that attended an EU PES network seminar in Brussels on 15 January 2019. The full report can be viewed here: <https://data.europa.eu/doi/10.2767/371065>.

²“Job Search in the 21st Century” was the title of the 2022 Schumpeter Lecture at the EEA annual meeting by Philip Kircher, which contains a summary of recent papers on this topic (Kircher 2022).

³The PES has developed a remote support system, including a profiling tool (based on various machine learning models) to predict the time job seekers are unemployed and an online job platform that uses deep learning to discover patterns in vacancy texts and job seekers resumes for matching.

job seekers on day 28 of their unemployment duration to make telephone contact with a caseworker. This generates variation in the timing of take-up; some job seekers call sooner than others, some require being called by the caseworker. Staggered take-up of the encouragement by the caseworker creates the variation for causal estimation with difference-in differences. Importantly, it allows us to examine the heterogeneity in the effectiveness of treatment by the timing of take-up; and for unobserved worker fixed effects in the use of the online job platform. In the second part of this paper, we examine how the timing of take-up and effect heterogeneity correlate with worker fixed effects in the use of the online platform. Specifically, we study: i) predictability based on person characteristics; ii) persistence; and iii) the link with job finding.

We make use of the population of newly registered unemployed job seekers in Flanders, Belgium, between March and September of 2021. For these individuals we observe the day at which they have the required call with the PES after receiving the invitation to call. We also know whether this call was made by the job seeker (inbound) or the PES (outbound). After day 35 in duration, the PES starts making outbound calls to those that have not yet had contact. For 10,579 job seekers that have telephone contact between days 28 and 49 of duration, we link the timing of this call to daily observations on the use of the online job platform maintained by the PES.⁴ As our main outcome, we study login behaviour. However, we also extend our analysis to saved vacancies (which is conditional on logging in) and receiving vacancies by mail (which is not conditional on logging in). These observations from the online job platform are supplemented by administrative records on person characteristics, and timing of outflow. We also observe the predicted job finding rate by the Machine Learning (ML) algorithm of the PES at a daily rate, which we use as a predictor in the second part of our analysis.

For the specific design of job search assistance by the Belgian-Flemish PES, this paper finds that there are persistent types in job search effort and job finding that are predictable. In summary, the encouragement to use the online job platform benefits unemployed job seekers who have experience using the platform, who are more educated, and who speak the local language used on the platform. Particularly, this paper shows that:

- a. Caseworkers' encouragements to use an online job platform designed by the PES increases unemployed job seekers' use of the platform.

⁴At day 49, this outbound call list is closed. Job seekers that still did not have contact may then end up in various other contact strategies by the PES. For this reason, we only consider the observed contact between days 28 and 49.

- b. However, caseworkers' encouragements to use an online job platform also creates heterogeneity in the use of the platform, both in terms of timing of treatment take-up as well as the effect of treatment. To showcase this further, Figure 1 plots the cumulative logins of job seekers over the first 49 days of unemployment duration. Job seekers are grouped by the day at which they have telephone contact with a caseworker who encourages them to use the platform. Three important observations can be made. First, login behaviour temporarily increases on the day at which they have contact with the PES. Second, this increase in login behaviour is larger for job seekers that call earlier. Most notably, there is a significant divide in the effect size between job seekers that call before day 36 (in green) and after (in blue). Third, this divide in effect size overlaps with earlier patterns in the use of the online job platform. Those that call before day 35 were more active in logging in from the start of their unemployment duration. While this figure is purely descriptive, our causal analysis provides the same take-away's.
- c. Heterogeneity in the use of the online job platform is predictable based on, in order of importance, an unemployed job seeker's prior use of the platform, education, a job seeker's knowledge of the region's official language, and her predicted job finding rate based on the PES ML algorithm.
- d. Heterogeneity in the predicted use of the online job platform is persistent over the unemployment spell.
- e. Persistent heterogeneity in predicted job search effort is positively correlated with persistent heterogeneity in predicted job finding rates.

Because job seekers with better overall and digital skills as well as command of the local language also have higher job finding rates, remote job search assistance by the Belgian-Flemish PES reduces short-term unemployment more than long-term unemployment. To gauge the importance of early intervention and targeting, we end the paper with a decomposition of duration dependence in job finding with dynamic selection, following (Mueller and Spinnewijn 2023). We find that dynamic selection plays a significant role in explaining duration dependence in job finding, which supports policy that targets types early on.

Broadly speaking, our paper contributes to three strands of literature. First, we contribute to the recently developed but vibrant literature on online job search. Several papers look into the question what kind of information we should provide job seekers through platforms to reduce search frictions. They find generally positive effects on job finding using recommendations that redirect search towards vacancies with higher job

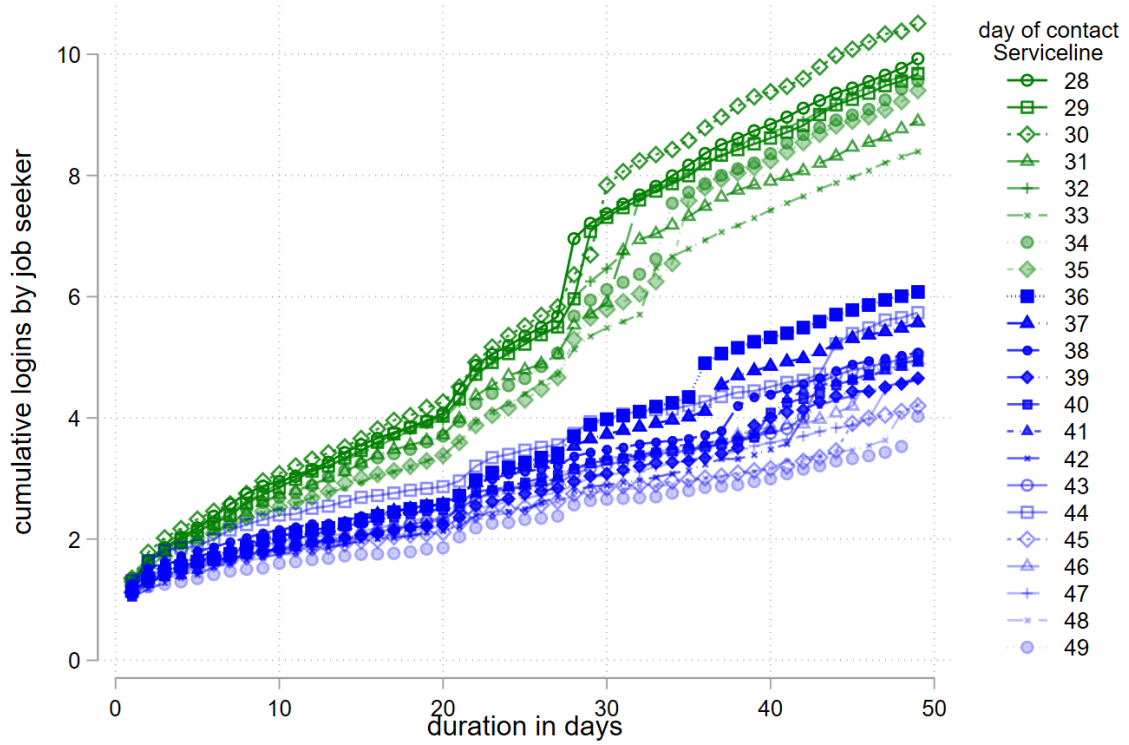
finding probabilities.⁵ To this literature, we contribute by focusing on the heterogeneity in take-up and effectiveness of remote job assistance and the implications this has for implicit targeting of job seekers. There is also a much older literature relating to job search assistance more broadly, see (Card, Kluve, and Weber 2018) for an overview. While this literature had a large focus on effect heterogeneity, it was not concerned with the upcoming digitisation of job search assistance.

Second, we contribute to a small set of papers that focus on job search effort. Thanks to innovative data collection, researchers are able to observe the effort job seekers make during their job search process. Most related to our work is a very recent paper by Schiprowski et al. (2024). They find very similar effects of caseworker meetings on job search effort. Nevertheless, their measure of effort was in total time spent searching and did not have this focus on remote assistance and online job search. Other papers looking into job search effort do so for different goals such as understanding moral hazard in unemployment (Marinescu and Skandalis 2021) and duration dependence (DellaVigna et al. 2022; Faberman and Kudlyak 2019).

Finally, this paper relates to the revived literature on difference-in-differences methodologies (Baker, Larcker, and Wang 2022; Sun and Abraham 2021; Callaway and Sant'Anna 2021). We contribute by using the differential timing in take-up of a policy as a source of identifying variation for the DiD analysis. We causally identify effect size heterogeneity related to the selection into timing of treatment, while allowing for the nonrandom selection to be absorbed through worker fixed effects.

⁵A non-exhaustive list of papers includes Altmann et al. (2022); Belot, Kircher, and Muller (2019, 2022); Behaghel et al. (2022); Ben Dhia et al. (2022); Le Barbanchon, Hensvik, and Rathelot (2023).

FIGURE 1. Cumulative login behaviour of job seekers, grouped by day of contact with a PES caseworker



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