

SEARCHING WITH FRIENDS ^{*}

Stefano Caria,[†] Simon Franklin,[‡] Marc Witte[§]

June 15, 2022

Abstract

We study how active labor market policies affect the exchange of information and support among jobseekers. Leveraging a unique social network survey in Ethiopia, we find that a randomized job-search assistance intervention reduces information sharing and support between treated jobseekers and their active job-search partners. Due to lower job-search support, untreated individuals search less and, suggestively, have worse employment outcomes. These results are consistent with a model of networks where unemployed individuals form job-search partnerships to exploit the complementarities of job search.

^{*}We are grateful to Steffen Altmann, Emily Breza, Esther Duflo, Marcel Fafchamps, Morgan Hardy, Ingo Isphording, Patrizio Piraino, Simon Quinn, Margaret Stevens for helpful comments and to Biruk Tekle for outstanding research assistance. We received helpful feedback from seminar participants at IZA, Oxford, LSE, Göttingen, and conference participants at CSAE, NEUDC, RES, DIAL and PEGNet. Data collection was funded by GLM — LIC. The project would not have been possible without the constant support of Rose Page and the Centre for the Study of African Economies (University of Oxford), nor without the support of the Ethiopian Development Research Institute in Addis Ababa.

[†]University of Warwick, stefano.caria@warwick.ac.uk.

[‡]Queen Mary University of London, s.franklin@qmul.ac.uk.

[§]IZA Institute of Labor Economics. Corresponding author: witte@iza.org.

1 Introduction

Social networks play a key role in job search. This is particularly true in developing countries, where 50 percent of workers report that they first heard about their current job from their social networks.¹ However, the nature of the social connections that people leverage in the labor market is poorly understood. This lack of understanding makes it hard to predict how labor market networks respond to policy. Do the direct beneficiaries of labor market policies support non-beneficiaries by sharing information and resources? Or do beneficiaries break social ties with non-beneficiaries because they no longer find it worthwhile to continue exchanging information and support?

In this paper, we show that job-search networks can be weakened by labor market interventions and that this can have adverse consequences for untreated individuals. These results have important implications for employment interventions, because typically such policies do not treat all people in a community – for example due to age, geographic, or neediness restrictions (??). They also advance our understanding of the nature of social networks in the labor market. Our setting and empirical results are consistent with models in which network links are formed on the basis of strategic interests and therefore can be broken by external interventions that disrupt those interests.

We focus on the understudied job-search support networks that exist between unemployed individuals. These networks deserve special attention for two reasons. First, survey data with young jobseekers in Addis Ababa, Ethiopia, shows that this is a crucial part of how networks are used to find jobs.² Second, these networks may be more susceptible to external interventions compared to the networks based on the sharing of job information from employed individuals to their unemployed peers, which have received more attention in the literature (????).³

Our experimental evidence comes from studying the effects of a randomized labor market intervention—a transport subsidy offered to young jobseekers—that has positive direct impacts on the job search intensity and labor market outcomes of treated individuals (?). Treated individuals thus have lower search costs and acquire new labor market information thanks to the intervention (but have not, at the time of our endline survey, found new jobs). We collect a unique dataset that tracks the close social ties of “seed” individuals from both the

¹Authors own calculations based on ? and further individual studies. ? show that the fraction of jobseekers who heard about their current job from a social contact varies from 13 percent in the US to 72 percent in the Philippines. For an overview of the literature, see ?.

²In our data, 50 percent of the information-sharing partners of unemployed youth are themselves unemployed. Furthermore, 42 percent of respondents who received information about jobs from their networks say that that the person providing the information did not have a particular connection to the employer.

³In standard models from this literature, social connections are assumed to be policy invariant. Thus, employment interventions are expected to have positive spillover effects on untreated individuals driven by information sharing. Our experiment was designed to test for these positive spillover effects. We did not anticipate that job search networks would be weakened by the intervention.

treatment and control groups of the original experimental study. We call these social ties the “job-search partners” of the seeds: people with whom the seeds regularly share job-search expenses and job-vacancies information (which is typically acquired from public job advertisements). Our primary empirical test compares the behavior and outcomes of the partners of treated seeds to that of the partners of untreated seeds.

We establish two central empirical results. First, we find the job search intervention decreases social interaction among those job search partnerships where both individuals search for employment at baseline. In particular, five months after the start of treatment, we document a significant, 32 percent, decrease in the probability of sharing information about vacancies and a significant, 49 percent, decrease in the likelihood of sharing transport expenses. In the full sample (which includes pairs where some individuals are inactive), we find insignificant declines in information sharing and in other forms of support such as sharing transport expenses.

Our second central finding is that the partners of treated individuals reduce their job-search effort as a result of the intervention. In particular, we find that the job-search partners of treated seed individuals are significantly less likely to search for work compared to the partners of untreated seeds. Overall job search goes down by 20 percent, and job search strategies that require transport to the city centre are chosen less frequently (a 30 to 40 percent drop). We also discuss suggestive evidence of a reduction in employment for the partners of treated individuals. The coefficient magnitudes are economically meaningful, but marginally insignificant.

To explain these findings, we propose a simple model that studies how network formation interacts with job search. The model illustrates how unemployed individuals have incentives to form job-search partnerships whenever there are positive externalities to job search effort. Furthermore, it shows that inequality in job search costs makes job-search partnerships unstable: in equilibrium, the individual with higher search costs searches less intensely than her partner, which gives a reason to the individual with lower search costs to break up the partnership. In line with this, we show that the negative effects on partnership are stronger for pairs of friends who reciprocally exchange information at baseline and have similar levels of expenditure—that is, the job search partnerships that, as predicted by our model, are most likely to be maintained on the basis of an equilibrium of similar job search contributions.

Further, our theoretical framework suggests that the break-up of job-search partnerships can cause a reduction in the untreated partner’s job search effort if the efforts of the two jobseekers are strategic complements. We provide descriptive evidence consistent with this interpretation: the returns to search effort are higher for individuals with stronger networks, suggesting that efforts are strategic complements.⁴ In line with this, we demonstrate quan-

⁴Section 2 discusses a number of reasons why search efforts could be strategic complements. Most importantly, job search consists of distinct tasks which need to be completed successfully to secure a job, and each

titatively that the decrease in job search effort that we document can be explained in large part by the severing of job-search partnerships. To show this, we use mediation analysis to estimate the Average Controlled Direct Effect (ACDE) of the intervention—that is, the effect that the intervention would have had on the partner’s job search effort if social interaction with the treated seed had not changed (?). We find that the ACDE is 80 percent smaller than the ATE we previously estimated: if job-search partnerships had not been disrupted, the reduction in job search among the partners of treated seeds would have been minimal.

We also consider a number of alternative explanations for our findings. We start by exploring alternative mechanisms that could generate a weakening of job-search networks, but fail to find empirical support for them. First, we show that the weakening of job-search networks is not mechanically driven by treated individuals spending more time working or searching for work. Second, we do not observe systematic changes in the location of residence of seeds or their partners, suggesting that the disruption of the partnership is not due to the emergence of additional spatial barriers. Third, we show that treated individuals do not systematically establish new links to higher-value job search partners, which implies that there is no “rewiring” of network ties. Furthermore, it is important to note that none of the alternative explanations considered so far is able to explain the reduction in partner search effort without positing an additional mechanism for that effect. We provide evidence inconsistent with three such additional mechanisms that do not involve strategic complementarities: a discouragement effect, a change in the beliefs about the returns to job search, and a story in which job search partnerships only exist to finance a fixed cost required to engage in job search, but where search efforts are strategic substitutes.

The paper makes a number of contributions. First, we show that policy interventions can disrupt social networks. There is very little work studying how social networks are influenced by external interventions. An exception is the work of ?, ?, and ? who investigate how savings and microfinance interventions affect financial networks. In addition, ? finds that untreated microentrepreneurs in Uganda are more likely to create new links with entrepreneurs who participate in a training intervention. To the best of our knowledge, the finding that people stop sharing information with their social ties after treatment is novel in the literature. The closest result to ours is from ?, who show that a community-level intervention in the Gambia led to a reduction in transfers in social networks within treated villages.⁵ We further advance this literature by showing that the negative effects on social networks are stronger when the ties have similar expenditure levels at baseline. This highlights that the inequality generated by targeted interventions is a possible mechanism leading to the deterioration of social capital.

partner may have a comparative advantage in a different task.

⁵A related literature looks at the effects of interventions on non-participants through channels other than social networks. Examples include psychological well-being (?) and social preferences (?).

There has been particularly little work regarding the effects of labor market and social protection policies on and through job-search networks. A large body of literature shows that job search effort is affected by unemployment insurance (??), and job search assistance policies (??).⁶ These direct policy impacts could have important implications for the social networks of beneficiaries. This is particularly true for programs that exclude some members of the social network from the receipt of benefits, such as means-tested social transfers, time-limited unemployment insurance, programs to which migrants and refugees do not have access, or age-restricted job search assistance.

Second, we highlight the key role played by information sharing among unemployed jobseekers. A large literature looks at the role of referrals in labor markets (????).⁷ These studies often focus on cases where information and support only flows from the employed to the unemployed (???). In contrast to this, the young unemployed people in our urban context regularly share information and transport expenses with their friends when looking for work. This type of network structure lacks empirical and theoretical study, which we provide in this paper. Our empirical results are consistent with a strong form of complementarity in job search-effort, in line with our proposed theoretical explanation for the existence for these networks. This is a novel finding in the job search literature. We further add to the job search literature by endogenizing the network structure to allow for members of the network to leave if membership is no longer beneficial to them. ? and ? both develop models in which social ties can be created or severed, but maintain the assumption that job opportunities flow exclusively from the employed to unemployed.

Finally, from a methodological perspective, we show the importance of tracking geographically dispersed networks in urban areas and the limits of relying on neighbors or family members alone. ? study the indirect effects of the intervention on a sample of control individuals residing close to program participants. Despite their geographical proximity, these individuals often have only weak social ties to treated jobseekers. ? do not find evidence of spillover effects on this sample. Similarly, it is common in the literature to proxy social networks with family ties (e.g. ??). We find that very few of the job-search partners in our sample are related. These results highlight that tracking close social connections across space is necessary to develop a comprehensive view of the economic role of urban networks.

⁶The literature on the effects of welfare programs such as the earned income tax credit is more limited. However, the evidence showing large effects of these types of programs on labor supply presents good reasons to believe that job search would also be affected (??).

⁷A related literature focuses on the benefits of hiring through social networks for employers (?).

2 Job search networks in Addis Ababa

In this Section, we present some key stylised facts about social networks in Addis Ababa. We use four main sources of data: (i) the 2013 Labour Force Survey of the Central Statistical Agency of Ethiopia, (ii) the endline survey from the experimental study of ?, (iii) the network survey which we ran for this study and which is described in more detail below, and (iv) a representative survey of young people searching for jobs at vacancy boards, conducted in 2020.⁸

Fact 1. *Social networks are a widespread and effective method of job search.*

Data from the Labour Force Survey shows that 24.5 percent of jobseekers rely on social networks as their main method of job search. This makes social networks the second most popular method of job search, after visiting the job vacancy boards, which is chosen by 25.4 percent of jobseekers. At the same time, there are clear overlaps between the different methods: 85 percent of a representative sample of young people at the boards use networks to search, and 75 percent have received information about a vacancy from networks.⁹

Further, the information acquired from social networks often leads to employment. 48 percent of the employed individuals in the sample of ? have heard about their current job through family, friends or acquaintances, while only 33 percent of individuals have found out about their current job by visiting the job boards. Referrals are also widespread. In our network baseline survey, of all the individuals working in the last seven days, 48 percent received the job or an interview for the job through a direct referral from a social contact. Similarly, 70 percent of individuals usually ask relatives, friends or acquaintances for help getting a job, and in half of these cases, this involved a direct referral to a job in the past. Importantly, the use of social networks for job search is common across all demographic groups.¹⁰

Fact 2. *Most of the social networks support comes from close friends.*

In our baseline sample, the person informing the respondent about their current job is a close friend in 67 percent of the cases and a family member in 17 percent of the cases. On

⁸More details about these surveys can be found in appendix Section A.1.

⁹43 percent of those who have received information said that the person who gave it to them had special information about the position. The other 57 percent say that all the information they received was publicly available.

¹⁰Men, migrants and individuals without tertiary education are more likely to rely on social networks (see Table H10 in the appendix). This is in line with the wider literature on social networks and job search, which emphasises the role of networks for migrants (?) and individuals with lower levels of education (?). While women generally tend to be underserved by employment networks (? and overview in ?), ? suggests that women are more likely to have a few strong ties rather than multiple weak ties. In Addis Ababa, men, non-migrants and educated individuals also make a substantial use of social networks in job search. Overall, our descriptive regression suggests that 95 percent of the working-age population in the city has a predicted probability of using social networks for job search above 10 percent.

average, respondents interact with this person three days a week. These patterns stand in stark contrast to the strength of weak ties hypothesis (?). ? study samples drawn from 55 countries, mostly from the developed world, and find that a single strong tie is more valuable even though most jobs are received through weak ties. Our findings show an even more prominent role for strong ties.

Fact 3. *Social network support is reciprocal and is often exchanged among unemployed people.*

In survey data that we collected from a representative sample of job-board visitors, 89 percent of people at the boards have friends who also visit the boards, and 90 percent of them have passed on information that they saw at the boards to their friends. Of those who have received information about a job vacancy, only 43 percent said that at least one person who passed them information had some special information about the vacancy. The other 57 percent only received information that was publicly available.

The exchange of information about jobs and vacancies is often reciprocal. In our network baseline survey, 80 percent of the close ties both give and receive information about jobs to and from their seeds. Further, reciprocal support is not limited to information sharing. For example, 50 percent of job search partners in our baseline sample travel together to the city centre with the seed to look for information about employment. Jobseekers often take turns to pay the transportation costs of these trips and further support each other in a number of ways. Interestingly, job-search partners often live in different neighborhoods.¹¹

A large share of job-search support is exchanged among individuals who are unemployed. The median unemployed jobseeker in ? regularly shares information with four other people, two of whom are also currently unemployed. In our baseline sample, the average job search partner has 2.5 job contacts, of whom fewer than one is employed. Again, this is contrast with standard accounts of labor market networks where most information transmission occurs from the employed to the unemployed (??). Indeed, one would think that unemployed jobseekers would have reasons not to share information about vacancies: their friends might be direct competitors for those jobs. On the other hand, given the large size of the labor market in Addis Ababa—with many private sector firms advertising positions across the whole city and receiving large number of applicants—we think that the chances that any two job-seekers directly displace one another for a position is extremely unlikely. For example, ?

¹¹The left panel of Figure A1 displays the place of residence in Addis Ababa of the individuals in ? whom we have sampled for this paper. The right panel shows the place of residence of their job-search partners. The original study participants were sampled from randomly selected geographical clusters outside of the centre of the city. Their job-search partners, on the other hand, are distributed all over the city. In total, less than 5 percent of the social contacts live within a 2 km radius of the city centre. Figure A2 displays the distribution of the distance between the place of residence of the original study participants and that of their job-search partners. The modal distance is approximately 2 km, with a mean of 3.75 km and a median of 1.6 km. This means that more than 50 percent of pairs live more than 25 minutes of walking distance apart, calculated “as the crow flies”. Actual walking times are likely to be higher.

report that each vacancy advertised as part of their experiment in Addis Ababa receives more than one hundred applicants, that on the job boards there are tens of vacancies available for a given occupation at any point in time, and that jobseekers apply on average to only two vacancies per month. This implies that competition for any specific vacancy is likely to be limited. Ultimately, the widespread existence of job-search partnerships suggests that the benefits from being in these partnerships outweigh the (limited) costs of competition.

Fact 4. *Not all job-search partners are actively searching.*

In our baseline sample, only 34 percent of job contacts have searched for a job in the past week and 53 percent have searched for a job in the past six months (61 percent if we restrict the sample to unemployed people). Active job-search partners differ from inactive job-search partners on several dimensions: they are less likely to be in employment, they have left school later and are also more likely to be poorer (Appendix Table E2, joint p -value=0.00). The seed individuals of active and inactive job-search partners, on the other hand, tend to have similar characteristics (Appendix Table E3, joint p -value=0.58), with the exception that active job search partners tend to have seeds that are also more active in job search. As a consequence, the baseline differences between the seed individuals and their job contacts who are searching for work are much less pronounced than the differences between the seeds and their inactive job contacts (Appendix Table E4). In particular, inactive job contacts are older, more likely to work, less likely to search, and out of school for longer than the seed. We can strongly reject the test of joint orthogonality of all covariates ($p = 0.00$), suggesting that for seeds and inactive job contacts have different characteristics. In sum, our sample contains two types of job-search links: i) links to unemployed people who are also searching for work, and who are very similar to the seed individual; or ii) links to employed people who are not searching, and who are dissimilar to the seed.

Fact 5. *Consistent with the existence of a strategic complementarity in search effort, the returns to job search increase with access to job search networks.*

The evidence on the returns to job search in the control group suggests that there are strategic complementarities in job search. We provide supporting evidence for this by comparing the returns to an additional day of job search for individuals with a below-median job-search network to those of individuals with an above-median network (where we proxy the strength of a network by its size, while acknowledging that network size is not exogenously assigned, but determined by a jobseeker's overall characteristics). Figure 1 shows that, for individuals with a below-median network, the returns to job search are fairly low. On the contrary, these returns are higher for individuals with a strong network. This is evidence consistent with the idea that job search efforts are complements: the more unemployed individuals have access to other active jobseekers, the higher the payoff from additional job

search.¹²

One key reason why partners' search efforts *may* be strategic complements is that securing a job requires successfully completing a number of tasks. A jobseeker has to acquire information about available vacancies, decide which jobs to target, prepare applications, take part in interviews, etc. Failure to complete one of these tasks will decrease the returns to effort in the other tasks. For instance, the effort spent preparing an application will have low returns if the jobseeker has targeted a job that does not suit their skills. Therefore, receiving support on one task by a job-search partner will increase the returns to effort on the other tasks. Moreover, partners may find it convenient to specialise in different tasks due to economies of scale or comparative advantage arising from skills, personality traits, or endowments. For example, one partner may be more conscientious and therefore better at collecting vacancy information in a timely manner, while the other partner may be extroverted, more comfortable talking to employers, and hence well-placed to coach their conscientious partner in interview skills. Consistent with specialisation across job search tasks, we find that among six pre-defined categories of job search (such as searching at the vacancy boards, in newspapers, asking friends and relatives), only 27% of jobseekers report at baseline that their main method of search is the same as that of their partner, which is slightly lower than what we would predict if pairs were formed at random.

It is natural to think of efforts spent on the same task as strategic substitutes. However, even within the same task, there may be reasons for the efforts of the two partners to complement each other. Consider, for example, information acquisition at different vacancy boards. On the one hand, it may be possible that the returns to visiting one of these boards are lower when one's partner has already collected some job vacancy information. On the other hand, different vacancy boards may contain information about different types of jobs, and jobseekers may value having a diverse portfolio of job applications. The prospect of this stronger portfolio may make it worthwhile for the individual to start job search in the first place. In line with this, we find that at baseline 80% of our job search pairs search in different boards.

Ultimately, it is an empirical question whether, on net, job search efforts are strategic complements or substitutes. The correlational evidence presented here is consistent with strategic complementarity.

¹²We find similar results when we disaggregate by the search effort of the partner at baseline, see Appendix Section H.7.

3 The experiment

3.1 The transport subsidy

The transport subsidy consists of a monetary transfer that is available for collection in a central location in the city, three times a week. The transfer is thus conditional on reaching the centre of town, where jobseekers can visit the job vacancy boards and where many firms are located. This intervention is designed to help young jobseekers pay for the transport costs required for effective job-search and thus overcome the spatial frictions that emerge in large, congested cities (?). The amount disbursed is calibrated to cover the cost of a return journey from the participant’s place of residence to the intervention centre. Figure A3 shows the amount and duration of the subsidy.¹³ The amount available on a given visit varies by participant, ranging from 15 Ethiopian Birr (0.74 USD)¹⁴ to 30 Ethiopian Birr (1.48 USD) with a median of 20 Ethiopian Birr (0.98 USD). The duration of the subsidy is randomized across participants and ranges between 13 and 21 weeks. The intervention started in late September 2014. By February 2015 the latest batch of participants had stopped receiving the subsidy.¹⁵

3.2 The network survey

This paper is based on a survey of the job-search partners of the original program participants. We proceed in three steps. First, we randomly select 165 individuals from the treatment and control group of the original study. We call these individuals the “seeds”. Second, we ask each seed the following, open-ended question: “With whom in Addis Ababa do you regularly share information about job opportunities?”¹⁶ We further ask a number of questions about the interaction between seeds and job-search partners and collect the partners’ contact details. This gives us a sample of about 1000 job-search partners. Third, we randomly select 596 job-search partners for interview. These 596 individuals constitute the main sample of this study. We conduct a baseline interview, before the start of the transport intervention, and an endline interview six months after the original interview. A timeline of events can be found in appendix Section A. We collect data on socioeconomic characteristics, labor market experience and job search decisions, measures of preferences and aspirations, as well as time use and expenditure data.

¹³Here we report data computed over the subset of original program recipients that are sampled for this study.

¹⁴Dollar amounts calculated with the average exchange rate during the intervention period from September 2014 to February 2015.

¹⁵The direct impact of the transport subsidy intervention on the recipients’ outcomes is summarized in appendix Section D.1.

¹⁶“Regularly” is defined as exchanging information at least once per month. We do not limit the number of job-search partners that can be reported.

4 A model of network formation and job search

In this Section we develop a simple theoretical framework that clarifies how job search and network formation decisions can be affected by a policy that subsidizes only one individual in a job-search partnership.

Our key assumption is that, when two individuals are in a partnership, the job search efforts of one person increase the chances of employment of both people in the pair. These positive externalities motivate individuals to form job search partnerships. This assumption is motivated by the intuition that there exist complementary tasks in the search process, in which different partners may specialise. Fact 5 in Section 2 presents evidence consistent with the existence of these complementarities.

Maintaining social links is also costly. Individuals have to invest time and attention in the partnership. Further, when they share resources, there is a risk that favours will not be returned in the future. Thus, individuals have to weight the benefits of a job search partnership against its costs.

To model how individuals solve this tradeoff, we study a simple game where two job seekers — a seed individual i and a potential job partner j — make two sequential decisions. First, each individual decides whether they want to form a connection with the other job seeker. Link formation is bilateral: a connection is established only if both job seekers agree to the link. Second, after job seekers observe whether a connection has been formed, they decide how much effort to exert to find a job.

If a link has been formed in the first stage, each partner benefits from the search efforts of the other partner. We capture this by imposing that the probability of finding a job is a CES function of the search efforts of the two job seekers, which we denote as y_i and y_j . The parameter $p \in (0, 1]$ determines the degree of complementarity of these efforts. Further, we assume that both the marginal cost of job search (κy^s) and the marginal cost of maintaining the link ($c y^s$) increase in own search effort ($s > 1$) (evidence of the convexity of search costs is found, for example, in ?). If a link has not been formed, job seekers do not benefit from the external effect of the other person's job search. However, they also save on the costs required to maintain the link.

We consider an intervention that reduces job search costs by a factor $\alpha \in (0, 1]$. If a job seeker does not receive the intervention, $\alpha = 1$. If a job seeker receives the intervention, $0 < \alpha < 1$: the job seeker can search at a lower cost. In the second stage, job seeker i will choose how much search effort to exert in order to maximise the following payoff function:

$$\pi_i = \begin{cases} (y_i^p + y_j^p)^{1/p} - y_i^s c - y_i^s k \alpha_i & \text{if searching in a partnership,} \\ (y_i^p)^{1/p} - y_i^s k \alpha_i & \text{if searching alone.} \end{cases} \quad (1)$$

Job seeker j solves a symmetric problem. In the first stage, jobseekers work out equilibrium search efforts and payoffs under both scenarios, and then agree to a link only if the payoff searching in a partnership is larger than the payoff searching alone. The optimal search effort when searching alone is:

$$y_i^* = \frac{1}{s\alpha_i k} \frac{1}{s-1}. \quad (2)$$

When searching in a partnership, the equilibrium level of effort is:

$$y_i^* = \left[\frac{\left(1 + z \frac{p}{p-s}\right)^{\frac{1-p}{p}}}{s(c + \alpha_i k)} \right]^{\frac{1}{s-1}}, \quad (3)$$

where $z = \left(\frac{c+\alpha_j k}{c+\alpha_i k}\right)$.

This analysis illustrates how, in a partnership, the person with the lower search costs exerts more effort in equilibrium. To see this, consider a simple case where $\alpha_i < \alpha_j = 1$, which we depict in the left panel of Figure 3: the more we subsidize the costs of the seed individual, the larger the asymmetry in optimal effort. This is intuitive: when costs are asymmetric and search effort is the same, the marginal return to search effort is not equalized. To reach an equilibrium, the low-cost individual has to exert more effort, while the high-cost individual applies less effort – a form of free riding.¹⁷ If the link is maintained, then the high-cost individual naturally benefits from the subsidy given to their partner, as shown in the middle panel of Figure 3.

Intuition 1. *If the social connection does not break, there are positive spillovers: the reduction in search costs for i will increase j 's payoff.*

Free-riding reduces the value of being in a partnership relative to searching alone. The right panel of Figure 3 illustrates this for a case where, when search costs are equal, both individuals prefer searching together than searching alone. In this case, a sufficiently large subsidy to the search costs of the seed individual makes searching alone more attractive. As a result, the subsidized individual breaks the partnership.

Intuition 2. *Subsidizing the search costs of one individual in a job search pair decreases the*

¹⁷We describe this situation as one of ‘free riding’ since the high-cost partner does not fully match the higher search effort of the low-cost partner. This does not imply that, when we reduce the cost of the first partner, the search effort of the second partner actually falls compared to the control condition. As long as the partnership is maintained, the second partner will also increase search effort due to the complementarity, but will do so in a more limited way compared to the treated partner.

value of the partnership due to free riding. This can motivate the treated job seeker to break the link.

How does the break-up of the partnership affect the other partner? This depends on whether search efforts are strategic complements or substitutes. If efforts are substitutes, losing a partner will incentivize the untreated job seeker to increase search effort. On the other hand, if efforts are complements, the untreated job seeker will exert less effort when searching alone compared to when searching in a partnership.

Formally, for the case where $\alpha_i < \alpha_j = 1$, effort in a partnership is greater than effort when searching alone when $p < \frac{1}{\frac{\ln(\frac{c+k}{k})}{1 + \frac{\ln(2)}{\ln(\frac{c+k}{k})}}}$. If $c = k$, this condition reduces to $p < 1/2$, which implies strategic complementarity (in our framework, search efforts are strategy complements whenever $p < 1$).

Intuition 3. *For a sufficiently strong strategic complementarity between search efforts, the untreated individual exerts less effort when searching alone than when searching in a partnership.*

This third intuition suggests that an intervention that causes a job-sharing link to be severed could lead to a reduction in search effort among the untreated partner.¹⁸

An important final observation is that our model captures relationships where the exchange of support and information is reciprocal. In this framework, once a partnership is formed, each partner benefits from the job search effort of their peer. Thus, our model is unsuitable to describe partnerships where support and information flow only in one direction. Asymmetric partnerships are not common in our study. If they occur, they are likely to be motivated by different considerations — e.g. one individual may derive a social benefit from the partnership — and are likely to respond differently to the transport subsidy intervention. For a similar reason, our model is also not appropriate to analyze partnerships that have highly unequal endowments and search efforts. These partnerships are unlikely to be motivated by the desire to leverage the complementarities of job search. Rather, their function may be to generate a social benefit. We would thus not expect these partnerships to easily break-up in response to the transport subsidy, nor do we expect their break-up to lead to a fall in search effort. These observations motivate our heterogeneity analysis in Section 6.

¹⁸A final implication of our model is that, when the complementarity is stronger, partnerships are harder to break. This is because a stronger complementarity limits the free-riding incentive of the untreated partner. However, as argued above, when high-complementarity partnerships do break, they cause a larger fall in the search effort of the untreated partner. We do not explore these predictions empirically, since we lack an accurate empirical proxy of the strength of the complementarity, but we flag this as an interesting area for future work.

5 Data and empirical strategy

5.1 Balance and attrition

We test for balance with respect to (i) the characteristics of the seeds, (ii) the characteristics of the job-search partners, and (iii) the nature of the interaction between seeds and their partners.

Baseline differences in the characteristics of the treatment and control seeds are reported in appendix Table F5. Overall balance is good, as we cannot reject the test of joint orthogonality of all covariates ($p = 0.13$). The only significant differences at five percent level are the higher share of females and the lower share of seeds who ever worked for pay in the treatment group. At a ten percent significance level, we have a lower proportion of casual workers and of individuals who recently searched at the job boards in the treatment group, as well as some small differences in the share of minority ethnicities.

Appendix Table F6 shows baseline balance in the characteristics of the job-search partners. We cannot reject the test of joint orthogonality of all covariates ($p = 0.60$).¹⁹ The only variables significantly different at a five percent or stronger level are whether the individual was born outside of Addis Ababa and had permanent work in the past seven days. We control for all unbalanced (at a ten percent or stronger level) baseline characteristics of the job-search partners in our analysis.

Lastly, we look at balance in the nature of the interaction between seeds and their partners. Table 1 shows that all variables are all balanced at the ten percent level, indicating that the experimental randomization was also successful for interactions in the job-search pairs. The test of joint orthogonality cannot be rejected (at $p = 0.80$).

We have low levels of attrition. 540 job search partners (91 percent) from our baseline sample of 596 are surveyed at endline. Attrition is very similar for the job search partners of treated seeds (90.5 percent resurveyed) and untreated seeds (91 percent resurveyed). Appendix Table G8 shows that attrited individuals are more likely to be female and to have worked in an office in the week before the baseline interview, while appendix Table G9 shows that these effects do not differ by treatment status of the seed, hence do not compromise the integrity of the experiment. Figure 2 gives an overview of our study sample. Interestingly, about half of the individuals would satisfy the eligibility criteria of the original study (age 18-29, at least high school education, no permanent employment). The other individuals tend to be older, more educated, and better positioned in the labor market.

¹⁹Due to the large number of covariates and the associated risk of overfitting, we exclude all covariates that have a correlation above 0.5 with any of the other covariates from the test of joint orthogonality.

5.2 Empirical strategy

We estimate the effects of the intervention on job-search partners using the following ANCOVA estimator:²⁰

$$y_{i,t=1} = \beta_0 + \beta_1 y_{i,t=0} + \beta_2 Treat_{i,t=1} + \beta_3 X_{i,t=0} + \varepsilon_{i,t}, \quad (4)$$

where

$$Treat_{i,t=1} = \begin{cases} 1 & \text{if the job-search partner's seed received transport subsidy;} \\ 0 & \text{if the job-search partner's seed did not receive transport subsidy.} \end{cases}$$

y_{it} is the outcome of interest of job-search partner i at time t ($t = 0$ refers to the pre-intervention period, and $t = 1$ to the post-intervention period), and $X_{i,t=0}$ is a vector of pre-treatment baseline controls. We study impacts on different measures of social interaction, job search and employment. For each family of tests, we also report effects for a summary index of all outcome measures in the family. Our choice to include the vector of pre-treatment baseline covariates enables us to control for minor baseline imbalances and to increase the precision of our estimates. We cluster the standard errors of all regressions at the level of the seed, the original unit of randomization.

We estimate heterogeneous impacts of the intervention on job-search partners with the following equation:

$$y_{i,t=1} = \beta_0 + \beta_1 y_{i,t=0} + \beta_2 Treat_{i,t=1} + \beta_3 Het_{i,t=0} + \beta_4 Het_{i,t=0} \cdot Treat_{i,t=1} + \beta_5 X_{i,t=0} + \varepsilon_{i,t}, \quad (5)$$

where $Het_{i,t=0}$ splits the sample in two groups on the basis of the binary characteristic Het , and β_4 is the treatment effect difference between the two groups of subjects.

Our key dimension of heterogeneity is whether the job-search partner of the seed was an active jobseeker at baseline or not. As discussed in Section 4, our key hypotheses are formulated for pairs of jobseekers where both individuals search for work and benefit from the job search of their partner. These are the typical partnerships in our context. However, in some cases we observe that the partner nominated by the seed is not an active jobseeker. These partnerships are not adequately captured in our model, since they are likely to be maintained for reasons other than the exploitation of job search complementarities. Further, we do not necessarily expect these partnerships to respond to the intervention in a way similar to those partnerships where both individuals search for work. The heterogeneity analysis thus enables us to focus on the part of the sample for which we have the sharpest

²⁰We did not register a pre-analysis plan, but rather view this study as an explorative exercise that departs from more traditional analysis of experimental data.

theoretical predictions.

6 Results

In this Section, we study the effects of the transport subsidy on the job-search partners of treated individuals. We report results on social interaction, job search and employment outcomes. All outcome variables are defined in the appendix Section B.

6.1 Social interaction between seeds and their job-search partners

We estimate that the intervention insignificantly decreases social interaction between seeds and their job search partners. We show this in Table 2, for different dimensions of social interaction. In particular, the fraction of partners that share transport expenses with their seed decreases by a marginally insignificant 7 percentage points (over a control mean of 24 percent). Further, the fraction of partners that share information with the seed decreases by an insignificant 4 percentage points (over a control mean of 41 percent).

6.1.1 Active job-search partners

When we focus on active job search partners, we find that the subsidy substantially and significantly reduces seed-partner social interaction²¹ The results of our analysis, reported in Table 3 (column (1)), show that the interaction between treated seeds and active job-search partners decreases substantially in almost all dimensions: the social interaction index, a standardised index of all outcome variables in the table, decreases by 0.5 standard deviations, which is a large effect. In terms of the detailed outcomes, job-search partners share fewer information with their seeds (-20 pp.), spend less time with their seeds (-15 pp.), travel to the centre less often (-19 pp.), and share travel expenses less often (-18 pp.). These effects are very large and statistically significant. Active job-search partners spend seven fewer hours per month with the seeds, when those seeds are treated. In our baseline sample, a one-kilometre increase in the geographical distance between the seed and the partner is associated with a reduction in the time they spend together of approximately one hour. The impact of the subsidy on time spent is thus comparable to doubling the baseline mean distance (3.75 km) between job-search partners.

We also find some suggestive evidence that the size of the overall job contact network decreases by 19 percent (over a baseline mean of 2.17 job contacts). These findings indi-

²¹A more detailed rationale for this analysis is given in Section 4. In appendix Section H.5, we show that our results are robust to different definitions of ‘active’ baseline searchers. And in appendix section H.6, we show that active search at baseline remains the key heterogeneity dimension when controlling for heterogeneity in gender, education, and wealth.

cate a clear disruption of information sharing and other forms of social interaction between seeds and their job-search partner. Further, the job-search partners do not fully offset this by establishing new connections.

6.2 Job search

We find that the intervention reduces the job search intensity of the partners of treated seeds, in the full sample of job-search partners. We show this by investigating both job search in the last seven days and in the last 30 days in Table 4. The search index decreases by a significant 0.2 standard deviations. Both recent overall job search and job search at the vacancy boards decrease by seven percentage points, respectively. These are declines of 21 percent and 41 percent, respectively, compared to the endline search levels of the control group. These are large effects, especially when contrasted with the direct effects of the intervention on program participants.²² Recent job search using social networks decreases by 3 percentage points, however this effect is statistically insignificant. The negative coefficient, however, is consistent with the decrease in the overall size of the job-search network that we have documented in the previous Section.

We observe a strong shift away from vacancy board job search in the past month that is even larger in economic and statistical significance than for the seven-day recall period. Besides, the search at work agencies and at central locations (such as central squares in the city) goes significantly down by approximately 2-4 percentage points. Search strategies that *do not* depend on commuting to the centre of Addis Ababa are not affected by the transport subsidy: neither job search at work sites (such as construction sites that can be found everywhere in the city, not just in the centre) nor searching the internet for jobs decrease significantly.

6.2.1 Active job-search partners

Table 5 shows the impacts on the job-search partners' job search behavior, split by whether the partner is actively looking for a job at baseline. The negative spillover results of the transport subsidy on the job search of the social contacts of the subsidy recipients are almost entirely driven by active job-search partners. The search index decreases by 0.45 standard deviations, which is large and significant. The coefficients on overall job search, board search, and social network job search are similarly large and in the first two cases statistically significantly negative. For the one-month recall period, we similarly find a stronger decrease in job board and city centre search for the group of active job-search partners. The difference in the coefficient for search at work sites follows this pattern, but we fail to reject that it is equal to zero.

²²? report the direct effects on program beneficiaries: overall job search increase by 12.5 percent (or five pp.) and job search at the job vacancy boards increases by nearly a third (or nine pp.).

At baseline, both the seed and the job-search partner mutually exchange information about jobs. Our negative findings on the partners' job search suggest a strong complementarity in job search behavior. Once the partnership with the seed is broken, vacancy information from the seed stops coming in. As a consequence, own vacancy information obtained by the job-search partners become less useful, and own job search decreases.

The negative effects on job search are very large, in particular for the sample of job contacts actively searching for a job at baseline. When interpreting the magnitude, it is important to recall that the median job-search partner in our sample has only 2 job contacts at baseline, the seed individual being one of them. Losing one (the seed) out of two information-sharing partners is thus equivalent to a 50 percent reduction in the job search network, which can plausibly explain the magnitude of the negative search impacts.

6.3 Employment

We report the findings for the the job-search partners' employment status in Table H11. ? document an insignificant, four percentage points increase in employment rates for program beneficiaries and a larger, significant increase for a subgroup of jobseekers with poor employment prospects. During the study period, the seeds also experience an insignificant, 2.5 percentage point increase in employment.

We also do not find effects on the employment of job search partners. This includes whether individuals are engaged in any work, whether they have a permanent job or a formal job, and their monthly earnings (Table H11).

6.3.1 Active job-search partners

We once more split our results by whether the job-search partner is actively looking for a job at baseline. Now, Table H12 shows patterns in a similar direction as for social interactions and the partners' job search. We find economically meaningful, but statistically insignificant decreases in the treated partners' probability of having any work or permanent work in the last seven days, or any formal work over the whole treatment period (ten to eleven percentage points each). The employment index decreases by an insignificant 0.2 standard deviations. Thus, the significant decrease in job search of the treated partners directly leads to an overall lower likelihood of employment.

6.4 Using LASSO to improve precision and power

All our main results are robust to the inclusion of an additional set of controls selected through a double LASSO procedure (?). This estimator enables us to obtain more precise estimates and hence to run tests that are more powered. We find that, despite the greater

power, we are still unable to detect significant impacts for the sample of individuals who were not searching for work actively at baseline. This gives us further confidence in these null results. Further, we gain some precision when we estimate impacts on the employment index for the active jobseekers (we now have a marginally significant effect) and when comparing the estimates of active and non-active individuals (which are now statistically different for all outcome indices). We report these results in Table H34 in the appendix.

6.5 Mediation analysis

To more formally test the hypothesis that the decrease in search behavior is caused by a disruption of the job search network, we follow the recommendations on mediation analysis by ?. We compute the Average Controlled Direct Effect (ACDE) of the transport subsidy on the search behavior of the job-search partners who were actively looking for a job at baseline, fixing the potential mediators of interest. The ACDE captures the impact of an intervention when a particular mediator is not allowed to respond to the treatment. We can thus assess the importance of a given mediator by comparing the original treatment effect to the ACDE.

We show this comparison in Figure 4. In the left panel, we find that a large share of the negative impact on the job search index of the job-search partners can be explained by the decrease in social interactions. The decrease in social interactions with the seed individual explains 39 percent of the effect, and all social interactions together explain almost 80 percent of the decrease in the job-search partners' search behavior. Since the search index includes job search in social networks, we show in the right panel of Figure 4 that we get very similar results when the outcome variable is search at the job boards. The results of our mediation analysis are thus not driven by the fact that the outcome variable includes search through social networks.

6.6 The spatial dimensions of our findings

In the appendix Section D.2, we take a detailed look at the spatial dimension of the social network impact of the job search assistance. Broadly, we do not find significant heterogeneity at the geographical level, but the negative impacts on job search and social interaction tend to be higher for job-search partners living closer to their seeds. In terms of distance to the city centre, the negative impacts on search and social interaction tend to be larger for individuals living farther away from the city centre.

7 Mechanisms

In what follows, we explore a number of potential mechanisms that may drive these results. In line with our framework in Section 4, we present empirical evidence consistent with the hypothesis that the intervention undermines job-search partnerships by creating inequality in job-search costs. We then investigate a non-exhaustive set of alternative explanations for the break-up in job-search partnerships. We are unable to find evidence that this is due to (i) a decrease in seed free time, (ii) the relocation of some seeds to new neighbourhoods, (iii) an increase in the seed’s ability to link to higher-value job-search partners. Finally, we explore a number of alternative mechanisms that could generate the observed decrease in job search effort. We do not find empirical support for the hypotheses that job search drops due to (i) a discouragement effect, and (ii) the inability to rely on the seed to finance job-search fixed costs (as opposed to the more general strategic complementarity in search efforts that we posited in the model).

Overall, this analysis suggests that the model we developed in Section 4 provides a potential explanation for the reduction in partner-seed social interaction and partner job search induced by the intervention. However, we also stress that this is necessarily a preliminary conclusion and that additional experimentation would be required to fully pin down mechanisms.

7.1 Are the impacts on job-search partnerships and effort due to the inequality between partners generated by the intervention?

Our framework in Section 4 shows that increasing inequality in job-search costs can break up job-search partnerships. If job-search efforts are strategic complements, the partnership break-up will in turn result in a decrease in the search effort of the untreated partner. As discussed at the end of Section 4, we hypothesise that the partnerships that have relatively equal job-search costs at baseline will be most susceptible to the inequality brought about by the interventions, since this inequality decreases the incentives of the seed to maintain the partnership. On the other hand, those partnerships that can sustain high levels of inequality prior to the intervention are likely to be motivated by different considerations. Hence, they should be more resilient to the changes in inequality caused by the transport subsidy. In this section, we test this hypothesis leveraging baseline data on individual characteristics and job search. As described in Section 5.1, the job-search partners are not restricted to meet the eligibility criteria of the transport subsidy sample from which our seeds were randomly drawn.²³ This means that our sample includes job-search pairs where both individuals have similar eco-

²³Namely: Between 18-29 years of age, at least a high school degree, not in permanent employment, living outside of the city centre of Addis Ababa.

conomic status and demographics—and thus similar job search costs—, and job-search pairs where the two individuals differ markedly along these dimensions. Further, in some of the pairs information is exchanged reciprocally, whereas in other pairs only one person obtains information from the other. While we expect people who do not share information to share other types of support, we do interpret two-way information sharing as a further proxy of similarity in job-search costs. In line with our model, we expect the negative effects of the subsidy to be stronger for pairs that have similar characteristics at baseline and for pairs where information exchange is reciprocal.

We run two sets of regressions. The first set splits the sample based on whether the seed and the job-search partner reciprocally exchange information. The second set splits the sample based on the difference in expenditure level at baseline between the two partners. Expenditure is a meaningful variable to use as it is related to an individual’s ability to finance job search. For both sets of regressions, we focus on active job-search partners, as this is the group that drives the treatment effects. Overall, both sets of regressions are consistent with our hypothesized mechanism.²⁴ However, we note that while the effects are always in the hypothesized direction, the difference between the impacts for the two groups is not always statistically significant. We describe the results in detail in the following two subsections.

7.1.1 Baseline reciprocity in information exchange

Table H13 shows impacts on social interaction by whether information is shared reciprocally between the seed and the partner. Consistent with our hypothesis, we find that treatment effects are largely driven by pairs where information sharing is reciprocal. As a result of the intervention, individuals in these pairs share less information with each other, are less likely to travel together to the city center and to share expenses, and spend considerably less time together (on the intensive margin). The untreated person in the pair also experiences a significant decrease in the overall size of her job network. On the contrary, when information flows only one way, effects are much smaller in magnitude and insignificant (though we cannot reject that they are the same). In Table H14, we display results for job search. The results give further support to our hypothesized mechanisms since, when information exchange is reciprocal, the spillover effects of the intervention on the untreated partner are more pronounced: the negative effect on the overall search index is more than twice the size of the effect we document when information flows only one way. For two specific types of job search — search at the job boards and search using social networks — the difference is both large and statistically significant.

²⁴We also studied heterogeneity with respect to the difference in education levels, a potential indicator of search effectiveness. The results for this sample split are inconclusive.

7.1.2 Baseline economic status

Table H15 shows impacts on social interaction by similarity in baseline expenditure. We find that pairs that have similar expenditure travel to the city less frequently, share expenses less often, exchange less money and spend less time together (on the intensive margin). These effects are typically larger than the effects for dissimilar pairs, but the only statistically significant difference shows up in the impact on sharing money. In Table H16, we display results for job search. Consistent with our hypotheses, we find that negative impacts on job search are more pronounced among partners who have similar baseline expenditure. Overall job search and search at the job boards decline by almost two thirds; network job search also decreases. The difference between the impacts of similar and dissimilar pairs is marginally insignificant. A similar pattern can be seen for the one-month recall variables, with those jobseekers that were similar to their seeds at baseline responding more strongly negatively to their seeds' treatment.

7.2 Alternative explanations for the break-up of job-search partnerships

7.2.1 Do treated individuals have less time to interact with their partners because of employment or job search?

One possibility is that treated seeds have less time to interact with their job-search partners because they found employment. We have two pieces of evidence that are inconsistent with this explanation. First, treated seeds are not significantly more likely to have work at endline. Second, we do not find significant or qualitative differences between the impacts on the partners of unemployed seeds and those on the partners of seeds who were employed at any point between baseline and endline (appendix Tables H25 to H26). Similarly, treated seeds may have less time to interact with their partners because they spend more time searching for work. We offer several pieces of evidence that do not support this explanation. First, the median *return* travel time from the seed's place of residence to the city centre is about one hour. While this is a significant amount of time, it clearly leaves ample time for other activities. Second, there are no interaction effects between the duration of the seed's travel to the city centre and the impacts of the interventions on the seeds' job-search partners. To show this, we split our sample based on the median baseline distance of the seed's residence to the city centre, which determines how much time an extra trip takes, and run separate regressions. The results are presented in appendix Tables H27 and H28. We find that the decrease in search is if anything more pronounced for job-search partners of seeds with a below median baseline distance to the centre. The decrease in sharing of job information is similar in both samples, above and below the median baseline distance. Overall, this evidence does not support the hypothesis that seeds do not interact with their partners due to the time

spent on job search.

7.2.2 Does relocation reduce interaction between seeds and job-search partners?

Second, we study whether subjects change their place of residence in a way that favors the break-up of job-search partnerships. For example, treated seeds may find work away from their place of residence and then move closer to their new job. Alternatively, the partners of treated seeds may move instead, for example, because they want to search in an area that is different from that of the treated seeds. We do not find any evidence in support of these explanations. First, very few seeds change their place of residence. Of the 165 seed individuals, two move out of Addis Ababa and 14 move within the capital at endline. Appendix Table H29 shows that there are no treatment effects on the probability of moving. Second, changes in the place of residence are also infrequent among the partners of the seeds and, importantly, the partners of treated seeds are not more likely to move compared to the partners of untreated seeds. In the six months between the baseline and follow-up survey, 30 job search partners move out of Addis Ababa temporarily or permanently: 20 partners of untreated seeds, ten partners of treated seeds. The most frequent reason cited is work migration (temporary or permanent, 57 percent), followed by pursuing additional education (20 percent), caring for family members (20 percent), and holiday (3 percent). Further, 35 job search partners relocate within Addis Ababa over the course of the intervention (20 partners of untreated seeds, 15 of treated seeds). Of these 35 movers within the capital, the average distance to the city centre *after* moving is 6.8 km and hence very similar to the mean distance to the city centre that we find at baseline for the whole sample (7.0 km). The 35 partners move to a new location that is on average 2.7 km away from their prior residence (median: 1.9 km). Only one single individual moves from the suburbs to the city centre.

7.2.3 Do treated individuals make new connections to “higher-value” individuals?

Third, we explore whether the subsidy gives treated seeds the opportunity to connect to individuals who provide better labor market support than their peers. This, in turn, may induce the seeds to break their existing partnerships. To investigate this, we leverage the data from ?. First, and most importantly, we do not find any significant evidence that treated individuals are more likely to interact with employed peers (Table A.23, second coefficient in ?). Second, in Figure A6 we show that treated individuals are less likely to talk to their friends. This is true not only during the intervention, but also in the months after treatment. If we produce a similar impact trajectory for the seed individuals only, we also find a negative effect on talking to friends – albeit a much larger one of almost five percentage points, which

is almost statistically significant despite the small sample (appendix Figure A7).²⁵ Overall, we interpret this as evidence that the seeds have not re-wired their links towards higher-value partners in a major way.

7.3 Alternative explanations for the decrease in job search among partners

7.3.1 Does the intervention discourage the job-search partners of treated seeds?

One alternative reason why the job-search partners of treated seeds search less is that they may become discouraged, as they feel unable to compete with treated jobseekers. Our analysis does not support this explanation. First, we have shown that job-search partners and seeds tend to live far away from each other. Hence, it is not likely that they are competing for the same limited pool of jobs found in their local labor market. Second, by looking at the effects on the job-search partners' job market expectations and aspirations in appendix Tables H17 and H18, we can rule out that the intervention changes the job-search partners' labor market expectations — neither reservation wages or expected wages change significantly, nor does the number of job offers expected in the near future. In addition, Table H30 displays the change in the job-search partners' beliefs, attitudes and life satisfaction. While there are no changes in overall happiness, we find that the intervention actually positively affects the two variables measuring the job-search partners' feeling of independence. Appendix table H31 shows that these effects are again primarily driven by the active baseline searchers. Taken together, these result do not support the discouragement hypothesis.

A related possibility is that the employment effects among treated seeds are weaker than expected, despite a considerable increase in job search, leading their job-search partners to become more pessimistic about the returns to job search effort. We test this hypothesis by studying the relationship between the job search intensity of the partners and their expectations about future job offers. If we observe a weakening of this correlation among the partners of treated seeds, this would support the view that they have become more pessimistic about the returns to job search effort. In appendix Tables H32 and H33, we show that the correlation between job search intensity and expected offers among the partners of treated seeds is similar to the correlation among the partners of untreated seeds. If anything, the correlation is (insignificantly) stronger for the partners of treated seeds. This evidence is inconsistent with this the hypothesis that the partners of treated seeds are more pessimistic about the returns to search effort.

²⁵This is not an artificial small sample effect: the results are very similar when using the complete control group sample ($N \simeq 800$) instead of the 86 control group seeds.

7.3.2 Are the former partners of treated seeds unable to fund a fixed job-search cost?

One final possibility is that the former partners of treated seeds are now unable to fund a fixed job-search cost. Our model assumes that the decrease in job search is due to the strategic complementarity of the efforts of the two partners. However, in principle, it would be possible to observe a similar negative impact on job search if the primary function of the partnerships was to finance a fixed job-search cost, for example, the cost of reaching the city centre. Under this alternative model, once individuals reach the city centre, peer search efforts may be strategic substitutes or may even exert a negative externality on the job finding probability of the partner, if individuals compete for the same vacancies. We present two pieces of evidence inconsistent with this explanation. First, we document observationally that individuals who live close to the city centre benefit from having stronger networks. Figure 1 in Section 2 shows that individuals with stronger networks have higher returns from search effort. Appendix Section H.7 documents that this conclusion is unchanged when we look at individuals who live below the median distance from the city centre. This is consistent with the existence of search effort complementarities that are not limited to the financing of transport expenses. Second, we present an additional mediation analysis where we exclude “sharing transport expenses” from the index of social interaction with the seed. We find that this revised index mediates a virtually identical proportion of the treatment effect on job search as the index that includes sharing transport expenses. Consistent with this, if we run a mediation analysis using an indicator for sharing transport expenses, we find that this indicator mediates only 6 percent of the total effect. In other words, the drop in sharing transport expenses does not seem to be the main driver of the fall in job search. We present the results of this additional mediation analysis in Appendix Figure A8. Overall, this evidence does not support the fixed job-search cost hypothesis.

8 Conclusion

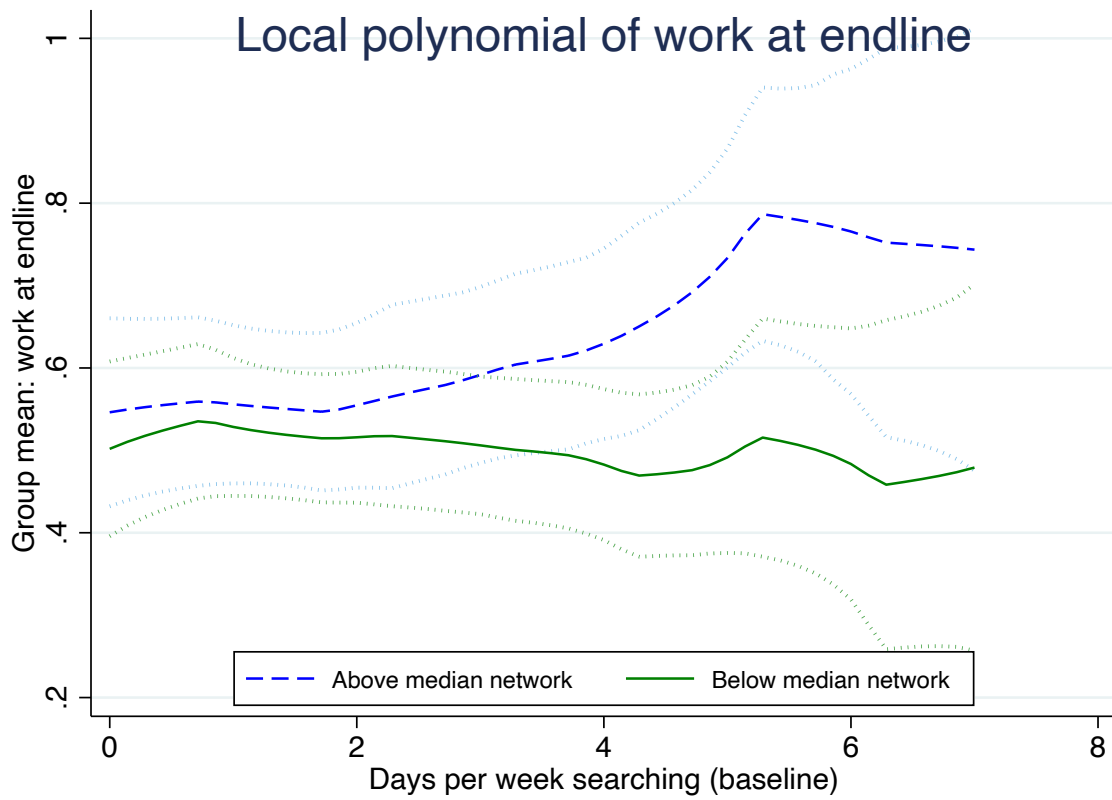
We study the exchange of information about job opportunities in the social networks of young jobseekers in Addis Ababa, Ethiopia. We find that a job-search assistance intervention induces program participants to interact less frequently with their job-search partners who are actively seeking employment at baseline. Program participants and their active partners exchange less information about job vacancies and also interact less along many other dimensions. Further, the job-search partners of treated individuals reduce job-search effort, suggesting a strong complementarity of job-search effort among job-search partners. We hypothesize that the intervention disrupts job-search networks because it increases inequality in the access to information within the pairs of jobseekers, making it harder to sustain job-search partnerships. Consistent with this, we find that the effects are stronger for pairs of

friends with similar levels of baseline expenditure.

These findings generate leads for future research. First, a long-standing literature in the social sciences laments the erosion of social interaction that is often associated with economic development (??). It would be important to assess whether people intrinsically value the kinds of social connections that we study in this paper—that is, the friendships and interactions built specifically around job search. If they do, then the break-up of job-search partnerships would create a loss of social welfare. An alternative view is that at least some network connections are purely instrumental: once the underlying market failures are addressed, these forms of interaction disappear with no loss of utility for the people involved. The welfare implications of our findings largely depend on this point.

A second and final point to explore is whether people are able to forecast network changes and whether they try to prevent these changes with side payments. For example, the recent literature has found evidence of a sophisticated ability to forecast future behavior among professional traders (?) and households (?). In the context of job-search networks and active labor market policies, sophisticated people would understand that if their partner were to receive job-search support from an employment program, the partnership may break. To prevent this from happening, they could pay their job-search partner on condition that they would not join the program. Sophistication and side payments of this kind would have important consequences for the ability of policymakers to treat selected individuals in the network.

Figure 1: Complementaries between own and network search



Notes: This figure shows a Kernel-weighted (epanechnikov) local polynomial regression of whether a respondent has work at endline on the number of days searching for a job at baseline. The local polynomial regression is shown separately by whether the individual's network size is below or above the median. 95% confidence intervals are shown.

Figure 2: Sample overview

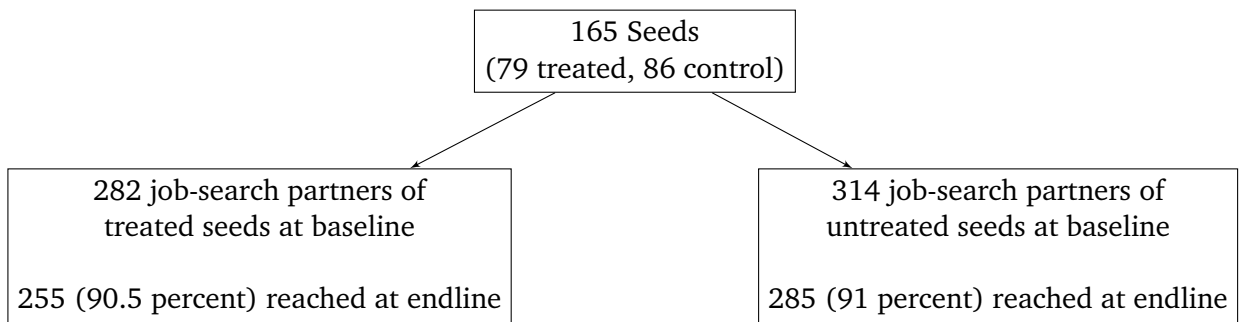
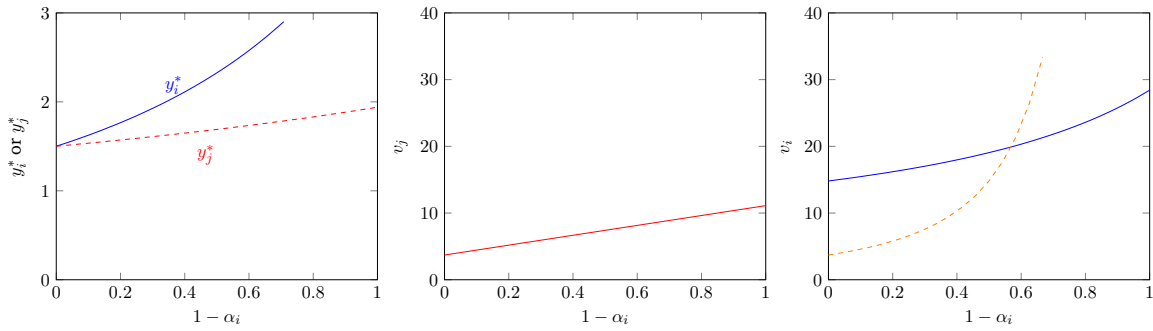


Figure 3: Search efforts and payoffs as a function of the job-search subsidy ($1 - \alpha_i$)

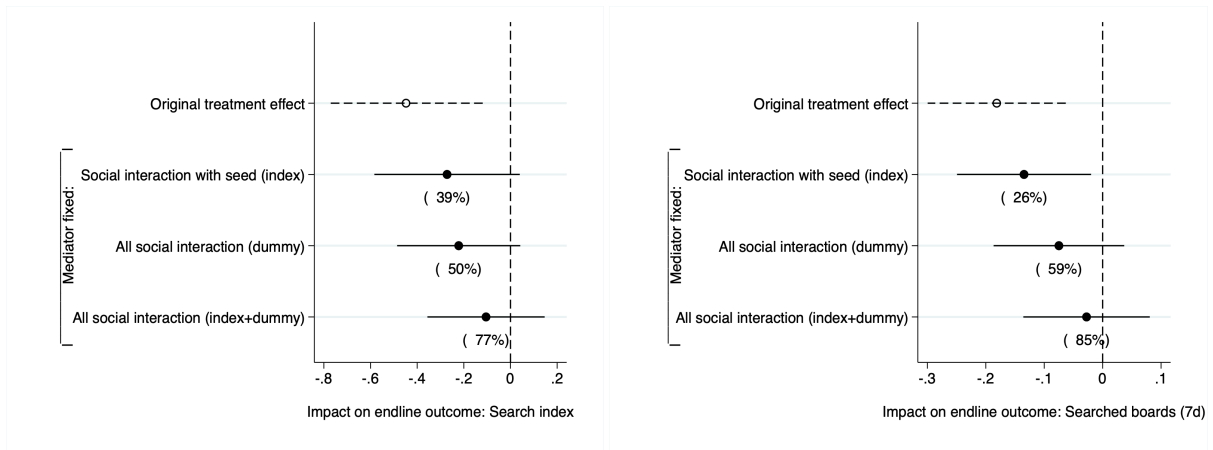


Notes: This figure shows various search efforts and payoffs as a function of the job-search subsidy ($1 - \alpha_i$), for the parameters $c = k = 0.2, p = 0.6, s = 1.5$. Left panel: The blue (red) solid (dashed) line shows the search effort of job-seeker i (j) as a function of the job-search subsidy ($1 - \alpha_i$), when searching in a partnership. Middle panel: The red solid line displays the payoff for job-seeker j when searching in a partnership. Right panel: The blue solid line displays the payoff for job seeker i when searching in a partnership, the orange dashed line the payoff when searching alone.

Figure 4: Mediation analysis: impact of transport subsidy on job search

(a) Search index

(b) Searching at the job boards



Notes: This figures reports coefficient estimates and 90 percent confidence intervals of the impact of the transport subsidy on endline search outcomes of the job-search contacts. The first row reports the original treatment effect. The following rows report the Average Controlled Direct Effect (ACDE) of the intervention, obtained by fixing the mediator indicated in the row's name (?). We can assess the importance of a given mediator by comparing the original treatment effect to the ACDE. To facilitate comparison, we report below each coefficient the share of the original treatment effect that is accounted for by the mediator. The variable “All social interaction (dummy)” is an indicator for whether the respondent has received information about a job from relatives, friends or acquaintances in the last 7 days.

Table 1: Interaction and distance between job-search partners and seeds, by seed treatment status, at baseline

	(1)	(2)	(3)	(4)	(5)	(6)
	Treatment difference	(Standard error)	Control mean	(SD)	Max pairwise difference	Obs.
Spoken (30d)	1.01	(1.27)	11.99	(9.82)	0.10	589
Travel (30d)	-0.00	(0.05)	0.50	(0.50)	0.01	592
Info from seed (ever)	0.03	(0.05)	0.82	(0.39)	0.08	592
Info to seed (ever)	-0.02	(0.02)	0.97	(0.18)	0.12	591
Lent/borrowed (ever)	-0.04	(0.06)	0.50	(0.50)	0.08	592
Distance from Seed to center	0.64	(0.46)	6.74	(3.33)	0.18	596
Distance between Seed and Peer	-0.30	(0.58)	3.87	(4.48)	0.07	594
Lives in center	-0.02	(0.02)	0.05	(0.23)	0.09	596
Same neighbourhood	0.01	(0.02)	0.04	(0.21)	0.02	596
Joint p -value	0.80					

Notes: OLS estimates of individual baseline differences by seed treatment status. The data are shown on individual peer level. Outcome variables are listed on the left. Standard errors are in column 2 and clustered by seed. Stars on the standard errors reflect unadjusted p -values. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level. All monetary values are displayed in Ethiopian birr (ETB). Brackets refer to the recall period in the baseline questionnaire: d=days, m=months, y=years, ever=whole life as recall period. The distances are measured in kilometres. Life satisfaction is measured with a picture of a ladder with steps from 0 (bottom) to 10 (top), representing lowest to highest life satisfaction. Respondents point to the step where they currently see themselves on the ladder. In column 5, we calculate the pairwise difference between the two group means and divide this by the standard deviation of the variable, following Imbens (2015). The last row shows the p -value from a test for joint orthogonality of all covariates.

Table 2: Impacts on social interaction

	(1) Treatment effect	(2) Mean of control search partners (SD)	(3) Max pairwise difference	(4) Obs.
Social interaction index	-0.05 (0.11) [0.63]	0.00 (1.00)	0.05	540
Spent time with seed (30d)	0.02 (0.05) [0.67]	0.72 (0.45)	0.06	490
Travel to Addis (30d)	-0.04 (0.04) [0.37]	0.25 (0.43)	0.09	540
Shared travel expenses (30d)	-0.07 (0.04) [0.11]	0.24 (0.42)	0.18	540
Shared information (6m)	-0.04 (0.06) [0.56]	0.41 (0.49)	0.06	540
Lent/borrowed (ever)	0.04 (0.04) [0.37]	0.25 (0.44)	0.05	540
Hours spent with seed (30d)	-0.83 (2.30) [0.72]	14.37 (21.35)	0.02	490
Job network	-0.01 (0.19) [0.98]	1.49 (1.54)	0.01	540

Notes: ANCOVA estimates of job-search partner variable differences by seed treatment status. Outcome variables are listed on the left. The index is a standardised index of all outcome variables below. Regressions control for the baseline outcome as well as variables that are imbalanced at baseline. Standard errors are in parentheses and are clustered by seed individual. Stars on the coefficient estimates and brackets reflect unadjusted p -values (in brackets). p -values are in brackets. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level. In column 3, we calculate the pairwise difference between the two group means and divide this by the standard deviation of the variable, following Imbens (2015). If the number of observations is smaller than 540, it is because of missing observations for the number of hours spent with the seed.

Table 3: Impacts on social interaction for active and inactive job-search partners

	(1)	(2)	(3)	(4)	(5)	(6)
	Treat. effect for Searchers at baseline	Treat. effect for non-Searchers at baseline	Treatment difference: (1)-(2)	Searchers at baseline (control)	Mean of control search partners (SD)	Obs.
Social interaction index	-0.50** (0.20) [0.01]**	0.10 (0.11) [0.37]	-0.59*** (0.20) [0.00]***	0.45*** (0.15) [0.00]***	0.00 (1.00)	540
Spent time with seed (30d)	-0.15 (0.09) [0.11]	0.07 (0.05) [0.18]	-0.23** (0.10) [0.02]**	0.07 (0.07) [0.32]	0.72 (0.45)	490
Travel to Addis (30d)	-0.19** (0.09) [0.03]**	0.01 (0.04) [0.76]	-0.20** (0.09) [0.02]**	0.17** (0.07) [0.01]**	0.25 (0.43)	540
Shared travel expenses (30d)	-0.18** (0.09) [0.04]**	-0.03 (0.04) [0.46]	-0.15* (0.09) [0.09]*	0.13** (0.07) [0.04]**	0.24 (0.42)	540
Shared information (6m)	-0.20** (0.10) [0.04]**	0.03 (0.07) [0.69]	-0.23** (0.11) [0.04]**	0.22*** (0.08) [0.01]***	0.41 (0.49)	540
Lent/borrowed (ever)	-0.08 (0.09) [0.34]	0.08* (0.04) [0.06]*	-0.16* (0.09) [0.08]*	0.11* (0.07) [0.10]*	0.25 (0.44)	540
Hours spent with seed (30d)	-6.81 (4.91) [0.17]	1.17 (2.35) [0.62]	-7.98 (5.15) [0.12]	5.09 (3.67) [0.16]	14.37 (21.35)	490
Job network	-0.42 (0.28) [0.14]	0.16 (0.22) [0.45]	-0.58* (0.33) [0.08]*	0.68*** (0.26) [0.01]***	1.49 (1.54)	540

Notes: ANCOVA estimates of job-search partner variable differences by seed treatment status. Outcome variables are listed on the left. The index is a standardised index of all outcome variables below. Regressions control for the baseline outcome as well as variables that are imbalanced at baseline. Standard errors are in parentheses and are clustered by seed individual. Stars on the coefficient estimates and brackets reflect unadjusted p -values (in brackets). p -values are in brackets. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level. If the number of observations is smaller than 540, it is because of missing observations for the number of hours spent with the seed.

Table 4: Impacts on job search

	(1) Treatment effect	(2) Mean of control search partners (SD)	(3) Max pairwise difference	(4) Obs.
Search index	-0.20** (0.10) [0.04]**	-0.64 (1.09)	0.20	540
Searched job (7d)	-0.07 (0.04) [0.11]	0.34 (0.48)	0.15	540
Searched boards (7d)	-0.07** (0.03) [0.03]**	0.17 (0.38)	0.18	540
Searched in networks (7d)	-0.03 (0.05) [0.54]	0.34 (0.47)	0.07	540
Searched boards (1m)	-0.17** (0.07) [0.02]**	0.52 (0.50)	0.30	540
Searched in network (1m)	-0.07* (0.04) [0.10]*	0.72 (0.45)	0.19	540
Searched at work sites (1m)	-0.01 (0.03) [0.80]	0.15 (0.36)	0.02	540
Searched at agency (1m)	-0.03 (0.02) [0.20]	0.10 (0.30)	0.11	540
Searched at central locations (1m)	-0.02** (0.01) [0.04]**	0.02 (0.14)	0.15	540
Searched internet (1m)	0.03 (0.03) [0.32]	0.08 (0.27)	0.16	540

Notes: ANCOVA estimates of job-search partner variable differences by seed treatment status. Outcome variables are listed on the left. The index is a standardised index of all outcome variables below. Regressions control for the baseline outcome as well as variables that are imbalanced at baseline. Standard errors are in parentheses and are clustered by seed individual. Stars on the coefficient estimates and brackets reflect unadjusted p -values (in brackets). p -values are in brackets. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level. In column 3, we calculate the pairwise difference between the two group means and divide this by the standard deviation of the variable, following Imbens (2015).

Table 5: Impacts on job search for active and inactive job-search partners

	(1)	(2)	(3)	(4)	(5)	(6)
	Treat. effect for Searchers at baseline	Treat. effect for non-Searchers at baseline	Treatment difference: (1)-(2)	Searchers at baseline (control)	Mean of control search partners (SD)	Obs.
Search index	-0.45** (0.20)	-0.11 (0.10)	-0.34 (0.21)	0.52*** (0.19)	-0.64 (1.09)	540
Searched job (7d)	[0.03]** -0.22** (0.09)	[0.28] -0.02 (0.05)	[0.11] -0.19* (0.10)	[0.01]*** 0.13 (0.09)	0.34 (0.48)	540
Searched boards (7d)	[0.02]** -0.18** (0.07)	[0.62] -0.04 (0.03)	[0.06]* -0.15* (0.08)	[0.14] 0.15** (0.06)	0.17 (0.38)	540
Searched in networks (7d)	[0.01]** -0.11 (0.09)	[0.27] -0.00 (0.05)	[0.06]* -0.11 (0.10)	[0.01]** 0.05 (0.08)	0.34 (0.47)	540
Searched boards (1m)	[0.20] -0.22** (0.09)	[0.99] -0.14* (0.08)	[0.23] -0.08 (0.10)	[0.51] 0.17** (0.08)	0.52 (0.50)	540
Searched in network (1m)	[0.02]** -0.04 (0.08)	[0.09]* -0.08 (0.05)	[0.39] 0.04 (0.09)	[0.02]** 0.03 (0.08)	0.72 (0.45)	540
Searched at work sites (1m)	[0.65] -0.07 (0.08)	[0.11] 0.02 (0.03)	[0.63] -0.09 (0.08)	[0.70] 0.13** (0.06)	0.15 (0.36)	540
Searched at agency (1m)	[0.38] -0.06 (0.06)	[0.50] -0.01 (0.02)	[0.28] -0.05 (0.07)	[0.02]** 0.08* (0.05)	0.10 (0.30)	540
Searched at central locations (1m)	[0.32] -0.06** (0.03)	[0.58] -0.01 (0.01)	[0.46] -0.05* (0.03)	[0.08]* 0.04 (0.03)	0.02 (0.14)	540
Searched internet (1m)	[0.04]** 0.06 (0.07)	[0.36] 0.03 (0.03)	[0.08]* 0.02 (0.07)	[0.11] 0.13** (0.05)	0.08 (0.27)	540
	[0.42]	[0.24]	[0.77]	[0.01]**		

Notes: ANCOVA estimates of job-search partner variable differences by seed treatment status. Outcome variables are listed on the left. The index is a standardised index of all outcome variables below. Regressions control for the baseline outcome as well as variables that are imbalanced at baseline. Standard errors are in parentheses and are clustered by seed individual. Stars on the coefficient estimates and brackets reflect unadjusted p -values (in brackets). p -values are in brackets. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.