WPS8266

Policy Research Working Paper 8266

The Value of Reference Letters

Martin Abel
Rulof Burger
Patrizio Piraino

WORLD BANK GROUP
Jobs Group
&
Africa Gender Innovation Lab
December 2017

Policy Research Working Paper 8266

Abstract

This paper shows that reference letters from former employers alleviate information asymmetries about workers' skills and improve both match quality and equity in the labor market. A resume audit study finds that using a reference letter in the application increases callbacks by more than 60 percent, with women driving the effect. Letters are effective because they provide valuable information about workers' skills that employers use to select applicants of higher ability. A second experiment, which encourages job seekers to obtain and use a reference letter, finds consistent results. In particular, employment rates for women encouraged to obtain a letter increase by 49 percent, closing the gender gap in the sample.

This paper is a product of the Jobs Group and Africa Gender Innovation Lab. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at mabel@middlebury.edu.

The Value of Reference Letters

Martin Abel* Rulof Burger† Patrizio Piraino‡

*Middlebury College. Email: abel@middlebury.edu

†Stellenbosch University. Email: rulof@sun.ac.za

‡University of Cape Town. Email: patrizio.piraino@uct.ac.za

§Acknowledgment: This paper greatly benefited from discussions with and comments by David Autor, Emmanuel Bakirdjian, Willa Brown, Eliana Carranza, Bruno Crepon, Robert Garlick, Rachel Glennerster, Rema Hanna, Lawrence Katz, Asim Khwaja, Michael Kremer, Amanda Pallais, Gareth Roberts, Volker Schoer. We also thank participants at the CSAE (2016), NEUDC (2016), World Bank/IZA (2017), Development Economics and Policy (2017), and EALE (2017) conferences, as well as seminar attendees at Harvard University, Middlebury College, Stockholm School of Economics, and University of Cape Town. Emma Lambert-Porter, Velenkosini Matsebula, Samantha Ndiwalana and Svetlana Pimkina provided superb research assistance. We thank the South African Department of Labour and J-PAL Africa, especially Laura Poswell, for assistance in the implementation of this project. This study was prepared in collaboration with the World Bank Jobs Group and the Africa Gender Innovation Lab. We thank EuropeAid for financial support. The experiment was registered under registry number AEARCTR-0000819. All errors and omissions are our own.

1 Introduction

Information asymmetries about workers' skills are prevalent in labor markets, especially in the market for low-skill and entry-level jobs.[1] Hiring firms can reduce these asymmetries through reference letters from previous employers. However, in various contexts (particularly in the developing world) this practice is largely absent and most firms resort instead to informal referrals, such as those from their existing workforce.[2] This has potential adverse effects on match quality as it limits the pool of candidates and as current employees may refer close friends or family members rather than their most qualified peers (Loury, 2006; Beaman and Magruder, 2012). In addition, informal referral systems may exacerbate inequity as they disadvantage less connected groups (Montgomery, 1991).

We conduct three experiments in cooperation with the South African Department of Labour (DoL) to investigate the value and usage of standardized reference letters among young job seekers. Specifically, we design a reference letter template and encourage young job seekers to have a former employer complete it. Belot et al. (2016) note that there are only a few studies in the literature that focus exclusively on the impacts of reducing information asymmetries in the labor market. In particular, the large literature on active labor market policies consists mostly of evaluations of programs that combine a variety of elements, such as advice, monitoring, and/or training. To our knowledge, this is the first study on the use and value of reference letters.[3]

Our first experiment (Experiment 1) is an audit study where we submit applications with and without reference letters on behalf of job seekers to vacancies and compare firm responses. Importantly, we conduct the study with actual job seekers who visit the Labour Centres. This addresses the criticism that application materials designed by researchers may not be realistic or include all relevant information (Heckman, 1998) as well as ethical concerns about sending fictitious applications (Riach and Rich, 2004).

[1] In these markets, job seekers often have limited work experience and lack educational degrees to signal skills. Firms are less likely to invest in costly screening as employment relationships are often short-term (Autor and Scarborough, 2008).

[2] In developed economies about 50% of jobs are found through informal network (Topa, 2011). In South Africa, where our study is based, about 68% of jobs are found through informal referrals (Schoer et al., 2014).

[3] There is relatively little research on reference letters, defined as a "description or evaluation of an applicant that is completed by an observer and used as a source of information for personnel selection" (McCarthy and Goffin, 2001), despite its ubiquity in the selection process (Aamodt, 2015). Existing research focuses on the ability of reference letters to predict future performance. One exception is Kaas and Manger (2012), who find through an audit study that reference letters do not increase overall employer responses but may benefit applicants from minority groups.

The results from the audit study show that reference letters are valuable to both job seekers and hiring firms. For the *same* applicant, attaching a letter increases the probability of receiving a response from the firm from 4.2% to 6.7% (a 60% increase) and the rate of interview requests from 2.4% to 3.9% (a 62% increase). The overall effect is driven by female applicants.

As reference letters become more common, applications attaching a letter may be less distinctive. We shed some light on this by randomly varying the share of applicants for whom we submit reference letters. We find no evidence that increasing the share of reference letters sent to a given vacancy affects the letter's impact.

Firms use the information provided by past employers to update their beliefs of applicants and are more likely to respond to applications with positive letters. In addition, we find that reference letters in which the former employer gives the highest rating in every category are ineffective. We interpret this as a perceived lack of credibility, which harms employment prospects.

Our design includes an aptitude test that job seekers complete at the Labour Centre. This provides a measure of ability that is observable to us but not to the employer. Using the applicant's score on this test, we show that reference letters lead firms to select candidates of higher ability. Performing one standard deviation higher on the aptitude test increases the likelihood of an employer response by 2.6 percentage points (a 62% increase) for applications that include a reference letter, as opposed to 0.6 percentage points (a 15% increase) for those not including a letter. This improvement in the firm's capacity to screen better applicants suggests that letters are informative of workers' unobserved ability. Indeed, we show that ratings from previous employers are highly correlated with aptitude scores, even after controlling for information that can be easily observed from the resume or school transcripts.

In sum, the results from the audit study (Experiment 1) show that reference letters can reduce information asymmetries, especially for women, and improve the employment prospects of higher ability candidates. Although our design cannot explicitly test for general equilibrium effects, theory predicts that the identification of higher ability workers should increase firm demand (Pissarides, 1985).

Since Experiment 1 uses employers' callback as the main outcome, it does not estimate employment effects. Moreover, it abstracts from job seekers' behavioral responses, as applications are submitted on their behalf. While these are limitations that are common to most audit studies (e.g. Bertrand and Mullainathan, 2004; Belot et al., 2016), we

conduct a second experiment (Experiment 2) in which we encourage half of job seekers to obtain a letter and subsequently follow their job search behavior and employment outcomes.

The results from Experiment 2 show that female participants who obtained letters are significantly more likely to receive job interviews and their employment rate doubles after three months. On the other hand, no significant impacts are found for men, thus fully closing the gender employment gap in our sample. This gender heterogeneity is very much consistent with the evidence from Experiment 1. We also show that the large employment effects for women are in part explained by a significantly higher usage of letters by female job seekers.

Finally, we run a third experiment (Experiment 3) to investigate why reference letters are not more prevalent in the applications of our target population. The results from this experiment show how providing information on the benefits of having a letter increases the share of participants that obtain one. By contrast, an arm of the same experiment, which offered cash incentives for obtaining letters, had no effect. Underestimating potential benefits may thus explain why job seekers are not asking former employers to provide (informative) reference letters.

The evidence presented in the paper contributes to the literature on job referrals. Previous studies have largely focused on whether social network links can be exploited to reduce information asymmetries, showing that although workers have information on the productivity of their peers (Pallais and Sands, 2016; Burks et al., 2015), they are less likely to pass on truthful information to firms unless sufficiently incentivized (Beaman and Magruder, 2012). Former employers may provide more credible information because their incentives are more aligned with the hiring firm. In addition, they can assess worker abilities more accurately as they observed them in a professional setting (Aamodt, 2015). However, few studies have looked at the role of former employers in reducing information asymmetries. Two notable exceptions are Pallais (2014), who finds that feedback on workers' past performance in an online labor market increases their employment prospects, and Bassi and Nansamba (2017) who study the effect of certifying soft skills. We contribute to this literature by investigating a more traditional labour market setting in which workers can choose both the referee and whether to reveal the information to the market after they observe it.

In addition, we contribute to the literature on how search frictions affect employment (Mortensen and Pissarides, 1994). Information asymmetries between firms and workers

lead to socially sub-optimal hiring of people with limited work experience and an overall decrease in market efficiency (Pallais, 2014; Terviö, 2009). We show that a simple intervention can improve firms' screening ability and reduce these asymmetries. This is a necessary precondition for reference letters to have general equilibrium employment effects, providing a rationale for the government to facilitate the information exchange.

This study also adds to an extensive literature evaluating the effectiveness of active labor market policies (ALMP) (see Card et al., 2015; McKenzie, 2017; for recent reviews). The evidence on ALMPs is mixed, in part because they typically include a package of interventions which makes it difficult to isolate the effectiveness of specific components. In this study, we are able to isolate one component of ALMPs, namely the reduction of information asymmetries. Our findings suggest that addressing information frictions through relatively simple interventions can translate into real employment results.[4]

We acknowledge three main caveats in our study design. First, since we do not randomize the information content of the reference letter, we cannot investigate the relative importance of different types of information on employer's demand. We partially address this concern in Experiment 1, where we can purge the effects of individual-specific characteristics and show that positive ratings on the skills listed in the letter increase employer's responses. Secondly, some of our results are imprecisely estimated. While this warrants some caution in the interpretation of the results, it is reassuring that findings from different experiments (and samples) and on different outcomes consistently point in the same direction. In particular, the empirical results consistently show that women disproportionately benefit from reference letters. Third, one may object that the letters used in this study are based on an easy-to-digest template created by the authors rather than the more common narrative letters found in the market. However, we consider the development of a low-cost and highly-replicable new tool as an additional contribution of the paper (see Belot et al., 2016, for a similar contribution).[5] Screening job applicants is costly, as it requires information that is time-consuming to acquire. The template, which we designed based on feedback from firms, has precisely the intention to reduce this friction. In addition, the intervention is evaluated through the Labour Centres, which is the real environment where the letter templates would be introduced.

[4] In fact, J-Pal Africa and the authors are currently advising the South African Department of Labor on possible ways to implement the reference letter template in the Labour Centres across the country.

[5] Belot et al. (2016) develop and evaluate experimentally a tool that provides tailored job search advice in Job Centres in Scotland. These authors note that most interventions evaluated in the literature have been designed by policymakers or practitioners and that there is added value in developing new tools using insights from the academic literature.

Overall, we believe that our results show that letters are effective: they benefit job seekers and enhance firms' screening ability. In particular, we find large employment gains for women, a group often excluded from informal referral networks. Reducing information asymmetries – through reference letters or other interventions – may thus improve equity by leveling the playing field for women in labor markets.

The remainder of the paper is structured as follows: Section 2 describes the study context and introduces a conceptual framework. Section 3 describes the data and experimental designs. We report and discuss the main empirical findings in Section 4, while Section 5 concludes.

2 Background and Conceptual Framework

2.1 South Africa's Labor Market

The unemployment rate in South Africa is high (26.4%), especially for youths (36.9%) (StatsSA, 2015). The gender employment gap among black South Africans is substantial, despite the fact that black females are on average more educated than their male counterparts (Rospabe, 2001; Shepherd, 2008). One explanation is that firms appear to either underestimate or are more uncertain about the ability of female applicants (Malindi (2016)).

The labor market in South Africa offers a context conducive to investigating the role of information asymmetries. Most of the unemployed did not complete secondary education (55%) and have no or limited work experience (50.6%), which leaves firms with very little information to screen job applicants. In addition, the quality of education is low on average and highly variable, which limits the use of educational credentials as signals for productivity (van der Berg, 2007). Finally, unemployment spells in weak labor markets are less indicative of job seekers' ability (Kroft et al., 2013).

Information asymmetries affect how firms and workers are matched. Some large firms in South Africa administer aptitude tests as part of the hiring process. While these tests can increase aggregate productivity and labor demand by improving match quality (Mortensen and Pissarides, 1994; Pissarides, 1985), they have not been widely adopted. This may be due to firms having fewer incentives to test candidates for jobs where investment in training is limited and employment spells are brief (Autor and Scarborough,

2008). Moreover, many small firms lack the expertise and resources to systematically test applicants.

Faced with these challenges, South African employers have increasingly turned to social networks and the existing workforce to fill vacancies. Schoer et al. (2014) report that up to 68% of workers found employment via networks. Yet, firms face a trade-off in their choice of hiring channels (Montgomery, 1991). Under the "good match" hypothesis (Rees, 1966), current employers can help overcome the asymmetric information problem and create better employment matches as they know both the firm and the people in their network. By contrast, the "limited choices" hypothesis stresses that finding employment through social networks limits the opportunities and match quality (Loury, 2006). In addition, current employees may have personal interests in referring family and friends that conflict with the interest of the firm (Beaman and Magruder, 2012; Fafchamps and Moradi, 2015).

A formal referral system with endorsements from former employers may thus be a more effective mechanism to reduce information asymmetries. Interviews with South African firms confirm the benefits of having former employers as references: if available, hiring managers report that they typically call them for the group of shortlisted candidates. However, focus group discussions with job seekers reveal that most do not have contactable references listed on their CV and less than 5% used a reference letter as part of the application process.

2.2 Conceptual Framework

Markets differ in the extent to which references can mitigate information asymmetries. In many markets, sellers have no choice over the source of the reference and whether this information is publicly revealed (e.g. Amazon ratings). By contrast, job seekers typically choose referees and often observe their feedback before deciding whether to reveal it to the market. This is an important feature which may limit how effectively referral systems can reduce information asymmetries, and which has been largely omitted from the theoretical literature on references.

This section introduces a static illustrative framework for employer learning in this type of market. It will generate two important sets of results: (i) it identifies conditions under which letters have value and (ii) it derives predictions for how the letter affects the hiring decision and screening ability of firms. Here we limit ourselves to an intuitive explanation of the model, while the formal derivations are provided in Appendix A.

Consider a job-seeker who has (general) ability a, which determines her productivity for any firm. At the time of applying for work, the job-seeker is endowed with an application signal $s_1 = a + e_1$. This represents the content of a resume, including school transcripts and other easily observable applicant attributes. With probability π she is also endowed with a reference letter signal $s_2 = a + e_2$. Assume that $a \sim nid(0, 1)$, $e_1 \sim nid(0, \sigma_1^2)$, and $e_2 \sim nid(0, \sigma_2^2)$. The job-seeker applies to a vacancy by sending application s_1 to the firm and must choose whether to also attach a reference letter s_2 ($d = 1$ if she does, otherwise $d = 0$).

The firm chooses whether to hire the applicant based on available information. It will do so if the expected productivity exceeds some threshold, which we assume is firm-specific and exogenously determined. The job seeker's utility depends only on whether or not she is offered a job, and there is no cost to applying or sending reference letters. The firm's conditional expectation is rational and common knowledge, but the hiring threshold is private information.

We show in Appendix A that the firm's equilibrium conditional expectation function, depending on whether they receive a reference letter (d), can be expressed as

$$E(a|s_1, s_2, d = 1) = \kappa_2 s_1 + \kappa_1 s_2 \tag{1}$$

$$E(a|s_1, s_2, d = 0) = -\chi\kappa_1\omega + (\frac{1}{1 + \sigma_1^2}\kappa_1 + \kappa_2)s_1 \tag{2}$$

where κ_1 and κ_2 capture the relative noise in resumes (s_1) and reference letters (s_2), respectively. ω is the variance of the letter signal conditional on the information in the resume and χ is a monotonic transformation of the probability that applicants who have a reference letter choose not to attach it.

When applicants include a reference letter ($d = 1$), firms form beliefs about ability using information from both the resume and reference letter, weighted according to the relative reliability of these two signals. If the application does not include a reference ($d = 0$), firms form beliefs using the information in the resume. They further penalize these applicants with a downward adjustment in expected ability, conditional on the quality of the resume. The magnitude of this penalty ($\chi\kappa_1\omega$) increases in the share of applicants who have access to letters but do not attach it, the relative reliability of the letter and the variance of the letter signal.

In equilibrium, applicants with access to letters will choose to send it if it improves the firm's perception of their ability, i.e. if $E(a|s_1, s_2, d = 1) > E(a|s_1, s_2, d = 0)$. This requires that the reference is sufficiently positive relative to the information in the resume.

Implicit in the model setup are two testable assumptions about the information provided by reference letters: (i) letters are informative about the applicant's ability, i.e. $\frac{\partial E(s_2|a)}{\delta a} > 0$, and (ii) letters contain information that is not already contained in the applicant's resume, i.e. $\frac{\partial E(s_2|a,s_1)}{\delta a} > 0$. Under these assumptions (which we validate in our empirical analysis), the model makes the following predictions about how job seekers use letters and how firms respond to receiving letters (see Appendix A):

- Including a reference letter *will increase the hiring probability* (unless the letter is sufficiently negative). Moreover, firms will be more likely to *hire candidates with stronger letters.*
- Letters result in a *closer mapping from ability to job offers.* That is, firms will be able to screen workers with a reference letter more accurately.
- Any attribute that casts doubt over the reliability of the reference letter (e.g. not providing contact information or being implausibly positive) reduces their effectiveness.
- If employers are more uncertain about the ability of a certain group of job seekers (e.g. females), then reference letters matter more for that group.
- As access to and usage of letters increase, the ability of firms to identify higher ability candidates improves.

This framework presents a rational benchmark model, which assumes that job seekers have correct beliefs about the value of reference letters. We revisit this assumption in Section 4.3.

3 Study Design

This section first describes the sampling and the process of eliciting reference letters common to all three experiments. We then describe each of the experimental designs in detail.

3.1 Study Sample and letter template

Our sampling frame is the Employment Services of South Africa (ESSA) database, consisting of more than 550,000 job seekers collected by the Department of Labour (DoL). We restricted this sampling frame to African unemployed youths between the ages of 18 and 34. We limit our study sample to job seekers who have some form of previous work experience (as our intervention tests reference letters from previous employers), have not completed university-level tertiary education and live within traveling distance from our implementing labor centers.

We further stratify the sample by gender to facilitate subgroup analysis. In the recruitment call, surveyors explain that the job seeker is invited to participate in an employment service study at the local labor center on a specified day. In return, they receive a stipend of 30 Rand (~ 2 USD) to cover travel costs. Across all experiments, 67% of the successfully contacted unemployed individuals agreed to participate.[6] A baseline survey is administered through an in-person interview at the labor center. In Experiment 1, this is followed by an aptitude test that evaluates basic math and literacy skills.[7]

The study employs an encouragement design implemented in cooperation with the DoL. After the baseline survey, participants assigned to the treatment group have a brief individual meeting explaining how to use reference letters in the job search. This is followed by a discussion of the job seekers' work history and identification of potential referees. We provide job seekers with several hard copies of the template.

We conducted more than 30 interviews with employers who frequently mentioned the importance of contactable references in the screening process. When asked what information they collect from references, employers listed both non-cognitive skills like motivation, reliability and work ethic as well as cognitive skills like numeracy and literacy. They are also interested in the nature of the relationship between the referee and job seeker and why the employment relationship ended. Based on this feedback, we designed a reference letter template that employers can easily fill out. Figure A.1 in the Appendix shows the

[6]Using the limited demographic information provided in ESSA, we find that age and gender are not correlated with the decision to participate. By contrast, every year of additional education increases the probability of participation by 1.6 percentage points (p-value: 0.063). Of those that agree to participate, 63.5% showed up at the labor center on the specified day. None of the socioeconomic variables predict whether participants fail to show up at the agreed time and day.

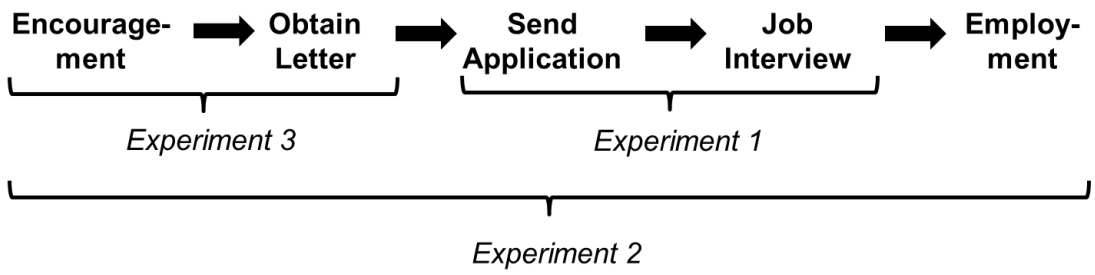
[7]The test takes about 20 minutes and was designed by the researchers. It closely follows standard entry level tests used in the hiring process by large employers in South Africa. Test scores are approximately normally distributed with a mean (median) joint numeracy and literacy score of 61% (63%). For sample questions see Figure A.3.

template, while Figure A.2 gives examples of completed letters.

3.2 Experimental Designs

Figure 1 describes how our intervention may affect employment and summarizes our experimental designs. In Experiment 1, we submit applications on behalf of job seekers to vacancies from online job sites and test if employers are more likely to respond when a reference letter is attached. This provides a "test case" whether reference letters can be valuable. Experiment 2 explores the effect of reference letters on job search behavior and estimates employment effects *after* people adjusted their search strategy. Experiment 3 tests different forms of encouragement to investigate why only a small share of people in our target population obtain reference letters in equilibrium.

Figure 1: Experimental Design Overview



3.2.1 Experiment 1: Employers' Response to Reference Letters

To test the effect of the letter on employer demand, we employ a within-subject randomization design: we encourage 441 job seekers across three labor centers to obtain a reference letter and provide instructions on how to return the completed letter to us. After one week, participants receive a text message reminding them to obtain and return the reference letter; 31% of encouraged job seekers returned the completed letter.

Table A.1 provides summary statistics of the reference letter content, converting employer ratings into numeric values (0=below average, 1=average, 2=good, 3=very good). Overall, ratings tend to be positive: on a scale from 0 to 6, the average aggregate hard and soft skill rating is 4.9; 11% have a perfect score of 6. We find that hard skills are slightly less positively rated than soft skills (2.3 vs. 2.6 on a 3 point scale). While for most categories women receive slightly more positive ratings, only one gender difference is significant at

the 10% level (Team Ability) and one at the 5% level (How highly recommended). Note that we do not verify the authenticity of the reference letters. In Section 4.2, we will explore whether the letter provides truthful information.

Table A.2 investigates which characteristics are correlated with the probability of returning a letter. Age is the only statistically significant predictor. However, there are likely unobservable variables correlated with the propensity to obtain a letter.

For the participants who return the letter to us, we send out applications with and without the reference letter. While selection at the encouragement stage may affect the generalizability of results, the within-subject randomization ensures that results are internally valid. This also has the advantage that we can control for individual specific factors that determine employer responses and thus estimate the effect of reference letters more accurately.

Figure 2 summarizes the randomization design. We search the four most popular South African job websites to identify vacancies for entry positions from one of the following sectors: administration, call center, cleaner, driver, retail, security and unskilled. The vacancies are randomly assigned to vacancy slot 1 through 6. Next, we select four of the job seekers who returned the letter and have previous work experience in a related sector. We create email addresses for each participant and send out six applications following the pattern described in Figure 2. For example, for Participant A we send four applications with the CV (and any additional supporting documents the job seeker provides) and two applications for which we attach the reference letter as an additional document. Importantly, we are invisible to the employer in the entire application process.

Vacancies 1 through 4 offer a straightforward test of the effect of reference letters as we can compare employer responses between applications with and without the attached letter (e.g. compare cell A1 to cell A2, A3 and A4). For vacancy 5 we only send CVs. This provides us with a test for displacement effects at the interview stage, i.e. whether being in an application pool with somebody with a reference letter reduces the chances of getting an employer response. To test for this, we can compare employer responses in cell A5 to A2, A3, and A4. Vacancy 6 receives three applications with reference letters. Comparing application A1 and A6 allows us to test whether employers respond to reference letters differently once they represent a higher proportion of the applicant pool.

We submitted a total of 2,050 applications between June 2015 and April 2016.[8] We

[8]We included vacancy 6 starting in January 2016.

Figure 2: Experiment 1: Randomization Design

Participant	Vacancy 1	2	3	4	5	6
A	CV + Ref Letter	CV	CV	CV	CV	CV + Ref Letter
B	CV	CV + Ref Letter	CV	CV	CV	CV + Ref Letter
C	CV	CV	CV + Ref Letter	CV	CV	CV + Ref Letter
D	CV	CV	CV	CV + Ref Letter	CV	CV

regularly checked for firm responses and forwarded these to the job seekers.[9]

3.2.2 Experiment 2: Job Search and Employment Effects

While Experiment 1 cleanly identifies the effect of including a reference letter in applications, it does not allow us to test whether the letters are effective when individuals are allowed to use it as they see fit. South African job seekers use a mix of search strategies beyond online vacancies (Schoer et al., 2014) and employment effects are more meaningful if they are measured *after* people adjusted both search intensity and search channels. We therefore conduct a second experiment with a separate sample in which half of the job seekers receive the encouragement treatment described above.

A total of 1,267 participants are part of this sample and were initially surveyed between September 2015 and February 2016.[10] Participants are invited to come to the labor center on a certain date, randomly assigned to either control or treatment days. The same calling script is used for the control and treatment group to ensure that there is no differential selection. The share of invited participants who show up are very similar (64.2% reference letter, 63% control group, p-value of test of equal coefficient: 0.55). Table A.3 suggests that the randomization was successful. To track job search activities and employment outcomes over time, we conduct phone surveys five weeks and three months after the

[9]One possible concern is that employers may contact job seekers directly via phone. Participants report this did not happen frequently. While it may lead us to underestimate the overall response rate there is little reason to believe that the choice of how employer communicate with job seekers is correlated with the treatment assignment.

[10]Table A.3 provides summary statistics for job seekers in this sample: 50.2% are female and the average age is 27.3 years. The average level of education is 12.1 years and 67% have completed secondary school (matric). 7% of participants are married and they have on average one child. 11.4% receive unemployment insurance and the average participant spends 14 hours per week searching for work.

treatment.[11]

One potential shortcoming of any survey data is that it is self-reported. We therefore complement the survey data with an observed measure of job search. Specifically, study participants in Experiment 2 receive a notification about a vacancy and are asked to submit their full application via email in case they are interested. This message was sent from a third party email address not associated with the research project in order to mitigate concerns about surveyor demand effects.[12] This allows us to test whether participants apply and whether they submit the reference letter as part of their application.

3.2.3 Experiment 3: Barriers to Obtaining Letters

Results discussed in more detail below suggest that reference letters substantially increase the probability of receiving an employer response. This raises the question of why only about 2% of job seekers in the control group use reference letters in their job search. Experiment 3 tests different barriers to obtaining reference letters.

During follow-up surveys, a significant share of participants could not provide us with a reason why they have not tried to obtain the letter or cited reasons like having "no time" or that they do not need it. This may be a sign that job seekers do not believe they benefit from these reference letters or are in other ways insufficiently incentivized to obtain them. We design two interventions to test potential explanations for low take-up: (i) provide job seekers with information on the effectiveness of letters and (ii) compensate participants with 100 Rand (about half a daily wage) in cell phone airtime if they obtain a letter.

A group of 438 job seekers, previously encouraged to obtain a letter,[13] receives a follow-up text message to their cell phone and (if provided) email address reminding them of how

[11]Table A.4 shows that attrition rate increases from about 6% in wave 1 to 17% in wave 2, likely due to survey fatigue and participants switching phone numbers. Attrition is clearly not random: younger and less educated participants are more likely to attrite, but importantly rates do not differ between treatment and control group.

[12]Participants were informed about a vacancy in a specific sector. Among those with work experience in multiple sectors, we randomly chose which sector we notify them of. For job seekers for whom we do not have information on previous sectors, we send a general notification about a vacancy. Sectoral shares were balanced by treatment status. Applications were submitted to actual vacancies after the end of the last survey wave so that it would not confound employment estimates.

[13]About half of these participants were drawn from the sample in Experiment 1. The other half were participants that were drawn from the ESSA database solely for this experiment. Importantly, there is no overlap with the Experiment 2 sample.

to return the completed letter to us. Participants were randomized into three groups.[14] The control group received only this reminder, while the other two groups received one of the following additional messages:

- "*Research suggests reference letters almost double chances of getting a job interview.*" (Information)
- "*To compensate your costs, you get 100 Rand airtime after sending us the completed letter.*" (Compensation)

4 Results

This section reports and discusses the empirical findings from our three experiments. We begin with the results from the audit study (Exp. 1), where we recover the value of reference letters to both job seekers and hiring firms from a within-subject identification strategy. We then move to Exp. 2, where we can account for changes in job search behavior by study participants and obtain treatment effect estimates for employment. We conclude by presenting the results from Exp. 3 (as well as additional evidence from baseline data and focus groups) to discuss potential reasons behind the low usage of reference letters in equilibrium.

4.1 Audit study

Experiment 1 tests the effect of reference letters on firm demand using within-subject randomization. We use two measures of employer response: (i) a narrow measure of interest that captures interview requests and (ii) a broader measure of interest that captures either an interview request or a different employer response (most commonly, firms asked questions, requested specific documents, or provided more information about the job and asked if job seekers were still interested). Throughout the analysis we will report results for both outcomes.

To estimate the effect of the reference letter, we estimate the following model:

$$y_{is} = \beta Ref_{is} + \lambda_s + \mu_k + e_{is} \tag{3}$$

[14] Comparing observable characteristics between the treatment and control group suggests that randomization was successful (Table A.5).

Outcome y_{is} is a binary variable measuring whether employers respond to application i of person s. Ref_{is} is an indicator variable for whether a reference letter was included with application i. λ_s and μ_k capture individual and sector fixed effects, respectively. The error term e_{is} is clustered at the individual level. The coefficient of interest β captures the causal effect of the reference letters.

4.1.1 Employer Responses

Table 1 reports results from Specification 3. Column 1 to 4 report effects using the broad measure of interest as an outcome, while Column 5 to 8 report effects on interview requests. On a control mean of 4.15 percent, the reference letter significantly increases the chance of getting any employer response by 2.54 percentage points (col. 1) and on getting an interview request by 1.54 percentage points on a control mean of 2.4 percent (col. 4). Coefficient estimates are consistently positive and of similar magnitude when including sector and individual fixed effects (col. 2, 3, 6, 7).

Coefficients on the gender interaction term are statistically significant and large in magnitude: compared to the control mean, both the measure of employer interest and interview requests approximately double for women, whereas they are close to zero for men (col. 4 and 8). Overall, the results in Table 1 show that reference letters have a large positive effect on employer callbacks for women, a result that will be corroborated in Section 4.2 below using a different sample and experimental design .

Table 1: Effect of Reference Letter on Call Back

	y=Employer Response: **Interest**				y=Employer Response: **Interview**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Reference Letter	0.0254**	0.0251**	0.0244**	-0.0019	0.0154*	0.0150*	0.0143	-0.0039
	(0.0102)	(0.0102)	(0.0107)	(0.0150)	(0.0087)	(0.0088)	(0.0091)	(0.0114)
Female x Letter				0.0416**				0.0300*
				(0.0206)				(0.0171)
Sector F.E.	N	Y	Y	Y	N	Y	Y	Y
Individual F.E.	N	N	Y	Y	N	N	Y	Y
R^2	0.003	0.006	0.077	0.083	0.002	0.008	0.052	0.056
N	2050	2050	2050	2050	2050	2050	2050	2050
Control mean	0.0415	0.0415	0.0415	0.0415	0.0240	0.0240	0.0240	0.0240

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors (reported in parentheses) are clustered at the applicant level. Results report OLS estimates. Dependent variables are binary measures of employer response: interview requests (Col. 5-8) and either interview request or a different employer response expressing interest in the job applicant (Col 1-4). Sector fixed effects are included for the six sectors for which we send applications. Since we employ within-subject randomization, the reference letter varies within individual; hence the gender interaction effect can be identified with individual fixed effects.

We also estimate Specification 3 including an interaction term between the reference letter

variable and an indicator variable for vacancies receiving multiple applications with letters attached (vacancy 6 in Fig. 2 above). The coefficient on the interaction term is very close to zero indicating that the effect does not differ if the employer receives more than one letter (Table A.6, col. 2 and 5). These results suggest that it is not the novelty of seeing a reference letter that is driving the positive employer response. While it is possible that within a large numbers of applicants a few reference letters may still carry a novelty effect, it is reassuring that tripling the number of candidates that attach the exact same template does not decrease its effectiveness.

Next, we test whether there is a negative effect from being in the applicant pool with a job seeker who submits a reference letter. We include a dummy for pure control applications (sent to vacancy 5 in Fig. 2). The estimated coefficients in Columns 3 and 6 of Table A.6 are small in magnitude and not statistically significant. This provides evidence against the possibility of displacement. However, the estimates are relatively imprecise and therefore need to be viewed with caution.

4.1.2 Screening Ability

Information asymmetries may inhibit firms from identifying the most suitable candidates. In order to test whether the letters enable firms to identify applicants of higher ability, we assume that there is an ability parameter a, imperfectly observed by the firm at the time of application, and estimate the following model:

$$y_{is} = \beta Ref_{is} + \gamma a_s + \delta Ref_{is} * a_s + \mu_k + e_{is} \tag{4}$$

where a is proxied by the standardized results on the aptitude test administered as part of the baseline survey. The coefficient γ captures whether employers select higher ability applicants when only the CV is attached, while $\gamma + \delta$ is the effect when the letter is attached.

Results are presented in Table 2. The estimate for γ is small in magnitude and not significant, suggesting that without the reference letter firms are ineffective in selecting the more productive applicants. The estimates for δ, on the other hand, are positive and significant (col. 1 and 3) indicating that reference letters enable firms to identify applicants of higher ability, despite not seeing the aptitude score.

The coefficients are large in magnitude: for applications with reference letters, a one standard deviation higher performance in the aptitude test increases the probability of

receiving an employer response and interview request by an additional 2 percentage points and 1.3 percentage points, respectively. Put differently, in control applications the chance of receiving an employer response for job seekers at the 90th ability percentile is 1.8 percentage points higher compared to those at the 10th percentile. Once the reference letter is included, this figure increases to 6.3 percentage points. This is one of our key results, as economic theory predicts that an improvement in screening ability increases firms' labor demand.

Note also that the effect on the firm's capacity to select candidates with higher aptitude scores does not differ by gender (col. 2 and 4). These results suggest that the letter helps firms to screen higher ability males, despite the evidence in Table 1 showing no increase in employer callback for male applicants with a letter. This is consistent with firms under-estimating the ability of female candidates, while being more accurate *on average* about males (see Malindi, 2016 for evidence of statistical discrimination against black females in South Africa).[15]

Table 2: Effect of Reference Letter on Screening Productive Applicants

	Y=Interest		Y=Interview	
	(1)	(2)	(3)	(4)
Reference Letter	0.02575**	0.01669	0.01555*	0.00933
	(0.010)	(0.019)	(0.009)	(0.013)
Aptitude (z-score)	0.00618	0.0074	0.00062	0.00013
	(0.005)	(0.008)	(0.003)	(0.004)
Ref Let x Aptitude (z-score)	0.01999**	0.01862	0.01305**	0.01372*
	(0.008)	(0.011)	(0.006)	(0.008)
Ref Let x Female		0.01760		0.01390
		(0.022)		(0.018)
Ref Let x Female x Aptitude (z-score)		-0.00433		-0.00889
		(0.019)		(0.015)
R^2	0.003	0.008	0.002	0.004
N	2050	2050	2050	2050
Control mean	0.0415	0.0415	0.0240	0.0240

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors (reported in parentheses) are clustered at the applicant level. Results report OLS estimates controlling for sector fixed effects. *Aptitude* is measuring the standardized English and Math score. For readability reasons, we suppressed coefficients for *Female* and *Female x Aptitude*. These coefficients are small in magnitude and insignificant.

[15] Malindi (2016) finds that black females have a much higher returns to job tenure than black males, white females or white males in South Africa. This is consistent with employers initially under-estimating or attaching greater uncertainty to the value of productive attributes possessed by black females.

4.1.3 Letters are informative

In order for reference letters to be effective they must (i) be informative of applicants' skills and (ii) provide information that cannot easily be inferred from other application documents. We test these assumptions by comparing subjective employer ratings to an objective assessment. Specifically, we regress results from the numeracy and literature aptitude test we administer at baseline on the ratings provided by employers on numeracy and literacy. Table 3 shows that employer ratings and test results are highly correlated for both literacy (col. 1) and numeracy (col. 4). This implies that the average letter contains information about the applicant's skills.

Next, we explore how the correlation changes when we control for additional covariates. In particular, we control for age, education, gender, and school grades in English and math. The results in Column 2 and 5 show that while coefficients decrease in magnitude, they stay highly significant. This suggests that the letter contains information that employers cannot easily infer from the resume.

Finally, Column 3 and 6 show that the coefficients do not differ by gender. This rules out the possibility that any differential employment effect for women is due to references being more informative of females' aptitudes.

Overall, Table 3 confirms that referee ratings convey additional information to employers, at least for skills captured in the aptitude test. Arguably, it would be even more difficult for firms to learn about other skills from the CV, especially non-cognitive skills like reliability or work ethics (Aamodt, 2015).

Table 3: Are Numeracy and Literacy Employer Ratings Correlated with Aptitude?

	Literacy: Reference Letter (z-score)			Numeracy: Reference Letter (z-score)		
	(1)	(2)	(3)	(4)	(5)	(6)
Literacy: Aptitude	0.3645***	0.2274**	0.2458**			
(z-score)	(0.0935)	(0.1026)	(0.1185)			
Female x Literacy Apt			-0.04907			
(z-score)			(0.2066)			
Numeracy: Aptitude				0.3001***	0.2627***	0.25585*
(z-score)				(0.0885)	(0.0966)	(0.1381)
Female x Numeracy Apt						0.01548
(z-score)						(0.1788)
Covariate	N	Y	Y	N	Y	Y
School Grade	N	Y	Y	N	Y	Y
R^2	0.136	0.232	0.232	0.093	0.116	0.116
N	116	116	116	114	114	114

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The dependent variable is the standardized value of the numeric employer rating (0=below average, 3=very good). *Literacy* and *Numeracy* measure the standardized performance in the aptitude test. Control variables include age, gender and education. School grade is measuring the grade (in %) participants achieved in the last math and English class, respectively.

4.1.4 The letter's content matters

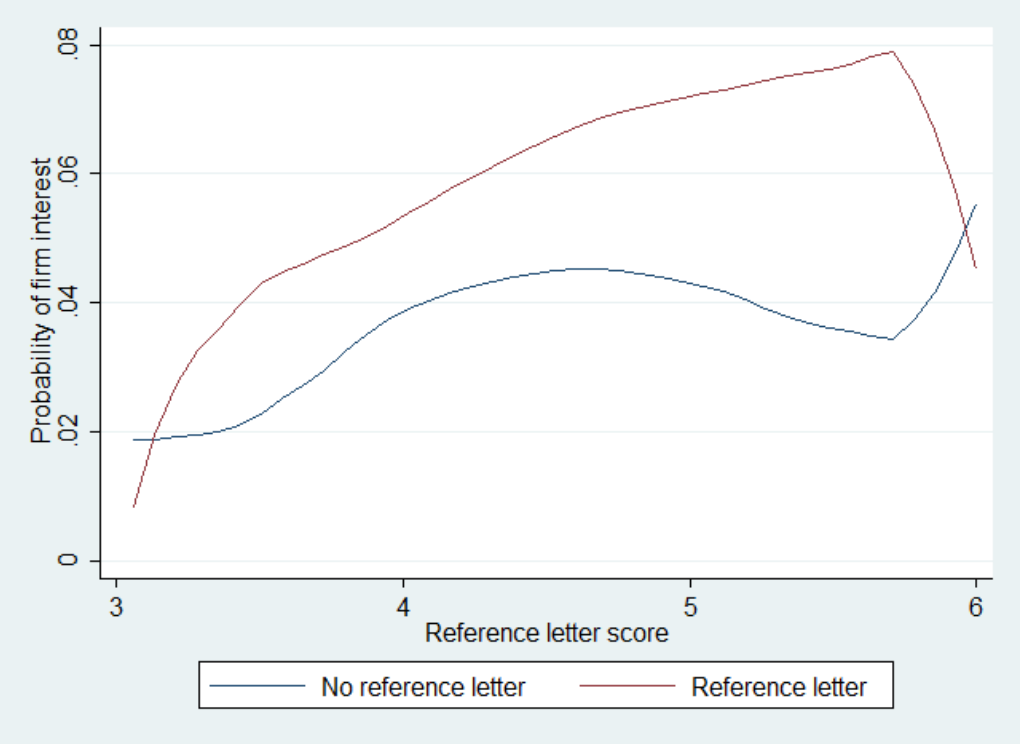
We posit that job seekers with *better* reference letters are more likely to receive job interviews. An alternative mechanism would be that the mere ability to obtain a reference letter and use it correctly in the job search is the relevant signal for firms.

In order to shed light on this question, we first look at the relationship between referee ratings and employer responses graphically. Figure 3 shows local linear regression estimates of the probability of receiving an interview by employer's rating. For applications including a reference letter (blue line), the relationship is clearly nonlinear: employer responses increase with higher ratings until the very top, where we observe a large drop in the probability of being interviewed. The figure also shows that when no letter is attached to the application, these *same* individuals do not experience a discontinuity at the near-perfect scores.

Figure 3 suggests that employers may ignore the reference letter signal if it is perceived to be implausibly positive and thus deemed non-credible.[16] Our data, however, reveal that firms are incorrect in inferring that applicants with perfect scores on their letter

[16] A uniform rating may also indicate that the referee did not take the time to carefully consider each category. However, we do not find that the effect of these uniform assessments differs for letters that include more detailed comments on skill categories, suggesting that the negative effect is not due to a perceived lack of effort of the referee.

Figure 3: Employer Responses by Referee Rating



are of lower ability. These job seekers are in fact the group that performs best in the aptitude test. It would thus appear that writing implausibly good letters presents a form of inadvertent signal jamming. Results (not reported) confirm that the effect of reference letters on firms' ability to select higher ability applicants is in fact increased when we exclude all positive letters. Overall, these findings provide empirical support for studies that explore the importance of credibility of signals (Clark and Martorell, 2014; Avery and Meyer, 2011).

In order to more formally test whether employer responses depend on the content of the letter, we estimate:

$$y_{is} = \mu_k + \lambda_s + \beta Ref_{is} + \gamma score_s + \delta Ref_{is} * score_s + e_{is} \tag{5}$$

Given the discontinuity documented above, we estimate Specification 5 with and without controls for applicants who have perfect scores on their reference letters.

The effect of the referee rating (*score*) when it is not revealed to employers is captured by γ. Table 4 shows that the coefficient estimate for γ is close to 0 and insignificant across all specifications. This provides evidence against the idea that job seekers that are in

higher demand also receive more positive reference letters, which allows us to rule out an obvious confounding factor.

The additional effect of the referee rating once the letter is revealed to the firm is measured by δ. When we control for applications with perfect scores, the effect of the referee rating on the probability of receiving a response from employers is positive and significant (col. 2, 5). The coefficient estimates in Column 2 and 5 indicate that a one standard deviation higher rating increases employer responses (interviews) by 48% (77%). The coefficient on the interaction term with the all positive dummy is also significant (and negative).

In addition, Column 3 and 6 of Table 4 suggest that the content of the letter may matter more for female applicants: good ratings generally have a larger positive impact and letters with perfect ratings have a more negative effect. This would be consistent with earlier work showing that reducing information asymmetries leads to a larger belief updating among employers for members of disadvantaged groups (Agrawal et al., 2013; Lang and Manove, 2011; Kaas and Manger, 2012).[17]

Table 4: Effect of Referee Rating on Call Back

	Y=Interest			Y=Interview		
	(1)	(2)	(3)	(4)	(5)	(6)
Reference Letter	0.0978	0.1213*	0.0943	0.0615	0.0902	0.0698
	(0.0644)	(0.0643)	(0.0702)	(0.0581)	(0.0594)	(0.0615)
Referee Rating (z-score)	-0.0032	-0.0066	-0.0001	0.0009	-0.0000	0.0013
	(0.0060)	(0.0060)	(0.0072)	(0.0039)	(0.0043)	(0.0059)
Letter x Rating (z-score)	0.0091	0.0198**	0.0056	0.0055	0.0185**	0.0102
	(0.0093)	(0.0090)	(0.0136)	(0.0086)	(0.0091)	(0.0103)
Letter x Rating x Female			0.0335*			0.0175
			(0.0200)			(0.0166)
All positive		0.0206	0.0298		0.0056	-0.0243*
		(0.0266)	(0.0765)		(0.0139)	(0.0129)
Letter x All positive		-0.0632*	-0.0895		-0.0762***	-0.0116
		(0.0349)	(0.0821)		(0.0239)	(0.0207)
Letter x All positive x Female			0.0110			-0.1021***
			(0.0901)			(0.0348)
R^2	0.014	0.015	0.016	0.014	0.017	0.020
N	2050	2050	2050	2050	2050	2050
Control content	Y	Y	Y	Y	Y	Y
Control mean	0.0415	0.0415	0.0415	0.0240	0.0240	0.0240

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors (reported in parentheses) are clustered at the applicant level. *Total Score* measures the average employer rating converted to numeric values (out of 6). *All positive* is a indicator variable for whether employers give a perfect rating. We estimate the model with all interaction terms but suppress coefficients for readability reasons. All columns control for other content revealed in the reference letter. We include dummy variables for five reference letters that did not include a rating.

[17]This finding is not inconsistent with the results presented in Table 2. Our data shows that math/literacy skills are less correlated with harder-to-observe skills (e.g. team ability, work ethics) for women than they are for men. This would explain why firms pay more attention to the letter content of female applicants. Results (not reported for brevity) confirm that firms pay more attention to these hard-to-observe skills for females.

4.2 Employment Effects

The results from the audit experiment reveal three main findings. First, they show that reference letters are valuable in principle: for the *same* individual, employers more often call back an applicant that attached a reference letter (on average, unconditional on content). Second, this effect is stronger for individuals with higher numeracy and literacy scores on an aptitude test. Third, the content of the letters is informative: employers' assessment is correlated with an objective measure of ability and higher referee ratings (unless deemed implausibly good) increase the probability of callback from employers.

While novel and informative, the results from Experiment 1 share the main limitations of most audit studies (e.g. Bertrand and Mullainathan, 2004). Specifically, the main outcome is limited to employers' callback, as opposed to actual employment. Also, the audit framework ignores potential changes in job seekers' search strategy, given that applications are submitted by the researchers.

4.2.1 Effect of reference letters on employment

Our Experiment 2 allows us to address these limitations and provide a more general contribution. As explained above, Exp. 2 uses a different sample of job seekers and encourages a random half of them to obtain a reference letter. We can then follow their job search behavior and employment outcomes. To test whether the letters increase firm responses and employment when used by job seekers, we estimate the following model:

$$y_{ij} = \beta T_i + \gamma X_i + \delta y_{ij}^{bs} + \lambda_j + e_i \tag{6}$$

The dependent variable y_{ij} is measured for individual i residing in location j. We focus on three key outcomes: (i) number of applications submitted, (ii) job interviews in the last four weeks, and (iii) employment status. T_i captures whether participants were assigned to the treatment group that received the encouragement to obtain a letter. In order to increase precision we control for the baseline value y_{ij}^{bs} of outcomes. To account for differences in firm demand across space, we control for location fixed effects λ_j. Robust standard errors are computed at the individual level. Since the audit study suggest that the effects of reference letters may differ by gender, we also estimate specification 6 separately for women and men.

Table 5 shows the results. Columns 1 to 3 report the intent to treat (ITT) effects after

three months. Columns 4 to 6 report the local average treatment effects (LATE) using the random encouragement assignment to instrument for the take-up of reference letters.[18]

The coefficient estimates in Table 5 are very much consistent with the main findings from the audit study shown in Table 1. In the pooled sample (Panel A), coefficients on both the number of applications submitted and on employment outcomes are sizable – LATE estimates range between 20% and 30% of the control mean – but not statistically significant. Panel B and C confirm there is important treatment effect heterogeneity by gender: after three months, women in the treatment group submit more applications and are significantly more likely to receive interviews and find employment.

Employment effects are large in magnitude: 5.7 percentage points for ITT estimates (col. 3) and 11.7 p.p. for LATE estimates (col. 6), effectively doubling employment rates for the group of compliers. Coefficients for men are close to zero and insignificant. We can reject that employment effects for women and men are equal at the 10 percent level.

While the magnitudes of the effects are very high, the estimates are relatively imprecise. This warrants some caution in the interpretation of these results. However, it is remarkable that treatment effects estimated from separate experiments, and on different outcomes, point in the same direction. Overall, the combined evidence from the Experiments 1 and 2 show that reference letters can improve employment outcomes. In particular, reducing information asymmetries – through reference letters or other interventions – may improve equity by leveling the playing field for women in labor markets.

[18]We do not report results after five weeks as they are generally small and insignificant. This is because the follow-up period is too short for effects to manifest. It takes on average about 3 weeks to obtain reference letters, with males and females equally likely to report having attempted to get a letter. Qualitative evidence also suggests that participants waited for the letter templates to be completed before applying for certain jobs. Finally, a non-negligible number of participants report that it takes them longer than five weeks to obtain a reference letter.

Table 5: Effect of Reference Letters on Employment (3 months)

	Intent to Treat Effects			**Local Average Treatment Effects**		
	(1)	(2)	(3)	(4)	(5)	(6)
	Application	Interview	Employment	Application	Interview	Employment
			Panel A: POOLED			
Reference Letter	0.660	0.072	0.020	1.336	0.147	0.037
	(0.426)	(0.046)	(0.022)	(0.857)	(0.092)	(0.046)
R^2	0.222	0.051	0.015	0.222	0.046	0.008
N	997	996	1033	997	996	1033
Control Mean	3.975	0.675	0.130	3.975	0.675	0.130
			Panel B: FEMALE			
Reference Letter	1.051	0.130**	0.057*	2.249	0.280**	0.117*
	(0.702)	(0.059)	(0.032)	(1.522)	(0.125)	(0.068)
R^2	0.267	0.063	0.029	0.242	0.050	0.001
N	501	506	528	501	506	528
Control Mean	3.842	0.534	0.117	3.842	0.534	0.117
			Panel C: MALE			
Reference Letter	0.118	0.014	-0.015	0.553	0.027	-0.032
	(0.431)	(0.071)	(0.032)	(0.868)	(0.135)	(0.062)
R^2	0.282	0.042	0.021	0.232	0.041	0.020
N	491	492	510	491	492	510
Control Mean	4.130	0.862	0.157	4.130	0.862	0.157
p-value: $\beta_{fem} = \beta_{male}$	0.368	0.241	0.090			

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Results presented in Column 1-3 are intent to treat estimates. Results in Column 4-6 are treatment on the treated estimates, using the encouragement assignment as an instrument for take-up. All regressions control for covariates. Panel A reports estimates from Specification 6 for the full sample. *Application* and *Interviews* measures the number of applications submitted and job interviews in the last four weeks, respectively. The number of applications and interviews are winsorized at the 1% level to account for outliers. Employment is an indicator variable denoting if people are in paid employment or self-employed. Panel B and C estimate results separately for women and men.

4.2.2 Women use letters more often

The design of Experiment 2 also allows us to explore job seekers' search behavior in response to treatment. In particular, we can investigate the usage of reference letters. As mentioned in Section 3.2, participants in Exp. 2 were informed about an open vacancy and asked to submit their application material if interested. We estimate the following specification:

$$y_{ij} = \beta T_i + \gamma X_i + \lambda_j + e_i \tag{7}$$

where we use two outcome measures: (i) a dummy capturing whether a job seeker i residing in location j submits an application and (ii) a dummy measuring whether they submit a reference letter as part of the application.

Column 1 of Table 6 shows that participants in the treatment group are not more likely to submit applications in response to our email, while Column 2 shows that the effect on applications for women is positive and of relatively large magnitude, although insignificant. For those who did send an application, we can investigate the documents they submitted. Column 3 shows that the share who submits a reference letter is significantly larger in the treatment group. In the control group, only 1.1% submit a letter, confirming that reference letters are nearly absent in the labor market we investigate. This share increases in the treatment group: 8% of all participants submit it as part of the application. This confirms that our intervention has a real impact on job seekers' behavior, consistent with the results from self-reports.[19]

Table 6: Application Material Submitted

	Y=Submit Application		Y=Attach Reference Letter		
	(1)	(2)	(3)	(4)	(5)
Reference Letter	-0.001	-0.023	0.069**	0.007	-0.000
	(0.022)	(0.033)	(0.029)	(0.030)	(0.006)
Female	0.011	-0.017	0.038	-0.018	-0.003
	(0.023)	(0.032)	(0.029)	(0.021)	(0.004)
Ref Let x Female		0.047		0.113*	0.021**
		(0.045)		(0.058)	(0.010)
R^2	0.006	0.017	0.072	0.091	0.014
N	1141	1141	184	184	1141
Control Mean	0.163	0.163	0.011	0.011	0.002
Sample	full	full	application	application	full

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors (reported in parentheses) are clustered at the applicant level. Outcomes are binary measures of whether job seekers submit an application (1-2) and whether they attach a reference letter (3-5). Column 3 and 4 restrict the sample to job seekers who submit an application.

[19]Slighlty more than 18% of those who obtained a letter attach it to their application. This compares to about 37% of job seekers who report to have used it in the survey. The discrepancy is most likely a result of asking job seekers to submit the material via email, as many job seekers in this market do not have easy access to scanners. In fact, qualitative evidence shows that a larger share of job seekers indeed used the letter in conventional job search channels.

Table 6 also reveals a large difference in the usage of reference letters across gender. Women are much more likely than men to attach it as part of the application (Col. 4, 5). Female participants may be more likely to use reference letters if they believe that firms are more uncertain about their skills (a belief that would be consistent with the evidence shown in Section 4 above). This, in turn, can help explain the large and significant employment effects for women reported in Table 5.

4.3 Why are Reference Letters Not More Widely Used?

The previous sections show that both job seekers and firms benefit from reference letters. This raises the question of why reference letters are almost absent in this market. Our analysis rules out two of the most obvious explanations by showing that (i) reference letters contain additional information and (ii) employers use them to update beliefs. This section discusses additional potential explanations on the part of previous employers, hiring firms and job seekers.

4.3.1 Previous employers and hiring firms

We ask job seekers to bring all their application documents to the initial meeting at the labor center. We find that among job seekers with previous work experience, only about 4% have a reference letter from a former employer. When probed, 86.4% of job seekers report that they "Did not ask", while only 3.1% report that they asked but the employer refused (Table A.7). It is however possible that many job seekers did not ask because they correctly predict that employers would not be willing to write a letter. We can exploit results from our encouragement design to test this hypothesis. Five weeks after the treatment, 56% of job seekers report that they have tried to obtain a letter. Of this group, 73.6% succeeded. Among those that tried, only 4.1% report that they failed to obtain a letter because the employer refused.

Interviews with hiring managers further shows that they recognize that job seekers do not have any bargaining power to request letters. Firms therefore do not require applicants to submit letters.

4.3.2 Job seekers

Why do job seekers not request reference letters from employers? We report here the results from Experiment 3, which is designed to test the relative importance of the cost and perceived benefits of obtaining letters. As explained in Section 3, a sub-group of job seekers previously encouraged to obtain a letter receives a reminder on how to return it. Participants receiving this reminder were randomized into three groups. The control group received only the reminder, while the other two groups received either information on the returns to having a reference letter or a monetary incentive. We estimate the following specification:

$$y_{ij} = \beta T_i + \gamma X_i + \lambda_j + e_i \tag{8}$$

The outcome y_{ij} is a binary measure of whether individual i residing in location j returned the reference letter. We report estimates with and without controlling for covariate vector X_i. To account for differences across space, we control for location fixed effects λ_j.

Table 7 shows the estimated coefficients. Pooling the information and monetary incentive treatment groups, we find a statistically significant increase in the share of people who obtain a letter of 7.4 percentage points (Column 2). When we estimate the effect of each treatment arm separately, we find that the information treatment effect is 12.6 p.p. and statistically significant, while the effect of the monetary incentive is much smaller (4.5 p.p.) and statistically indistinguishable from 0 (Column 4). We can reject that treatment effects are identical at the ten percent significance level. Overall, the results from Experiment 3 show that job seekers may underestimate the potential benefits of reference letters. This, in turn, could help explain the low usage of letters in this market.

One of the reasons why job seekers would come to believe that reference letters are not beneficial is that the type of letter in circulation at baseline may in fact be of lower value. Clearly, the effectiveness of the reference letter depends on the noisiness of the signal relative to the resume. Reviewing a total of 30 reference letters collected from job seekers in our sample at baseline reveals that existing letters in the market are generally of low quality. The majority of letters lack information on the workers' position (48% include this information), responsibilities (38%), skills (28%) duration of employment (48%), and reason for termination of employment (18%). In addition, only 48% of letters are signed and only 56% provide contact information. If job seekers are using reference letters that are both less informative and credible, they may incorrectly infer that all letters are

Table 7: Take up Experiment

	(1)	(2)	(3)	(4)
Pooled Treatment	0.0753*	0.074**		
	(0.040)	(0.041)		
Information			0.128**	0.126**
			(0.053)	(0.052)
Money			0.040	0.045
			(0.043)	(0.0433)
R^2	0.149	0.169	0.157	0.175
N	438	437	438	437
Mean Dependable	0.210	0.210	0.210	0.210
Control Variables	N	Y	N	Y
p-value: $\beta_{Inf} = \beta_{Mon}$			0.077	0.098

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Column 1 and 2 pool Information and Money. The control group received message reminding them of how to return the letter.

ineffective.

In-depth interviews with a sample of 28 hiring firms provide further support for this explanation. About 73% of hiring managers report that our reference letter template is more effective than other reference letters they receive. The most frequently cited reasons are that the template provides information on specific skills (55%) and that it is more clearly structured (32%). In addition, the rubric form offers *less ambiguous* presentation of the assessment than a reference letter in paragraph form. This may particularly benefit women as previous research documents that candidates who are perceived to be similar by the predominantly male hiring managers receive more favorable evaluations (Cardy and Dobbins, 1986).

Asked for reasons that make the template *less* effective than other letters, managers point to the lack of a firm letter head or stamp (45%) and that letters are too positive (14%). This corroborates our experimental findings documenting the importance of credibility and suggests that modifications in the design of the letter may further increase its effectiveness.

5 Conclusion

Technology has drastically reduced information asymmetries across many markets: online labor market platforms require firms to provide public evaluations of employees' perfor-

mance and offer workers the option to take tests to certify their skills. Services like LinkedIn offer an easy way to communicate credentials, work experience and even endorsements from former co-workers and employers. These professional network sites also identify common connections than can serve as informal references. Yet, large parts of the global labor force is working in markets that have not been affected by these changes.

Our study investigates the role of information asymmetries in one such market: the low-skill sector in South Africa. We document that information asymmetries are prevalent in this market and employers struggle to identify high-ability job seekers. We find that a simple intervention – encouraging job seekers to obtain a standardized reference letter from a former employer – can lead to improvements in firms' ability to select job seekers of higher ability from the pool of applicants. Women, who are excluded from many informal referral networks in South Africa, especially benefit from reference letters. Female participants who obtained letters are significantly more likely to receive job interviews and their employment rate doubles after three months. This demonstrates that reducing information asymmetries can improve equity in labor markets.

While our study looks at the effects of reference letters in a static framework, reducing information asymmetries may also have dynamic effects. Similar to other developing countries, South Africa suffers from low quality of education, which limits the use of educational credentials to screen job seekers. This has adverse dynamic effects: if a high school certificate loses its signaling value, youths may be less motivated to study or graduate. Likewise, if workers are employed on temporary contracts and their job performance is not revealed to the market, returns to exerting effort are lower. Our results suggest that reference letters have the potential to provide a powerful incentive to workers. Reducing information asymmetries may therefore have positive effects on productivity beyond the diminished frictions in the matching process explored in this study. Yet, not having a reference letter may also pose a barrier for new labor market entrants as letters enhance firms' ability to screen applicants with job experience relative to entrants. This could lead to inefficiently low hiring of people without work experience (Pallais, 2014). Quantifying these dynamic effects remains the work of future research.

References

Aamodt, M. (2015). *Industrial organizational psychology.* Cengage Learning, London, 8th edition.

Agrawal, A., Lacetera, N., and Lyons, E. (2013). Does Information Help or Hinder Job Applicants from Less Developed Countries in Online Markets? *NBER Working Paper 18720.*

Autor, D. and Scarborough, D. (2008). Does job testing harm minority workers? Evidence from retail establishments. *The Quarterly Journal of Economics*, 123(1):219–277.

Avery, C. and Meyer, M. (2011). Designing Promotion and Hiring Procedures with Biased Evaluators. *Working Paper.*

Bassi, V. and Nansamba, A. (2017). Information Frictions in the Labor Market: Evidence from a Field Experiment in Uganda. *mimeo.*

Beaman, L. and Magruder, J. (2012). Who gets the job referral? Evidence from a social networks experiment. *The American Economic Review*, 102(7):3574–3593.

Belot, M., Kircher, P., and Muller, P. (2016). Providing advice to job seekers at low cost: An experimental study on online advice. Technical report, IZA Discussion Papers.

Bertrand, M. and Mullainathan, S. (2004). Are emily and greg more employable than lakisha and jamal? a field experiment on labor market discrimination. *The American Economic Review*, 94(4):991–1013.

Burks, S. V., Cowgill, B., Hoffman, M., and Housman, M. (2015). The Value of Hiring through Employee Referrals. *Quarterly Journal of Economics*, 130(2):805–839.

Card, D., Kluve, J., and Weber, A. (2015). Active Labor Market Policy Evaluations: A Meta Analysis. *NBER Working Paper*, No. 21431.

Cardy, R. and Dobbins, G. (1986). Affect and appraisal accuracy: Liking as an integral dimension in evaluating performance. *Journal of Applied Psychology*, 71(4).

Clark, D. and Martorell, P. (2014). The Signaling Value of a High School Diploma. *Journal of Political Economy*, 122(2):282–318.

Fafchamps, M. and Moradi, A. (2015). Referral and Job Performance : Evidence from the Ghana Colonial Army. *Economic Development and Cultural Change*, 63(4):715–751.

Gibbons, R. and Katz, L. (1991). Layoffs and Lemons. *Journal of Labor Economics*, 9:351–380.

Heckman, J. J. (1998). Detecting Discrimination. *The Journal of Economic Perspectives*, 12(2):101–116.

Kaas, L. and Manger, C. (2012). Ethnic Discrimination in Germany's Labour Market: A Field Experiment. *German Economic Review*, 13(1):1–20.

Kroft, K., Lange, F., and Notowidigdo, M. J. (2013). Duration Dependence and Labor Market Conditions: Evidence from a Field Experiment. *Quarterly Journal of Economics*, 128(3):1123–1167.

Lang, K. and Manove, M. (2011). Education and Labor-Market Discrimination. *American Economic Review*, 101(4):1467–1496.

Loury, L. (2006). Some Contacts Are More Equal than Others : Informal Networks, Job Tenure, and Wages. *Journal of Labor Economics*, 24(2):299–318.

Malindi, K. (2016). Wage Effect of Labour Market Experience and Firm Tenure for Black and White South African Workers. *Working Paper*.

McCarthy, J. and Goffin, R. (2001). Improving the Validity of Letters of Recommendation: An Investigation of Three Standardized Reference Forms. *Military Psychology*, 13(4):199–222.

McKenzie, D. (2017). How Effective Are Active Labor Market Policies in Developing Countries? A Critical Review of Recent Evidence. *Working Paper*.

Montgomery, B. (1991). Social Networks and Labor-Market Outcomes : Toward an Economic Analysis. *American Economic Review*, 81(5):1408–1418.

Mortensen, D. and Pissarides, C. (1994). Job creation and job destruction in the theory of unemployment. *The Review of Economic Studies*, 61(3):397–415.

Pallais, A. (2014). Inefficient Hiring in Entry-Level Labor Markets. *American Economic Review*, 104(11):3565–3599.

Pallais, A. and Sands, E. G. (2016). Why the Referential Treatment? Evidence from Field Experiments on Referrals. *Journal of Political Economy*.

Pissarides, C. (1985). Short-Run Equilibrium Dynamics of Unemployment , Vacancies , and Real Wages. *American Economic Review*, 75(4):676–690.

Rees, A. (1966). Information Networks in Labor Markets. *American Economic Review*, 56(1):559–566.

Riach, P. and Rich, J. (2004). Deceptive Field Experiments of Discrimination: Are they Ethical? *Kyklos*, 57:457–470.

Rospabe, S. (2001). An Empirical Evaluation of Gender Discrimination in Employment, Occupation Attainment and Wage in South Africa in the late 1990s. *Working Paper*.

Schoer, V., Rankin, N., and Roberts, G. (2014). Accessing the first job in a slack labour market: job matching in South Africa. *Journal of International Development*, 26:1–22.

Shepherd, D. (2008). Post-Apartheid Trends in Gender Discrimination in South Africa: Analysis through Decomposition Techniques. *Working Paper*.

StatsSA (2015). National and provincial labour market: Youth. Technical Report Quartile 1., Statistics South Africa.

Terviö, M. (2009). Superstars and Mediocrities : Market Failure in the Discovery of Talent. *Review of Economic Studies*, 76(2):829–850.

Topa, G. (2011). Labor markets and referrals. In *Handbook of Social Economics*, pages 1193–1221.

van der Berg, S. (2007). Apartheid's Enduring Legacy: Inequalities in Education. *Journal of African Economies*, 16(5):849–880.

Appendix

Tables

Table A.1: Content of Reference Letter by Gender

			Gender		
	N	mean	Female	Male	p-value
Total Score	119	4.933	5.04	4.821	.134
Hard Skill Score	119	2.307	2.362	2.25	.211
Soft Skill	120	2.625	2.677	2.571	.151
All Positive	119	0.109	0.131	0.086	0.434
TeamAbility	117	2.692	2.77	2.607	.058
WorkEthics	120	2.675	2.742	2.603	.162
Reliability	118	2.568	2.597	2.536	.568
Agreeability	118	2.61	2.645	2.571	.448
Interpersonalskills	119	2.597	2.639	2.552	.408
Literacy Ref	117	2.462	2.5	2.421	.487
Numeracy Ref	115	2.174	2.22	2.125	.48
ComputerLiteracy	109	1.917	2.052	1.765	.104
LearningAbility	118	2.576	2.574	2.579	.961
Task1	70	2.5	2.5	2.5	1
Task2	60	2.433	2.452	2.414	.807
Comments (any)	120	.458	.452	.466	.88
Comments (nr)	120	1.842	1.984	1.69	.606
How Recommend (0=reserv.,2=highly)	104	1.558	1.691	1.408	.012
Confidence Assessing (0=low, 2=high)	112	1.67	1.717	1.615	.278
Termination: Voluntary	107	.224	.263	.18	.304
Termination: Contract Ended	107	.645	.632	.66	.762
Termination: Retrenchment	107	.112	.088	.14	.403
Termination: Fired	107	.019	.018	.02	.927
Signed	115	.974	.967	.981	.63
Phone listed	115	.957	.934	.981	.205
Email listed	115	.496	.492	.5	.931

Notes: The table reports details from the completed reference letters. Ratings are converted to numeric values (0=below average, 3=very good). Columns on the right provide summary statics separately for women and men and report p-values of a test of equal means.

Table A.2: Selection: Who returns Reference Letters?

Dep var: 1=return letter	(1) demogr	(2) search	(3) aptitude	(4) job spell	(5) unemp spell	(6) job termination	(7)
Education (yr)	0.01820	0.01911	0.01221	0.01484	0.01765	0.00884	0.00568
	(0.0215)	(0.0220)	(0.0232)	(0.0217)	(0.0215)	(0.0228)	(0.0248)
Age (yr)	0.01277**	0.01272**	0.01292**	0.01767***	0.01268**	0.01370***	0.01765***
	(0.0050)	(0.0050)	(0.0051)	(0.0059)	(0.0052)	(0.0051)	(0.0059)
1=Female	-0.00344	-0.00411	-0.00686	-0.01303	-0.00345	-0.00856	-0.01830
	(0.0435)	(0.0437)	(0.0436)	(0.0441)	(0.0437)	(0.0442)	(0.0447)
Nr Applications (4 weeks)		0.00161					0.00214
		(0.0075)					(0.0076)
Aptitude Score (%)			0.00070				0.00039
			(0.0012)				(0.0013)
Last job spell (yr)				-0.02174*			-0.01762
				(0.0120)			(0.0122)
Time since last job (yr)					0.00175		0.00144
					(0.0029)		(0.0028)
Job termination: contract end						0.03234	0.03983
						(0.0508)	(0.0512)
Job termination: fired						-0.08013	-0.04502
						(0.0855)	(0.0874)
Job termination: voluntary						0.08781	0.08085
						(0.0852)	(0.0875)
R^2	0.027	0.028	0.027	0.035	0.028	0.033	0.038
N	437	435	436	437	437	437	434
Dep Var mean	0.308	0.308	0.308	0.308	0.308	0.308	0.308

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

The table explores factors correlated with whether job seekers return a completed letter. *Aptitude Score* measures the average numeracy and literacy score of an aptitude test. *Last job spell* captures the number of years the job seeker stayed in her last job. The *Job termination* variable capture the reason of termination stated by employers on the reference letter.

Table A.3: Balance Test: Reference Letter vs Control Group

	Full Sample		Control		Reference Let		pvalue
	N	mean	N	mean	N	mean	
1=Female	1267	.502	566	.516	701	.491	.373
Age in yrs	1267	27.33	566	27.07	701	27.55	.042
Education (years)	1262	12.16	561	12.08	701	12.23	.395
1=married	1267	.069	566	.055	701	.081	.06
Nr of Children	1179	1.026	525	1.021	654	1.031	.878
1=moved to Johannesburg	1267	.744	566	.753	701	.738	.539
Zulu	1267	.273	566	.281	701	.267	.575
Xhosa	1267	.084	566	.083	701	.086	.871
Venda	1267	.056	566	.049	701	.061	.356
1=ever had job	1267	1	566	1	701	1	.
1=ever selfemployed	1267	.193	566	.187	701	.197	.667
Currently receiving UIF	1267	.114	566	.102	701	.124	.225
Reservation wage (ZAR/month)	1259	3381	559	3251	700	3484	.079
Fair Wage (ZAR/month)	1265	6108	565	5930	700	6251	.143
Hours search (week)	1226	14.35	544	14.13	682	14.52	.768
Interview requests (month)	1041	.671	472	.593	569	.735	.127
Plan for job search	1132	2.972	471	2.958	661	2.982	.71
Total search cost (ZAR/month)	1107	169.01	458	168.434	649	169.416	.93
Likelihood find job	1129	2.06	471	2.038	658	2.076	.421

Notes: The table reports summary statistics for the full sample as well as separately for the control and the treatment group. The last column reports p-values of a test of equal means of the control and treatment group. Results (not reported) show that we can reject joint significance of control variables in explaining treatment status (p-value: 0.72). *Likelihood find job* measures preceived chances to find employment in next month (0=very unlikely, 4=very likely).

Table A.4: Attrition (Experiment 2)

	Wave 1		Wave 2	
	(1)	(2)	(3)	(4)
Reference Letter	-0.010	-0.005	-0.019	-0.017
	(0.014)	(0.014)	(0.021)	(0.021)
Education (yrs)		-0.009***		-0.009***
		(0.001)		(0.002)
Age (yrs)		-0.003**		-0.005**
		(0.002)		(0.003)
1=Female		-0.006		-0.013
		(0.014)		(0.021)
Control Variables	N	Y	N	Y
R^2	0.000	0.024	0.001	0.016
N	1246	1241	1246	1241
Control Mean	0.068	0.068	0.182	0.182

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
The dependent variable is an indicator variable for whether people attrited in wave 1 and 2 of the follow up survey.

Table A.5: Balance Test: Take-Up Experiment

	Pooled		Control	Information		Money	
	N	Mean	Mean	Mean	p-value	Mean	p-value
Age in yrs	496	26.85	27.12	27.25	.813	26.28	.134
1=Female	498	.506	.508	.524	.796	.483	.697
Married	498	.056	.047	.056	.733	.052	.862
Nr of Children	498	.998	.977	1.089	.372	1.026	.711
Education (years)	497	11.95	11.76	12	.098	11.97	.188
1=Migrant	498	.795	.781	.823	.412	.802	.695
1=Ever self-employed	498	.205	.227	.234	.891	.198	.591
Currently receiving UIF	498	.143	.109	.129	.632	.164	.22
Reservation wage	496	3121	2949	3299	.214	3547	.091
Hours search (week)	487	13.8	11.98	12.94	.555	18.08	.004
Total search cost (month)	455	165.1	164	173	.71	167	.904
Likelihood find job (month)	459	2.07	2.04	2.02	.791	2.08	.73

Note: The table reports summary statistics for the pooled sample, control group and treatment groups. P-values report results of a test of equal means of the control group and respective treatment group. *Likelihood to find job* converts reports responses converted to numeric values (0=very unlikely, 4=very likely).

Table A.6: Multiple Reference Letter and Displacement

	Y=Interest			Y=Interview		
	(1)	(2)	(3)	(4)	(5)	(6)
Reference Letter	0.0251**	0.0238**	0.0223**	0.0150	0.0140	0.0133
	(0.010)	(0.0116)	(0.0114)	(0.009)	(0.0099)	(0.0094)
Reference Letter x Multiple		0.0038			0.0016	
		(0.0305)			(0.0254)	
Control Group - Pure			-0.0139			-0.0087
			(0.0126)			(0.0101)
R^2	0.006	0.074	0.074	0.008	0.058	0.058
N	2050	2050	2050	2050	2050	2050
Control mean	0.0415	0.0415	0.0415	0.024	0.024	0.024

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at applicant level.

Coefficients report results of Specification 3 estimated with sector fixed effects. Column 2 and 4 include an interaction term between the reference letter indicator and an indicator of the vacancy that receive three reference letters. Column 3 and 5 includes a dummy for applications sent to a vacancy that does not receive any reference letters.

Table A.7: Reasons for Low Prevalence of Reference Letters

	N	Mean
Why do you not have a letter? (Baseline)		
I did not ask	936	0.864
Employer refused	936	0.031
It was not requested	936	0.016
Other	936	0.089
Did you try to obtain a letter? (After encouragement)		
Yes	618	0.56
If No, *Why did you not try?*		
Travel Cost / Distance	618	0.052
Firm Unavailable / Relocated	618	0.038
No Time	618	0.037
Bad Terms wit Employer	618	0.019
No Need for it	618	0.013
Other	618	0.281
Did you Succeed? (If participant tried)		
Yes	360	0.736
If No, *Why Not?*		
Firm relocated / unavailable	360	0.078
Waiting to hear back	360	0.053
Firm Refused	360	0.041
Other	360	0.087

Note: Results report responses at different points in time. The first panel asks why participants do not have letters at the time of the baseline. The second panel reports follow up survey responses in the treatment group that was encouraged to obtain a letter. The third panel limits responses to participants that tried to obtain a letter.

Figures

Figure A.1: Reference Letter Template

Subject: Reference for _____ _____
(Name) *(Address of Firm)*

_____
(Address of Firm)

To Whom it May Concern:

My name is_____ . I am the ___ _____ of _____ .
(Name) *(Position)* *(Firm / Business Name)*

Our firm is _____.
(Describe what firm is doing)

I have known _____ for _____. He/She has worked for our firm as a _____ for _____.
(Name) *(Time Known)* *(Position)* *(Time Worked)*

From _____ interactions I feel _____ _____ to accurately judge his attitude and skills.
(daily/weekly/monthly) *(very confident / confident / somewhat confident)*

Attitude	Rating					Comment
Team ability: Ability to work under supervisor and in a team.	Very good	Good	Average	Below Average	Cannot rate	
Interpersonal skills: Friendliness and communication with customers/ co-workers	Very good	Good	Average	Below Average	Cannot rate	
Work Ethics: Willingness and ability to work hard.	Very good	Good	Average	Below Average	Cannot rate	
Reliability: Show up on time and not mismanage funds / equipment	Very good	Good	Average	Below Average	Cannot rate	
Agreeability: responds well to instructions/ is able to adapt	Very good	Good	Average	Below Average	Cannot rate	

ADDITIONAL COMMENT on Attitude: _____
_____

Skill	Rating					Comment
Numeracy: Math skills necessary for this job.	Very good	Good	Average	Below Average	Cannot rate	
Literacy: English proficiency: Reading / Writing skills needed for this job	Very good	Good	Average	Below Average	Cannot rate	
Computer literacy: Use of Windows, Word, Excel, Internet, etc.	Very good	Good	Average	Below Average	Cannot rate	
Learning ability: Able to pick up new skills quickly	Very good	Good	Average	Below Average	Cannot rate	
Task 1: *(Describe Task)*	Very good	Good	Average	Below Average	Cannot rate	
Task 2: *(Describe Task)*	Very good	Good	Average	Below Average	Cannot rate	

ADDITIONAL COMMENT on Skills: _____
_____

Our employment relationship ended because _____
(Reason for end of employment)

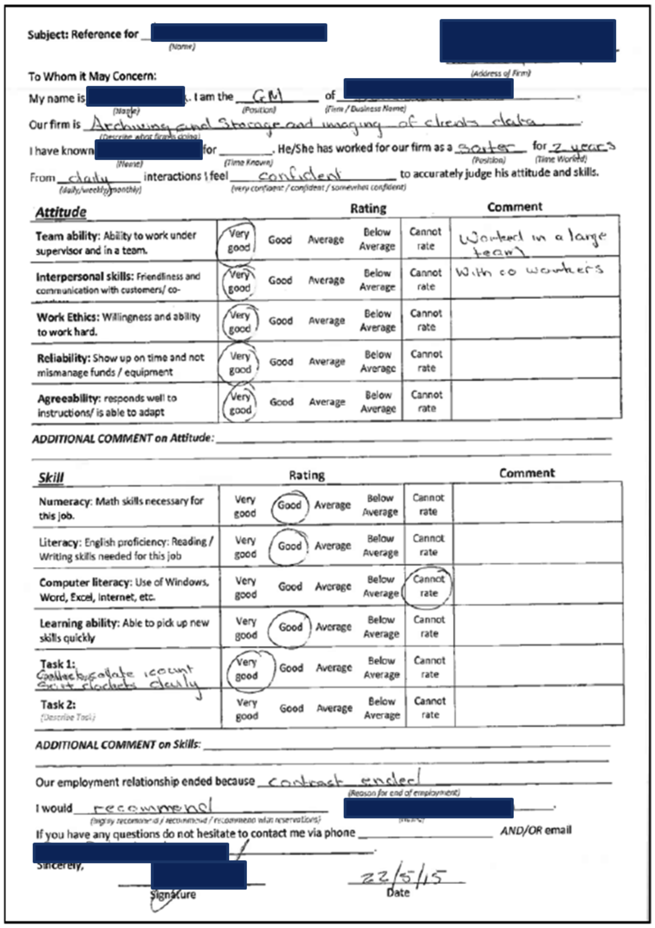
I would _____ _____.
(highly recommend / recommend / recommend with reservations) *(Name)*

If you have any questions do not hesitate to contact me via phone _____ *AND/OR* email _____.

Sincerely,

_____ _____
Signature Date

Figure A.2: Reference Letter Template - Examples



Subject: Reference for [redacted] (Name) [redacted] (Address of Firm)

To Whom it May Concern:

My name is [redacted] (Name). I am the GM (Position) of [redacted] (Firm / Business Name).

Our firm is Archiving and Storage and imaging of clients data (Describe what firm is doing).

I have known [redacted] (Name) for ______ (Time Known). He/She has worked for our firm as a Sorter (Position) for 2 years (Time Worked).

From daily (daily/weekly/monthly) interactions I feel confident (very confident / confident / somewhat confident) to accurately judge his attitude and skills.

Attitude	Rating (circled)	Comment
Team ability: Ability to work under supervisor and in a team.	Very good	Worked in a large team
Interpersonal skills: Friendliness and communication with customers/ co-workers	Very good	With co workers
Work Ethics: Willingness and ability to work hard.	Very good	
Reliability: Show up on time and not mismanage funds / equipment	Very good	
Agreeability: responds well to instructions/ is able to adapt	Very good	

ADDITIONAL COMMENT on Attitude: ______

Skill	Rating (circled)	Comment
Numeracy: Math skills necessary for this job.	Good	
Literacy: English proficiency: Reading / Writing skills needed for this job	Good	
Computer literacy: Use of Windows, Word, Excel, Internet, etc.	Cannot rate	
Learning ability: Able to pick up new skills quickly	Good	
Task 1: Collect/calculate/count Sort clocks daily	Very good	
Task 2: (Describe Task)		

ADDITIONAL COMMENT on Skills: ______

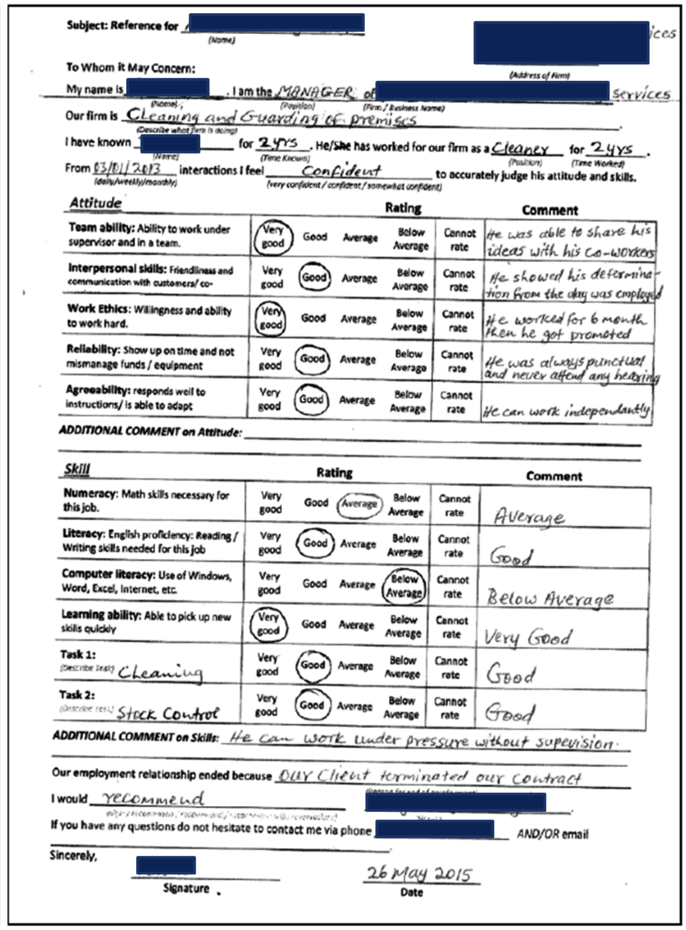
Our employment relationship ended because contract ended (Reason for end of employment).

I would recommend [redacted] (highly recommend / recommend / recommend with reservations)

If you have any questions do not hesitate to contact me via phone ______ AND/OR email [redacted]

Sincerely, [redacted]

Signature — Date 22/5/15



Subject: Reference for [redacted] (Name) [redacted] ices (Address of Firm)

To Whom it May Concern:

My name is [redacted] (Name). I am the MANAGER (Position) of [redacted] Services (Firm / Business Name).

Our firm is Cleaning and Guarding of premises (Describe what firm is doing).

I have known [redacted] (Name) for 2 YRS (Time Known). He/She has worked for our firm as a Cleaner (Position) for 2 YRS (Time Worked).

From 03/01/2013 (daily/weekly/monthly) interactions I feel Confident (very confident / confident / somewhat confident) to accurately judge his attitude and skills.

Attitude	Rating (circled)	Comment
Team ability: Ability to work under supervisor and in a team.	Very good	He was able to share his ideas with his co-workers
Interpersonal skills: Friendliness and communication with customers/ co-workers	Good	He showed his determination from the day was employed
Work Ethics: Willingness and ability to work hard.	Very good	He worked for 6 month then he got promoted
Reliability: Show up on time and not mismanage funds / equipment	Good	He was always punctual and never affend any hearing
Agreeability: responds well to instructions/ is able to adapt	Good	He can work independantly

ADDITIONAL COMMENT on Attitude: ______

Skill	Rating (circled)	Comment
Numeracy: Math skills necessary for this job.	Average	Average
Literacy: English proficiency: Reading / Writing skills needed for this job	Good	Good
Computer literacy: Use of Windows, Word, Excel, Internet, etc.	Below Average	Below Average
Learning ability: Able to pick up new skills quickly	Very good	Very Good
Task 1: Cleaning	Good	Good
Task 2: Stock Control	Good	Good

ADDITIONAL COMMENT on Skills: He can work under pressure without supevision.

Our employment relationship ended because our Client terminated our contract

I would recommend [redacted]

If you have any questions do not hesitate to contact me via phone [redacted] AND/OR email

Sincerely, [redacted]

Signature — Date 26 May 2015

Figure A.3: Aptitude Test - Sample Questions

MATH

25 + 8 =

0.58 + 1.29 =

11.39 - 3.18 =

25 ÷5 =

3 +(2x 5) =

What is larger 1/4 or 1/3?

Three quarters of 100=

Which of these means 8/10: a) 80 b) 78 c) 0.8 d) 0.08

30% of R100

How many meters in a kilometre?

The time is 8:10. What time will it be in 1hours and 40 mins?

The distance to work is 50km and I am halfway there, how much longer do I still have to travel to get to work?

At the bake sale, you sold biscuits for R2 each. You earned R32. How many biscuits did you sell?

Thandeka works from 8am to 11am. Every hour, she sells 6 books. How many books does she sell in a day?

ENGLISH

Please fill in the correct word:

Alicia, _____ the windows please. It's too hot in here.

- A. opens
- B open
- C opened
- D will opened

Maria _____ never late for work.

- A. am
- B. are
- C. were
- D. is

Please read the paragraph and answer the questions:

Tomorrow, you will need to pick up the fish from the harbour. Be there in the morning before it gets too hot and the fish will go bad. You can tell the fisher that the secretary will make a bank transfer tomorrow. Please bring the fish directly to the restaurant so that the chef can use it for lunch customers.

Why do you need to pick up the fish early?

Who fill make the payment?

A) the fisher
B) you
C) the secretary
D) the chef

Where are you supposed to drop off the fish?

A Model

A job-seeker has (general) ability a which determines her productivity for any firm. At the time of applying for work, the job-seeker is endowed with an application signal $s_1 = a + e_1$. With probability π she is also endowed with a reference letter signal $s_2 = a + e_2$ ($c = 1$ if she does, otherwise $c = 0$).[20] Assume that $a \sim nid(0, 1)$, $e_1 \sim nid(0, \sigma_1^2)$ and $e_2 \sim nid(0, \sigma_2^2)$. The job-seeker applies to a vacancy by sending application s_1 to the firm and must choose whether to also attach a reference letter s_2 ($d = 1$ if she does, otherwise $d = 0$).

The firm offers a fixed wage and chooses whether to hire the applicant based on available information Ω. It will do so if the expected productivity exceeds some threshold θ, i.e. $E(a|\Omega) > \theta$. We denote this hiring decision as $h = 1$ if a job is offered and $h = 0$ otherwise. The utility of the worker depends only on whether or not she is offered a job, and there is no cost to applying or sending reference letters. The firm's conditional expectation is rational and common knowledge, but the hiring threshold θ is private information

The firm's conditional expectation function, which we assume to be linear, is

$$E(a|s_1, s_2, d) = \beta_{00} + \beta_{01}d + \beta_{10}s_1 + \beta_{11}s_1d + \beta_{21}s_2d$$

Since the firm's expectations are rational and common knowledge, the job-seeker's decision to send a reference letter is

$$d(s_1, s_2) = c \times 1[E(a|s_1, d = 0) < E(a|s_1, s_2, d = 1)]$$

This becomes

$$d(s_1, s_2) = c \times 1[\beta_{01} + \beta_{11}s_1 + \beta_{21}s_2 > 0] = c \times 1[s_2 > -\frac{\beta_{01}}{\beta_{21}} - \frac{\beta_{11}}{\beta_{21}}s_1]$$

If the candidate sends a reference letter, then the employer observes s_1 and s_2. The linear regression coefficients for

$$E(a|s_1, s_2, d = 1) = (\beta_{00} + \beta_{01}) + (\beta_{10} + \beta_{11})s_1 + \beta_{21}s_2$$

[20] Building on Gibbons and Katz (1991), we assume that π is independent of a which limits what firms can infer about workers ability from their access to letters. (Predictions would not qualitatively change as long as there is no perfect correlation.) This assumption is supported by fieldwork we conducted finding that some firms out of principle do not provide reference letters to former employers, citing concerns about legal reasons.

can be calculated via the Frisch-Waugh-Lovell theorem as

$$\beta_{10} + \beta_{11} = \frac{\sigma_2^2}{\sigma_2^2 + \sigma_1^2\sigma_2^2 + \sigma_1^2}$$

$$\beta_{21} = \frac{\sigma_1^2}{\sigma_2^2 + \sigma_1^2\sigma_2^2 + \sigma_1^2}$$

$$\beta_{00} + \beta_{01} = 0$$

so that

$$E(a|s_1, s_2, d = 1) = \frac{\sigma_2^2}{\sigma_2^2 + \sigma_1^2\sigma_2^2 + \sigma_1^2}s_1 + \frac{\sigma_1^2}{\sigma_2^2 + \sigma_1^2\sigma_2^2 + \sigma_1^2}s_2$$

Define $\kappa_1 \equiv \frac{\sigma_1^2}{\sigma_2^2+\sigma_1^2\sigma_2^2+\sigma_1^2}$, $\kappa_2 \equiv \frac{\sigma_2^2}{\sigma_2^2+\sigma_1^2\sigma_2^2+\sigma_1^2}$, and we have Eq. (1) in the main text.

It follows that, if $\kappa_1 > 0$, firms will be more likely to hire candidates with stronger reference letters. Positive reference letters will be particularly useful when resumes are deemed to be unreliable compared to reference letters. Therefore, any attribute of the reference letter that casts doubt over the reliability of the information provided will reduce their effectiveness. In addition, if firms place less faith in positive resumes of a certain group of applicants (such as females) then the reference letter should matter more for such group.

When no reference letter is sent, the employer should use this information to update their expectation about the value of s_2. By the law of iterated conditional expectations:

$$E(a|s_1, d) = E(E(a|s_1, s_2, d)|s_1, d) = \beta_{00} + \beta_{01}d + \beta_{10}s_1 + \beta_{11}s_1d + \beta_{21}E(s_2|s_1, d)d$$

The expected value of s_2, given the observed value of s_1 and the fact that no reference letter was sent, is

$$E(s_2|s_1, d = 0) = P(c = 0|d = 0)E(s_2|s_1, c = 0) + P(c = 1|d = 0)E(s_2|s_1, s_2 < -\frac{\beta_{01}}{\beta_{21}} - \frac{\beta_{11}}{\beta_{21}}s_1)$$

Define $\psi \equiv P(c = 1|d = 0)$ and $\omega = \sqrt{(1 + \sigma_2^2)(1 - \rho^2)}$, where ρ is the correlation coefficient between s_1 and s_2.

Then

$$E(s_2|s_1, d=0) = \frac{1-\psi}{1+\sigma_1^2}s_1 + \frac{\psi}{1+\sigma_1^2}s_1 - \psi\omega\frac{\phi\left(\frac{-\frac{\beta_{01}}{\beta_{21}} - \frac{\beta_{11}}{\beta_{21}}s_1 - \frac{1}{1+\sigma_1^2}s_1}{\omega}\right)}{\Phi\left(\frac{-\frac{\beta_{01}}{\beta_{21}} - \frac{\beta_{11}}{\beta_{21}}s_1 - \frac{1}{1+\sigma_1^2}s_1}{\omega}\right)}$$

Linearising the inverse Mill's ratio in the last term around 0 provides the following approximation

$$E(s_2|s_1, d=0) \cong -\psi(0.64\frac{\beta_{01}}{\beta_{21}} + 0.8\omega) + (\frac{1-0.64\psi}{1+\sigma_1^2} - 0.64\psi\frac{\beta_{11}}{\beta_{21}})s_1$$

When the job-seeker chooses not to send the letter the employer has to replace the observed value of s_2 with its conditional expectation $E(s_2|s_1, d=0)$

$$E(a|s_1, d=0) = (\beta_{00} + \beta_{01}) + (\beta_{10} + \beta_{11})s_1 + \beta_{21}E(s_2|s_1, d=0)$$

$$\cong -0.64\beta_{01}\psi - 0.8\beta_{21}\psi\omega + \left(\frac{1-0.64\psi}{1+\sigma_1^2}\beta_{21} - 0.64\psi\beta_{11} + (\beta_{10} + \beta_{11})\right)s_1$$

Defining $\chi = \frac{0.8\psi}{1-0.64\psi}$, the coefficients of the conditional expectation

$$E(a|s_1, d=0) = \beta_{00} + \beta_{10}s_1$$

are

$$\beta_{00} = -\chi\kappa_1\omega$$

$$\beta_{10} = \frac{1}{1+\sigma_1^2}\kappa_1 + \kappa_2$$

Then

$$\beta_{01} = \chi\kappa_1\omega$$

$$\beta_{11} = -\frac{1}{1+\sigma_1^2}\kappa_1$$

$$\beta_{21} = \kappa_1$$

The perfect Bayesian equilibrium (PBE)[21] for this dynamic game of incomplete information is then that the job-seeker's decision to send the letter can be expressed as

$$d(s_1, s_2) = c \times 1\left[s_2 - \frac{1}{(1+\sigma_1^2)}s_1 > -\chi\omega\right]$$

Since job-seekers have rational expectations about firm behavior, this equation also provides the condition under which the inclusion of a reference letter will increase the hiring probability.

It also follows from the model (not shown for brevity) that the reference letter information will result in a closer mapping from ability to job offers (providing that firms only make job offers to a small share of applicants). In addition, it can be shown that as the usage of letters increases, the ability of firms to identify higher ability candidates improves. As more job seekers gain access to reference letters, the usage will increase for two reasons: (i) mechanically, more people will have access to positive letters and (ii) on the margin, people with less positive letters will use it as the penalty of not sending the letter increases.

[21] A PBE is a strategy profile and belief system that are sequentially rational and consistent. In our context, employers know the decision problem of the job seeker, who in turn knows that the hiring firm has this information. Neither firm nor job seeker can benefit by deviating from their strategy.