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The Value of Reference Letters: Experimental Evidence from South Africa[†]

By Martin Abel, Rulof Burger, and Patrizio Piraino*

We show that reference letters from former employers alleviate information frictions in a low-skill labor market, improving applicant screening and gender equity. A resume audit study finds that using a reference letter in the application increases callbacks by 60 percent. Women drive 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, reference letters raise job interviews and employment for women. (*JEL* D83, J16, J24, J64, O12)

Information asymmetries about workers' skills are prevalent in labor markets, especially in the market for low-skill and entry-level jobs.[1] This can have adverse effects on match quality, ultimately affecting output and employment. To the extent that employers are more uncertain or underestimate the ability of disadvantaged groups, such as women, information frictions can also exacerbate labor market inequality (Agrawal, Lacetera, and Lyons 2016; Lang and Manove 2011). Hiring firms can partially reduce these asymmetries through referrals from previous employers who may have valuable information about workers' skills that is otherwise unobservable to them. However, in various contexts (particularly in the developing world) this practice is largely absent.

*Abel: Middlebury College, 14 Old Chapel Road, Middlebury, VT 05753 (email: mabel@middlebury.edu); Burger: Economics Department, Stellenbosch University, Private Bag X1, Matieland, 7602, South Africa (email: rulof@sun.ac.za); Piraino: University of Notre Dame, 2144 Jenkins Halls, Notre Dame, IN 46556 (email: ppiraino@nd.edu). Benjamin Olken was coeditor for this article. 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, and 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.

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[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).

In this study, we design a reference letter template and encourage young South African job seekers to have a former employer complete it. 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). 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 (fictitious) reference letters do not increase overall employer responses but may benefit applicants from minority groups. Closely related to our paper, Pallais (2014) finds that feedback on workers' past performance in an online labor market increases the employment prospects of entry-level workers. Unlike these studies, we investigate a more common labor 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, our design allows us to shed light on the mechanisms behind the effectiveness of reference letters.

Figure 1 describes how reference letters may affect employment. It also summarizes the three experiments we conduct as part of this study in cooperation with the South African Department of Labour (DoL) to test different parts of this causal chain. Experiment 1 tests if employers are more likely to respond when a reference letter is attached to an application. Experiment 2 explores the effect of reference letters on job search behavior and estimates employment impacts *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. Experiments 1 and 2 use two separate samples of job seekers. Experiment 3 combines some of the sample from Experiment 1 and a new group of job seekers.

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, which are the branches of the Department of Labour for employment services across the country. This addresses the criticism common to audit studies using fictitious resumes that application materials designed by researchers may not be realistic or include all relevant information (Heckman 1998) as well as ethical concerns (Riach and Rich 2004).

Results from Experiment 1 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 4.2 percent to 6.7 percent (a 60 percent increase) and the rate of interview requests from 2.4 percent to 3.9 percent (a 62 percent increase). The overall effect is driven by female applicants, whose response rates approximately double.

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 applicants' 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 percent increase) for applications who include a reference letter, as opposed to 0.6 percentage points (a 15 percent increase) for those not

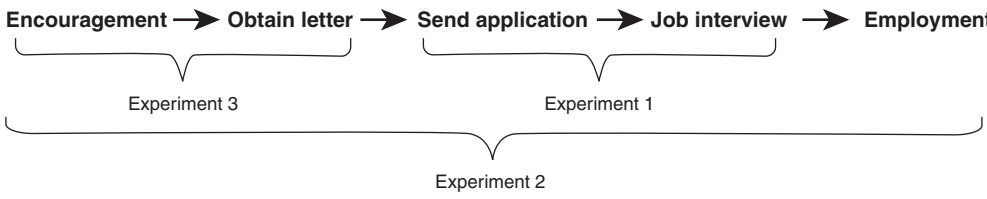

Figure 1. Experimental Design Overview

including a letter. This improvement in the firm's capacity to screen better applicants suggests that letters are informative of workers' unobserved ability. Consistent with this interpretation, we show that ratings from previous employers are highly correlated with our objective aptitude scores, even after controlling for information that can be easily observed from the resume or school transcripts.

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. This is especially true for the women in our sample, consistent with employers being more uncertain about women's skills. 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.

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 (Wolpin 1977).

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), we conduct a second experiment on a separate sample (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 to be employed after three months. On the other hand, no impacts are found for men, thus closing the gender gap in our sample. This gender heterogeneity is in line with the evidence from Experiment 1. We also show that the employment effects for women are in part explained by a significantly higher usage of letters by female job seekers. This is consistent with the idea that groups who feel in a position of disadvantage are more likely to welcome additional tools to prove their ability.

Finally, a third experiment (Experiment 3) shows that 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 many job seekers are not asking former employers to provide (informative) reference letters.

The evidence presented in the paper contributes to the literature on how search frictions affect employment (Mortensen and Pissarides 1994). In particular, we contribute to a recent strand of research investigating how various types of labor market frictions in developing countries can result in worker misallocation and higher inequity (Abebe et al. 2016; Abebe, Caria, and Ortiz-Ospina 2017; Bassi and Nansamba 2017; Groh, McKenzie, and Vishwanath 2015; Hardy and McCasland 2017). Our study shows that interventions leveraging information from former employers can improve firms' screening ability and reduce gender disparities.

Our paper also 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; Dustmann et al. 2016), they can be reluctant to pass on truthful information 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).

The present study also adds to an extensive literature evaluating the effectiveness of active labor market policies (ALMPs) (for recent reviews, see McKenzie 2017; Crépon and van den Berg 2016; Card, Kluve, and Weber 2018). 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. We are able to isolate one component of ALMPs, namely the reduction of information asymmetries.

We acknowledge some caveats in our study design. First, some of our results are imprecisely estimated. While this warrants some caution in the interpretation of the findings, it is reassuring that estimates from different experiments (and samples) and on different outcomes point in the same direction. In particular, the empirical results consistently show that women disproportionately benefit from reference letters. Second, 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, Kircher, and Muller 2019 for a similar contribution).[2] 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 actual environment where the letter templates would be introduced.

Finally, it is important to note that our study was carried out in a context where reference letters are not widely used, which may raise concerns about the generalizability of our findings to other contexts, particularly in developed economies.

[2] Belot, Kircher, and Muller (2019) develop and evaluate experimentally a tool that provides tailored job search advice in job centers 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.

However, a small survey of employers we conducted in the United States shows that half of the employers in our sample report that fewer than 10 percent of applicants to low-skill jobs attach a reference letter.[3] This suggests that our experiment is relevant beyond the low-skill sector in developing countries.

Overall, our results show that letters can benefit job seekers and enhance firms' screening ability. In particular, treatment effects estimated from separate experiments and samples consistently show gains for women on a number of employment-related outcomes. 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 I describes the study context. Section II describes the data and experimental designs. We report the main empirical findings in Section III, while Section IV provides a concluding discussion.

I. Background

The unemployment rate in South Africa is high (26.4 percent), especially for youths (36.9 percent) (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 percent) and have no or limited work experience (50.6 percent), 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, Lange, and Notowidigdo 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, 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. Schöer, Rankin, and Roberts (2014) report that up to 68 percent of workers found employment via

[3] We used Google Surveys to survey 100 firms, who hire a combined 5,000 low-skilled workers annually. Google Surveys uses a stratified sampling process to create a nationally representative sample of internet users according to the Census Bureau's 2010 Current Population Survey's Internet Use Supplement. Low-skill jobs were defined as those not requiring a two-year or four-year college degree.

networks.[4] Yet, firms face a trade-off in their choice of hiring channels (Montgomery 1991). Under the "good match" hypothesis (Rees 1966), current employees can help overcome the asymmetric information problem and create better employment matches as they know both the firm and the people in their network. Moreover, firms may use referrals from current workers to reduce moral hazard problems (Heath 2018). By contrast, the "limited choices" hypothesis stresses that finding employment through social networks limits the opportunities and match quality (Loury 2006). For instance, 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). In addition, informal referral systems may exacerbate inequity as they disadvantage less connected groups (Montgomery 1991). In particular, they may harm women who are often disadvantaged by informal networks (Beaman, Keleher, and Magruder 2018; Magruder 2010).

A formal referral system with endorsements from former employers may thus be a useful alternative (or additional) 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 percent used a reference letter as part of the application process.

II. 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.

A. *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 youths between the ages of 18 and 34 who report not having done any work in the last seven days. 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 Labour Centres, which are located in urban areas (Johannesburg and Polokwane). In order to facilitate the analysis of heterogeneous effects by gender, we stratify the sample by sex of job seeker, as prespecified in the AEA RCT Registry.[5]

[4] This reliance on informal networks may be inefficient for job seekers. Abel et al. (2019) show that a plan-making intervention leading to a broader use of formal search channels increases employment in a similar population of job seekers.

[5] Gender was a focus of the study from the design stage, as the research was conducted in collaboration with the World Bank's Africa Gender Innovation Lab.

In the recruitment call, surveyors explain that the job seeker is invited to participate in an employment service study at the local Labour Centre on a specified day. In return, they receive a stipend of 30 ZAR (around US$2) to cover travel costs. Across all experiments, 67 percent of the successfully contacted unemployed individuals agreed to participate.[6] A baseline survey is administered through an in-person interview at the Labour Centre. 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 noncognitive 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 A1 in the Appendix shows the template, while Figure A2 gives examples of completed letters.

B. *Experimental Designs*

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 Labour Centres 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 percent of encouraged job seekers returned the completed letter. For the participants who return the letter to us, we send out applications with and without the reference letter.

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. On the other hand, selection at the encouragement stage may introduce external validity concerns. Appendix Table A1 investigates which characteristics are correlated with the probability of returning a letter. While age is the only statistically

[6] In the call we ask if they are "interested in participating in a survey" and mention that the information they provide will be used to "update the Department of Labour database." 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 who agree to participate, 63.5 percent were present at the Labour Centre 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 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 percent (63 percent). For sample questions see Appendix Figure A3.

significant predictor, there are likely unobservable factors correlated with the probability of returning a letter. However, this reflects the (arguably) positive selection of workers with access to reference letters we would also expect to observe in other contexts.

Appendix Table A2 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, hard skills are slightly less positively rated than soft skills (2.3 versus 2.6 on a 3 point scale). When we sum the average hard and soft skill ratings, the mean score is 4.9 (on a scale from 0 to 6); 11 percent have a perfect score of 6. While for most categories women receive slightly more positive ratings, only one gender difference is significant at the 10 percent level (team ability) and one at the 5 percent level (how highly recommended). Note that we do not verify the authenticity of the reference letters. In Section III, we will explore whether the letter provides truthful information.

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 1–4 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. We regularly checked for firm responses and forwarded these to the job seekers.[8]

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

[8] 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 employers communicate with job seekers is correlated with the treatment assignment.

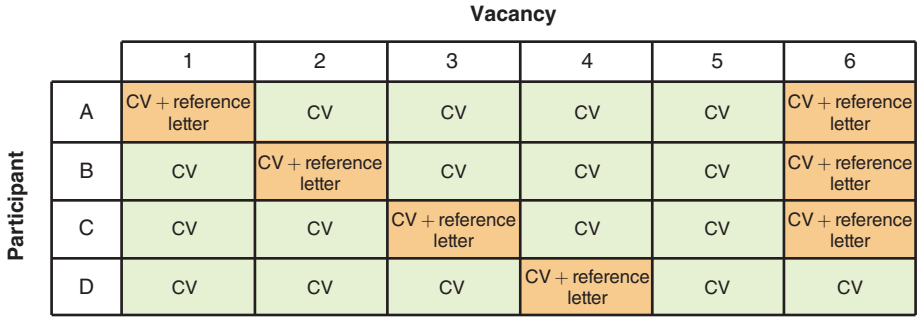

FIGURE 2. EXPERIMENT 1: RANDOMIZATION DESIGN

vacancies (Schöer, Rankin, and Roberts 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.[9] Participants are invited to come to the Labour Centre 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 percent reference letter; 63 percent control group; p-value of test of equal coefficient: 0.55). Appendix Table A3 suggests that the randomization was successful. Moreover, the treatment and control samples are balanced within gender groups (not shown for brevity). To track job search activities and employment outcomes over time, we conduct phone surveys five weeks and three months after the treatment.[10]

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.[11] This allows

[9] Appendix Table A3 provides summary statistics for job seekers in this sample: 50.2 percent are female and the average age is 27.3 years. The average level of education is 12.1 years. About 7 percent of participants are married and they have on average one child. 11.4 percent receive unemployment insurance and the average participant spends 14 hours per week searching for work.

[10] Appendix Table A4 shows that attrition rate increases from about 6 percent in wave 1 to 17 percent in wave 2, likely due to survey fatigue and participants switching phone numbers. Attrition is clearly not random: younger participants are more likely to attrite, but importantly rates do not differ between treatment and control group.

[11] Participants were informed about a vacancy in a specific sector. Among those with work experience in multiple sectors, we randomly chose a sector and notified them. For job seekers for whom we do not have information on previous sectors, we sent 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.

us to test whether participants apply and whether they submit the reference letter as part of their application.

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 a small fraction 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 ZAR (about half a daily wage) in cell phone airtime if they obtain a letter.

A group of 498 job seekers, previously encouraged to obtain a letter, receives a follow-up text message to their cell phone and (if provided) email address reminding them of how to return the completed letter to us. Participants were randomized into three groups.[12] The control group received only a 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)[13]
- "To compensate your costs, you get 100 rand airtime after sending us the completed letter." (Compensation)

III. Results

This section reports and discusses the empirical findings from our three experiments. We begin with the results from the audit study (Experiment 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 Experiment 2, where we can account for changes in job search behavior by participants and obtain treatment effect estimates for employment. We conclude by presenting the results from Experiment 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.

[12] Comparing observable characteristics between the treatment and control groups suggests that randomization was successful (Appendix Table A5). About half of participants in this experiment 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.

[13] This information was based on preliminary findings during the initial phase of the study. Ex post, we acknowledge that the average effect is somewhat smaller than suggested by the message.

Table 1—Effect of Reference Letter on Callback

	$y =$ 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 × letter				0.0416				0.0300
				(0.0206)				(0.0171)
Sector fixed effects	N	Y	Y	Y	N	Y	Y	Y
Individual fixed effects	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
Observations	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050
Control mean	0.0415	0.0415	0.0415	0.0415	0.0240	0.0240	0.0240	0.0240

Notes: 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 (columns 5–8) and either interview request or a different employer response expressing interest in the job applicant (columns 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 the individual; hence, the gender interaction effect can be identified with individual fixed effects.

A. *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:

$$y_{is} = \beta Ref_{is} + \lambda_s + \mu_k + e_{is}. \tag{1}$$

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.

Employer Responses.—Table 1 reports results from specification (1). Columns 1 to 4 report effects using the broad measure of interest as an outcome, while columns 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 (column 1) and of getting an interview request by 1.54 percentage points on a control mean of 2.4 percent (column 5). Coefficient estimates are consistently positive and of similar magnitude when including sector and individual fixed effects (columns 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 (columns 4 and 8). Overall, the results in Table 1 show that reference letters have a positive effect on employer callbacks for women, a result that will be corroborated in Section IIIB using a different sample and experimental design.

We also estimate specification (1) including an interaction term between the reference letter variable and an indicator variable for vacancies receiving multiple applications with letters attached (vacancy 6 in Figure 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 (Appendix Table A6, columns 2 and 5). Next, we test whether there is a negative effect from being in the applicant pool with a job seeker who submits a reference letter. In order to do this, we include a dummy for pure control applications (sent to vacancy 5 in Figure 2). The estimated coefficients in columns 3 and 6 of Appendix Table A6 are small in magnitude and not statistically significant. The insignificant coefficients on rows 2 and 3 of Appendix Table A6 thus provide suggestive evidence against the presence of displacement and novelty effects. We acknowledge, however, that our design is underpowered to reliably detect these and other types of general equilibrium effects.

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:

$$y_{is} = \beta Ref_{is} + \gamma a_s + \delta Ref_{is} \times a_s + \mu_k + e_{is}, \tag{2}$$

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 (columns 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 ninetieth ability percentile is 1.8 percentage points higher compared to those at the tenth percentile. Once the reference letter is included, this figure increases to 6.3

Table 2—Effect of Reference Letter on Screening Productive Applicants

	$y =$ interest		$y =$ interview	
	(1)	(2)	(3)	(4)
Reference letter	0.0257	0.0167	0.0156	0.0093
	(0.010)	(0.019)	(0.009)	(0.013)
Aptitude (z-score)	0.0062	0.0074	0.0006	0.0001
	(0.005)	(0.008)	(0.003)	(0.004)
Reference letter × aptitude (z-score)	0.0200	0.0186	0.0131	0.0137
	(0.008)	(0.011)	(0.006)	(0.008)
Reference letter × female		0.0176		0.0139
		(0.022)		(0.018)
Reference letter × female × aptitude (z-score)		−0.0043		−0.0089
		(0.019)		(0.015)
R^2	0.003	0.008	0.002	0.004
Observations	2,050	2,050	2,050	2,050
Control mean	0.0415	0.0415	0.0240	0.0240

Notes: 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 × aptitude. These coefficients are small in magnitude and insignificant.

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 (columns 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 underestimating 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).[14]

The improvement in the firm's capacity to screen better applicants suggests that letters are informative of workers' unobserved ability, thereby alleviating information frictions for our sample of job seekers. To corroborate this interpretation, we compare subjective employer rating of workers' skills to an objective assessment. Specifically, we regress the numeracy and literacy ratings provided by employers on the results from the numeracy and literacy aptitude test we administer at baseline. Table 3 shows that employer ratings and test results are highly correlated for both literacy (column 1) and numeracy (column 4). This implies that the average letter contains valuable 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 columns 2 and 5 show that while coefficients decrease in magnitude, they stay highly significant. This suggests that the letter is useful even after controlling for information that can be easily observed from the

[14] 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 underestimating or attaching greater uncertainty to the value of productive attributes possessed by black females.

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 (z-score)	0.3645	0.2274	0.2458			
	(0.0935)	(0.1026)	(0.1185)			
Female × literacy aptitude (z-score)			−0.0491			
			(0.2066)			
Numeracy: aptitude (z-score)				0.3001	0.2627	0.2559
				(0.0885)	(0.0966)	(0.1381)
Female × numeracy aptitude (z-score)						0.0155
						(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
Observations	116	116	116	114	114	114

Notes: 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 percent) participants achieved in the last math and English class, respectively.

resume or school transcripts. That is, 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 ethic (Aamodt 2015).

Finally, columns 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.

Employer Responses by Referee Rating.—Are job seekers with *better* reference letters more likely to receive job interviews? 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 (red 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.[15] Our data, however, reveal that firms are incorrect in inferring that applicants with perfect scores on

[15] 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 by the referee.

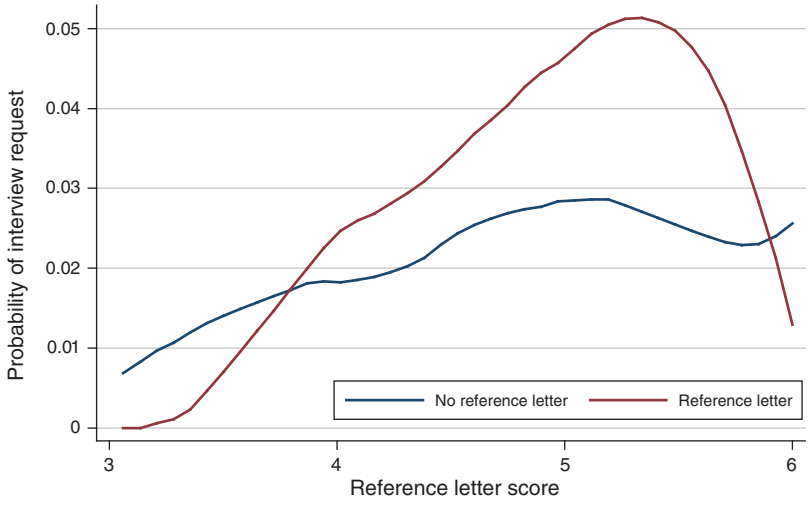

FIGURE 3. EMPLOYER RESPONSES BY REFEREE RATING

their letter 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).

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

$$y_{is} = \mu_k + \beta Ref_{is} + \gamma score_s + \delta Ref_{is} \times score_s + e_{is}. \tag{3}$$

Given the discontinuity documented above, we estimate specification (3) 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 zero and insignificant across all specifications. This provides evidence against the idea that job seekers who 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 (columns 2 and 5). The coefficient estimates in columns 2 and 5 indicate that a one standard deviation higher rating increases employer responses (interviews) by 48 percent (77 percent). The coefficient on the interaction term with the all-positive dummy is also significant (and negative). These findings suggest that

Table 4—Effect of Referee Rating on Callback

	$y =$ interest			$y =$ interview		
	(1)	(2)	(3)	(4)	(5)	(6)
Reference letter	0.0251	0.0312	0.0180	0.0149	0.0226	0.0064
	(0.0105)	(0.0113)	(0.0166)	(0.0088)	(0.0096)	(0.0115)
Referee rating (z-score)	−0.0002	−0.0030	0.0027	0.0010	0.0005	−0.0001
	(0.0062)	(0.0055)	(0.0065)	(0.0038)	(0.0038)	(0.0053)
Letter × rating (z-score)	0.0076	0.0149	−0.0017	0.0055	0.0145	0.0033
	(0.0080)	(0.0081)	(0.0108)	(0.0067)	(0.0072)	(0.0079)
Letter × rating × female			0.0423			0.0267
			(0.0162)			(0.0142)
All positive		0.0210	0.0283		0.0044	−0.0228
		(0.0295)	(0.0771)		(0.0143)	(0.0105)
Letter × all positive		−0.0554	−0.0880		−0.0684	−0.0061
		(0.0331)	(0.0818)		(0.0209)	(0.0155)
Letter × all positive × female			0.0115			−0.1045
			(0.0904)			(0.0321)
R^2	0.008	0.009	0.011	0.009	0.012	0.015
Observations	2,050	2,050	2,050	2,050	2,050	2,050
Control content	Y	Y	Y	Y	Y	Y
Control mean	0.0415	0.0415	0.0415	0.0240	0.0240	0.0240

Notes: Standard errors (reported in parentheses) are clustered at the applicant level. The z-score is the standardized employer rating. All positive is an indicator variable for whether employers give a perfect rating. We estimate the model with the interaction terms for gender, rating, and reference letter, but only report the coefficients on the interaction terms of interest 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.

firms pay attention to the information provided by the referee, which is consistent with the positive effect on screening ability documented above.

In addition, columns 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 is consistent with the idea that employers may be more uncertain about the ability of women.

B. *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 who 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 unobservable to firms. 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

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

	Intent to treat effects			Local average treatment effects		
	Application (1)	Interview (2)	Employment (3)	Application (4)	Interview (5)	Employment (6)
Panel A. Pooled						
Reference letter	0.570	0.067	0.019	1.146	0.135	0.037
	(0.601)	(0.050)	(0.019)	(1.179)	(0.100)	(0.036)
R^2	0.231	0.041	0.011	0.230	0.037	0.008
Observations	1,000	998	1,038	1,000	998	1,038
Control mean	3.968	0.680	0.134	3.968	0.680	0.134
Panel B. Female						
Reference letter	0.857	0.124	0.059	1.829	0.264	0.125
	(1.035)	(0.059)	(0.028)	(2.115)	(0.127)	(0.060)
R^2	0.252	0.061	0.023	0.252	0.050	—
Observations	508	506	530	506	506	530
Control mean	3.842	0.534	0.117	3.842	0.534	0.117
Panel C. Male						
Reference letter	0.349	−0.011	−0.022	0.668	−0.022	−0.043
	(0.523)	(0.084)	(0.026)	(0.990)	(0.161)	(0.051)
R^2	0.227	0.022	0.027	0.225	0.022	0.024
Observations	492	492	511	492	492	511
Control mean	4.130	0.862	0.157	4.130	0.862	0.157
p-value: $\beta_{fem} = \beta_{male}$	0.660	0.191	0.039	0.619	0.274	0.067

Notes: Results presented in columns 1–3 are intent to treat estimates. Results in columns 4–6 are treatment on the treated estimates, using the encouragement assignment as an instrument for take-up as measured by whether people successfully obtained a reference letter (51 percent). Control variables were selected using the post-double selection estimator from a pool of regressors that includes baseline characteristics such as age, schooling, gender, marital status, language, parental education, as well as the baseline values of the dependent variables. Panel A reports estimates from specification (4) for the full sample. Columns 1–2 and 4–5 (Application and Interview) measure 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 percent level to account for outliers. Employment is an indicator variable denoting if people are in paid employment or self-employed. Panels B and C estimate results separately for women and men.

employment. Also, the audit framework ignores potential changes in job seekers' search strategy, given that applications are submitted by the researchers. Our Experiment 2 allows us to address these limitations and provide a more general contribution.

Effect of Reference Letters on Employment.—Experiment 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:

$$y_{ij} = \beta T_i + \gamma X_{ij} + e_i. \tag{4}$$

The dependent variable y_{ij} is measured for individual i residing in location j. We focus on three outcomes: (i) number of applications submitted, (ii) job interviews in the last four weeks, and (iii) employment status. The variable T_i captures

whether participants were assigned to the treatment group that received the encouragement to obtain a letter. We select control variables, X_{ij}, using the double-LASSO estimator described in Belloni, Chernozhukov, and Hansen (2014). Standard errors are clustered by the date the treatment was delivered, as suggested by Abadie et al. (2017). Since the effects of reference letters may differ by gender (as shown in the audit study), we also estimate specification (4) 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.[16]

The coefficient estimates in Table 5 are in line with the main findings from the audit study. In the pooled sample (panel A), coefficients on employment outcomes are sizable, but not statistically significant. Panels B and C confirm that there is important treatment effect heterogeneity by gender: after three months, women in the treatment group are significantly more likely to receive interviews and find employment.

Employment effects for women are large in magnitude: 5.9 percentage points for ITT estimates (column 3) and 12.5 percentage points for LATE estimates (column 6). Coefficients for men are close to zero and insignificant. We can reject that employment effects for women and men are equal at the 5 percent level.

While the magnitudes of the effects are high, it is important to remark that these are short-term effects (three months). This warrants some caution in the extrapolation of our results to long-term impacts. For example, evidence from other ALMPs show that the effects of certain programs may fade out over time (Card, Kluve, and Weber 2018). This, however, appears to be less of a concern for interventions that reduce information frictions about job seekers' ability (Abebe et al. 2016).

Overall, the combined evidence from Tables 1 and 5 shows that providing women with an additional tool to signal their skills can improve their employment prospects. It is notable that the results across distinct experiments and separate samples point in the same direction. This is consistent with existing evidence from other contexts showing that reducing information asymmetries—through verified work history information or other interventions—may improve equity by leveling the playing field for job applicants at an initial disadvantage (Agrawal, Lacetera, and Lyons 2016; Lang and Manove 2011; Kaas and Manger 2012; Pallais 2014).

Gender Heterogeneity in the Usage of Letters.—Female participants may be more likely to use reference letters if they believe that firms are more uncertain about their skills. Indeed, women interviewed in focus group discussions report having to exert

[16] 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 three 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 nonnegligible number of participants report that it takes them longer than five weeks to obtain a reference letter.

Table 6—Application Material Submitted

	$y =$ submit application		$y =$ attach reference letter		
	(1)	(2)	(3)	(4)	(5)
Reference letter	−0.003	−0.023	0.069	0.007	−0.000
	(0.022)	(0.033)	(0.029)	(0.030)	(0.006)
Female	0.010	−0.017	0.038	−0.018	−0.003
	(0.023)	(0.032)	(0.029)	(0.021)	(0.004)
Reference letter × female		0.047		0.113	0.021
		(0.045)		(0.058)	(0.010)
R^2	0.008	0.017	0.072	0.091	0.014
Observations	1,141	1,141	184	184	1,141
Control mean	0.163	0.163	0.011	0.011	0.002
Sample	Full	Full	Application	Application	Full

Notes: Outcomes are binary measures of whether job seekers submit an application (columns 1–2) and whether they attach a reference letter (columns 3–5). Columns 3 and 4 restrict the sample to job seekers who submit an application. Regressions control for educational level, age, gender, language, and location fixed effects. Heteroskedasticity-robust standard errors are estimated at the individual level.

greater effort, relative to men, to "prove themselves" in the eyes of the (mostly male) prospective employers.[17]

The design of Experiment 2 allows us to investigate the usage of reference letters. As mentioned in Section IIB, participants in Experiment 2 were informed about an open vacancy and asked to submit their application material if interested. We estimate the following specification:

$$y_{ij} = \beta T_i + \gamma X_i + \lambda_j + e_i, \tag{5}$$

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 but 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 percent submit a letter, confirming that reference letters are nearly absent in the labor market we investigate. This share increases in the treatment group: 8 percent 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.[18]

[17] This is also consistent with qualitative evidence on first-year students from historically disadvantaged groups at a large South African university reporting that they often feel they need to "show more" for their skills to be recognized compared to white males.

[18] Slightly more than 18 percent of those who obtained a letter attach it to their application. This compares to about 37 percent 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 used the letter in conventional job search channels.

Importantly, Table 6 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 (columns 4 and 5). This is consistent with the idea that female applicants may feel in a position of disadvantage (a belief that would be consistent with the evidence from Experiment 1), and are therefore more likely to use the additional tool provided in the experiment to signal their skills. This, in turn, can partly explain the employment effects for women reported in Table 5.

C. *Why Are Reference Letters Not More Widely Used?*

The previous sections show that both job seekers and firms can benefit from reference letters. This raises the question of why reference letters are not more widely used in low-skill markets. Our analysis rules out two of the most obvious explanations by showing that (i) reference letters contain valuable 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.

Previous Employers and Hiring Firms.—We ask job seekers to bring all their application documents to the initial meeting at the Labour Centre. We find that among job seekers with previous work experience, only about 4 percent have a reference letter from a former employer. When probed, 86.4 percent of job seekers report that they "Did not ask," while only 3.1 percent report that they asked but the employer refused (Appendix Table A7). It is, however, possible that many job seekers did not ask because they correctly predicted 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 percent of job seekers report that they tried to obtain a letter. Of this group, 73.6 percent succeeded. Among those who tried, only 4.1 percent report that they failed to obtain a letter because the employer refused.

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

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 II, a subgroup 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:

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

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

Table 7—Take-Up Experiment

	(1)	(2)	(3)	(4)
Pooled treatment	0.075	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
Observations	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: Columns 1 and 2 pool the Information and Money treatments. The control group received a message reminding them of how to return the letter.

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 percentage points and statistically significant, while the effect of the monetary incentive is much smaller (4.5 percentage points) and statistically indistinguishable from 0 (column 4). We can reject that treatment effects are identical at the 10 percent significance level. Overall, the results from Experiment 3 suggest 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.[19]

IV. Discussion

Technology has drastically reduced information asymmetries across many markets; online labor market platforms require firms to provide public evaluations of employees' performance 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 coworkers and employers. These professional network sites also identify common connections than can serve as informal references. Yet, large parts of the global labor force are working in markets that have not been affected by these changes.

[19] For a small group of job seekers ($N = 50$) in two study sites, we also tested the effect of combining the monetary incentives and information. The estimated effect is statistically indistinguishable from the information treatment alone. One caveat for this comparison, however, is that these job seekers were predominantly drawn from the Polokwane area.

Our study investigates the role of information asymmetries in one such market: the low-skill sector in South Africa. We find that a simple intervention—encouraging job seekers to obtain a standardized reference letter from a former employer—can lead to improvements in the firms' capacity to select job seekers of higher ability from the pool of applicants. Women especially benefit; female participants who obtained letters are significantly more likely to receive job interviews and to be employed after three months. This demonstrates that reducing information asymmetries can improve both match quality and equity in labor markets.

We provide evidence that underestimating the potential benefits of employer referrals may partly explain the low prevalence of reference letters in the labor market we analyze. 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 any additional information on worker skills 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 percent include this information), responsibilities (38 percent), skills (28 percent) duration of employment (48 percent), and reason for termination of employment (18 percent). In addition, only 48 percent of letters are signed and only 56 percent 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 ineffective.

In-depth interviews with a sample of 28 hiring firms provide further support for this explanation. About 73 percent 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 percent) and that it is more clearly structured (32 percent). 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).

While this suggests that there is room to increase take-up of reference letters in the market, it is important to reflect on the potential labor market implications of policies that would encourage reference letters as a common practice. A first concern may be that any policy resulting in a wider usage of letter would mechanically favor job seekers with stronger labor market attachment. Indeed, Pallais (2014) shows that in a context where employer feedback is more common, job seekers with no prior work experience have worse employment outcomes. This is due to the fact that no information about their ability is generated by the market until they can have a first job, which results in inefficiently low hiring of entry-level workers. A policy that subsidizes first-time labor market entrants would therefore correct this inefficiency. Such policy could complement an intervention promoting reference letters, which would instead help reduce inefficiencies in the larger segment of the labor market with prior work experience.

A related concern is that a widespread usage of reference letters may give employers excessive leverage over their employees, while at the same time hurting

workers with negative past employment experiences. However, in markets where work relationships are often temporary and job churning is high (such as the low-skill sector in South Africa), it is unlikely that a single negative experience may overly influence job prospects. In addition, employers may incur higher costs for new hires if they develop a reputation for unfair assessments of worker productivity (similar to reputation effects in online markets with frequent feedback). Finally, while there is a role for governments to facilitate the information exchange through the use of standardized reference letters, job seekers would still be able to decide on both the referee and whether to use the letter, in line with common practice in high-skill markets.

One may also contend that if the government were to encourage reference letters as a widespread practice, their effectiveness would vanish. That is, the impacts estimated in our context may not be due to the informational content of the letter but to the fact that applications attaching a letter "stand out" relative to the mass. In Section IIIA, we showed that randomly varying the share of letters sent to a given vacancy did not affect the treatment effect, although we acknowledged that the higher number of letters may still represent a small proportion of the applicant pool. In addition, we showed that higher employer ratings generally increase the probability of interviews, except for reference letters in which the employer gives a perfect score in every category (perhaps due to a perceived lack of credibility). This indicates that employers are paying attention to the content, as we would not otherwise expect them to reward higher employer ratings and/or penalize references with perfect scores.

While these findings suggest that the effects we estimate are not simply driven by applications "standing out," we cannot exclude that the gains observed in our context may become smaller as reference letters are increasingly used. However, our findings on the improvement in firms' screening ability give us some confidence that employment gains will persist even when letters become more common.

Overall, the study provides novel evidence on the effect of information frictions on the efficiency and equity of the labor market. We document that information asymmetries are prevalent in a low-skill labor market and that employers struggle to identify high-ability job seekers. We show that a simple intervention leveraging information from former employers can reduce these asymmetries and improve firms' screening ability. This is a necessary precondition for reference letters to have general equilibrium employment effects. In addition, we show that equipping women with an additional tool to signal their skills may improve their employment prospects. Reducing information frictions can thus contribute to leveling the playing field for job applicants at an initial disadvantage. Taken together, these results may provide a rationale for governments to facilitate the information exchange.

Appendix

Table A1—Selection: Who Returns Reference Letters?

Dep var: 1 = return letter	Demogr (1)	Search (2)	Aptitude (3)	Job spell (4)	Unemp spell (5)	Job termination (6)	(7)
Education (year)	0.007	0.008	0.006	0.007	0.006	0.006	0.006
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Age (year)	0.008	0.008	0.008	0.009	0.008	0.010	0.010
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
1 = female	0.057	0.055	0.058	0.055	0.057	0.052	0.050
	(0.034)	(0.034)	(0.034)	(0.035)	(0.035)	(0.035)	(0.036)
Nr applications (4 weeks)		−0.007					0.00214
		(0.011)					(0.0076)
Aptitude score (percent)			0.000				0.00039
			(0.002)				(0.0013)
Last job spell (year)				−0.003			−0.01762
				(0.009)			(0.0122)
Time since last job (year)					−0.003		0.00144
					(0.016)		(0.0028)
Job termination: contract end						−0.004	−0.006
						(0.043)	(0.044)
Job termination: fired						−0.057	−0.054
						(0.058)	(0.059)
Job termination: voluntary						0.055	0.050
						(0.067)	(0.068)
R^2	0.139	0.140	0.139	0.139	0.139	0.142	0.143
Observations	496	496	496	496	496	496	496
Dependent variable mean	0.212	0.212	0.212	0.212	0.212	0.212	0.212

Notes: 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 captures the reason of termination stated by employers on the reference letter. Heteroskedasticty-robust standard errors are estimated at the individual level.

Table A2—Content of Reference Letter by Gender

	Observations	Mean	Gender		
			Female	Male	*p*-value
Total score	119	4.933	5.04	4.821	0.134
Hard skill score	119	2.307	2.362	2.25	0.211
Soft skill	120	2.625	2.677	2.571	0.151
All positive	119	0.109	0.131	0.086	0.434
Team ability	117	2.692	2.77	2.607	0.058
Work ethic	120	2.675	2.742	2.603	0.162
Reliability	118	2.568	2.597	2.536	0.568
Agreeability	118	2.61	2.645	2.571	0.448
Interpersonal skills	119	2.597	2.639	2.552	0.408
Literacy ref	117	2.462	2.5	2.421	0.487
Numeracy ref	115	2.174	2.22	2.125	0.48
Computer literacy	109	1.917	2.052	1.765	0.104
Learning ability	118	2.576	2.574	2.579	0.961
Task1	70	2.5	2.5	2.5	1
Task2	60	2.433	2.452	2.414	0.807
Comments (any)	120	0.458	0.452	0.466	0.88
Comments (nr)	120	1.842	1.984	1.69	0.606
How highly recommended (0 = reserv., 2 = highly)	104	1.558	1.691	1.408	0.012
Confidence assessing (0 = low, 2 = high)	112	1.67	1.717	1.615	0.278
Termination: voluntary	107	0.224	0.263	0.18	0.304
Termination: contract ended	107	0.645	0.632	0.66	0.762
Termination: retrenchment	107	0.112	0.088	0.14	0.403
Termination: fired	107	0.019	0.018	0.02	0.927
Signed	115	0.974	0.967	0.981	0.63
Phone listed	115	0.957	0.934	0.981	0.205
Email listed	115	0.496	0.492	0.5	0.931

Notes: The table reports details from the completed reference letters. Of the letters returned, 16 were not used in Experiment 1 because they were illegible. Ratings are converted to numeric values (0 = below average, 3 = very good). Columns on the right provide summary statistics separately for women and men and report *p*-values of a *t*-test of equal means.

Table A3—Balance Test: Reference Letter versus Control Group

	Full sample		Control		Reference letter		
	Observations	Mean	Observations	Mean	Observations	Mean	*p*-value
1 = Female	1,246	0.504	560	0.52	686	0.491	0.319
Age in yrs	1,246	27.35	560	27.1	701	27.6	0.055
Education (years)	1,240	12.04	554	12.07	686	12.03	0.55
1 = married	1,246	0.069	560	0.055	686	0.08	0.08
Nr of Children	1,246	0.952	560	0.948	686	0.955	0.913
1 = moved to Johannesburg	1,246	0.747	560	0.752	686	0.743	0.736
Zulu	1,246	0.275	560	0.281	686	0.271	0.718
Xhosa	1,246	0.086	560	0.084	686	0.087	0.825
Venda	1,246	0.055	560	0.049	686	0.061	0.45
1 = ever had job	1,246	1	560	1	686	1	—
1 = ever self-employed	1,246	0.194	560	0.184	686	0.203	0.405
Currently receiving UIF	1,246	0.116	560	0.102	686	0.127	0.165
Reservation wage (ZAR/month)	1,238	3,373	553	3,256	685	3,469	0.118
Fair wage (ZAR/month)	1,246	6,091	560	5,921	686	6,230	0.164
Hours search (week)	1,205	14.21	538	14.16	667	14.25	0.948
Interview requests (month)	1,246	0.554	560	0.495	686	0.602	0.17
Plan for job search	1,111	2.97	466	2.96	645	2.99	0.541
Total search cost (ZAR/month)	1,086	169.8	453	166.8	649	171.9	0.646
Likelihood find job	1,108	2.06	466	2.04	642	2.08	0.483

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 *t*-test of equal means between 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 the next month (0 = very unlikely, 4 = very likely).

Table A4—Attrition (Experiment 2)

	Wave 1		Wave 2	
	(1)	(2)	(3)	(4)
Reference letter	−0.010	−0.005	−0.019	−0.018
	(0.021)	(0.019)	(0.035)	(0.032)
Education (years)		−0.008		−0.013
		(0.005)		(0.011)
Age (years)		−0.003		−0.005
		(0.003)		(0.002)
1 = Female		−0.003		−0.013
		(0.015)		(0.019)
Control variables	N	Y	N	Y
R^2	0.000	0.013	0.001	0.012
Observations	1,246	1,241	1,246	1,241
Control mean	0.068	0.068	0.182	0.182

Notes: Heteroskedasticity-robust standard errors in parentheses are clustered at the date of the treatment. The dependent variable is an indicator variable for whether people attrited in wave 1 and 2 of the follow-up survey.

Table A5—Balance Test: Take-Up Experiment

	Pooled		Control	Information		Money	
	Observations	Mean	Mean	Mean	*p*-value	Mean	*p*-value
Age in years	451	26.84	27.05	27.28	0.679	26.42	0.2
1 = Female	453	0.501	0.50	0.517	0.801	0.492	0.895
Married	303	0.05	0.04	0.099	0.148	0.034	0.826
Nr of children	453	1.00	0.977	1.20	0.263	0.945	0.776
Education (years)	452	11.90	11.76	12.0	0.07	11.91	0.266
1 = migrant	453	0.792	0.773	0.827	0.405	0.782	0.88
1 = ever self-employed	453	0.21	0.227	0.23	0.946	0.186	0.381
Currently receiving UIF	498	0.146	0.102	0.119	0.658	0.191	0.022
Reservation wage	287	2,760	2,528	2,878	0.169	2,818	0.187
Hours search (week)	442	12.78	11.64	12.6	0.487	13.62	0.127
Total search cost (month)	416	165	164	180	0.504	156	0.697

Notes: The table reports summary statistics for the pooled sample, control group, and treatment groups; *p*-values report results of a *t*-test of equal means between the control group and respective treatment group.

Table A6—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 × 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
Observations	2,050	2,050	2,050	2,050	2,050	2,050
Control mean	0.0415	0.0415	0.0415	0.024	0.024	0.024

Notes: Standard errors clustered at applicant level. Coefficients report results of specification (1) estimated with sector fixed effects. Columns 2 and 4 include an interaction term between the reference letter indicator and an indicator of the vacancy that receives three reference letters. Columns 3 and 5 include a dummy for applications sent to a vacancy that does not receive any reference letters.

Table A7—Reasons for Low Prevalence of Reference Letters

	Observations	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 with 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

Notes: 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 who tried to obtain a letter.

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 A1. REFERENCE LETTER TEMPLATE

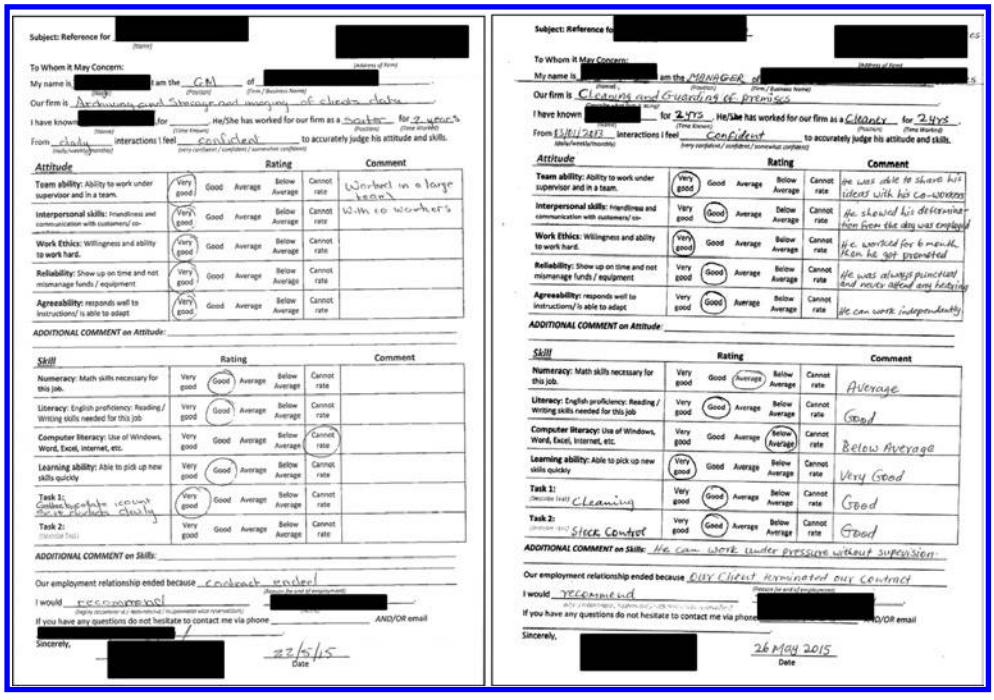

FIGURE A2. REFERENCE LETTER TEMPLATE—EXAMPLES

Sample Questions for Aptitude Test

NUMERACY

1.3 + 19.1

22.25 – 7.08 =

7 x 9 =

What is larger ½ or 1/3?

A quarter of 100 =

If you sell 35 lighters in a week (5 days), how many lighters did you sell on average per day?

Which of these means 7/10: a) 70 b) 7 c) 0.7 d) 0.07

25% of R100 =

How many grams are in a kilogram?

If the time now is 09:20, what will the time be in 2 hours and 10 minutes?

If the distance to work is 1 km and I am exactly half way there, how many meters do I still need to travel?

ENGLISH LITERACY

Please fill in the correct word:

1. Do you _____ where the nearest Pick n Pay is?
   A) Know
   B) No
   C) Now
2. I can't fit into my jeans any more. I think I've put on too _____ weight.
3. If you cannot change something, this means that there is _____ you can do about it.
4. A carrot is not a fruit, it is a _____.

Please read the paragraph and answer the questions:

You are supposed to deliver goods. Here are instructions. Leave Interstate 25 at exit 7S. Follow that road (Elm Street) for two miles. After one mile, you will pass a small shopping center on your left. At the next set of traffic lights, turn right onto Maple Drive. Erik's house is the third house on your left. It's number 33, and it's white with green trim. Drive carefully because there are many traffic cops in that area.

1. What is Erik's address?
2. Which is closest to Erik's house?
   A) the traffic lights
   B) the shopping center
   C) exit 7S
   D) a greenhouse
3. Why should you not speed?

FIGURE A3. APTITUDE TEST—SAMPLE QUESTIONS

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