Firm Culture: Can Information Interventions Close Gender Gaps in Online Labour Markets?

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We study the effects of information frictions on gender gaps in matching and hiring in online labour markets. Administrative data from the largest online job platform in Nigeria suggest significant gender differences in job applications, hiring and potential mismatch by gender. Women are less likely to apply to senior level jobs, despite being equally qualified for positions. Women are also less likely to be hired. We implement randomised experiments that provide information on these patterns, along with diversity encouragement information, separately, to applicants and hiring managers. The results so far demonstrate the importance of providing information to both sides of the online labour market and suggest that information can reduce gender gaps in employment by correcting misinformation among misinformed applicants and hiring managers.

Introduction

There is significant gender inequality in employment in labour markets around the world, with women underrepresented in employment globally. The World Bank estimates that the global labour force participation rate for women is just over 50% compared to 80% for men[1]. This underrepresentation has negative consequences for societal welfare, with gender inequality in wages, income and bargaining power (Bertrand, 2020). There are many reasons given for why these gaps exist. One primary one is that information asymmetry on the part of job seekers or applicants and employers may lead to a skills mismatch that increases both unemployment and the gender gap in employment (Carranza et al., 2022; Bandiera et al., 2022). With rising internet connectivity, widespread use of information and communication technology (ICT) like mobile phones, and the rise of online labour markets, many of these information frictions were expected to decrease or vanish over time since these markets provide a low-cost way for applicants and employers to acquire information for more efficient matching (Stigler, 1961; Hjort and Poulsen, 2019). Can online labour markets close gender gaps in employment by smoothing information frictions? And to what extent does providing more information to both applicants and firms lead to improved matching and reduced gender gaps in employment? We answer these questions using evidence from the largest online job platform in Nigeria[2].

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[1] Source: World Bank: https://genderdata.worldbank.org/data-stories/flfp-data-story/.
[2] We do not reveal the name of the platform here due to ongoing studies. Please contact the authors directly for more information.

Distortions in employment from information asymmetry for both job seekers and firms, which are reflected in widened gender gaps, can worsen other frictions, particularly in environments of high unemployment and costly search. This is the case in many developing country settings, and especially within Africa which faces the double challenges of a growing young population, and high levels of youth unemployment (Abebe et al., 2021; Carranza et al., 2022; Bandiera et al., 2022; Abel, Burger, and Piraino, 2020). The online setting provides an informative environment to study the effects of information on gender gaps in employment, since information is relatively less costly to share within the online context (Hjort and Poulsen, 2019; Stiglitz, 2000; Wheeler et al., 2022). Information frictions can drive gender gaps in both applications and hiring in online labour markets. On the applicant side, female applicants who are underrepresented in the labour market may be more misinformed about their skills and qualifications for jobs. They may also be more uncertain about employers' preferences or willingness to hire women at firms, especially in environments with non-zero levels of gender discrimination (Bertrand, 2020; Bertrand and Mullainathan, 2004; Ibanez and Riener, 2018; Altonji and Blank, 1999). Both these sources of information frictions can reduce applications from qualified women and contribute to gender gaps in applications and eventual employment. On the employer side, hiring managers may be misinformed about the nature of gender bias in the labour market, reflected in "unconscious bias" that reduces the likelihood of a woman getting hired for jobs. These information problems may be exacerbated in environments where there are significant gender gaps in employment, and social networks exhibit homophily, with information diffusing through gender-segregated social networks (Ioannides and Datcher Loury, 2004; DiMaggio and Garip, 2011).

Methodology

We study how providing information on matching patterns by gender, and diversity information encouraging applications from women affects the gender gap in applications, on the applicant side, and the gender gap in hiring, on the employer side. The rationale behind our study is that providing information to misinformed agents, that either corrects their misinformation, or reduces uncertainty involved in decision making with information asymmetry, is a low-cost way to reduce gender gaps stemming from information problems in online labour markets. Additionally, by providing information to both the supply and demand sides of the labour market, we can better understand the key sources of information frictions that may contribute to gender inequality in these markets. We provide evidence that both job seekers and hiring managers change their behaviour when they receive new information, with significant gender differences in the effects of information on matching and hiring behaviour. The responses lead to significant improvements in women's labour market outcomes, with little change for men's outcomes, leading to a reduction in the gender gap in employment in the labour market. Our study is one of very few recent papers that examines the effects of information provided to both sides of the market, and one of a very small set that examines the effects of information on gender gaps stemming from both sides of the market (Carranza et al., 2022).

We conduct our investigation in two steps, summarised in Figure 1. The first step involves using novel data from the online job platform in Nigeria to document patterns in matching behaviour of job applicants and firms. The data spans seven years from 2014-2020, with 227,194 unique applicants and over 2 million applicant-job matches. We highlight two important features of our context. First, an important characteristic

that emerges from the descriptive data is that, in contrast with job seekers on platforms in other developing country settings and the median job seeker in Nigeria, applicants on our job platform are very high-skilled labour: they are highly educated and have many years of experience in the job market[3]. Second, direct application costs for job seekers are zero, since it is costless to set up an account an apply for a job on the platform. The rich descriptive data allows us to document three empirical facts about gender gaps in matching and hiring in the online labour market. Fact 1: women apply to lower level jobs than men and are less likely to apply to senior level positions, even when they are equally qualified for the position by the required years of experience and education for the job; Fact 2: women apply to fewer jobs on the platform than men; Fact 3: hiring managers are, on average, more likely to hire qualified men over equally qualified women applicants.

In the second step of our investigation we build on these three empirical facts to conduct two experiments on the platform. We aim to study the effects of providing information of these gender gaps in matching and hiring to applicants and hiring managers. In Experiment 1, we provide two information treatments to applicants on the platform. The match information treatment provides female applicants with the information on match patterns by gender mentioned in Fact 1, along with the information that "Applications increase a candidate's likelihood of being hired". This is to test whether treated applicants are more likely to express interest in applying to senior level positions, and actually apply to a real senior level job posting. It also tests whether they are more likely to apply for any job at all (Fact 2). The diversity information treatment provides information that reduces uncertainty about employers' preferences or willingness to hire women. This allows to test whether applicants that receive a signal of the employer's commitment to diversity are more likely to apply for a senior level position.

Experiment 2 involves a hiring information treatment and is conducted with the hiring managers on the platform. Here we inform hiring managers of the hiring patterns from Fact 3, along with the information that "Evidence shows that hiring a more diverse workforce and hiring more qualified women can significantly improve firm performance and value". Thus we test if treated managers are: (1) more likely to highly rank/shortlist fictitious applicant profiles and resumes in an incentivised resume rating (IRR) study setting; (2) more likely to agree to include the same diversity information, encouraging women to apply, provided in Experiment 1, in their current and future job ads; and (3) whether they actually include this diversity messaging in their ads posted within six months of the experiment. Crucially, the fictitious applicant profiles and resumes provided in the IRR study are based on real applicant profiles, and we tell this to the hiring managers as well. This follows the recent literature and addresses both the criticisms and potential ethical issues that can arise with audit studies (Abel, Burger, and Piraino, 2020; Kessler, Low, and Sullivan, 2019; Heckman, 1998).

Main findings

Results from Experiment 1 show that female applicants that receive information on match patterns are more likely to express interest in applying to senior level positions. While the estimates are imprecise in the full sample, the results are largely driven by increases in applications to senior level positions from women in male-skewed industries, where men represent a greater share of applications in the descriptive sample. The effects

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[3] 98% of them have completed at least tertiary education, and they have 4.6 years of work experience on average.

are robust for highly qualified/experienced[4] women in male-skewed industries where the treatment increases the likelihood of expressing intent to apply to senior level positions by 18 percentage points (pp) (a 4.7 pp overall increase), compared to a 13 pp decrease in the control group. Men's application choices are largely unaffected by the match information treatment. Receiving the treatment alone generally does not significantly increase actual applications to a senior job position. Results show that the diversity information treatment significantly increases applications from women to the senior job position. The diversity information treatment also receives significantly more applications overall to both junior and senior level positions. It increases actual applications from women to the senior level job by 13 pp relative to the control group (a 5 pp overall increase), compared to an 8 pp decrease in the control group. This treatment does not affect men's applications to the senior level job. As before, the effects of the diversity information treatment are driven by women in male-skewed industries who are 27 pp more likely to apply for the senior level job in the treatment arm. Receiving both the match information and diversity information treatments does not significantly change the application behaviour of women to the senior level job, and the evidence suggests that the diversity information treatment has a stronger effect on increasing actual applications from women to the senior level job.

Next steps

Experiment 2 is ongoing and full results are forthcoming. The results from a small pilot suggest that the effects of the hiring information treatment on hiring managers' behaviour differ by gender. Male hiring managers who receive the treatment are more likely to report willingness to add diversity messaging in their posted ads. In contrast, female managers in the treatment arm are even less likely to report willingness to add this messaging to their ads, while female managers generally (in the control) report lower willingness to include it. We expect the full experiment to replicate the results in the hiring manager pilot, conditional on similar industry and gender compositions of the firms participating in the full study.

We provide suggestive evidence that the information experiment increases applications from women by correcting misinformed beliefs, and boosting self-confidence among female applicants. Women generally are more likely to have incorrect information about Fact 1, and women currently employed in male-skewed industries are even more likely to have incorrect beliefs, as measured by their responses to a True/False question regarding the information in Fact 1. However, they are not misinformed about the labour market in general, for they registered higher rates of correct answers to questions about the locations of jobs in the online labour market. With regard to the women who received the match information treatment and actually applied for the job, they are 12 pp more likely to report believing they will get the job, versus a 10 pp decrease in this belief in the control group. The diversity information treatment does not significantly increase self-belief among women. As before, the effects are driven by women currently employed in male-skewed industries. Similarly, female hiring managers appear to be better informed about both women's hiring outcomes/Fact 3 and the labour market in general. Hence a key mechanism driving the results for both applicants and hiring managers may be that misinformed populations, that is women in the applicant sample, and men in the hiring

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[4] With 6 or more years of experience.

manager sample, update positively by increasing applications/outreach for/to women upon receiving the women/gender information treatments.

Policy Impact

An important goal of this research is to assess the extent to which countries can leverage ICT to address frictions in labour markets and close gender gaps in hiring. The results will provide important insights into how policymakers can leverage online platforms and low-cost strategies to reduce search barriers for job seekers and lessen hiring costs for firms. This is especially important in African countries which have both the world's youngest populations and some of the highest levels of youth unemployment globally. African countries have also seen a significant increase in ICT use over the last decade. Given that the suggested interventions are relatively low-cost, we can scale these interventions across different countries on the continent to leverage the access to ICT to reduce youth unemployment and improve labour market outcomes for women.
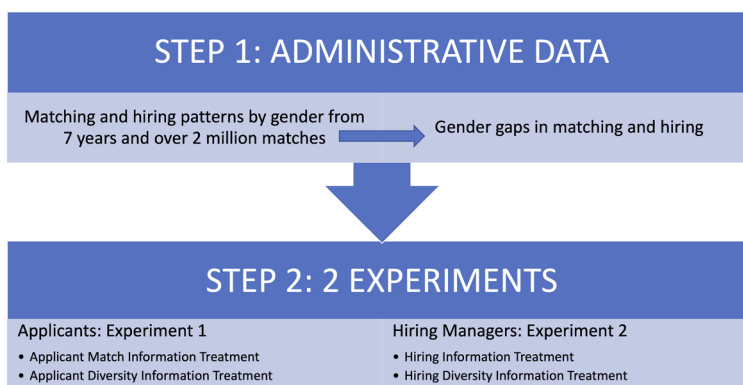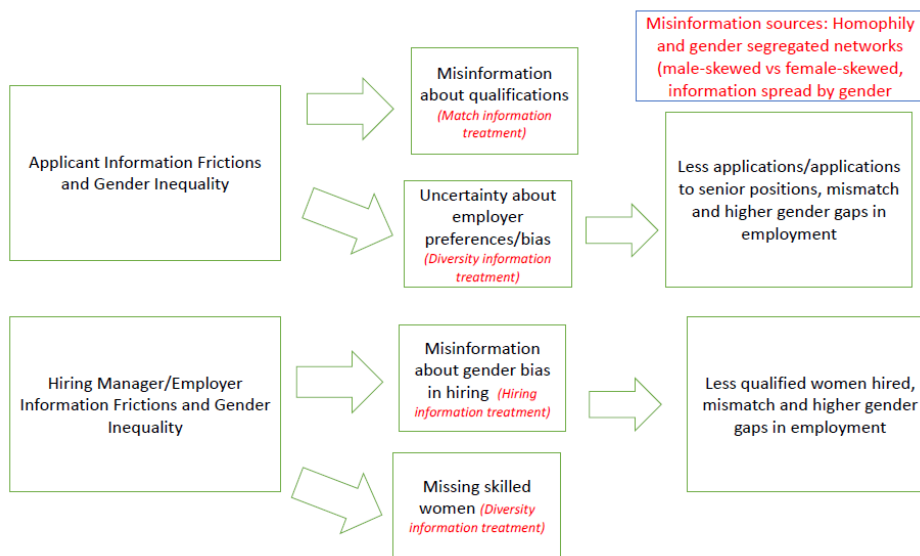
Figure 1: Study design overview

Figure 2: Conceptual Framework: Misinformation and homophily

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