Gender Discrimination in Hiring

Evidence from an Audit Experiment in Uzbekistan

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Abstract

This paper studies gender discrimination in hiring through an experiment that randomly assigned fictitious resumes to job advertisements in Uzbekistan. The experiment focused on positions commonly advertised in the local context, such as accountants, office managers, information technology specialists, welders, call center operators, and drivers in the capital city. With the single exception of the applicant's gender (signaled by the person's name), the resumes were identical within each job category. The study finds strong evidence of prevalent and economically significant gender discrimination in response rates. Despite identical qualifications, we find that in female-dominated professions, women were 185 percent more likely to get a callback than men, and in male-dominated professions, men were 79 percent more likely to get a callback than women. The findings suggest strong gender discrimination in hiring practices in Uzbekistan.

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Introduction

A change in presidential leadership in 2016 brought significant social and economic reform to Uzbekistan. Making changes to national employment policies to better combat gender discrimination was a high priority of the new government – an ambitious goal for a society with deeply rooted gender stereotypes.

A series of legal reforms set off the new program. An article guaranteeing equal rights and opportunities for women and men was defined in the National Development Strategy (2017-2021). A subsequent presidential decree (published in 2019) committed the government to lifting restrictions to participation of women in all fields of economy, increasing women's economic participation, and launching awareness-raising campaigns to develop a culture of women's leadership and entrepreneurship. The country's first gender equality law codifying these principles was enacted in 2019, and a national strategy for achieving gender equality from 2020-2030 was published in 2020. Also in 2019, the authorities lifted a law first instituted in 1999 that restricted women from working in over 450 professions[1] with unfavorable working conditions (but often higher pay).[2] Finally, a new labor law first proposed in 2019 and currently under parliamentary discussion as of this writing would prohibit employers from indicating preferences based on sex, age, appearance, residence permit, and other criteria during the recruitment process in Uzbekistan,[3] punishable by administrative liability.

The ground also shifted with respect to women's participation and representation in political life. In 2017, women made up only 16 percent of the legislative chamber of parliament. But after elections in 2019 this rose to 48 percent in the lower chamber of parliament and 32 percent of deputies (IPACIS, 2020). This brought Uzbekistan to the 37th position among 190 parliaments in the world in terms of the number of women in the parliament (OSCE, 2020). But despite these remarkable improvements, women have remained underrepresented in leadership positions, especially in local government. For instance, in 2020 women still made up only 3 percent of the country's 162 district governors (Petrov, 2020).

Broad indexes of gender equality suggest that Uzbekistan has achieved rather mixed overall performance. The 2019 Human Development Index value for women in Uzbekistan was 0.70 compared to 0.74 for men, resulting in a Gender Development Index (GDI) value of 0.94. This places Uzbekistan in the middle of neighboring countries' performance, with GDI values for the Kyrgyz Republic somewhat higher 0.96, and somewhat lower in Tajikistan at 0.82. The 2019 round of the global Gender Inequality Index (GII) in 2019 ranked Uzbekistan in 62nd place out of 162 countries (UNDP, 2020). Benchmarking the index components reveals that women in Uzbekistan were not reaching their full human development potential mainly due to gender inequalities across three dimensions: i) reproductive health, ii) empowerment (measured by educational attainment and political participation), and iii) labor market participation. At 70.6, Uzbekistan scored modestly according to Women Business and the Law index for 2021, though its ranking has improved in recent years (World Bank, 2021).

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[1] The list of jobs prohibited to women from December 1999 to May 1, 2019 can be found here. This list was approved by the Ministry of Employment and Labor Relations (on December 24, 1999) and the Ministry of Health (on December 22, 1999) in consultation with the Council of the Federation of Trade Unions of Uzbekistan.
[2] Available at https://lex.uz/ru/docs/4230938
[3] Available at https://regulation.gov.uz/ru/document/22152

Although equal rights and opportunities for men and women are now guaranteed by the national constitution and laws, women are underrepresented or have secondary roles in many fields including science, technology, engineering, and mathematics (STEM). The female labor force participation rate in Uzbekistan has remained consistently much lower than the rate among men, by as much as 28 percentage points according to the Listening to Citizens of Uzbekistan survey in 2018. These trends are partly the result of gender related stereotypes, social norms, and tradition-bound notions of family and motherhood that are widespread in Uzbekistan. If deciding to have a career, women are commonly expected to balance family life and work in ways that are not expected of men. The 2016 round of the Life in Transition survey found that 80 percent of the population supports a traditional family model of marriage in which "the man works outside the home and earns money while the woman takes care of children and the house" (EBRD, 2016; FAO, 2019). According to the 2018 Asian Development Bank Country Gender assessment (ADB, 2018), traditional gender norms, though usually not expressed in formal laws or policies, constrain the roles of women and men in the family and society, define implicit and explicit rules, and assign different jobs, values, responsibilities, and obligations to men and women (ADB, 2018). These largely qualitative assessments suggest that professional choices for women and men are significantly affected by gender stereotypes related to these social roles and expected feminine or masculine behavior, which in turn influence young people's opportunities in education and in the selection of fields for future career development.

Providing equal opportunities for both men and women to be employed in nontraditional male or female occupations can lead to better job matching, a more productive labor force, and higher incomes. A growing literature attests to occupational integration on average helping both sexes contribute their human capital to enhancing the productivity of firms. Since 1960, occupational integration in the United States was responsible for driving 15 percent to 20 percent of the increase in aggregate output per worker (Hsieh Chang-Thai et al, 2019). Establishing a "critical mass" of at least 30-percent women in corporate leadership improves company innovation and general performance (Joecks et al, 2013). These firm- and individual-level rewards can have a large impact on growth and overall productivity. In these studies, norms about a gender's suitability for a particular profession are commonly found to be the drivers of differences. For example, in many studies, secretarial or office managers are found to be coded as female, with expectations that a candidate should possess gender characteristics typically attributed to women, such as of softness, flexibility, carefulness, and persistence. This results in women being tracked into positions with inferior pay and responsibilities (Booth and Leigh, 2010).

Women's underrepresentation in formal employment in Uzbekistan has translated to large economic losses. According to L2CU respondents, concern is equally high about the lack of jobs among both women and men, and overall, the issue is among the most pressing policy priorities facing Uzbekistan. Around 1.03 million more women would be active if the female employment rate in Uzbekistan equaled that of the states in the Organization for Economic Co-operation and Development (FAO, 2019). Unemployment has also been much more prevalent among women than men in Uzbekistan, suggesting that when looking for work, women have more difficulty finding a job than men do. According to State Statistics Committee of Uzbekistan (2019), the official unemployment rate stood at 9 percent in 2019: 12.8 percent for women and 6 percent for men. A comparison of job seekers in the Ministry of Employment and Labor Relations' largest job board showed that in 2019 about 54 percent of job seekers were women and 46 percent were men, with consistent trends in the first four months of 2020 (MELR, 2020).

Official statistics suggest that working women are concentrated in low-paid sectors of the economy, including education, health care, and social security where women represent majority of employees. In 2018, women held more than three-quarters of jobs in education and in human health and social work. At the same time, women are almost absent from sectors that are associated with higher pay and prestige (including transport, communications, construction, IT, and other fields) (Matvienko, 2019). Occupational sex segregation is one of the core drivers of Uzbekistan's gender wage gap: on average, women's pay was about 39 percent less than men's in 2018 (StateStatisticsCommittee, 2018). Globally, such discrimination is one of the key contributing factors to the persistence of exclusion from social, economic, and political life.

Figure (1) provides details on family structure and levels of well-being in Uzbekistan. The country has a higher fertility rate than is typical of the Europe and Central Asia region, and poverty is positively associated with larger families with more children. In such households and families, women are substantially less likely to work for pay than are men.

Figure 1. Distribution of households in poverty ($3.2 per capita in 2011 PPP), by demographic typology
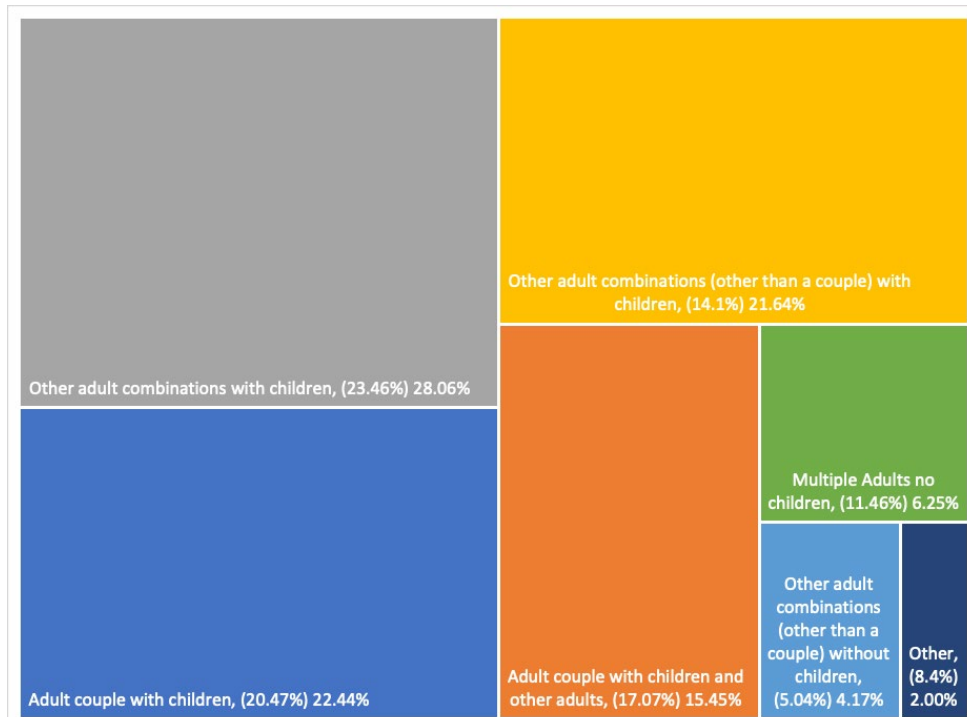
Note: The percentages in the cells refer to the share of the type among poor households; the numbers in parentheses refer to the share of the typology among all households.

Our study focuses on gender discrimination during the hiring process based on an audit correspondence survey. We find evidence of very significant levels of discrimination against both men and women that differs by occupation. Our review of online job postings in several targeted occupations in preparation for the experiment also strongly confirmed the high prevalence of discriminatory selection criteria. Of the job posts reviewed, about 68 percent of open secretary announcements contained gender requirements, 72 percent included age requirements, and 22 percent appearance requirements. For accountant positions, 42 percent included gender requirements and 46 percent included age requirements. About 27 percent of call center operator job announcements

contained gender requirements and 28 percent included age requirements. Though there were usually no explicit gender requirements in vacancy announcements for more male-dominated occupations (including IT specialists, welders, and drivers), the wording in Uzbek and Russian commonly referred to applicants as "he" or "him." Annex 1 provides a summary of requirements specified by employer in online job ads (Spot, 2019).

The following sections proceed as follows. Section I includes an overview of the relevant literature, section II describes data, experimental design, and empirical approach. Section III summarizes survey findings, and section IV closes with discussion and policy recommendations related to the results.

I.   Audit and Correspondence Studies

Discrimination occurs when there is differential treatment of otherwise identical individuals from different social groups, such as age or gender (Bohren et al, 2019). Audit and correspondence studies are two common and closely related methods used to explore discrimination in hiring. Audit studies were first introduced in the 1960s to identify discrimination in the labor market that is difficult to conclusively establish with observational data. Such studies make it possible to measure the source and strength of employer preferences across demographic attributes such as gender, age, and other characteristics (Gaddis, 2018). The approach typically relies on real testers or auditors who physically meet their potential employer.

However, there are several limitations to direct audit studies, discussed in detail in Heckman and Siegelman (1993) and Heckman (1998). The main weakness of the approach is that job applicants from different groups may not appear identical to employers for reasons other than the characteristic being studied. Another prominent critique of audit surveys is that they are not double-blinded. As Bertrand and Dufflo (2017) note, auditors are aware of the purpose of the study and may have a belief that employers treat minorities differently, which can result in measured differences in treatment.

Correspondence surveys largely address these weaknesses by using fake resumes or digital applicants for which the qualifications are by design exactly identical across groups. This method overcomes both the omitted variable and self-selection biases present in observational data (Neumark et al. 1996, Bertrand and Mullainathan 2004, Petit 2007, Zhang et al. 2021). By monitoring "callbacks" from employers, unequal treatment based on single characteristic (gender, race, age, or ethnicity) can be identified and given a causal interpretation (Gaddis 2018). The majority of correspondence studies are inspired by the work of Bertrand and Mullainathan (2004) who showed that the scope of employers' racial discrimination drives large observed gaps by race in the United States.

We conducted a correspondence study to explore potential gender discrimination in the hiring process in Uzbekistan. The approach focused on examining employers' patterns of responses to randomly assigned fictitious resumes. The extent of gender discrimination was estimated by comparing hiring firms' response rates to resumes in which only the candidates' gender differed. Due to random assignment, gender is independent and uncorrelated with hiring firms' characteristics, and the effect of gender on an applicant's probability of obtaining an interview can be separated from the effects of other factors.

A large literature attests to widespread discrimination in labor, credit, and housing markets around the globe. Correspondence studies measuring discrimination by studying employers' reactions to identical

resumes with randomly assigned gender, ethnicity, marital status, attractiveness, or other attributes have been conducted in many high-income countries (e.g., Levinson 1975, Riach and Rich 1987, Neumark et al. 1996, Bertrand and Mullainathan 2004, Riach and Rich 2006, Booth and Leigh 2010, Carlsson 2011, Zhou et al. 2013, Bursell 2014, Maurer-Fazio and Lei 2015, Edelman et al. 2017, Asali. et al. 2018, Chen 2019, Hou et al. 2020, Zhang et al. 2021). Some studies such as Booth and Leigh (2010), Carlsson (2011), and Zhou et al. (2013) explored whether the degree of discrimination depended on nature of the profession. Kiaušienė and Štreimikienė (2011) examined how gender stereotyping impacts men and women in the labor market. Stereotypes of gender roles are defined in the literature as "a cultural and social approach towards the very thing that is traditionally considered being 'masculine' and 'feminine' roles and functions" (Kiaušienė and Štreimikienė 2011).

The reasons and consequences of discrimination in the labor market have also been studied over several decades (e.g. Altonji and Blank 1999, Darolia et al. 2016, Bertrand and Dufflo 2017, Gaddis 2018). There are two prominent and often overlapping drivers: "statistical" forms of discrimination and "preference-based" explanations. Becker (2010) pioneered the preference-based explanations, claiming that discrimination often arises when employers have a distaste for hiring members of certain groups such as minorities, or women. In such cases, employers may decide not to hire certain groups of people because of this distaste, and if they do hire them, they are likely to pay them lesser than other equally productive employees (Becker 2010, Zhang et al. 2021). Statistical forms of discrimination are often viewed as an alternative to preference-based explanations, but in practice both can be present to some degree at the same time. Statistical discrimination describes a situation in which employers have imperfect information on potential employees' productivity (Phelps 1972, Arrow 1973, Aigner and Cain 1977, Schwab 1986). Instead, the employer uses group-specific membership to infer potential employees' productivity (Bohren et al. 2019, Zhang et al. 2021). In such circumstances, an employer may rationally favor an applicant belonging to the group with a higher expected productivity when faced with two applicants having the same unobservable productivity but belonging to two different groups. In practice, most correspondence studies are alone not able to distinguish between these two potential drivers of discriminatory practices.

In comparison to studies of race-based discrimination, there are relatively few correspondence studies focused on gender. According to Bertrand and Dufflo (2017), from 2005 to 2016, only around 15 field experiments addressed discrimination on the grounds of gender. The literature on gender discrimination focuses predominantly on developed states and only in the recent years have a few studies been conducted in developing countries such as China, Georgia and Turkey (Zhou et al. 2013, Maurer-Fazio and Lei 2015, Asali et al. 2018, Nas Özden et al. 2020, Zhang et al. 2021). To our knowledge, only two have been conducted in CIS countries (Asali et al. 2018, Ryabushkin and Kim 2018).

A review of the narrower literature on gender differences in receiving callbacks for on-site interviews reveals the existence of a considerable variation across different countries and occupations or industries within a country. Although it may be difficult to indicate the exact explanations for the differences in results, these differences may be attributed to a number of factors, including cultural differences, regulatory environments, labor market conditions (e.g., Kuhn and Shen 2013, Zhang et al. 2021), and the composition of specific study samples (i.e., specific types/mix of occupations and industries). For instance, previous research conducted on gender preferences in IT positions is controversial and highly variable to the country and market under study. Riach and Rich (1987) found that women were discriminated against for programmer or computer analyst jobs. But Riach and Rich

(2006) later found discrimination against men in programmer or computer analyst positions in the UK, while men were 5.2 percent more likely to receive a favorable response than women for engineering jobs. Zhou et al. (2013) found discrimination against men in high ranked software positions. But in Sweden, Carlsson and Rooth (2007) find no differences in the callback rates for women and men in male-dominated professions. They attribute Sweden's occupational sex segregation not to discrimination in hiring, but rather to factors on the supply side of the labor market. In a later study, Carlsson (2011) found that across the entire labor market in Sweden, women were 3 percent more likely to be invited for job interviews than men, but there was no statistically significant difference in response rates between genders in male-dominated occupations. Women were 4 percent more likely to be invited for interviews in female-dominated and mixed-gender occupations (Carlsson 2011).

This study focuses on potential gender discrimination in the labor market in Uzbekistan, and in particular the capital city of Tashkent. The approach follows a similar experimental design to that used by Bertrand and Mullainathan (2004), and Booth and Leigh (2010). To the best of our knowledge, this is the first study to examine gender discrimination in employment in the context of Central Asia.

II.   Experimental Design and Identification Strategy

The primary data used for this study come from an audit correspondence survey conducted in Uzbekistan in 2020. The experiment relies on fictitious applications and measures callbacks and email invitations by employers to the emailed fictitious job applications. The paper uses additional data from the Listening to the Citizens of Uzbekistan study conducted by the World Bank together with the Development Strategy Center of Uzbekistan and other partners. The basic design includes four steps: resume design, firm selection, resume submission, and response recording.

We selected six of the most in-demand occupations advertised on four major job boards in Uzbekistan for the selected periods of the survey in early 2020: accountant, office administrator (secretary), IT specialist, welder, call center operator, and driver. We found these to be consistent with annual ratings for top demanded occupations in Uzbekistan conducted by local headhunting agencies and the government job portal – ishmehnat.uz. The top occupations were intentionally balanced between expected gender dominance: based on the wording of job postings and feedback from local partners, we defined accountant, secretary and call center operator as expected female-dominated professions, and IT specialist, driver, and welder as male dominated professions. Indeed, many employers in Uzbekistan routinely specify gender, age, character traits and appearance and use gender-coded language in job advertisements.

Firms posting jobs reviewed for this study covered several industries and types of ownership, but in the interest of comparability, all were selected in the capital city. As it is common that applicants from other regions of Uzbekistan face discrimination in the capital city, therefore we manipulate our submissions so that both applicants and their target companies are located only in Tashkent city to avoid geographic heterogeneity of discrimination. In April 2020, Tashkent city and region accounted for about half of all online open vacancies (14,497 out of around 30,000 vacancy announcements.)

Table 3. Distribution of vacancies by regions, April 2020.

Regions, Republic of Karakalpakstan, Tashkent city	Vacancies
Republic of Karakalpakstan	1210
Tashkent city	6223
Tashkent	8274
Namangan	2184
Andijan	468
Fergana	2222
Jizzakh	589
Samarkand	1471
Surkhandarya	2151
Kashkadarya	785
Bukhara	1255
Khorezm	2152
Syrdarya	1361
Navoi	594

Source: repost.uz based on the data from the Ministry of Employment and Labor Relations (ish.mehnat.uz), 2020

We developed fake resumes based on a review of resumes posted on major job websites and consulted with human resources specialists to ensure their appropriateness. The resulting resumes described average years of job experience with plausible but fictitious private companies. In order to avoid any possibility of over- or underqualification, we designed all resumes to reflect a typical level for these employment positions. For applicant names, we assigned most common first and last names for men and women, forming matching pairs. These names could be easily recognized as male or female applicants. In all other respects the resumes were identical, including the education, working experience, techniques, age, address, family attributes and other aspects of these two fabricated individuals. Each resume was assigned an email address, mobile phone number and regular home address. During the experiment, the gender revealed in the fictitious resume was randomly assigned to the hiring firm. This experimental design completely controls for problems of self-selection and omitted variable bias, producing unbiased and consistent estimates of gender impacts in callback rates.

As a standard approach to these was not prepared in advance, we deliberately excluded applications to job advertisements that required photos in resumes or a requirement to send the resume via messaging apps (such as Telegram or WhatsApp). We created separate cell phone and email accounts for each of the six profiles in each round. We also created fictitious profiles on internet job boards, also identical for male and female, with the person's name being the sole difference between them.

Online job boards are one of the most important channels through which jobseekers send their resumes to potential employers in Uzbekistan, and particularly so in Tashkent. Most job seekers use private job boards, and we submitted fake resumes to the four largest in the country – Olx.uz,

Rabota.uz, Headhunters, and Uzjobs.[4] In preparation for the experiment, we collected recruitment ads listed on each for the most demanded six occupations. We cross-checked this list to exclude duplications across the four job portals (such that each employer received an application from only a single fictitious applicant), though in practice the number of duplications among job portals was small.

For recording callbacks, we used the "Backup and Restore" function to recall the full call log history for each of the phone numbers created for the study. We then counted all callbacks and emails received from the target firms. The submission process proceeded in two phases. For the positions of accountant, office manager, and IT specialist, applications were completed in February 2020. In May 2020, the team stopped the study given the large decline in the number of open positions during the nationwide lockdown due to the outbreak of COVID-19, and the atypical situation during this time. The study resumed in November 2020 with a focus on the positions of welder, call center operator, and driver, when the situation with COVID-19 in the country began improving. The experiment ended in early February 2021.

We expected that gender bias would vary by occupations typically considered male or female-dominated. The first cohort included office manager (secretary), accountant, and IT specialist positions. We expected that office manager and accountant positions were female dominated occupations, and IT specialist a male dominated occupation. We applied to 294 open jobs by the end of February 2020. The second phase began in November 2020 and included applications to 477 announcements. The second group of occupations included welder, driver, and call center operator. We expected that welder and driver were male-dominated positions while call-center operator was a female dominated position. The total number of applications reached 771 across the two study phases. We received 390 callbacks in total, and approximately 245 job interview invitations in response to these submissions.[5]

The standard method (used for instance in Booth and Leigh (2010), Zhou et al. (2013), Kaas and Manger (2012), Asali et al (2018), Zhang et al. (2021)) tests the difference in the callback rate attributable to the randomly assigned gender in each application in a simple regression framework. We use probit model as the dependent variable is binary (when the dependent variable Y event is observed, it takes the value 1 otherwise 0). The simplest binary selection model is the linear probability model, in which the probability of occurrence, p, is defined as a linear function dependent on the explanatory variable(s) (Stock and Watson, 2007):

$$Pr(Y = 1|X) = \phi(\beta_1 + \beta_2 X_i) \tag{1}$$

This provides a summary of differences in response across all observations in the study (not yet stratified by profession) where ϕ shows cumulative standardized normal distribution function. For comparison and robustness, we also estimate a probit model in the same spirit, taking the form:

$$Response(0,1) = \alpha + \beta_1 JobType + \beta_2 Female + \beta_3 (JobType \times Female) + \varepsilon \tag{2}$$

In equation (2) we add greater nuance to the results by explicitly breaking down responses by profession.

Finally, for the key summary result of discrimination broken down by "male dominated" or "female dominated" professions, we estimate the following:

$$Response(0,1)=\alpha_0+\beta_1 Female+\beta_2 Fem\_dom\_jobs+\beta_3 (Female \times Fem\_dom\_jobs)+\varepsilon_1 \qquad (3)$$

As in equations (1) and (2), the dependent variable is a dummy for receiving a call back. The term *Fem_dom_jobs* is a dummy variable for accountant, office manager, or call center operator (while an alternative variable not shown is dummy for IT, welder, or driver). The term *Female X Fem_dom_jobs* is an interaction between an applicant's gender being female and the application being made to a female-dominated job type. Female is a gender variable for fictitious applicant and male category is chosen as a reference category for the Female variable. The gender variable is equal to 1 if the resume is associated with the female gender and 0 if otherwise. The coefficient on the female variable, β_1, measures the difference between the probability of female and male applicants obtaining an on-site interview, with all other factors remaining constant. Any unobservable factor that affects the probability of obtaining an on-site interview is captured in ε.

For each estimation, we also include a simple ordinary least square estimation (OLS) of the linear regression model that would yield a consistent estimate of the impact of gender on the probability of obtaining a callback. The main results of probit estimate are also clearly reflected in the OLS results: female applicants are more likely to receive a callback for applications of an accountant, office manager and call center operator, whereas men receive significantly more calls for male-dominated job types (see Table 4 and Table5). Column (1) shows OLS output and column (2) probit outputs. Marginal effects are provided in Annex 3, Table 5 and Table 6.

III. Results

Tables 4 and 5 display our main results. We observe substantial discrimination against male candidates for female dominated occupations, and substantial discrimination against female candidates for male-dominated occupations. The typical female applicant received a callback 77 percent of the time in female dominated occupations, while the typical male applicant received a callback 27 percent of the time. Therefore, an average male applicant would have had to submit 185 percent more applications in order to receive the same number of callbacks for female dominated professions. In male dominated occupations the typical female applicant received a callback 14 percent of the time, while the typical male candidate received a callback 25 percent of the time. Therefore, an average female applicant would have had to submit 79 percent more applications to receive the same number of callbacks for male-dominated occupations.

Table 4: Callback rates by perceived gender and job type

Callback	Male	Female	Ratio (fem /male)	Difference (fem-male)	p-value on difference
Female dominated jobs	**0.27**	**0.77**	**2.80**	**0.49**	**0.00**
Female dom jobs pre-covid	**0.19**	**0.79**	**4.22**	**0.60**	**0.00**
Female dom jobs post-covid	**0.49**	**0.71**	**1.44**	**0.22**	**0.03**

Accountant	0.41	0.69	1.68	0.28	0.00
Office administrative	0.01	0.86	59.6	0.85	0.00
Call center operator	0.49	0.71	1.45	0.22	0.03
Male dominated jobs	**0.25**	**0.14**	**0.54**	**-0.11**	**0.00**
Male dom jobs pre-cov	**0.40**	**0.22**	**0.55**	**-0.18**	**0.20**
Male dom jobs post cov	**0.24**	**0.13**	**0.53**	**-0.11**	**0.01**
IT specialist	0.40	0.22	0.56	-0.18	0.20
Welder	0.27	0.18	0.65	-0.09	0.12
Driver	0.20	0.07	0.37	-0.13	0.01
Discrimination differ?	Chi2(5) = 77.95; Prob > chi2 = 0.0000				
Observations	771				

Note: To test whether gender discrimination differs significantly by job, we run the probit regression. $Response(0,1)=\alpha+\beta I^{JobType}+\mu I^{Female}+\pi(I^{JobType}\times I^{Female})+\varepsilon$. The dependent variable is a dummy for receiving an interview, while $I^{JobType}$ and I^{Female} are, respectively, indicators for each of six job types (omitting accountant) and being a female applicant. The Chi^2 test above is a test for the joint significance of the five coefficients. The test is significant regardless of which of the four job type indicators are omitted.

We observe significant heterogeneity across job types. For accountant, office manager, call center operator, driver positions, gender differences in callback rates were large, while for IT specialist positions and welder they were insignificant (due in part to lower overall callback rates and statistical power). For example, a man wishing to be employed as an accountant would have to submit 68 percent more applications to receive the same number of callbacks, and a man who aims to be employed as call center operator would have to submit 45 percent more applications. A man wishing to work as an office manager has a very low probability of a callback. Actual callbacks were so low that the magnitude of the difference is difficult to estimate, but the point estimates roughly suggest a man would have to submit 5,800 percent more applications to receive the same number of callbacks as a woman applying for the same position with the same experience. A woman wishing to work as a driver would have to submit 171 percent more applications. Our results document the extent to which women are preferred for female dominated positions, whereas men for male dominated positions. As such, they appear to be driving the results that women are discriminated against in receiving callbacks in male dominated occupations and men in female dominated occupations.

As an additional test of robustness, we split the estimation between pre- and post-COVID-outbreak phases of the study. The results (reported in Table 4) are qualitatively similar for the two periods, and in the expected direction. However, the results may be affected by difference in occupations (and the expected gender dominance of each) during the pre-pandemic period (pre-nationwide lockdown) and period after the outbreak in Uzbekistan. More detailed disaggregated results are provided in Annex 4. According to the Annex 4 the probability of female' callback rates in both male- and female dominated jobs after the outbreak period decreased.

These findings are consistent with a considerable literature, including the empirical findings of Riach and Rich (2006), Booth and Leigh (2010), Carlsson (2011), Zhou et al. (2013). It is apparent that gender stereotyping in both male and female dominated occupations is widespread in Uzbekistan, as is the case in some other countries. Further confirming the underlying cause, we received several emails in which denials were explicitly based on gender. For instance, we recorded numerous cases for which an employer indicated that an office management or call center operator position is not suitable for men and driver position is not suitable for women.

The main results of model from equation (3) are reported in Table 5. The findings reveal that gender has a statistically significant effect on candidates' chances of being invited for an interview in both female- and male-dominated jobs in Uzbekistan. Male applicants were about half as likely as female applicants to receive a positive employer response in female-dominated occupations. Similarly, with all other factors constant, female applicants receive fewer invitations from hiring firms in male dominated occupations.

Table 5 OLS and probit outputs for female dominated jobs

	OLS	Probit
	Callback	Callback
Female	-0.114**	-0.421**
	(-2.99)	(-2.97)
Fem_dom_jobs	0.0209	0.0640
	(0.46)	(0.46)
Female#Fem_dom_jobs	0.608***	1.755***
	(10.06)	(8.59)
Constant	0.252***	-0.667***
	(8.40)	(-7.10)
Observations	771	771
R-squared	0.2465	
Pseudo R-squared		0.1906

Note: t statistics in parentheses: $+ p < 0.10$, $* p < 0.05$, $** p < 0.01$, $*** p < 0.001$

IV. Conclusion

To our knowledge, this is the first study to use an experimental design to document the existence and extent of gender discrimination in hiring practices in Central Asia. We conducted a correspondence test, sending applications with randomly assigned applicant gender (either male or female) to the most popular job boards in Uzbekistan. We find evidence of substantial gender discrimination. Men were discriminated against in female-dominated occupations (such as office manager and call-center operator), while women were discriminated against in male-dominated occupations. A likely explanation for this pattern of bias is gender-stereotyping. If certain jobs are perceived as more appropriate for women, male applicants may be (implicitly or explicitly) evaluated less favorably because they do not fit society's perceptions about what is suitable for men or women, and vice-versa.

The results suggest that employers in Uzbekistan often have gender preferences for certain types of jobs, which can negatively impact employment prospects for both men and women. Gender segregation often pushes women into lower-paying occupations and depresses female wages (McGrew, 2016). Gender stereotyping in Uzbekistan likely perpetuates occupational segregation and can contribute to women clustering in low-paying careers including secretary or cosmetology, and men clustering in more remunerative occupations such as welding, automotive repair, and IT. Occupational segregation, beyond its effect on individual workers, limits optimal matching of workers with jobs where they can best leverage their skills and fulfill their ambitions. The comprehensive review from Blau and Kahn (2016) focusing on the trends in the gender wage gap since 1980 attributes half of the existing gap to women working in different industries and occupations than men. If men and women are pushed into careers based on societal definitions of "masculinity" and "femininity," workers are less able to pursue labor market opportunities that best match their skills and ambitions.

While clearly demonstrating the presence of gender discrimination, our study does not provide conclusive evidence as to its underlying causes. The presence of either preference-based or statistical discrimination (or both) is consistent with our findings. However, based on a review of the anecdotical responses from employers, we find strong evidence of prejudicial attitudes regarding expectations about the abilities of each gender (in several cases, employers explicitly rejected the applicant based on gender, specifying whether the position is suitable or not suitable for applicant due to the nature and complexity of position etc.). Our findings suggest the need for continued study to distinguish the causes of the gender discrimination we document, and especially the extent to which inaccurate beliefs are a driving factor for discrimination – potentially following the experimental approaches such as those applied in Bordalo et al. (2016) and Bohren et al. (2019). Such further evidence would be practically useful if, for instance, inaccurate statistical discrimination contributes to the patterns of discrimination we find. In such a case, policy interventions that correct the beliefs as well as discriminatory practices would be called for.

Remarkably, beyond the experimental evidence generated in this study, we also find that a large share of job announcements in Uzbekistan explicitly contain gender or age preferences. We find that especially in the female dominated occupations in this study (such as office manager and accountant) employers openly specify their gender, age, and appearance preferences. A closer look at job advertisements for traditionally male-dominated positions, one can also clearly identify gender-coded language (such as referring to potential applicants as "he" or "him"). When employers signal that a man would be a better fit by including excessive masculine-coded language, women may be discouraged from applying if the job, and vice versa (Gaucher D. et al, 2018). Such signals likely have an overall impact on the gender diversity of the employers' candidate pool, beyond the direct discrimination in response rates identified in this paper.

Many counties apply regulations that prohibit such discrimination in job advertisements and in other hiring practices. For example, in the United States it is illegal for an employer to publish a job advertisement that shows a preference for or discourages someone from applying for a job because of his or her race, color, religion, sex (including gender identity, sexual orientation, and pregnancy), national origin, age, disability, or genetic information (US Employment Opportunity Commission, 2021). In the United Kingdom it is illegal to state or imply in job advertisements that the employer will discriminate against job seekers (GOV.UK, 2021). In all European Union member countries, rules must require employers to conduct recruitment processes free of any type of discrimination (Romeis and Kessinich, 2018).

Under a new proposed labor code, discrimination during recruitment may soon become unlawful in Uzbekistan. Although the existing Labor Code broadly prohibits discrimination of workers based on gender, race, residence, age, disability, marital status, and religion, there are no specific provisions regarding the hiring process, nor are any enforcement mechanisms specified. The results of this study identify the high prevalence of discrimination of this kind, likely contributing to the gender gaps in the Uzbek labor market, and which limits progress on the government's goals for gender equality.

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Annex 1.

Table 1. Characteristics of the jobs

Occupations	Minimum average age	Maximum average age	Mean wages[6]
Accountant	28	43	2,992,091
Office (Administrative)	21	33	1,994,779
IT specialist	-	-	3,490,825
Welder	25	43	2,633,333
Call center operator	22	33	3,287,755
Driver	20	40	2,852,941

Source: Authors' calculations based on vacancy announcements published at OLX, 2020

Annex 2.

Table 2. Selection of labor market audit correspondence studies on gender discrimination

Author	Country	CVs/apps	Effect (call-back ratio)	Effect
Booth and Leigh (2010)	Australia	3,365	Female-to-male: 1.28 (female dominated professions)	+
Carlsson (2011)	Sweden	3,228	Female-to-male: 1.07	+
Zhou et al. (2013)	China	19, 130	Female-to-male: Senior Software Engineer 31% Senior Office Assistant 72% Senior Accountant 38% Marketing Manager 41%	+
Bursell, M. (2014)	Sweden	1,643	-	0

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[6] Source: hh.uz data does not include below professions (1st round) and authors' calculation based on OLX data collected from vacancy announcements, 2020. In 2020 the exchange rate is 1USD=10 400UZS.

Maurer-Fazio, M., & Lei, L. (2015).	China	24,192	Female – to male: 1.9	+
Baert (2015) and Baert et al. (2016 a)	Beligum	-	-	0
Darolia, R., et al. (2016)	USA	9,000	-	0
Asali, M. et al. (2018)	Georgia	2,200	-	0
Zhang, J. et al. (2021)	China	1,138	-	+

Annex 3.

Table 6 OLS and Probit outputs for male dominated jobs

	OLS	Probit
	callback	callback
Female	0.494***	1.333***
	(10.53)	(9.08)
Male_dom_jobs	-0.0209	-0.0640
	(-0.46)	(-0.46)
Female#Male_dom_jobs	-0.608***	-1.755***
	(-10.06)	(-8.59)
Constant	0.273***	-0.603***
	(8.02)	(-5.90)
Observations	771	771
R-squared	0.2465	
Pseudo R-squared		0.1906

Note: t statistics in parentheses $^+ p < 0.10$, $^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

Table 7. Average Marginal effects for probit model, male dominated jobs

Average marginal effects   Number of obs = 771
Model VCE : Robust
Expression : Pr(callback), predict()
dy/dx w.r.t. : Female Male_dom_jobs

	dy/dx	Delta-method Std.Err.	z	P>z	[95%Conf.	Interval]
Female	0.157	0.030	5.300	0.000	0.099	0.215
Male_dom_jobs	-0.328	0.030	-10.870	0.000	-0.387	-0.269

Note: dy/dx for factor levels is the discrete change from the base level.

Table 8 Average Marginal effects for probit model, female dominated jobs

Average marginal effects   Number of obs = 771
Model VCE : Robust
Expression : Pr(callback), predict()
dy/dx w.r.t. : Female Fem_dom_jobs

	dy/dx	Delta-method Std.Err.	z	P>z	[95%Conf.	Interval]
Female	0.157	0.030	5.300	0.000	0.099	0.215
Fem_dom_jobs	0.328	0.030	10.870	0.000	0.269	0.387

Note: dy/dx for factor levels is the discrete change from the base level.

Annex 4. Impact of covid-19 pandemic on female callback rate

Table 9. Probit outputs

Probit regression

callback	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]
covid	-1.187	.139	-8.55	0	-1.459	-.915
Constant	.492	.107	4.62	0	.283	.701

Mean dependent var	0.416	SD dependent var		0.494
Pseudo r-squared	0.145	Number of obs		389
Chi-square	76.760	Prob > chi2		0.000
Akaike crit. (AIC)	455.596	Bayesian crit. (BIC)		463.523

Note: *** $p<.01$, ** $p<.05$, * $p<.1$

Table 10. Average marginal effects for probit model, assessing impact of covid.

Marginal effects after probit
   y = Pr(callback) (predict)
    = .40757261

variable	dy/dx	Std.Err.	z	P>z	[95%	Conf. Interval.]	X
covid*	-0.445	0.047	-9.500	0.000	-0.537	-0.353	0.612

(*) dy/dx is for discrete change of dummy variable from 0 to 1