12 Geographic Discrimination in the Gig Economy

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Introduction

Scholars have long noted that labor markets are shaped by geography, creating special relationships between employers and workers in proximity. In recent years, however, a new narrative has emerged that challenges the role of geography in explaining hiring and wages. This narrative asserts that the global diffusion of high-capacity communication networks and the digitization of work is making location increasingly irrelevant, creating a globally contested market for labor (Blinder 2006). This is the narrative of the "flat world" popularized by, among other sources, Thomas Friedman's bestseller *The World Is Flat: A Brief History of the Twenty-First Century* (2005).

According to this narrative, digital work has the potential to drive wage and employment growth in emerging economies through several mechanisms (Raja et al. 2013; Rossotto, Kuek, and Paradi-Guilford 2012). Driven by salary differentials, employers in advanced economies are likely to gravitate toward countries with large pools of lower-cost white-collar workers. Further, online labor platforms significantly reduce problems of spatial mismatch between workers' abilities and opportunities in local job markets. This increases the returns to skills acquisition, thus unleashing a virtuous cycle of human capital development and job growth in developing regions.

Several stylized facts support this narrative. First, most employers in online labor platforms are based in high-income countries, while the majority of workers are based in middle- and low-income countries (Agrawal, Lacetera, and Lyons 2013; Graham, Hjorth, and Lehdonvirta 2017). This simple fact suggests that workers in developing regions may be able to earn higher (hourly) wages than in local labor markets. Second, digital work dramatically expands the number and range of labor opportunities, providing access to employers in higher-wage countries and increasing the likelihood that individual skills will be matched with available jobs. Third, online labor platforms allow employers to break down large processes into so-called microtasks, enabling individuals or small labor cooperatives to compete directly with offshoring firms that intermediate between employers and workers.

In this chapter we seek to empirically test the narrative of a flattened global market for digital labor. In particular, we test the hypothesis that cost differentials will induce employers to offshore contracts to workers in low-wage countries. Our empirical strategy is based on examination of internal data from Nubelo, one of the largest Spanish-language online labor platforms.[1] We obtained records for all transactions in Nubelo over a forty-four-month period between March 2012 and December 2015. The data set includes basic demographic characteristics for employers and workers, as well as extensive platform-specific information about contracted jobs.

Our results suggest that information-related frictions long observed in traditional labor markets remain pervasive (and possibly exacerbated) in online labor platforms, resulting in a significant penalty for job seekers from developing countries. This penalty works in two ways. First, after controlling for observable individual characteristics and job bids, we show that foreign (i.e., non-Spanish) workers are 42 percent less likely to win contracts from employers in Spain, the highest-wage country in our sample and where most employers in our study are based. Second, we show that Spanish workers are able to command a significant wage premium, of about 16 percent, over similarly qualified foreign workers. The combination of a hiring and a wage penalty helps explain why the attrition rate is much higher for non-Spanish workers, who are significantly less likely to remain active in Nubelo within twelve months of joining the platform.

We offer two complementary hypotheses for these results. The first relates to the nature of the contracts outsourced through online labor platforms. Most of the job opportunities available in Nubelo (such as web design or article writing) require a degree of coproduction between buyer and seller. This differs from other platforms, particularly Mechanical Turk, where demand is typically for very small, low-skill tasks that require minimal communication between employer and worker (Irani 2013). Because employers in Nubelo anticipate higher communication costs when working with foreign contractors, the balance tilts in favor of domestic workers.

Yet, the countries served by Nubelo (which mainly encompass Spain and Latin America) are relatively homogeneous in culture, language, and (to a lesser extent) time zone. Therefore, our second and most relevant hypothesis relates to information asymmetries and uncertainty about worker quality. In online labor platforms, employers evaluate candidates based on very limited verifiable information. Further, employers are unable to observe latent worker characteristics, which may be inferred in traditional hiring contexts (e.g., through personal job interviews).

Under these circumstances, stereotypes that relate country of origin to worker quality provide cognitive shortcuts that orient hiring choices. This is similar to the spatial-signaling mechanism whereby employers discriminate against job seekers from US inner cities or those living in public housing (Neckerman and Kirschenman 1991). We provide empirical evidence for this mechanism by showing that Spanish employers adjust preferences based on the amount of platform-verified information available about workers. In particular, the hiring advantage for domestic (i.e., Spanish) workers falls as more information about individual workers is available, and as employers acquire experience contracting foreign workers. This suggests that employers discriminate because of information uncertainty rather than distaste for hiring workers from other countries.

This study contributes to the emerging literature on the dynamics and socioeconomic impact of digital labor. Our contribution to this literature is threefold. First, we corroborate previous findings about the continued salience of geographic location in labor markets in a setting where language and other cultural factors are by and large irrelevant. Second, we provide a novel measure to quantify wage differentials between foreign and domestic workers, and we explore how wage penalties change when information uncertainty is reduced. Third, we propose a path-dependent mechanism that suggests why, despite very low entry costs, workers from developing countries are less likely to remain active in digital labor markets in the long run.

Discrimination in Labor Markets and the Emergence of Digital Work

Online platforms that facilitate matching for contingent work (often called the "gig economy") have been the subject of significant scholarly attention in recent years. From a macro perspective, several scholars have examined how market design features embedded in these platforms are exacerbating power imbalances between employers and workers (e.g., Kingsley, Gray, and Suri 2015). A related literature has examined how contingent work, despite being framed in a discourse of entrepreneurship and family-work balance, may be eroding workers' rights, trapping job seekers from disadvantaged groups in precarious work arrangements (Huws 2015; Mann and Graham 2016).

The starting point for this body of work is that the Internet is rapidly changing how labor markets operate. Following Autor (2001), we identify three dimensions of such change. First, search costs are significantly reduced, potentially improving matching between employers and job seekers. Second, the digitization of tasks results in more workers able to perform their tasks remotely. Third, online platforms make geographic proximity between employers and workers less relevant, potentially flattening the labor market.

In this study we examine the hypothesis of a flattening labor market in which geographic proximity between employers and job seekers is increasingly irrelevant. Before the diffusion of the Internet and the emergence of online platforms, spatial distance benefited workers who lived near the most productive firms. This resulted in better employment opportunities and higher wages for workers in advanced economies, since workers in other countries were largely prevented from competing for these jobs by barriers to migration as well as high search and communication costs. Online labor platforms are hypothesized to create a more level playing field in which workers compete for contracts regardless of place of residence, nationality, race, gender, or other characteristics unrelated to individual productivity (Agrawal et al. 2015).

The digitization of work has the potential to significantly reduce spatial mismatch between employers and job seekers. The spatial mismatch hypothesis posits that frictions in the housing market and underinvestment in transportation results in inferior labor market outcomes for racial minorities and other disadvantaged groups because of their greater geographic distance from high-wage jobs (Kain 1992). The key insight is that, under spatial mismatch, employers need not discriminate against racial minorities or other groups, since differential outcomes result naturally from the pool of job applicants. As geographic proximity becomes irrelevant, nondiscriminating employers will hire exclusively based on productivity-related characteristics, leading to better outcomes for previously disadvantaged groups.

The above argument rests on two key assumptions that deserve further examination: first, that tasks are easily codifiable and written into binding job contracts that can be monitored and enforced remotely. Second, that online employers can accurately observe the productivity-related characteristics of job seekers. Decades of scholarship on information asymmetry and transaction costs have shown that these assumptions largely do not hold true in offline labor markets (Ashenfelter, Layard, and Card 1999; Leamer 2007). Building on these findings, scholars have turned attention to the dynamics of online labor platforms.

In general, the findings suggest that information asymmetries and communication costs are far from irrelevant for explaining outcomes in online labor markets. For example, Gefen and Carmel (2008) find that most contracts in an online programming marketplace are awarded to domestic contractors. When jobs are offshored, employers prefer workers from countries with minimal cultural distance (rather than lower costs), such as US employers hiring programmers in Canada and Australia. Hong and Pavlou (2014) find that differences in language, time zone, cultural values, and levels of economic development negatively affect hiring probabilities in a global platform for IT contracts. Similar results are reported by Lehdonvirta and colleagues (2014), who also find that the hiring penalty for foreign job applicants increases when tasks require knowledge of formal institutions (e.g., legal work) or regular interaction with employers.

Other studies attempt to identify remedial mechanisms that mitigate these observed frictions. For example, Stanton and Thomas (2015) show that being affiliated with an outsourcing firm increases hiring and wages among inexperienced workers, helping them overcome the first-job barrier. The advantage dissipates over time and jobs as more information is available about the quality of individual workers. Mill (2011) finds that feedback from previous contracts significantly reduces the effect of geographic location on hiring. Similarly, Agrawal, Lacetera, and Lyons (2013) demonstrate that the benefit of platform-verified information is disproportionately large for job applicants from less-developed countries, which suggests that employers have more difficulty evaluating quality among foreign workers. Along these lines, Ghani, Kerr, and Stanton (2014) find that ethnic Indian employers based outside India are more likely to hire Indian workers. The researchers attribute the advantage to the familiarity of these employers with information regarding workers' qualifications rather than ethnicity-based preferences.

In general, these results are consistent with theories of statistical discrimination whereby employers, faced with uncertainty about worker productivity, attribute values to individual job seekers based on perceived group averages (Aigner and Cain 1977; Phelps 1972). At its core, statistical discrimination is a theory of social stereotyping. When hiring workers, employers seek information that helps predict future productivity. If this information is too noisy or simply unavailable, stereotypes provide cognitive shortcuts that help orient hiring choices. Geographic stereotyping has long been observed in the context of traditional labor markets (Fernandez and Su 2004). For example, Neckerman and Kirschenman (1991) describe employers in the Chicago area using the home addresses of job candidates as a primary screening mechanism. In a study of hiring behavior in the New York area, Newman (1999) finds a similar pattern of employer discrimination driven by job applicants' residences (more specifically associated with public housing) rather than their socioeconomic background.

Geographic stereotyping may play an even larger role in online labor platforms for several reasons. Online employers are largely unable to screen job applicants in person. Rather, they rely on two types of information generally available on a job applicant's online profile. First, platform-generated information, such as the number of previously obtained jobs and a reputation score. Second, nonverifiable information voluntarily provided by applicants, such as career experience and technical skills not validated by platform-administered tests.

Under some circumstances, the inability to screen candidates in person may reduce hiring biases—most famously when symphony orchestras started implementing "blind" auditions, as shown by Goldin and Rouse (2000). Conversely, less information may also trigger stereotyping when other credible signals of worker quality are unavailable. The amount of platform-validated information about job applicants on Nubelo (as in most online labor platforms) is very limited. In this context, as Pallais (2014) shows, even very small differences in the amount of information available can have a significant effect on future hiring and earnings.

In addition, given the relatively small value and short-term nature of a typical digital labor contract, employers are unlikely to devote many resources to screening job applicants (Horton and Chilton 2010). Faced with several dozen applicants for each contract, limited verifiable information, and a short-term contract window, employers are likely to activate cognitive shortcuts in hiring decisions. Prior beliefs about the average productivity of workers based on available signals (such as country of origin) are likely to become highly salient in such contexts.

Data and Descriptive Results

Nubelo matches employers who post contracts for short-term jobs with workers who bid for those jobs. Job postings typically describe the task required, the job category, the expected date of delivery, and the location of the employer. Employers select workers based on the proposed bid as well as other characteristics that are visible on job applicants' online profiles. These include name, country of residence, previous work experience in the platform, and a summary feedback score from previous jobs completed. In addition, job applicants can voluntarily include other information such as a CV, a brief description of skills and work experience outside Nubelo, portfolio samples, and a personal picture.

Our data set includes records for all transactions in Nubelo for a forty-four-month period between March 2012 and December 2015. They include information on all jobs posted by employers and on all bids placed by workers, both winning and unsuccessful. Unlike other platforms, Nubelo actively discourages employer-worker interaction prior to hiring. Therefore, all the information visible to employers is available in our data set, reducing concerns about omitted variables in our estimation models. Our units of observation are the bids made by job seekers. As a result, the data set is restricted to active contractors, by which we refer to those who have submitted at least one bid during the forty-four-month study period. The full data set includes 81,497 bids made by 18,356 job seekers for a total of 5,262 jobs posted by 2,517 employers. We indicate appropriately when partial data subsets are used.

Nubelo targets Spanish-speaking employers and freelance workers. While sixty-three countries are represented in our data set, Spain and a few large countries in Latin America account for the majority of job seekers

Table 12.1
Freelancers, employers, and jobs posted, by country

Country	*Freelancers*	*%*	*Employers*	*%*	*Jobs*	*%*
Spain	6,820	37.16	1,639	65.12	3,528	67.00
Argentina	4,045	22.04	390	15.49	689	13.10
Colombia	2,144	11.68	139	5.52	222	4.22
Mexico	1,326	7.22	175	6.95	419	7.96
Venezuela	1,268	6.91	8	0.32	13	0.25
Chile	648	3.53	49	1.95	147	2.79
Peru	399	2.17	9	0.36	17	0.32
Uruguay	239	1.30	10	0.40	16	0.30
Ecuador	175	0.95	9	0.36	50	0.95
Dominican Rep.	144	0.78	6	0.24	6	0.11
Others	1,148	6.25	83	3.30	155	2.95
Total	*18,356*	*99.99†*	*2,517*	*100.01†*	*5,262*	*99.95†*

Source: Author calculations based on Nubelo data.
†Percentages do not total exactly 100 because of rounding.

(table 12.1). Yet, labor demand is largely concentrated in Spain, which accounts for about two-thirds of all employers.

Descriptive results suggest that employers tend to favor job applicants based in Spain. As shown in figure 12.1, Spanish workers win a larger-than-expected share of all jobs posted. This difference is magnified when the sample is restricted to Spanish employers: job applicants based in Spain compose 37 percent of all workers but obtain 65 percent of the contracts originating in Spain. On the other hand, when not hiring domestically, Spanish employers hire equally from all other countries in our sample. In other words, the share of contracts awarded to workers across Latin America is proportional to their share of workers in the sample.

Nubelo supports outsourcing in a broad range of job categories. Four categories account for the majority of transactions: (1) software development, (2) graphic design and multimedia, (3) writing and translation, and (4) IT services. Demand is thus concentrated in relatively high-skill jobs, particularly when compared with microtask platforms like Mechanical Turk, where lower-skill tasks (such as image identification and data entry) are most common. As expected, the market is tighter in the job categories that require more technical skills, such as software development and IT

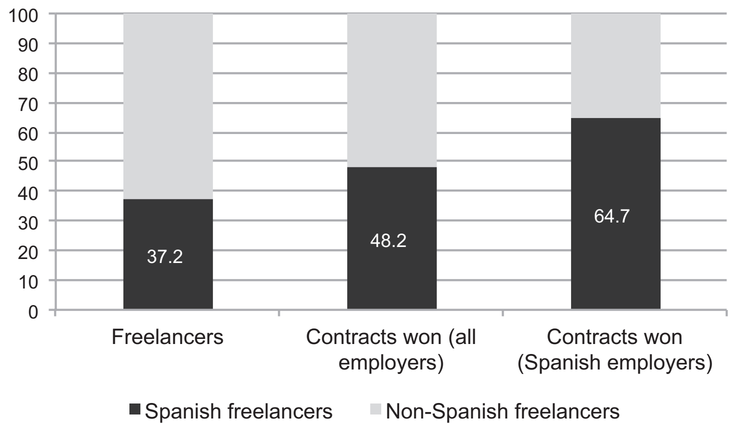

Figure 12.1
Percentage of freelancers and contracts won, by Spanish and non-Spanish. *Source*: Author calculations based on Nubelo data.

services. By contrast, competition (as per bids to projects ratio) is particularly intense for contracts in multimedia and graphic design. The intensity of competition and contract prices vary widely across but also within job categories.

Employers find two types of information in a job applicant online profile: first, information about previous jobs obtained through the platform, along with the average feedback score received by the worker in these contracts. This information is generated automatically by the platform and therefore cannot be manipulated by either party. Figure 12.2 shows the distribution of feedback scores, which is highly skewed toward the maximum of 5 ($\bar{x}$ = 4.73, SD = 0.57). This distribution is consistent with previous studies that find feedback scores in online marketplaces to be highly inflated.[2]

Recall that feedback scores are conditional on having obtained at least one job contract in Nubelo. Most active workers (i.e., those who have submitted at least one bid during the study period) have never won a contract. At the same time, a small number of successful workers concentrate much of the job volume. This results in a superstar-type distribution, which is self-reinforcing, given that, as shown below, both work experience and feedback scores are significant predictors of hiring.

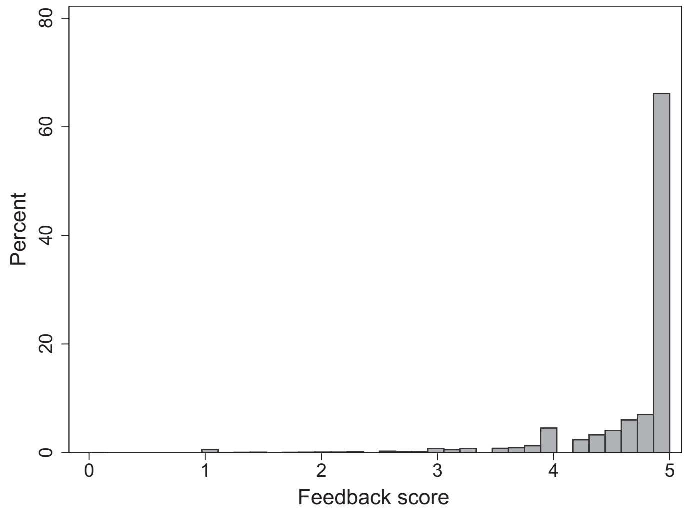

Figure 12.2
Distribution of freelancers' feedback scores (5-point scale). *Source*: Author calculations based on Nubelo data.

The second type of information available to employers is information voluntarily disclosed by workers. Nubelo encourages job seekers to complete an online profile with details about previous work experience, skills and training, a sample portfolio, and a personal picture. The platform computes the degree to which workers have completed their online profiles by assigning a certain percentage value to different data categories.[3] As shown in figure 12.3, the average worker profile is 80 percent complete. We use this threshold to examine the effect of voluntarily disclosing more (or less) information in our probability models in the next section.

Figure 12.4 shows the distribution of worker activity in Nubelo, measured by the number of bids submitted per job seeker during our study period. While the sample average is seventy-two bids, the distribution is highly skewed to the left, with a median value of just fifteen bids per worker.

Ultimately, the evidence reveals high attrition rates, with most job seekers dropping out (or remaining inactive) within the first three months of joining the platform. In fact, about 40 percent drop out within the first month. This is partly to be expected given the small probability workers will obtain a contract without validated work experience and feedback.

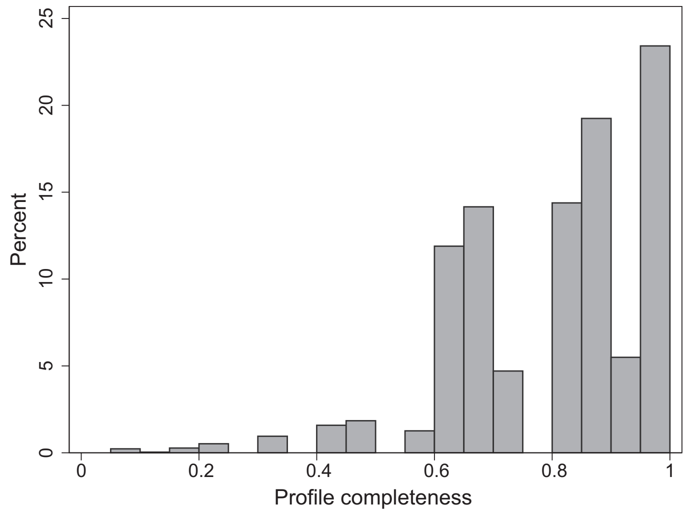

Figure 12.3
Distribution of online profile completeness. *Source*: Author calculations based on Nubelo data.

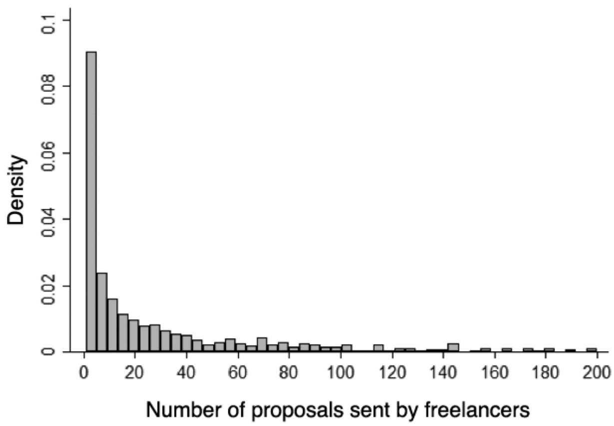

Figure 12.4
Distribution of bid activity (truncated at 200 bids). *Source*: Author calculations based on Nubelo data.

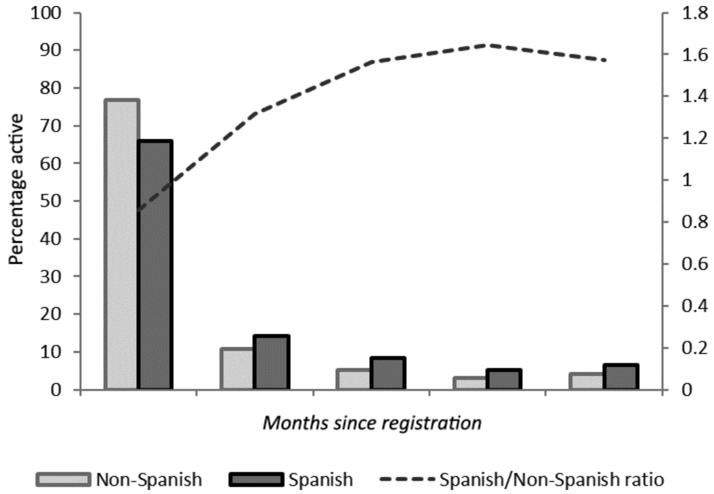

Figure 12.5
Active workers (%) by number of months since registration. *Source*: Author calculations based on Nubelo data.

Nonetheless, there are significant differences in attrition rates for Spanish and non-Spanish workers.

Workers are most active during their first six months after joining Nubelo, as shown in figure 12.5. After six months, activity levels drop sharply for both groups. Spanish workers are more likely to remain active beyond the first semester, however, with the domestic to foreign ratio stabilizing at about 1.5:1. We attribute this difference in attrition rates to the cumulative effect of hiring and wage penalties against foreign workers, as described in the next section.

Method and Results

Descriptive results suggest a hiring bias in favor of Spanish workers, particularly among Spanish employers. To formally test this proposition, we built a linear model that estimates the probability of a worker being hired, conditional on nationality and covariates that capture bid amount, bid timing (in hours after the job is posted), other worker characteristics, and country reputation. The vector of worker characteristics includes the number of previous jobs in the platform, a dummy variable for having completed the online profile at or above the sample average of 80 percent, a dummy variable for having positive feedback from previous jobs (i.e., 4 points or more on a 5-point scale), and a dummy variable that indicates whether the job seeker has previously worked with the employer.

Country reputation is measured by the number of times the employer has previously contracted a worker from the same country as the job applicant. Given high feedback scores, we hypothesize that the more previous hires from a certain country, the more likely the employer will be to hire a worker from that country. Finally, given the variance in the intensity of competition and the value of contracts across jobs, the model includes a jobs fixed-effects term, which captures both observed and unobservable differences across jobs.[4]

We restricted the sample to job postings from Spanish employers, for a number of reasons. First, as noted, contracts originating in Spain represent the bulk of job opportunities in Nubelo. Second, our main interest lies in labor offshoring from high-income to lower-income countries. With a gross national income (GNI) per capita of $28,520 in 2015 (in current US dollars), Spain's average income is about twice that of Argentina, the second largest employer. Further, during our study period, Argentine employers were prevented from hiring outside Argentina (because of government-imposed limits to international payments), which eliminates variance in our main variable of interest. Mexico, the third largest employer, with about 8 percent of jobs posted, has a GNI per capita of less than a third of Spain's.

In addition, given our interest in comparing outcomes for workers depending on country of residence, we further restrict the sample to job postings that received at least one bid from a Spanish job applicant and one from a non-Spanish (i.e., foreign) applicant. Finally, filtering for job postings that did not result in a positive match (i.e., where the employer did not hire), our restricted sample comprises 46,799 bids for 2,500 jobs.

Hiring Penalty

Table 12.2 corroborates that, after controlling for bid amount and delay, country reputation, previous contracts between applicant and employer, and observable worker quality characteristics, non-Spanish job applicants are less likely to be hired by Spanish employers. Following the full model in column 7, foreignness reduces the winning odds by 2.2 percentage points. Relative to the average winning odds of 5.3 percent in the full sample, this represents a hiring penalty of about 42 percent.

Table 12.2
Hiring probabilities (OLS with fixed effects)

Dependent variable: hiring probability							
	1	2	3	4	5	6	7
Foreign worker	–0.030***	–0.030***	–0.029***	–0.029***	–0.028***	–0.022***	–0.022***
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
Controls:							
Bid amount	✓	✓	✓	✓	✓	✓	✓
Bid delay		✓	✓	✓	✓	✓	✓
Country reputation			✓	✓	✓	✓	✓
Work experience				✓	✓	✓	✓
Profile					✓	✓	✓
Feedback						✓	✓
Worked w/employer							✓
Constant	0.152***	0.168***	0.167***	0.148***	0.128***	0.0789***	0.0743***
	[0.005]	[0.005]	[0.005]	[0.005]	[0.006]	[0.006]	[0.005]
N	46,799	46,799	46,799	46,799	46,799	46,799	46,799
R^2	0.011	0.013	0.013	0.022	0.025	0.050	0.161
Jobs	2,500	2,500	2,500	2,500	2,500	2,500	2,500
Mean DV	0.053	0.053	0.053	0.053	0.053	0.053	0.053

Source: Author calculations based on Nubelo data.
Note: Standard errors in brackets.
* $p < .1$; ** $p < .05$; *** $p < .01$

It is interesting to note how the hiring penalty for non-Spanish applicants changes as different covariates are introduced. Model 1 represents the base estimate, which includes only bid amount and nationality. In this model, the magnitude of the effect for Foreign is about 3 percentage points, which represents a 58 percent penalty relative to the sample mean. In models 2 to 7 the control variables are sequentially introduced. The penalty remains essentially unchanged until model 6, when individual reputation (i.e., feedback from previous jobs) is introduced. This strongly suggests that Spanish employers attribute quality to workers based on nationality in the absence of credible signals for individual workers. Once this information is available, the magnitude of the foreign worker penalty drops by about a third.

Wage Premium

Descriptive statistics also suggest that Spanish employers are willing to pay a wage premium for hiring domestically. To quantify this wage premium, we built a linear model that estimates bid amount (in log) conditional on nationality and a vector of worker characteristics.[5] We then restrict the sample to projects that resulted in a Spanish applicant being hired. Hence, our coefficient of interest (γ) indicates the marginal change in the number of bids submitted by foreign workers to the price of contracts ultimately obtained by Spanish workers. In other words, it quantifies the premium that the employer was willing to pay to hire domestically, relative to alternative bids by similarly qualified (per observable characteristics) foreign workers.

The results in table 12.3 indicate that, when hiring locally, Spanish employers rejected alternative bids by non-Spanish job seekers that were, on average, 14 percent lower (model 6). This translates into a wage premium for Spanish workers of about 16 percent when calculated as a premium over alternative bids.

We next examine if the wage premium varies when more information about job applicants is available (table 12.4). Our hypothesis is that the wage premium will be higher among job applicants without previous contracts, with lower-than-average feedback, and with less information on their online profiles. To test these hypotheses, we replicate the full model (model 6 in table 12.3) for different subsamples of job postings.

Table 12.3
Wage premium (OLS with fixed effects)

Dependent variable: bid amount (log)						
	1	2	3	4	5	6
Foreign worker	–0.120***	–0.122***	–0.124***	–0.125***	–0.140***	–0.141***
	[0.012]	[0.012]	[0.012]	[0.012]	[0.012]	[0.012]
Controls:						
Bid delay		✓	✓	✓	✓	✓
Work experience			✓	✓	✓	✓
Profile				✓	✓	✓
Feedback					✓	✓
Worked w/ employer						✓
Constant	4.738***	4.615***	4.644***	4.660***	4.746***	4.747***
	[0.008]	[0.014]	[0.015]	[0.018]	[0.019]	[0.019]
N	31,516	31,516	31,516	31,516	31,516	31,516
R^2	0.003	0.007	0.008	0.008	0.014	0.014
Number of jobs	1,626	1,626	1,626	1,626	1,626	1,626
Mean DV	281	281	281	281	281	281

Source: Author calculations based on Nubelo data.
Note: Standard errors in brackets.
* $p < .1$; ** $p < .05$; *** $p < .01$

Table 12.4
Wage premium by applicant characteristics (OLS with fixed effects)

Dependent variable: log of bid amount	Previous contracts		Feedback score		Profile completeness	
	No	Yes	<4	4+	<80%	80% +
	1	2	3	4	5	6
Foreign penalty	–0.119***	–0.079***	–0.164**	–0.052***	–0.122**	–0.135***
	[0.029]	[0.020]	[0.066]	[0.017]	[0.048]	[0.016]
Controls:						
Bid delay	✓	✓	✓	✓	✓	✓
Profile	✓	✓	✓	✓		
Feedback	✓	✓			✓	✓
Work experience			✓	✓	✓	✓
Worked w/ employer	✓	✓	✓	✓	✓	✓
Constant	4.916***	4.421***	4.856***	4.482***	4.768***	4.737***
	[0.041]	[0.049]	[0.093]	[0.026]	[0.064]	[0.022]
Observations	7,463	8,831	1,790	13,089	2,877	17,124
R^2	0.007	0.008	0.006	0.004	0.010	0.017
Number of jobs	518	1,108	144	1,482	321	1,306
Mean of DV	377.5	214.0	527.3	224.6	392.1	236.6

Source: Author calculations based on Nubelo data.
Note: Standard errors in brackets.
* $p < .1$; ** $p < .05$; *** $p < .01$

In model 1, the sample is restricted to jobs that only received bids from workers without previous job experience. These results are compared to model 2, in which the sample is restricted to jobs that received bids only from workers with previous contracts in Nubelo. As in table 12.3, we restrict our sample to jobs for which a Spanish worker was hired, but which also received (unsuccessful) bids from non-Spanish applicants. As expected, the wage penalty is larger among job seekers without previous contracts (model 1) with respect to job seekers with validated work experience (model 2). In other words, the less validated information about individual workers is available, the higher the premium employers are willing to pay to hire domestically.

Models 3 and 4 are based on a similar exercise. In this case the comparison is between workers with below-average feedback scores (model 3) against workers with above-average scores (model 4). The results indicate that having poor feedback from previous contracts disproportionately affects foreign job applicants. As shown, the wage penalty in model 3 is about three times larger than the penalty in model 4. Spanish employers likely interpret poor feedback as confirmation of their prior beliefs about lower average quality among foreign workers.

Finally, we replicate this exercise for jobs that received bids only from workers with below-average information in their online profile (model 5) against jobs where all bidders had average or above-average information in their profiles (model 6). As shown, the foreign wage penalty is almost identical in both cases. This suggests that employers discount this type of information regardless of worker nationality.

Conclusions

Online platforms offer a valuable laboratory to examine how discrimination operates in various social realms. In some cases, the research interest lies in understanding how the algorithms that determine what information is presented to which platform participants affects individual behavior and beliefs (Sandvig et al. 2014). This study is situated in a related line of work, which examines how biases emerge from choices by participants in multisided platforms, and how alternative market design choices promote or mitigate discriminatory behavior. Examples include scholarship about bias in short-term property rentals (Edelman, Luca, and Svirsky 2017), in peer-to-peer transportation (Ge et al. 2016), and in crowdfunding platforms (Pope and Sydnor 2011).

The focus of this study is geographic discrimination in a contract labor platform that matches employers with job seekers. We find that discrimination stems from information frictions that trigger cognitive shortcuts among employers. These cognitive shortcuts are, by definition, stereotypes that associate country of origin with expected worker productivity. We corroborate this mechanism by showing that increasing the availability of validated information about individual workers tends to deactivate geographic stereotypes, reducing the hiring and wage penalties faced by foreign job applicants.

The findings have multiple theoretical implications. The first is that the reduction in search and communication costs brought about by online platforms does not result in perfectly competitive labor markets. Rather, competition continues to be highly imperfect, with outcomes shaped by the geographic proximity between employers and job applicants. In the online environment, however, geography operates less in terms of physical distance (as it does in the spatial mismatch hypothesis) and more as a signaling mechanism that orients hiring choices. This is why the "flat world" metaphor is inadequate to describe the dynamics of online labor. The metaphor correctly describes recent changes in the underlying information infrastructure of labor markets but mistakenly identifies the source of frictions that determine employment and wage outcomes.

A flattened labor market assumes impersonal exchanges in which race, gender, nationality, and other personal characteristics become irrelevant. The results of this study indicate that this is not how digital labor platforms operate. In fact, they suggest that stereotypes may play an even larger role in determining hiring and wage outcomes, particularly when verifiable information about individual job applicants is limited and employers lack other mechanisms for screening workers.

Moreover, research has shown that most tasks cannot be easily routinized or codified, and the ones that can (such as image recognition and data entry) are increasingly being automated (Kokkodis, Papadimitriou, and Ipeirotis 2015). The limits to the commodification of work suggest that exchanges in online labor markets will continue to depend on human relationships and, as a result, be affected by communication costs and information frictions. In other words, the location and identities of the transacting parties will continue to matter.

Several platform design and policy implications emerge from our findings. First, platform operators may discourage displaying information unrelated to productivity on workers' profiles, while implementing mechanisms to validate skills and previous work experience. This would not only favor workers in developing countries (who, as shown, are penalized disproportionately when they lack verified experience) but also improve employer-worker matching. Horton (2017) estimates that about half of the job contracts posted in digital labor platforms are never filled.

Second, platforms can further develop mechanisms that help employers find and screen job applicants. As mentioned, Nubelo discourages employer-applicant interaction before hiring, but other platforms in fact promote personal interviews and direct contract negotiation between parties. Following our results, these mechanisms are likely to deactivate stereotypes in hiring choices, thus favoring foreign job seekers and more generally promoting diversity in job categories that are currently associated with specific demographic groups.

Third, employers can be nudged to hire more diversely by altering the order in which alternative candidates are presented. For example, Nubelo attempted to lower the first-job barrier (and thus reduce worker attrition) by favoring job seekers without previous contracts in the algorithm that determined the display of potential matches to employers. A similar nudge could be applied to favor foreign job seekers, or candidates from specific countries that are under-represented in certain job categories. In turn, individual hiring would help build country reputation, which, as this and other studies show, is an important predictor of hiring (see Leung 2012).

Finally, the question of governance for online labor contracts must be addressed to protect workers from the vulnerabilities associated with digital work. These vulnerabilities are multifaceted, ranging from lack of enforcement of minimum-wage legislation to the boundaries of employment relationships (De Stefano 2016). This and other questions related to the protection of workers' rights only become more pressing when hiring takes place across borders. In particular, clear jurisdictional lines must be established to enable the enforcement of existing antidiscrimination laws in hiring and compensation in the context of online labor contracting.

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Notes

1. In December 2016, Nubelo was acquired by Freelancer.com.

2. For example, Pallais (2014) finds that 83 percent of data entry workers in oDesk received a rating of at least 4, while 64 percent received a maximum rating of 5. Similarly, Stanton and Thomas (2015) find that about 60 percent of workers in oDesk received a feedback score of 5 in their first job.

3. For example, a personal picture adds 10 percent to the completeness of the profile, a description of previous work experience adds 5 percent, a description of skills adds 10 percent, and so forth.

4. More formally, the estimated model is

$$\text{Hiring}_{ij} = \alpha_{ij} + \gamma\text{Foreign}_{ij} + \delta\text{logPrice}_{ij} + \lambda\text{logDelay}_{ij} + \eta\text{CountryRep}_{ij} + \beta Z + \sigma_j + \varepsilon_{ij}$$

where Hiring is the probability of worker's bid *i* being selected for job posting *j*, Foreign is a dummy (yes = 1) that identifies non-Spanish workers, Price denotes bid amount (in log), Delay is the difference (in hours) between the job posting and the bid submission (in log), CountryRep denotes whether the employer has previously hired from the same country of the worker submitting bid *i* at the time of job posting *j*, Z is a vector of worker characteristics that vary over time, σ controls for job fixed effects, and ε is an error term.

5. More formally, the estimated model is

$$\log(\text{Price})_{ij} = \alpha_{ij} + \gamma\text{Foreign}_{ij} + \lambda\text{logDelay}_{ij} + \beta Z + \sigma_j + \varepsilon_{ij}$$

where Price is the bid by worker *i* for job posting *j*, Foreign is a dummy (yes = 1) that identifies non-Spanish workers, Delay is the difference (in hours) between the job posting and the bid submission (in log), Z is a vector of worker characteristics that vary over time, σ controls for job fixe effects, and ε is an error term.

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