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Experimental Evidence from Georgia**

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Sources of Statistical Discrimination: Experimental Evidence from Georgia*

Nikoloz Kudashvili †

Abstract

While discrimination in the marketplace is well documented in empirical studies, field experiments have been less successful in identifying the sources of discrimination. This paper documents experimental evidence of the extent and nature of discrimination in the Georgian land market. The experiment is designed to uncover sources of statistical discrimination due to different beliefs about foreign investors. Discrimination is measured by the difference in price offers to foreign and Georgian investors. We find that the magnitude of discrimination shrinks significantly once foreign investors signal their willingness to search and pay the lease price in advance. This suggests that discrimination is largely driven by stereotypes about search costs and payment reliability of foreign investors - leaving no or very little preference-based discrimination. Knowing the source of discrimination can be helpful for policy makers to frame anti-discriminatory legislation.

JEL codes: C93, J15, Q15

Keywords: preference based discrimination, statistical discrimination

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1 Introduction

A growing body of research suggests that discrimination against nonwhites, ethnic minorities, women and people with disabilities is common in the marketplace. Field experiments have been widely used to test for discrimination in the labor and housing markets.¹ In addition, many empirical studies effectively document the extent of discrimination, though less progress has been made in identifying the sources of discrimination (List 2004).

Economic literature distinguishes between two types of discrimination - preference-based and statistical-based. Preference, or taste-based discrimination is due to animosity against a specific group of people. This type of discrimination can be against race, color, ethnicity, religion or a minority group. In this case individuals are willing to give up monetary gains in the form of profits or wages in accordance with their prejudice (see Becker 1971), and thus prejudice enters an individuals' utility function. Preference-based discrimination can be reflected in lower wage rates or higher housing prices offered to a certain group of people who are discriminated against. Statistical discrimination, on the other hand exists when individuals do not have complete information about a specific person (see Phelps 1972, Arrow 1973). Lack of information leads to a reliance on stereotypes and beliefs about average, standardized group behavior. Various stereotypes can constitute statistical discrimination that in turn affects an individual's decision. Statistical discrimination is likely to disappear once the discriminator is given relevant information about the minority group member.

¹ Bertrand and Duflo 2016 provide an overview of field experiments.

This paper addresses not only the extent of discrimination, but also provides insights into its sources. We conducted a series of field experiments in Georgia. Our experimental design allows the identification of whether Georgian landlords discriminate against foreign investors when leasing land. Once discrimination is found, we disentangle different sources of statistical discrimination. This study addresses the following central questions:

- (a) Is discrimination present in the Georgian land market?
- (b) Is this discrimination based on beliefs or preferences?
- (c) If there is statistical discrimination, which stereotypes drive it?

In general, field experiments model various interactions between subjects and objects and observe the subject's behavior over the object type (see List and Rasul 2011 for an excellent overview of empirical studies in labor economics). We take a similar route to measure the extent of discrimination. In this study the experimental subjects are Georgian landowners who are willing to lease their land. We observe how Georgian landowners' behavior changes given the nationality of the investor (object).

In our experiment, randomly selected Georgian farmers who were willing to lease their plot of land are contacted by cell-phone by a representative of a Georgian or a foreign investor. Both investors are identical; the only difference is in nationality. Landowners were asked to state their price quotes if they were to lease a plot land to either a Georgian or Indian investor. The first *experimental treatment* manipulates the nationality of the investor and the extent of discrimination is calculated as the relative difference between the proposed price given by the landowner to foreigners and Georgians.

With regard to question (a) we find that foreign investors are quoted roughly a 50% higher lease price compared to Georgian investors when no signal is provided. Furthermore, we consider four stereotypes that could potentially form the statistical discrimination, based on focus group discussions.

One possibility is that Georgian landowners discriminate against foreign farmers because they think that foreigners have higher land search costs, and therefore have fewer choices when searching for agricultural land.

A second possibility is that statistical discrimination is due to stereotypes about a foreign farmer's wealth. In other words, if Georgian landowners perceive that foreigners have, on average, more income, then foreigners may be willing to pay a higher price.

A third possibility is that Georgian landowners think that foreign investors will extract more resources from their land and hence the land will be less productive in subsequent periods. Specifically, if landowners believe that foreigners deplete land more than Georgians due to the use of different technology, then foreigners may be charged a higher rent price than Georgian farmers for the same plot.

The final possibility investigated is that Georgian landowners perceive that it might be harder to enforce a contract when dealing with a foreign farmer. Landowners may think that foreigners delay payment or can leave the country without actually paying the rent. Hence, foreign investors are treated differently.

We build on the experimental approach of Gneezy, List and Price (2012) to address each of these four stereotypes. Experimental results in Gneezy et al. (2012) suggest that

individuals with disabilities are discriminated against in the automobile repair market. The authors conduct an additional experiment to identify the source of discrimination where both disabled and non-disabled drivers provide a signal² about their knowledge of car fixing prices. Provision of the signal lowers the price quotes for both non-disabled and disabled agents, and the difference in price offers becomes statistically insignificant. Thus, disabled drivers face higher price quotes as car repair shop staff believe that non-disabled individuals have lower search costs. Therefore, discrimination observed in the automobile repair market is consistent with a model of statistical discrimination.

Unlike Gneezy et al. (2012) we consider four potential sources of statistical discrimination. In these *experimental treatments* four different types of signals are provided to landowners to tackle the common stereotypes described above. All experimental treatments are orthogonal - the first experimental manipulation is over the nationality of the investor, while the second varies by the type of the signal provided to the landowners by both Georgian and Indian investors. In order to address the first stereotype, the representative of both Georgian and Indian investors states that they are considering leasing a piece of land in a neighborhood when phoning the landowner. This signal is designed at eliminating the stereotype about search cost differences between local and foreign investors. In the next treatments, the representative of both investors either notes that the company is a family business or plans to produce bio products with no use of fertilizers. These two signals are aimed at eliminating stereotypes about differences in investor wealth and extractive usage of the technology, respectively. Finally, differences in landowner beliefs

²Both drivers clearly state that they are getting a few price quotes.

about payment reliability between two investors are addressed by proposing an advance payment at the beginning of the contract period.

After measures designed to reduce the price difference, we find that the total discrimination markup shrinks significantly. Only differences in search costs and payment reliability turn out to be significant determinants of statistical discrimination. Thus, statistical discrimination is amplified by stereotypes regarding information availability to foreign investors and beliefs about the reliability of foreign investors.

Once the representative manager of interested investors provides signals to Georgian landowners about the land prices available to foreign investors, statistical discrimination vanishes. A similar effect is found once the representative manager provides information to Georgian landowners about the reliability of foreign investors. The drop in the discrimination markup is largest when providing a joint signal on search effort and reliability. In this case discrimination shrinks from 48% to 12%, implying that the largest portion of discrimination is due to statistical grounds, rather than preference driven. Thus, our experimental results suggest that at least 75% of discrimination occurs due to the channels of statistical discrimination identified, while the remaining part is likely to be preference-based discrimination. Nevertheless, there might be some other channels of statistical discrimination which are not captured in this study.

2 Literature Review

This paper is related to the studies that uncover sources of discrimination. Fershtman and Gneezy (2001) use a laboratory experimental setting to show that individuals with eastern origins are systematically discriminated against in Israeli society by both Eastern and Ashkenazic Jews. They employ trust and dictator games to disentangle the source of discrimination. Interestingly, they find no evidence for preference-based discrimination against Eastern Jews. Experimental results in Fershtman and Gneezy (2001) suggest that stereotypes about Eastern Jews drive discrimination; therefore the mistrust observed against Eastern Jews is consistent with a model of statistical discrimination.

Another strand of literature investigates sources of discrimination in the marketplace. List (2004) finds that minorities (women, nonwhite and older players) receive inferior initial and final offer prices compared to the majority group in a sportscard market. Similar to Fershtman and Gneezy (2001), a dictator game is played to identify whether the discrimination detected is due to animus. List (2004) finds no evidence for taste-based discrimination; instead the discrimination observed is driven by stereotypes. A complementary experimental treatment is implemented to provide further insights into the nature of discrimination. In particular, dealers treat minority and majority buyers equally when reservation values are drawn randomly. This implies that dealers "knowingly perform statistical discrimination" against minority buyers.³

Two field studies effectively identify the source of discrimination in well-functioning

³This occurs when dealers do not know that reservation values are drawn randomly.

markets. We use a similar experimental design to provide signals to experimental subjects; and these studies are therefore the closest to our work. The first paper is by Castillo, Petrie, Torero and Vesterlund (2013) who conducted a field experiment in the Lima taxi market. Surprisingly, Castillo et al. (2013) find that men face higher prices and rejection rates from taxi drivers. Trained male and female taxi passengers signal their valuation to identify the source of discrimination. The trained taxi passengers reject the taxi hailed first, and that is seen by the taxi queued behind it. The rejection of the first taxi hailed is used to signal the passenger's low valuation. Castillo et al. (2013) show that men and women receive similar price offers - implying that differential gender treatment vanishes once the signal on the fare valuation is sent to taxi drivers. Therefore, men face higher prices and rejection rates, as taxi drivers perceive that men value taxi rides at a higher price than women. Experimental results suggest that discrimination is entirely driven by a stereotype about a passenger's willingness to pay. Therefore, the discrimination observed against men is consistent with statistical discrimination, leaving no room for preference-based discrimination.

The second study that distinguishes the source of discrimination is by Gneezy, List and Price (2012) who analyze whether there is discrimination against individuals with disabilities in the car repair market. In this field experiment, control and treatment groups are formed to capture the magnitude of discrimination. The treatment group consists of 6 disabled agents who drive a specialized vehicle, while the control group is formed by 6 non-disabled agents. Each type drives to six car repair shops and asks for a price quote.

The cars have only visible problems⁴ and the same car is used by all the non-disabled agents. Similarly, the same specialized car is driven by disabled individuals. Therefore, differences in price quotes can only be attributable to the disability status of the agent and differential price treatment could only be due to the disability status of the individual.

In the first treatment, Gneezy et al. (2012) find that drivers with disabilities are discriminated against. Specifically, disabled agents receive about a 30% higher price quote compared to their non-disabled counterparts. Gneezy et al. (2012) further investigate whether discriminatory behavior is due to sellers' beliefs about drivers' knowledge of car repair prices. This is equivalent to testing whether car repair shop workers think that individuals with disabilities have a higher search cost and hence less precise information about car repair prices. In the second treatment, both disabled and non-disabled drivers clearly state that they have received several price quotes from other car repair shops. In this way both types of drivers disclose that they have information about the current car repair prices. This treatment is aimed at eliminating the statistical discrimination that arises due to search cost differences between two groups of drivers. Once the sellers receive a signal that disabled drivers have information about car repair prices, the magnitude of the discrimination falls. Experimental results suggest that prices offered to both disabled and non-disabled drivers are not statistically different after the signal provision. Therefore, differences in price quotes can be explained by car repair shop workers' stereotypes about search costs. Our experimental design is similar to Gneezy et al. (2012). However, we consider more stereotypes which can constitute the statistical discrimination.

⁴The problem is not related to the type of vehicle (specialized vs non-specialized); therefore repair prices should be the same for both types of cars.

Another strand of literature documents the extent of discrimination in the housing and labor markets. For instance, Bertrand and Mullainathan (2004) find that individuals with African-American sounding names are discriminated against in the U.S. labor market. The field experiment was conducted in Boston and Chicago, and fictitious resumes were randomly assigned to either African-American or White-sounding names. Resumes were then sent in response to employment advertisements. Discrimination is measured as the difference between callback rates for African-American and White-sounding names. Bertrand and Mullainathan (2004) find that job applicants with African-American sounding names receive about 50% fewer callbacks for interviews. Furthermore, differences in callback rates for African-American and White-sounding names is higher once high-quality resumes are sent in response to advertisements.

Bartos, Bauer, Chytilova and Matejka (2016) study how limited attention and lack of information about minorities lead to their inferior treatment. They find that ethnic minorities are treated differently in both the labor and rental housing markets. Their experimental results suggest that employers invest less effort in inspecting resumes of the minority-sounding individuals, whereas landlords devote more time to reading them. Attention discrimination is captured with the use of novel experimental tools to observe information acquisition in the labor and rental housing markets. Interestingly, the observed inferior treatment of ethnic minorities in the labor market can explain their low earnings and educational attainment.

3 Field Experiment

3.1 Short Overview of the Georgian Land Market

Agricultural land ownership is very fragmented in Georgia. Specifically, the average size of a plot of land is about 0.96 hectares and only 5% of individuals own land that is larger than 2 hectares (Kan, Kimhi and Lerman 2004).

A significant share of Georgian agricultural land is not utilized. Prasad (2012) reports that half of the arable land in Georgia is not farmed. Foreign farmers, particularly from Asia and South Africa have, however, expressed increasing interest in investing in the Georgian agricultural sector (Prasad 2012).

This study is important in the context of the development of the Georgian agricultural sector, as over 50% of all workers in Georgia are still employed in this sector (Geostat 2012). Given the foreign investors' interest in this sector, it is important to know factors that could impede foreigners from leasing Georgian land.

3.2 Sample

The experiment took place in the summer of 2015. Leasing land in summer is typical for lessors and most of the lease contracts occur in summer. 384 randomly chosen farmers were phoned by a representative of both foreign and Georgian investors. The representative for both types of investors was the same person, to avoid a contamination effect. The data contain details about landowners who had posted their lease offers. We strati-

fied by region⁵ to randomly select farmers who were later contacted by the representative manager. The randomization was performed within each stratum: Kakheti and Kartli. We limit our analysis to these regions as the largest plot of agricultural land is located there (Geostat 2014). We also collected data for other characteristics of the land, such as the irrigation system, location and productivity. Foreign investors were specifically identified as Indian in our experiment.⁶ Indian farmers have recently become widespread participants in the Georgian agriculture sector (Prasad 2012).

We only consider plots of lands up to two hectares. Agricultural land ownership is fragmented in Georgia and therefore there would be very few plots of lands larger than two hectares. In particular, according to Kan, Kimhi and Lerman (2006) 95.4% of farms are smaller than 2 hectares.

The food and Agriculture Organization of the United Nations (FAO) distinguishes two types of crops: permanent and temporary. Temporary crops have a growing cycle of less than one-year. These types of crops are usually planted or sown every year for further production. In contrast, permanent crops are planted once every few decades. Thus, most vegetables and grains are in the temporary crop category, while grapes and some fruit production belong to the permanent crop category. Production of permanent crops requires long-term investments; hence it is not very common to lease a plot of land for a year to produce permanent crops. Therefore, in this experiment the representative manager asked for the annual price per hectare suitable for temporary crop production.

⁵Land quality and prices could potentially be different across regions.

⁶Lease price offers could potentially be different for foreigners who are culturally closer to locals.

3.3 Data

All plots of land are located in different parts of the region. We constructed a distance variable to control for the location of the land (note that the exact distance from the land to the town was not available). Distance to the city takes a value of either zero or one. Zero is used for values up to 15 kilometers from the city and one for those in excess of 15 kilometers.

Access to irrigation is similarly valued. Limited or no access to irrigation corresponds to zero, while high access to irrigation corresponds to one.

The third covariate controls the type of land. If a plot of land was fallowed previous year the fallow is valued one, and zero otherwise.

The lease price offer that is stated by the landowners during the phone conversation is the outcome variable⁷. Lease prices are quoted per hectare on an annual basis.

Randomization checks are performed for each covariate. We find that mean covariates are not statistically different for Indian and Georgian investors in both experimental manipulations. Results are presented in Table S1.

⁷See telephone conversation scripts in Appendix B.

Table S1: Georgian Land Market - Randomization Check

Experimental manipulation:	Investor Nationality			Signal Provided												
	Georgian	Indian	t-test p-value	No Signal		Search Cost		Investor Wealth		Technology Used		Payment Reliability		Search Cost & Reliability		F-test p-value
				(1)	(2)	(1)	(2)	(3)	(4)	(5)	(6)					
				(G)	(I)	(G)	(I)	(G)	(I)	(G)	(I)	(G)	(I)	(G)	(I)	
Distance	0.32 (0.03)	0.33 (0.03)	0.83	0.31 (0.08)	0.25 (0.07)	0.37 (0.08)	0.37 (0.08)	0.25 (0.07)	0.31 (0.08)	0.31 (0.08)	0.37 (0.08)	0.31 (0.08)	0.31 (0.08)	0.37 (0.08)	0.37 (0.08)	0.92
Irrigation	0.79 (0.03)	0.78 (0.02)	0.80	0.81 (0.07)	0.81 (0.07)	0.81 (0.07)	0.87 (0.05)	0.87 (0.05)	0.81 (0.07)	0.75 (0.07)	0.75 (0.07)	0.75 (0.07)	0.75 (0.07)	0.75 (0.07)	0.68 (0.08)	0.65
Fallow	0.42 (0.04)	0.38 (0.04)	0.53	0.50 (0.08)	0.44 (0.08)	0.43 (0.08)	0.43 (0.08)	0.43 (0.08)	0.31 (0.08)	0.37 (0.08)	0.37 (0.08)	0.43 (0.08)	0.37 (0.08)	0.31 (0.08)	0.37 (0.08)	0.93
N	192	192		32	32	32	32	32	32	32	32	32	32	32	32	

Notes:

1. Standard errors are in parentheses beneath mean estimates.
2. Column 3 reports p-value for a t-test testing the null hypothesis that the means are equal for Georgian and Indian investors.
3. Column 10 reports p-value for an F-test testing the null hypothesis that the means are equal across all six treatments.

3.4 Experimental Design

The first experimental manipulation relates to the nationality of the investor, while the second varies by the type of the signal provided to landowners by both Georgian and Indian investors. All experimental treatments are orthogonal, as representative managers of both Georgian and Indian investors provide exactly the same signal to both treatment and control groups in each experiment; the only difference is the reported nationality of the investor.

3.4.1 Manipulating the Identity of Investor

The experiment was based on phoning the landowners expressing an interest in leasing their land. To avoid contamination, each landowner was called only once. In addition to the lease price, the representative manager also asked questions regarding the location, irrigation and productivity of the land, to confirm the figures given in the lease ad. Any additional questions asked by the landowner were responded to as follows: "we will answer all your questions when we visit the land". Thus, the representative manager provides exactly the same set of information to each landowner.

A similar procedure is repeated by a representative manager of a foreign firm when calling another landowner - the only difference is the stated nationality of the investor. The representative of a foreign manager conducting all calls for the experiment is the same person and speaks in Georgian.

The representative manager of both Georgian and foreign companies clearly states

that he will be the person dealing with the landowner during the contract. This excludes any potential differences in lease price quotes due to language barriers. The script of the conversation can be found in appendix B.

3.4.2 Manipulating the Provision of Information

Five different treatment groups are formed to disentangle different sources of statistical discrimination. Georgian farmers reporting a lease price offer to Georgian investors represent a control group. Note that the representative manager of Georgian and Indian firms discloses exactly the same piece of information to the landowners in all five treatments.

1. Search Cost Treatment

During the phone conversation the representative manager of a foreign firm discloses information to the landowner that the foreign investor has several other leasing offers in the surroundings and is considering leasing some of them.

Hence, if the high rental price was due to perceived higher search costs for foreigners, then the extent of discrimination should shrink. This is the result of the elimination of the high search cost stereotype.

2. Investor Wealth Treatment

The representative manager of a foreign firm also discloses information about the size of the foreign investor to the landowner during the phone conversation. In particular, to eliminate the stereotype that foreigners are willing to pay more, the manager states that

the foreign firm carries out small scale farming in Georgia.

Hence, if the high rental price was due to perceived beliefs about the foreign investor's wealth, then the extent of discrimination should shrink. This is the result of the elimination of the "wealthy foreigners" stereotype.

3. Technology Used Treatment

According to the third hypothesis, foreigners are charged a high price because landowners believe that foreigners depreciate agricultural land more. In this treatment the representative managers clearly state the production technology which is going to be used during the leasing period. In other words, randomly chosen farmers are told that both Georgian and foreign farmers have identical plans of land usage.

Hence, if the high rental price was due to perceived overuse of land, then the extent of discrimination should shrink. This is the result of the elimination of the "foreigners depreciate our lands more" stereotype.

4. Payment Reliability Treatment

According to the fourth hypothesis, foreigners are charged a high price because landowners believe that they may not pay the rent in a timely fashion or it is difficult to enforce the leasing contract. In this treatment the representative managers offer to pay the rent in advance, at the beginning of the leasing period.

Hence, if the high rental price for foreigners was due to perceived differences in reliability or difficulty in enforcing the contract, then the extent of discrimination should shrink. This is the result of the elimination of the "foreigners may not pay or pay late"

stereotype.

5. Search Cost and Payment Reliability Treatment: Joint Signal Provision

We form a multi-channel treatment that is composed of signals one and four. In this treatment representative managers signal their readiness to pay the rent in advance and state that they have considered leasing other land in the surroundings.

We estimate the following equation

$$P_i = \beta_0 + \beta_1 \mathbf{I} + \gamma X_i + M_i + \sum_{j=1}^5 (\alpha_{j0} T_j + \alpha_{j1} T_j \mathbf{I}) + \epsilon_i \quad (1)$$

where P_i is the lease price offered to investors in region i . X_i is a vector of control variables in each region. M_i is a stratum dummy and takes a value of one if the land is located in Kakheti, and zero otherwise. Similarly, investor nationality \mathbf{I} takes a value of one if the investor is Indian and zero otherwise.

T_j denotes the provision of the signal j and equals one when signal j is provided and zero otherwise. For instance, $T_1 = 1$ corresponds to the search effort signal provision, $T_2 = 1$ corresponds to the investor wealth signal provision, $T_3 = 1$ corresponds to the technology usage signal provision, $T_4 = 1$ corresponds to the payment reliability signal provision, and finally, $T_5 = 1$ corresponds to the *joint signal* on search effort and payment reliability provision.

The treatment effect, i.e. the relative difference between the landowner's proposed price to Indians and Georgians, is captured by the coefficient β_1 when no signal is provided. We test the hypothesis whether there is a difference in lease price offers between

Georgian and Indian investors. According to the H_0 hypothesis there is no discrimination in terms of lease price quotes, that is $\beta_1 = 0$. In contrast, according to the alternative hypothesis H_a there is discrimination against Indian investors in terms of lease price offers, that is $\beta_1 > 0$.

α_{j0} shows how the provision of signal j affects the price reported to Georgian investors. For instance, α_{10} shows the change in the conditional mean lease price offer to Georgian investors when a search effort signal is provided. In contrast, α_{j1} shows the change in in discrimination markup after providing signal j . For instance, α_{11} shows the change in the magnitude of discrimination once a search effort signal is provided.

Estimates of equation (1) are reported in Table 1.

3.5 Experimental Results

Result 1

Foreign investor receives a higher lease price offer compared to Georgian investor in the baseline treatment when no signal is provided.

The result is shown in Table 1. The estimated coefficient β_1 is about 115, suggesting that an Indian investor receives an approximately 115 GEL⁸ greater lease price offer compared to the Georgian investor per hectare per year. The estimated treatment effect is significant at the $p < 0.001$ level in all model specifications. Coefficient estimates in Table 1 imply that Indian investors receive a 48.35% higher price offer compared to

⁸GEL stands for the Georgian Lari, the average exchange rate for 2015-2016 is roughly \$1=2.2 GEL.

Table 1

	(1)	(2)	(3)	(4)	(5)	(6)
Indian (I)	115.1*** (9.329)	114.7*** (8.244)	115.1*** (10.42)	114.5*** (10.10)	114.8*** (8.057)	115.4*** (7.396)
SearchCost		-6.529 (8.252)				
I*SearchCost		-62.33*** (11.66)				
Wealth			-2.102 (10.43)			
I*Wealth			-8.595 (14.76)			
Technology				-2.037 (10.13)		
I*Technology				-3.449 (14.29)		
Reliability					-15.33 (8.057)	
I*Reliability					-63.66*** (11.38)	
S&R						-18.52* (7.460)
I*S&R						-88.86*** (10.47)
Constant	207.8*** (14.90)	215.5*** (9.704)	214.5*** (13.12)	217.3*** (12.15)	219.3*** (9.855)	221.8*** (9.641)
Observations	64	128	128	128	128	128
Adjusted R^2	0.715	0.700	0.645	0.674	0.727	0.776

Notes:

1. OLS in all columns. The dependent variable is the lease price received by the representative manager. Indian investor = 1 if the investor is Indian, 0 otherwise. Standard errors are in parentheses beneath coefficient estimates. Region, Distance, Irrigation and Fallow are included in all 6 specifications.

2. *** denotes significance at the 1% level, ** at the 5% level and * at the 10% level. Results remain robust on the regional level.

Georgian investors.

The left panel of Figure 1 shows mean price offers for Georgian and Indian investors when no signal is provided. The mean lease price offer for Georgians is about 240 GEL, while the mean price offer is about 355 GEL for Indian investors.

Result 2

Price discrimination against foreign investors can be partially explained by search cost differences.

Coefficient estimates in Table 1 suggest that a significant part of the total discrimination is driven by search cost differences. A coefficient estimate of α_{10} is insignificant at the $p < 0.05$ level - implying that the mean lease offer to Georgian investors does not change. Georgian investors receive similar lease price offers as in the case of no signal provision. This indicates that landowners have beliefs about search cost differences between Georgian and Indian investors. In contrast, the mean lease price offer to Indian investors drops by about 62 GEL. The estimated treatment effect of the search effort signal α_{11} is significant at the $p < 0.001$ level.

A decrease in the magnitude of discrimination is illustrated in Figure 1, which depicts mean lease prices. Indian investors receive about a 52 GEL higher lease price offer compared to Georgian investors once in this treatment, as opposed to the baseline of 115, indicating that landowners offer higher lease prices to foreigners as lessors perceive that foreigners have high search costs. This result is consistent with the model of statistical discrimination (Phelps 1972) and findings of Gneezy et al. (2012). Coefficient estimates

in Table 1 imply that Indian investors receive a 22.58% higher price compared to Georgian investors. Therefore, over half of the discrimination markup is due to perceived higher search costs.

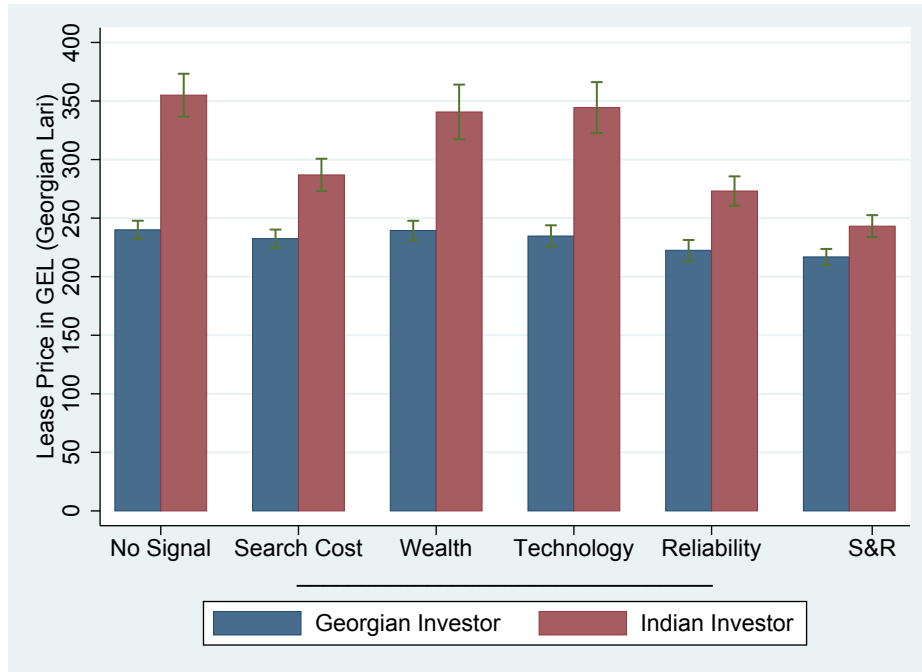


Figure 1: Average lease price for Indian and Georgian Investors **Search Cost, Investor Wealth, Technology, Reliability and Search Cost & Reliability Treatments**

Notes:

1. Error bars show 95% confidence intervals.

Result 3

We do not find any significant interaction effect for the treatment in which we state that the investor carries out small scale farming, suggesting that stereotypes about foreign investors' wealth cannot explain their observed differential treatment.

Coefficient estimates in Table 1 suggest that discrimination is not driven by the stereotype about foreigners' wealthiness, that is - "foreigners are wealthy and therefore we should charge a higher lease price." Coefficient estimates α_{20} and α_{21} are insignifi-

cant at the $p < 0.05$ level, suggesting that lease price offers does not change for neither Georgian nor Indian investors. Under the provision of the wealth signal Indian investors receive a 45.32% higher price offer compared to Georgian investors. This implies that foreigners receive similar lease price offers as in the baseline when providing a signal about their wealth. Figure 1 also confirms that the magnitude of discrimination is similar to that in the baseline treatment when no signal is provided.

Result 4

We do not find any significant interaction effect for the treatment in which we state that the investor only wants to do organic farming, suggesting that stereotypes about foreign investors relating to their intended production technology cannot explain their observed differential treatment.

Coefficient estimates α_{30} and α_{31} in Table 1 suggest that discrimination is not driven by the stereotype about higher land depletion by foreigners, that is - "foreigners use more extractive technologies and deplete our land." Both coefficients are insignificant at the $p < 0.05$ level. Under the provision of the technology signal Indian investors receive a 47.13% higher price offer compared to Georgian investors. Hence, the magnitude of discrimination is similar to the one in the baseline treatment when no signal is provided (see Figure 1). Therefore, differences in the technology usage cannot account for differential price treatment of foreign investors.

Result 5

Price discrimination against foreign investors can be partially explained by the stereotype about foreigners' reliability.

Coefficient estimates in Table 1 suggest that the total discrimination is partly driven by the stereotype of foreigners being less reliable. The coefficient estimate α_{40} is insignificant at the $p < 0.05$ level, suggesting that Georgian investors receive similar price offers as in the baseline treatment. In contrast, the mean lease price reported to foreign investors falls by about 64 GEL. In this case foreigners receive only a 51 GEL higher lease price offer as compared to 115 GEL in the baseline treatment.

Results are consonant with Georgian landowners' beliefs about foreign investors being less reliable. Discrimination shrinks significantly once the manager of the Indian investor expresses his willingness to pay the lease price in advance (see Figure 1). Under the provision of the reliability signal Indian investors receive a 22.94% higher price offer compared to Georgian investors. The estimated treatment effect of the reliability channel α_{41} is significant at the $p < 0.001$ level.

Result 6

More than 75% of the price discrimination against foreign investors can be explained by the interaction of search cost and investor reliability stereotypes.

Once the representative manager of the Indian investor states that his client has obtained a few price quotes and wants to pay the lease price in advance, the disparate treatment effect shrinks significantly. The coefficient estimate of α_{51} is significant at the

$p < 0.05$ level, suggesting that Georgian investors receive about an 18.5 GEL lower lease price offer compared to the baseline treatment. Indian investors receive about an 88.9 GEL lower price offer implying, an approximately 75% drop in discrimination. The estimated treatment effect of the search cost and reliability channels α_{51} is significant at the $p < 0.001$ level. Under the provision of the joint signal on search effort and reliability Indian investors receive only a 12.10% higher price offer compared to Georgian investors. Thus, discrimination under joint signal provision is about four times smaller compared to under no signal provision (see Figure 1).

Figure 1 summarizes the change in mean lease price offers to Georgian and Indian investors. Our findings suggest that at least 75% of apparent discrimination is based on statistical grounds. The remaining part could be driven either by preference-based discrimination or other stereotypes which are not captured in this study. Our experimental results suggest that discrimination shrinks significantly once landowners receive relevant information about foreigners' search efforts and willingness to pay in advance.

4 Conclusion

This paper contributes to the existing studies on discrimination in the land market by experimentally separating the extent and source of discrimination. Our novel design allows us to uncover different stereotypes that form the statistical discrimination. Individuals disclose specific signals which are aimed to eliminate agents' stereotypes about foreign investors. We find that foreign investors systematically receive approximately

50% higher lease price offers compared to Georgian investors. Next we show that discrimination is largely driven by stereotypes about search costs and the payment reliability of foreign investors - leaving no or very little preference-based discrimination. Interestingly, we find no evidence that stereotypes about foreigners' wealth and technology usage contributes to inferior treatment of foreign investors. Overall, we suggest that at least 75% of discrimination is on statistical grounds, given a joint signal on foreigners' search effort and payment reliability. Our results may be useful for policy makers when crafting their anti-discriminatory legislation. In particular, knowing the source of discrimination helps decision makers to form desirable policies. The government could make lease price offers publicly available, thus attenuating the first source of statistical discrimination due to perceived search cost differences. With respect to the reliability of foreign investors, government could help local lessees by providing information about law enforcement or making an advance lease payment obligatory.

This paper suggests a further policy implication for developing countries aiming at higher investment inflows. Foreign investment inflows might be impeded by high price offers, leaving the factors of production unitized. Thus, curbing discrimination could potentially lead to a higher level of investment inflow, which in turn creates employment opportunities for locals.

Policies aiming to curb preference-based discrimination are usually costly. For instance better educational systems and institutional development could gradually eliminate this type of discrimination. In contrast, curbing statistical discrimination requires an emphasis on better information movement within societies. Our findings show how the

arrival of different informational signals can change price offers to foreigners, thus pointing to potential policies that aim to affect the cause of the discrimination rather than the outcome.

References

- [1] Arrow, K. J. (1973). The Theory of Discrimination? *Discrimination in Labor Markets*, Vol. 3 (10), pp. 3-33.
- [2] Arrow, K. J. (1998). What Has Economics to Say About Racial Discrimination? *Journal of Economic Perspectives*, Vol. 12 (2), pp. 91-100.
- [3] Banerjee, A., Bertrand, M., Datta, S. and Mullainathan, S. (2009). Labor Market Discrimination in Delhi: Evidence from a Field Experiment. *Journal of Comparative Economics*, Vol. 37(1), pp. 14–27.
- [4] Bartos, V., Bauer M., Chytilova J. and Matejka, F. (2016). Attention Discrimination: Theory and Field Experiments with Monitoring Information Acquisition. *The American Economic Review*, Vol. 106(6), pp. 1437-1475.
- [5] Bayer, P., Casey, M. D., Ferreira F. and McMillan, R. (2012). Estimating Racial Price Differentials in the Housing Market. *NBER Working Paper* 18069.
- [6] Becker, G. (1971). *The Economics of Discrimination*. 2nd Edition, Chicago Press.
- [7] Bertrand, M. and Duflo, E. (2016). Field Experiments on Discrimination. *Handbook of Field Experiments*.
- [8] Bertrand, M., Chugh, D. and Mullainathan S. (2005). New Approaches to Discrimination: Implicit Discrimination. *The American Economic Review*, Vol. 95 (2), pp. 94-95.
- [9] Bertrand, M. and Mullainathan, S. (2004). Are Emily and Greg More Employable than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination. *The*

- American Economic Review*, Vol. 94 (4), pp. 991-1013.
- [10] Bloom, H. S. (1995). Minimum Detectable Effects: A Simple Way to Report the Statistical Power of Experimental Designs. *Evaluation Review*, Vol 19, pp. 547-556.
- [11] Castillo, M., Petrie R., Torero M. and Vesterlund, L. (2013) Gender Differences in Bargaining Outcomes: A Field Experiment on Discrimination. *Journal of Public Economics*, Vol. 99, pp. 35-48.
- [12] Chattopadhyay, R. and Duflo, E. (2004). Women as Policy Makers: Evidence from a Randomized Experiment in India. *Econometrica*, Vol 72, pp. 1409-1443.
- [13] Corrigan, P. W., Kuwabara, S. A and O'Shaughnessy J. (2009). The Public Stigma of Mental Illness and Drug Addiction: Findings from a Random Stratified Sample. *Journal of Social Work*, 9(2), pp.139-147.
- [14] Cox, D. and Reid, N. (2000). Theory of the Design of Experiments. *Chapman and Hall, London*
- [15] Duflo E., Glennerster, R. and Kremer M. (2008). Using Randomization in Development Economics Research: A Toolkit. *Handbook of Development Economics*, Vol. 4, Chapter 61.
- [16] Fershtman, C. and Gneezy, U. (2001). Discrimination in a Segmented Society: An Experimental Approach. *The Quarterly Journal of Economics*, Vol. 116 (1), pp. 351-357.
- [17] Galster, C. G. (1977). A Bid-Rent Analysis of Housing Market Discrimination. *The*

- American Economic Review*, Vol. 67 (2), pp. 144-155.
- [18] Gneezy, U., List, J. and Price, K. M. (2012). Toward an Understanding of Why People Discriminate: Evidence from a Series of Natural Experiments. *NBER Working Paper* 17855.
- [19] Kain, J. F. and Quigley, J. M. (1972). Housing Market Discrimination, Homeownership, and Savings Behavior. *The American Economic Review*, Vol. 62 (3), pp. 263-277.
- [20] Kain, J. F. and Quigley, J. M. (1975). Housing Markets and Racial Discrimination: A Microeconomic Analysis. *NBER Book*, pp. 1-18.
- [21] Kremer, M. (2003). Randomized Evaluations of Educational Programs in Developing Countries: Some Lessons. *The American Economic Review*, Vol. 93 (2), pp. 102–106.
- [22] LaLonde, R. K. (1986). Evaluating the Econometric Evaluations of Training Programs Using Experimental Data. *The American Economic Review*, Vol. 76 (4), pp. 602–620.
- [23] List, J. A. (2004). The Nature and Extent of Discrimination in the Marketplace: Evidence from the Field. *The Quarterly Journal of Economics*, Vol. 119 (1), pp. 49-89.
- [24] List, J. A. and Rasul I. (2011). Field Experiments in Labor Economics. *Handbook of Labor Economics*, Vol. 4(1), pp. 103-228.

- [25] List, J. A., Sadoff, S. and Wagner, M. (2011). So You Want to Run an Experiment, Now What? Some Simple Rules of Thumb for Optimal Experimental Design. *Experimental Economics*, Vol. 14 (4), pp. 439-457.
- [26] Massey, D. S. and Lundy, G. (2001). Use of Black English and Racial Discrimination in Urban Housing Markets: New Methods and Findings. *Urban Affairs Review*, Vol. 36 (4), pp. 452-469.
- [27] Miguel, E. and Kremer, M. (2004). Worms: Identifying Impacts on Education and Health in the Presence of Treatment Externalities. *Econometrica*, Vol. 72(1), pp. 159-217.
- [28] Ondrich, J., Ross, S. and Yinger, J. (2003). Now You See It, Now You Don't: Why Do Real Estate Agents Withhold Available Houses from Black Customers? *The Review of Economics and Statistics*, Vol. 85 (4), pp. 854-873.
- [29] Phelps, E. S. (1972). The Statistical Theory of Racism and Sexism. *The American Economic Review*, Vol. 62, pp. 659-661.
- [30] Prasad, C. (2012). South African Boers in Georgia? *ECMI Working Paper*, Vol. 55.
- [31] Riach, P. A. and Rich, J. (2002). Field Experiments of Discrimination in the Market Place. *Economic Journal*, Vol. 112(483), pp. F480-F518.
- [32] Turner, M. A. and Mikelons, M. (1992). Patterns of Racial Steering in Four Metropolitan Areas. *Journal of Housing Economics*, Vol. 2, pp. 199-234.
- [33] Weiner, B., Perry, R. P. and Magnusson J. (1988). An Attributional Analysis of

Reactions to Stigmas. *The Journal of Personality and Social Psychology*, Vol. 55(5), pp. 738-748.

[34] Yinger, J. (1986). Measuring Racial Discrimination with Fair Housing Audits: Caught in the Act. *The American Economic Review*, Vol. 76 (5), pp. 881-893.

Appendix A Experimental Results

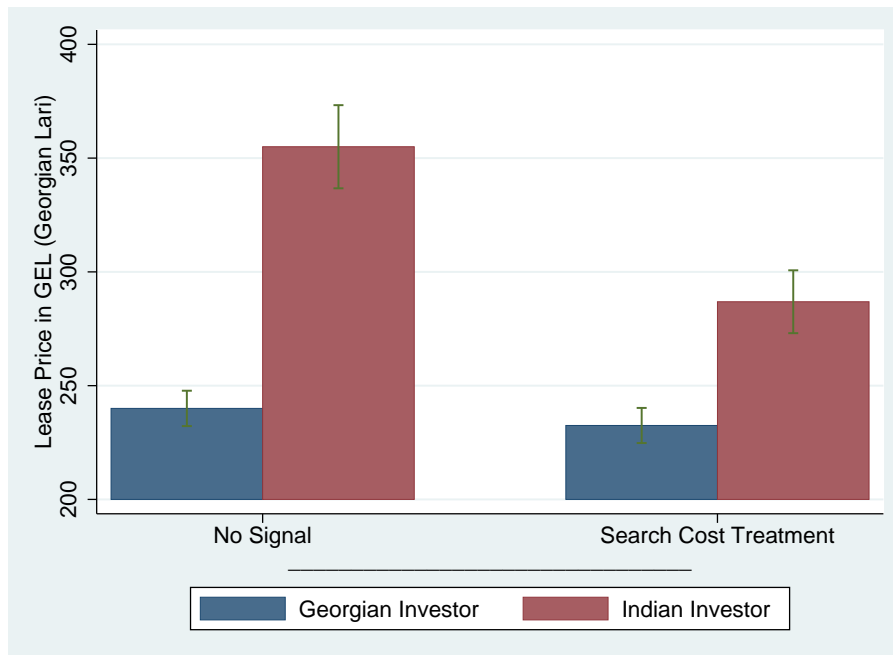


Figure A1: Average lease price for Indian and Georgian investors
Search Cost Treatment

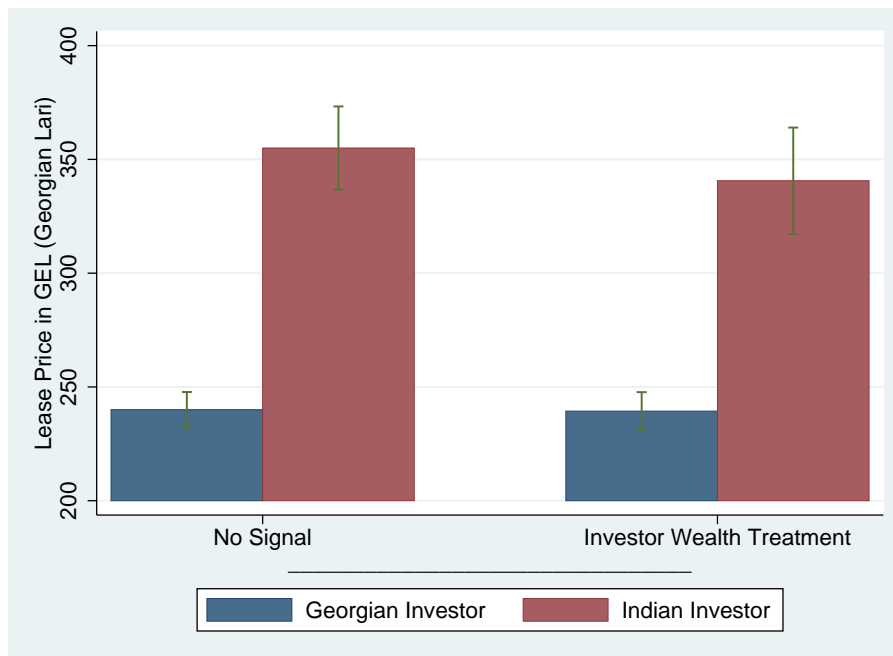


Figure A2: Average lease price for Indian and Georgian investors
Wealth Treatment

Notes:

1. Error bars show 95% confidence intervals.

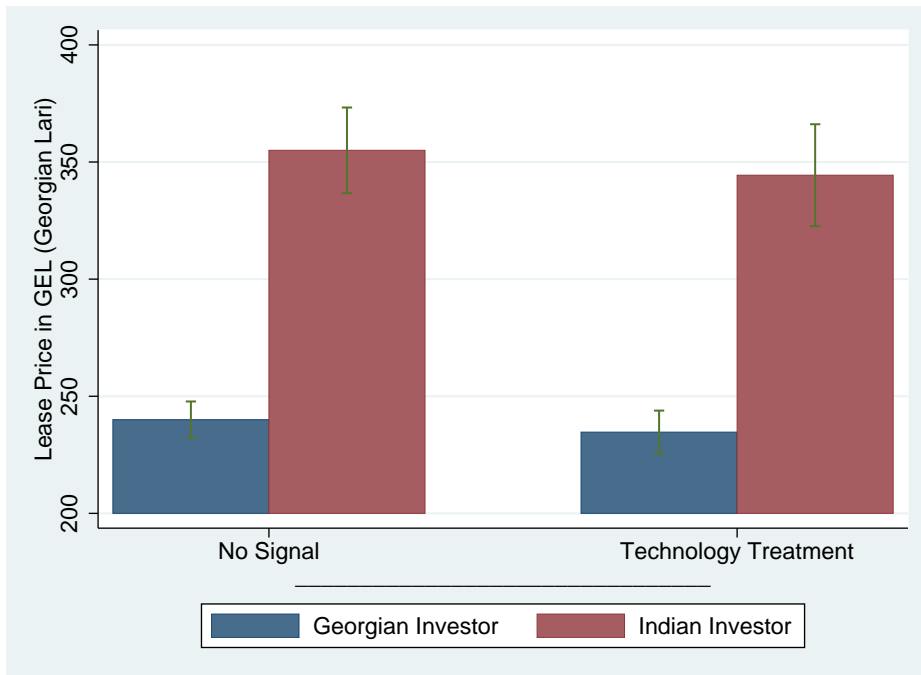


Figure A3: Average lease price for Indian and Georgian investors
Technology Treatment

Notes:

1. Error bars show 95% confidence intervals.

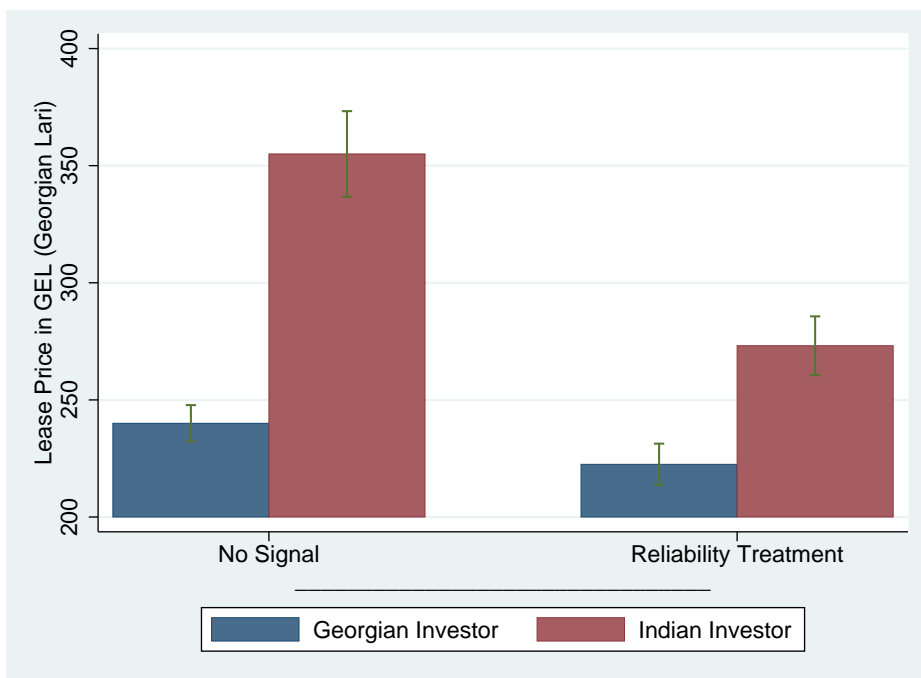


Figure A4: Average lease price for Indian and Georgian investors
Reliability Treatment

Notes:

1. Error bars show 95% confidence intervals.

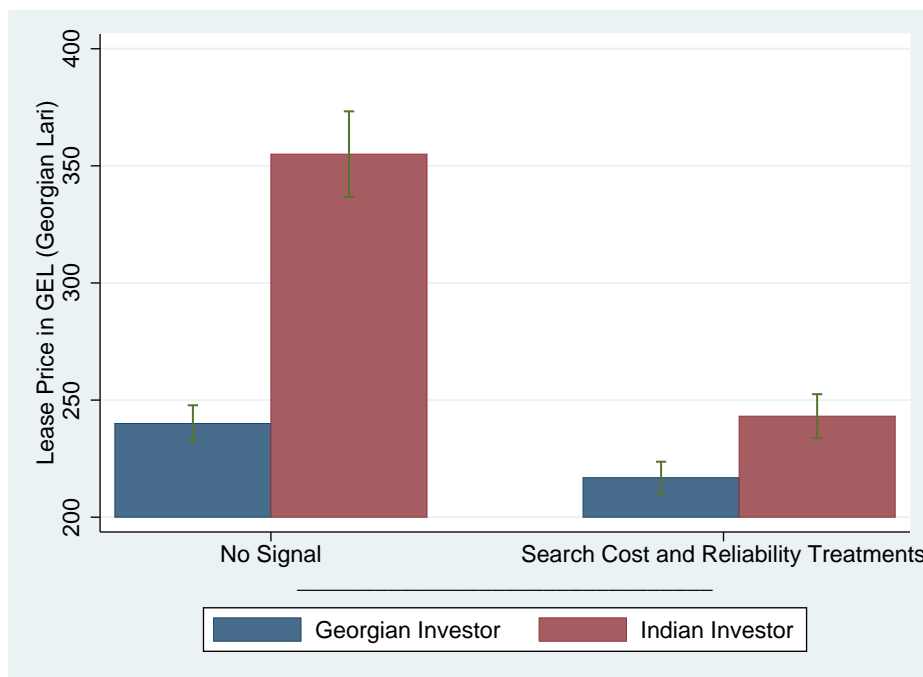


Figure A5: Average lease price for Indian and Georgian investors
Search Costs and Reliability Treatments

Notes:

1. Error bars show 95% confidence intervals.

Appendix B Telephone Conversation Scripts

Experiment 1: Baseline Treatment (No Signal)

Good morning Mr. X,

My name is Giorgi and I am a manager of a Georgian (Indian) investor. The company is based in Tbilisi under the name “Agro.”

I am calling you because I am very interested in leasing your land. Could you please confirm us whether you are leasing the land located in Kakheti (Kartli)?

Could you please confirm for us figures on the location of your land, productivity (whether it was fallowed or not) and access to irrigation?

We plan to produce temporary crops such as vegetables or fruit if we lease your land. If we agree on a price I will be communicating with you and representing “Agro” until the end of the lease contract.

What would be the price per hectare for a year? Please state the minimum possible price so that we consider a visit to see your land. I will report the price to my boss and call you back if the price is acceptable for him.

Thank you very much for your time.

Have a nice day!

Experiment 2: Identify Channels of Statistical Discrimination

Treatment 1: Search Costs

Good morning Mr. X,

My name is Giorgi and I am a manager of a Georgian (**Indian**) investor. The company is based in Tbilisi under the name “Agro.”

I am calling you because I am very interested in leasing your land. Could you please confirm us whether you are leasing the land located in Kakheti (**Kartli**)?

Could you please confirm for us figures on the location of your land, productivity (whether it was fallowed or not) and access to irrigation?

We plan to produce temporary crops such as vegetables or fruit if we lease your land. If we agree on a price I will be communicating with you and representing “Agro” until the end of the lease contract.

Our company has a few other price quotes from other Georgian landlords in your neighborhood.

What would be the price per hectare for a year? Please state the minimum possible price so that we consider a visit to see your land. I will report the price to my boss and call you back if the price is acceptable for him.

Thank you very much for your time.

Have a nice day!

Treatment 2: Investor Wealth

Good morning Mr. X,

My name is Giorgi and I am a manager of a Georgian (Indian) investor. The company is based in Tbilisi under the name “Agro.”

I am calling you because I am very interested in leasing your land. Could you please confirm us whether you are leasing the land located in Kakheti (Kartli)?

Could you please confirm for us figures on the location of your land, productivity (whether it was fallowed or not) and access to irrigation?

We plan to produce temporary crops such as vegetables or fruit if we lease your land. If we agree on a price I will be communicating with you and representing “Agro” until the end of the lease contract.

The company is a family business and only carries out small scale farming in Georgia.

What would be the price per hectare for a year? Please state the minimum possible price so that we consider a visit to see your land. I will report the price to my boss and call you back if the price is acceptable for him.

Thank you very much for your time.

Have a nice day!

Treatment 3: Technology Used

Good morning Mr. X,

My name is Giorgi and I am a manager of a Georgian (Indian) investor. The company is based in Tbilisi under the name “Agro.”

I am calling you because I am very interested in leasing your land. Could you please confirm us whether you are leasing the land located in Kakheti (Kartli)?

Could you please confirm for us figures on the location of your land, productivity (whether it was fallowed or not) and access to irrigation?

We plan to produce temporary crops such as vegetables or fruit if we lease your land. If we agree on a price I will be communicating with you and representing “Agro” until the end of the lease contract.

The company plans not to use pesticides or chemical fertilizers, as we want to produce bio products.

What would be the price per hectare for a year? Please state the minimum possible price so that we consider a visit to see your land. I will report the price to my boss and call you back if the price is acceptable for him.

Thank you very much for your time.

Have a nice day!

Treatment 4: Reliability

Good morning Mr. X,

My name is Giorgi and I am a manager of a Georgian (Indian) investor. The company is based in Tbilisi under the name “Agro.”

I am calling you because I am very interested in leasing your land. Could you please confirm us whether you are leasing the land located in Kakheti (Kartli)?

Could you please confirm for us figures on the location of your land, productivity (whether it was fallowed or not) and access to irrigation?

We plan to produce temporary crops such as vegetables or fruit if we lease your land. If we agree on a price I will be communicating with you and representing “Agro” until the end of the lease contract.

The company plans to pay the lease at the beginning of the contract period, just right after we make a deal over the land you lease.

What would be the price per hectare for a year? Please state the minimum possible price so that we consider a visit to see your land. I will report the price to my boss and call you back if the price is acceptable for him.

Thank you very much for your time.

Have a nice day!

Abstrakt

Tržní diskriminace je dobře zdokumentována empirickými studiemi. Field experimenty jsou naproti tomu méně úspěšné při identifikaci zdrojů diskriminace. Tento článek předkládá experimentální důkazy o rozsahu a povaze diskriminace na trhu s pozemky v Gruzii. Cílem experimentu je odhalit možné zdroje statistické diskriminace v důsledku rozdílných názorů na zahraniční investory. Diskriminace je měřena rozdílnými cenami pro domácí a zahraniční investory. Zjistili jsme, že síla diskriminace významně klesá s ochotou zahraničních investorů důkladněji prozkoumat trh a platit nájem předem. To naznačuje, že diskriminace je ovlivněna především stereotypy o nákladech na průzkum trhu a schopnosti zahraničních investorů platit nájem předem. Vliv diskriminace na základě preferencí mezi zahraničními a domácími investory se zdá být zanedbatelný. Znalost původu diskriminace může být užitečná při tvorbě antidiskriminačních zákonů.

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