


RESEARCH ARTICLE

Discrimination Against Puerto Ricans in the Puerto Rican Housing Market: Evidence From a Preregistered Audit Experiment

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Abstract

Do locals discriminate against themselves by favoring foreigners with higher expected purchasing power? Drawing on theories of prejudice, discrimination, and colonialism, I argue that in colonized and post-colonial countries, local home sellers discriminate against local potential homebuyers while favoring foreigners with expected higher purchasing power, anticipating a more profitable transaction. I support this argument with evidence from a preregistered online audit study targeting discriminatory attitudes toward local home buyers. In the study, fictitious home buyers with distinctive language and ethnic names emailed 1,512 home sellers (realtors and homeowners) across all municipalities in Puerto Rico. Home sellers reported more houses available to Americans and invited them to more house showings than Puerto Ricans. My estimates indicate that ethnic discrimination exists in the Puerto Rican housing market. These findings provide new insights into ethnic dynamics in colonized and post-colonial societies and underscore concerns about recent legislation that turned Puerto Rico into a tax haven.

Keywords: Discrimination; colonialism; race and ethnicity; nationality; language; audit study

Introduction

Social scientists have long been interested in understanding discrimination in social life. They have addressed the questions of who experiences discrimination (Branigan and Hall 2023; Dana *et al.* 2019; Mattila and Papageorgiou 2017) and its consequences (Berry, Cepuran, and Garcia-Rios 2022; Hopkins *et al.* 2020; Oskooii 2016, 2020). Ethnic minorities have greater difficulty in virtually all aspects of life. In several countries, minorities cannot access the entire real estate market (Gaddis *et al.* 2021), even if they can afford the house they want. Past studies have investigated the discriminatory practices of home sellers against minority home seekers by looking at multiple actors along the complex process of buying a house.¹

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Researchers have documented how home sellers limit the options of minorities who can buy houses through practices such as not responding to housing inquiries (Ahmed and Hammarstedt 2008) or showing minorities houses located in specific neighborhoods (DeSena 1994; Massey and Denton 1993; Yinger 1995). These studies suggest that discriminatory treatment toward customers is based on beliefs and perceptions about customers' financial capabilities (Ondrich, Ross, and Yinger 2003; Ondrich, Stricker, and Yinger 1998). In studies demonstrating discrimination in the housing market, home sellers favor the dominant national ethnic group. These studies were conducted in the United States (U.S.) or Europe, where Whites are the largest and dominant group, and minorities are considered the outgroup and situated lower in the ethnoracial hierarchy (Fraga and Perez 2020; Masuoka 2017).

However, these studies are virtually nonexistent in colonized or post-colonial countries. Within these contexts, a colonized mentality that favors foreigners from either the metropolis or any other wealthy Western country prevails. These foreigners are perceived as wealthier, more civilized, and more racially desirable than locals. Thus, in colonized or post-colonial countries, the most privileged are not nationals from any race or ethnicity, as is the case with Whites in wealthy countries in the Global North. Instead, the dominant group is foreigners from the metropolis or wealthy countries (Fanon 1963; Memmi 1974). Within this context, realtors may favor foreigners from wealthy countries over nationals.

One of the theoretical explanations for home sellers' discriminatory practices against minorities is that home sellers treat customers differently based on characteristics such as race, ethnicity, gender, or religion because they believe these characteristics predict the profitability of an eventual transaction (Ondrich, Ross, and Yinger 2003). Thus far, no study has tested whether and how home sellers in colonized countries respond differently to local and foreign homebuyers from wealthy countries. I posit that in colonized countries, home sellers discriminate against locals.

This article explores how home sellers respond to potential Puerto Rican and American homebuyers in Puerto Rico. I employed an email-based housing audit of local home sellers (realtors and homeowners) in Puerto Rico to determine whether Puerto Ricans face more barriers when accessing the Puerto Rican real estate market than Americans. I sought to establish whether local home sellers responded differently to emails from Puerto Ricans and Americans inquiring about house availability, time to respond, willingness to show the house, and inquiries about proof of funds or bank pre-approval while accounting for potential confounders.

First, I identified active listings in the major real estate platform in Puerto Rico. I identified unique sellers who constitute the target sample. These sellers would only receive one inquiry. Inquiries consisted of an email asking about house availability and the possibility of a showing. Emails came from fictitious Puerto Ricans or Americans in Spanish and English, respectively. Analyzing responses to 1,512 emails sent, I found strong causal evidence of bias in favor of American homebuyers. While Puerto Rican homebuyers were more likely to receive a response, they were less likely to receive replies with houses available or offering a showing.

I argue that this inequality in responses occurs because home sellers assume that Puerto Ricans cannot afford a cash sale (known to be simpler and faster), which makes any transaction dependent on bank pre-approval. Thus, Puerto Ricans'

purchasing power is constrained to the appraised value, which is what banks are willing to finance. On the other hand, American homebuyers are perceived as having the financial capability and willingness to buy a house above the asking price (often higher than the appraised value) and to pay in cash. Results show that home sellers respond with fewer hurdles to American homebuyers, possibly expecting lower effort, a fast sale, and a generous commission. Conversely, home sellers tended to respond to Puerto Ricans that a house was not available or did not offer to show the property.

My study makes two contributions to the literature on ethnic discrimination. First, to the author's knowledge, no previous audit study has investigated housing discrimination in colonized countries. My audit study is the first to find that a national dominant group is discriminated against in favor of foreigners. Second, I contribute to the literature on access to the housing market. Prior work has shown discrimination against African Americans (Murchie and Pang 2018), Latinos (Haubert Weil 2009), Arabs/Muslims² (Ahmed and Hammarstedt 2008; Baldini and Federici 2011), females (Ahmed and Hammarstedt 2008), same-sex couples (Friedman *et al.* 2013; Schwegman 2019), homosexuals (Ahmed and Hammarstedt 2009), and darker-skinned individuals (Branigan and Hall 2023). However, this is the first study to explore the dynamics within a colonial relationship by employing a preregistered audit study.

The remainder of this paper is organized as follows: in Sections 2 and 3, I present the previous research on discrimination in the real estate market as it relates to the Puerto Rican context. In Section 4, I detail the experimental design. Finally, in Section 5, I discuss the results and implications, and propose future research.

Why Does Country of Origin Affect Home Sellers' Responsiveness?

Past studies have used field experiments that insert racial and ethnic cues to capture discriminatory practices (Gilens 1996; Huber and Lapinski 2006; Tesler 2012; White 2007). Block *et al.* (2021) sent emails asking subjects to participate in a survey, randomizing the sender's name to be either White or Black. Broockman (2013) and Butler and Broockman (2011) emailed politicians using White and Black names to measure responsiveness. Kalla, Rosenbluth, and Teele (2018) and Dhima (2020) emailed American and Canadian legislators, respectively, using racial and gendered names.

Discrimination is an unfavorable treatment based solely on a person's membership in a particular group (Allport 1954). Previous studies found discrimination against minority groups in the housing market regarding treatment, access to advertised units (Wienk 1979), number (Turner *et al.* 2013), and price of units shown (Ondrich, Ross, and Yinger 2003). Scholars have proposed three hypotheses to explain why home sellers discriminate. First, the customer-prejudice hypothesis, also known as White customer prejudice, was defined by Becker (1971), who argues that home sellers discriminate to protect their business dealings with prejudiced Whites or the group that provides most of their business. According to this hypothesis, home sellers have no economic reason to discriminate in neighborhoods where ethnic minorities already live or are a majority because White households will not blame them for selling a property to an ethnic minority there. There are reasons to question the applicability of this hypothesis to Puerto

Rico. This hypothesis is specific to the American context, where neighborhoods are historically segregated by race, and Whites are reluctant to have ethnic minorities living among them (DeSena 1994). Since Puerto Ricans compose almost the entire population of Puerto Rico, home sellers have no reason to expect blame from prejudiced Americans.

Second, the agent-prejudice hypothesis, also based on Becker (1971), argues that discrimination results from home sellers having a strong personal bias against minorities. This hypothesis cannot be tested directly with housing audits, but scholars have used indirect determinants associated with prejudice. Specifically, research on discrimination has found that among Whites, there is greater prejudice among men and older people (Schuman *et al.* 1997; Schuman and Bobo 1988). Scholars have compared the race, age, and gender of the home seller as indirect determinants of prejudice to test the agent-prejudice hypothesis. This hypothesis explains the discrimination of the privileged dominant ethnic group against ethnic minorities and could apply in Puerto Rico; for example, to explain discrimination against Dominicans, who have been historically discriminated against by Puerto Ricans in Puerto Rico (Nina-Estrella 2018, 2022). This hypothesis, however, does not help explain discrimination by Puerto Ricans against Puerto Ricans.

Third, some literature focuses on the statistical discrimination hypothesis, which argues that home sellers use characteristics such as race, ethnicity, gender, or religion to treat customers differently because they believe these characteristics can predict the profitability of an eventual transaction. The statistical discrimination hypothesis also states that home sellers make inferences about the neighborhoods where minorities would prefer to live and that such discrimination largely depends on the value of houses because home sellers infer the financial capabilities of customers based on group membership. Ondrich, Ross, and Yinger (2003) argue that home sellers tend to discriminate against ethnoracial homebuyers by showing them, but not Whites, cheaper units than the advertised ones. This hypothesis partially applies to the Puerto Rican real estate market, with the caveat that in Puerto Rico, the favored group would not be the local majority, as this hypothesis typically suggests, but rather Americans.

Due to the colonized mentality, a home seller in Puerto Rico may believe that Puerto Ricans cannot afford to buy a house, whereas Americans can, even at a price above the appraised value, and they can pay in cash. The belief that a sale to an American represents a faster and easier deal with less effort leads the home seller to favor American homebuyers in several ways. When they receive an inquiry from a Puerto Rican homeseeker, they may correlate them with high effort, low profitability, and a low probability of selling a house. In contrast, when home sellers in Puerto Rico receive an inquiry from an American homeseeker, they may equate it with low effort, a fast sale, and a generous commission. This belief may make the home seller maximize effort with American homebuyers. Based on this, I hypothesize that home sellers in Puerto Rico will favor American homeseekers over Puerto Rican ones.

Language and Price are Representative of Statistical Discrimination

Using different languages in house advertisements conditional on price is perhaps the most obvious behavior of statistical discrimination. Thinking that Puerto Ricans

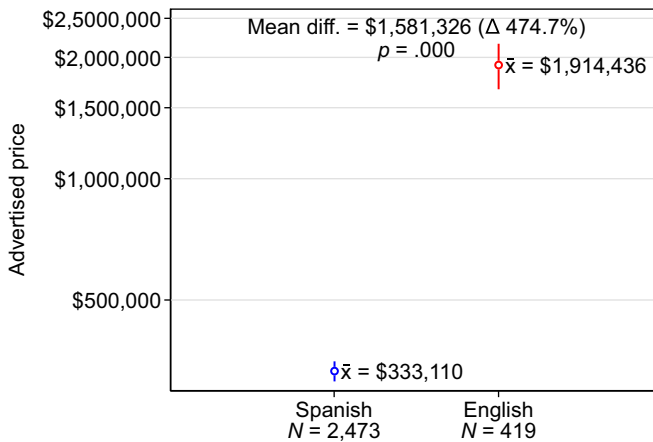


Figure 1. Means and 95% Confidence Intervals of Price of Houses Advertised by Language. *Note:* Lines represent 95% CIs. Data corresponds to all houses posted in ClasificadosOnline on August 28, 2023 (except houses foreclosed and under contract) with price included. Seventy-seven houses were described in both languages. I coded these 77 houses as Spanish since having descriptions in both languages does not hinder Puerto Ricans from buying a house. The mean price of these 77 houses is \$464,488.

are less likely to afford an expensive house, they can promote their more expensive properties in English, targeting Americans as potential buyers. Following such rationale, home sellers promote their cheaper properties in Spanish. Data from houses advertised for sale in ClasificadosOnline.com, the largest real estate website in Puerto Rico, provide support to this assertion. I examined the price of all houses advertised in ClasificadosOnline.com on August 28, 2023, by language of description (Figure 1). The mean price of houses with the advertisement in Spanish is \$333,110, while houses with a description in English have a mean price of \$1,914,436, more than five and half times that of houses with a description in Spanish. These differences also suggest that home sellers have different home buyers in mind when advertising properties, and that listing houses in either English or Spanish in a country where the main language is Spanish is a deliberate strategy to reach either American or Puerto Rican homebuyers for houses depending on price. There seems to be a market for the relatively less costly houses for Puerto Ricans and another market for more expensive ones, with American homebuyers in mind. Publishing information in English about the most expensive houses, in addition to suggesting statistical discrimination, represents a barrier that limits access for Puerto Ricans to the whole real estate market.

The asset value of a house is not conditioned only by the comforts or luxuries that the property may have but also by access to services such as schools, transportation, security, and most domains of life (Collins and Margo 2003). In other words, the value of a house, in addition to being an indicator of the comforts and access to services, determines quality of life and opportunities or lack thereof. Discriminatory practices by home sellers exacerbate these disparities. If home sellers in Puerto Rico use strategies to limit the market for homes that Puerto Ricans can buy, the long-term effect could be similar to that in the U.S., where the value of the houses where

Blacks live is lower than that of houses where Whites live (Collins and Margo 2003). According to U.S. Census data, the population of Puerto Rico decreased by 11.8% between 2010 and 2020. Just after Hurricane Maria in 2017, more than 106,000 people left Puerto Rico (Santos-Lozada 2018). The difficulties that Puerto Ricans looking for housing face in Puerto Rico could further accelerate the migration of Puerto Ricans to the U.S.

Research Setting: The Puerto Rican Colonial and Tax Haven Context

The historical relationship between Puerto Ricans and Americans has been tense in Puerto Rico. This tension is reflected, for example, in popular culture. Virgilio Dávila, one of the most famous Puerto Rican poets of the twentieth century, discouraged Puerto Ricans from selling their property to Americans in his poem “*Don’t give your land to the stranger*” (Dávila 1916). The poem refers to Americans as strangers and offers verses like “*How low and how miserable the one who sells their land*” and “*Who sells their land sells their homeland with them.*” More than a century later, the Puerto Rican singer Bad Bunny has spoken out against displacement in Puerto Rico (Cabrera 2022), with a song in 2022 that says, “*I don’t want to leave here, let them go*”; “*what belongs to me, they keep*”; and “*this is my beach, this is my sun, this is my land.*”

In 2012, the government of Puerto Rico enacted Act 22 (now Act 60), seeking to attract foreign investment that exempted foreign investors from paying taxes on capital gains. Since then, Puerto Rico has become a destination for foreign investors looking for a competitive tax regime. Since 2012, more than five thousand foreign investors have been the beneficiaries of a decree that grants them tax benefits. One of the conditions for obtaining and keeping the tax breaks is to buy property in Puerto Rico within two years and live in Puerto Rico for at least half of the year. These tax conditions have motivated thousands of American millionaires, with purchasing power well above average Puerto Ricans’ purchasing power, to move to Puerto Rico and buy property. They are willing to pay cash to speed up the process and secure the purchase at a price above the appraised value. In an interview with *The New York Times*, a resident and homeowner in the municipality of Rincón said that Americans “*don’t ask you for a price, they just hand you a check and tell you to fill it out with whatever you think the house is worth*” (Murphy Marcos and Mazzei 2022).

Many Puerto Ricans have complained on social media and in the press that it is difficult for them to buy a house because many realtors prefer to sell houses to Americans, expecting a larger and faster profit. In January 2022, a Puerto Rican actor used social media to protest that he had tried to buy a house in Puerto Rico for more than two years. However, Puerto Rican realtors did not respond to his texts or emails. He decided to run an experiment and asked a British friend with an English-sounding name to send text messages to the same realtors. His British friend received “*100% of responses almost immediately.*” In addition, one realtor explicitly said that they prefer European investors.

Not only do foreign investors buy luxury properties to live in but they also invest in properties that the average Puerto Rican can afford, for purposes of speculation or short-term rentals on the platform Airbnb. There is an ongoing controversy

regarding the proliferation of short-term rentals in Puerto Rico. Communities have argued that the expansion of short-term rentals through Airbnb in Puerto Rico has intensified the gentrification of communities (Santiago-Bartolomei *et al.* 2022). In the past few years, Puerto Ricans on the island have protested against the displacement caused by the beneficiaries of the decrees under Act 60. On January 16, 2022, protesters in Old San Juan carried banners that read “GRINGO GO HOME,” “PR NO SE VENDE” (Puerto Rico is not for sale), and banners with photos of famous American millionaires who moved to Puerto Rico that read “THIS IS WHAT A COLONIZER LOOKS LIKE.”³

On July 6, 2022, residents of Vieques, one of the two island municipalities of Puerto Rico, protested against a public auction of ten municipal properties. The day before the protest, a regional newspaper published the following:

Viequenses have recently expressed great concern about access to housing. Short-term rentals (Air BnB), rising rents, and increased property sales are making Vieques an inaccessible town for Viequense families. This is generating a gentrification process where foreigners are the ones who have the purchasing power to acquire property on Vieques, while Viequenses are displaced (Hernández 2023).⁴

Culebra, the other island municipality, has a population of around 3,500 people. Statements in September 2023 by the mayor of Culebra, Edilberto Romero Llovet, evidence how the proliferation of Airbnb in Puerto Rico affects access to housing for locals. He recently stated that the number of Airbnbs in Culebra “*has impacted our residents for the simple reason that we do not have long-term rentals, and by not having them, many residents are living with their relatives.*” He also stated that families come to him because they are concerned that landlords will evict them in order to turn the house into short-term accommodation. A report from a consulting firm based in Puerto Rico reported in 2019 that in Culebra, 27.4% of all housing corresponds to Airbnb properties (Estudios Técnicos 2019), making Culebra the municipality with the highest share of Airbnb properties as a percent of all housing.

Regardless of the various manifestations of discomfort that Puerto Ricans have demonstrated, there is no generalized and unanimous consensus on the island that home sellers are disproportionately enthusiastic about selling houses to Americans, nor that this negatively affects Puerto Rican homebuyers. Instead, opinions are ideologically and partisanly divided and are influencing public policy. The New Progressive Party (Partido Nuevo Progresista-PNP), currently in power, enacted Act 22 in 2012. In the past, an anti-Puerto Rican sentiment has been found even at the highest levels of the island’s power structures. In 2019, a Telegram chat from the innermost circle of political advisors for the then Governor of Puerto Rico (PNP affiliate) was leaked in the scandal known as TelegramGate. In this chat, one of the advisors said “I saw the future . . . is woooooonderful . . . there are no puertorricans.” This expression, and other content of the leaked chat, exacerbated the feelings that Puerto Ricans were being pushed out of the island.

The current PNP administration has shown openness and support to foreign investors by hosting events and guaranteeing the permanence of these exemptions under its government. Furthermore, the Secretary for Economic Development and

Commerce also guaranteed the continuation of Act 22 and emphasized that those receiving tax exemptions significantly contribute to economic growth (Rivera Sánchez 2021). On May 9, 2023, the Governor of Puerto Rico lashed out against complaints made by residents of several communities that Americans have monopolized the purchase of properties to convert them into short-term rentals, labeling them as “anti-foreign discourse.” He stated that “in Puerto Rico, there is no room for xenophobia” and added, “Our borders must be open, and whoever wants to come here to Puerto Rico to reside and invest here within the law is more than welcome [. . .]. Here we want investment within our legal framework” (Cruz 2023).

Two perspectives have emerged. On one side, Puerto Ricans have complained about gentrification, rising housing costs, and disparities in how realtors treat Puerto Ricans and Americans. On the other hand, the government of the PNP has defended Act 22, arguing that it brings socioeconomic and fiscal benefits while labeling Puerto Ricans who complain about the law’s effects as xenophobic and anti-foreigner. The Popular Democratic Party (Partido Popular Democrático-PPD), in power between 2013 and 2017, also made no efforts to repeal Act 22. This study seeks to determine whether Puerto Ricans’ complaints are empirically supported or if, on the contrary, the data support the ruling party’s position, which dismisses these complaints.

How The Political Status of Puerto Rico Can Influence Home Sellers

Interactions among individuals from diverse social-identity groups are associated with increased levels of discriminatory attitudes and behaviors in these groups (Enos 2014; Forbes 1997). Studies of ethnic conflict and attitude polarization assume that members of ethnic groups act to protect their group interests (Mackie and Cooper 1984) and favor their group members over nonmembers because they have more in common with group members than with outgroups (Vanhanen 1999). Contrary to assumptions that political choices are based on individual self-interest (Downs 1957), the concept of linked fate proposes a form of group consciousness that explains why members of a minority group may cohere with their ethnic group and act in the best interests of their ethnic group, rather than of individual members (Dawson 1994). Linked fate has been widely studied among African Americans, but the concept operates similarly for Latinos (Sanchez and Masuoka 2010). This literature explains how members of ethnic groups behave, but it has been designed to apply primarily in sovereign countries, not necessarily in colonized ones.

The literature on colonization argues that in colonized countries, local subjects tend to consider themselves to be low in the racial hierarchy compared to subjects from the metropolis, whom they perceive as a role model and whom they try to resemble and emulate (Césaire 2000; Fanon 1952, 1963; Memmi 1974). In *The Colonizer and the Colonized*, Albert Memmi states that in colonized countries, a settler from the metropolis is “received as a privileged person by the institutions, customs and people” (1974, p. 61). In Puerto Rico, home sellers may favor Americans over Puerto Ricans, which would reflect the characteristic behavior of a colonized subject who favors settlers from the metropolis over locals. This contrasts with the standing assumption that ethnic groups act to protect their own group interests.

Puerto Rico was a colony of Spain for over four centuries. At the conclusion of the Spanish-American war in 1898, Puerto Rico became a U.S. colony. From 1898 to 1952, Puerto Rico was ruled by governors appointed by the president of the U.S. Until 1948, all appointees were Americans. These governors attempted to “Americanize” Puerto Ricans by imposing English in the public school system, naming streets and public schools after American figures and politicians, and repressing, imprisoning, torturing, and killing Puerto Ricans who advocated for the independence of Puerto Rico. Although the U.S. imposed the American citizenship on Puerto Ricans in 1917, they maintain a vibrant identity (Duany 2002), and Spanish remains the primary language. Internationally, the colonial nature of the relationship between the U.S. and Puerto Rico is not in doubt.

Although this study is limited to Puerto Rico, privileged treatment toward Americans, Europeans, or foreigners from Western countries may be found in virtually all post-colonial countries and should apply to many aspects of life (Fanon 1963; Memmi 1974). The external validity of this research can be extended to specific cities in post-colonial countries that have received considerable numbers of American immigrants in recent years, such as Medellín, Colombia, or Mexico City, Mexico.

Research Design

I conducted a housing audit to test discrimination against Puerto Ricans in Puerto Rico’s real estate market. Fictitious male homeseekers with either a typical Puerto Rican or American name inquired through a real estate website to home sellers who had active listings about that house’s availability in the market and the possibility of a showing, in Spanish or English, respectively. Measures of responsiveness included house availability in the market, the possibility of a showing, and inquiries about proof of funds or bank pre-approval.

To ensure that all treatment conditions were evenly distributed, I block randomized all home sellers by house’s location, price, and language of description. Instead of matching American and Puerto Rican fictitious profiles to each home seller, I randomly assigned one of the two fictitious profiles to each home seller contacted. Each home seller received one email with only one inquiry, instead of receiving almost identical emails from two profiles. All emails were virtually identical in form and content (except for names and language), so sending two emails to each home seller might have alerted home sellers to the experiment. This approach has previously been implemented in audit studies of housing discrimination (Carpusor and Loges 2006).

In 2014, the National Association of Realtors of the United States reported that 43% of homebuyers said their first step was searching online for properties (National Association of Realtors 2014). Real estate websites allow homeseekers to send emails to real estate agents, landlords, or individual home sellers. Scholars have taken advantage of the rapid expansion of these websites by creating fictitious profiles to send email inquiries to home sellers. Researchers have sent inquiries containing specific cues such as country of origin, gender, or ethnicity to capture discrimination. In this study, the ethnic cues are the name of the inquirer and the language of the inquiry.

The Real Estate Website

Data for this study come from ClasificadosOnline (<https://www.clasificadosonline.com/>), the largest real estate platform in Puerto Rico. On August 28, 2023, ClasificadosOnline had 11,414 properties. In contrast, other popular real estate websites in the U.S., like Zillow or Realtor, had only 2,374 and 3,915 houses in Puerto Rico, respectively. Anyone can place an advertisement for free on this platform, but most advertisements for houses are placed by real estate agents, who tend to include their phone number, real estate agency name, realtor license number, photos, price, and a short description of the property. ClasificadosOnline is available in English and Spanish, making it easy for English and Spanish speakers to use. Like many other similar websites, ClasificadosOnline offers the possibility of using the platform to send an email directly to the seller or whoever published the advertisement. Users only need to type an email address and a message in two separate textboxes and click the “send” button. There is no need to create an account, use a profile picture, or add a phone number.

Identities of Fictitious Homebuyers

I created two fictitious identities of homebuyers whose names and languages represent different home countries. I needed multiple names for the two profiles, representing an American male and a Puerto Rican male. There are two main advantages of using various names. First, people often associate names with different attributes (Bertrand and Mullainathan 2004; Crabtree *et al.* 2023). Using multiple names avoids the possibility that different attributes associated with names might drive differences in home sellers’ responsiveness (Dhima 2020; Kalla, Rosenbluth, and Teele 2018). Second, using multiple names reduces the possibility that real estate agents working in the same office or company would become suspicious that they are being tested. I initially considered adding a Puerto Rican female, but the number of home sellers was not enough for such an analysis. Future studies comparing discrimination between Puerto Rican females and males are warranted. However, they are beyond the scope of this preregistered study.

To select multiple American first and last names, I used the most common names among the 5,010 foreign investors who received a decree to obtain tax benefits between September 2012 and February 2023. The Department of Economic Development and Commerce of Puerto Rico provided the data.⁵ The five most common names first were Michael, David, John, James, and Robert. Since David is a common name in Spanish and Puerto Rico, it would not signal the country of origin of the fictitious American. Therefore, I chose to use Andrew instead of David, the eleventh most common name. During the past decades, these names have been on the list of the five most common names in the U.S., according to the U.S. Social Security Administration. I selected five last names following the same method. The five most common last names are Smith, Miller, Johnson, Davis, and Brown. These are typical American last names and suggest that most recipients of decrees are Americans.

To select first and last names for the Puerto Rican fictitious homebuyer, I relied on the most common names among donors to political campaigns in Puerto Rico. Although a complete dataset of donors to political campaigns in Puerto Rico is

unavailable online, the Office of the Electoral Comptroller of Puerto Rico provided the data. The five most common male first names are José, Luis, Carlos, Juan, and Ángel. These names are not inherently Puerto Rican but are Spanish. In Latino cultures, people traditionally have two surnames. The first is the paternal surname, and the second is the maternal surname. I therefore needed ten common last names for the Puerto Rican profiles to select five pairs of last names. The ten most common last names among donors to political campaigns in Puerto Rico were Rivera, Rodríguez, González, Torres, Pérez, Ortíz, Hernández, López, Santiago, and Colón. Even if donors to political campaigns in Puerto Rico do not represent the population of Puerto Rico, these last names are common in Puerto Rico.

Puerto Ricans in Puerto Rico do not hyphen their last names. However, many Puerto Ricans and Latinos in general who move to or live in the U.S. adopt a hyphen between the two last names (e.g., José Rivera-Rodríguez) to avoid confusion. Consequently, using a hyphen between the first and second last names in Puerto Rico could make home sellers believe that this Puerto Rican lives in the U.S. and may enjoy a better economic situation than Puerto Ricans who live in Puerto Rico, which could influence their behavior. To avoid that possibility, I chose not to hyphenate the two last names for Puerto Rican profiles. I have randomly matched American first with last names and Puerto Rican first with two last names.⁶ To conduct the experiment, I registered email addresses for all American names in the form *first.lastname#####@gmail.com* for Americans and *first.lastnamelastname#####@gmail.com* for Puerto Rican names, where I received all replies. All email addresses have the same number.

Emails from Fictitious Applicants

I established identical email scripts for the two fictitious profiles when inquiring about the availability of a house and the possibility of a showing. The scripts were virtually identical in content and wording but differed in names and language, suggestive of country of origin (Puerto Rican or American). The email from the fictitious American was in English, while that from the Puerto Rican was in Spanish. This approach reflects the authentic communication patterns in Puerto Rico and is necessary to maintain the credibility and realism of the scenarios. Table 1 shows the scripts sent in emails.

This short message represents a realistic email that any homebuyer would send to a home seller or that a home seller may typically receive. The email intentionally does not establish any qualification because this study aims to test whether home sellers assume Puerto Ricans are less qualified than Americans. Specifying qualifications would have eliminated the possibility of sellers assuming on their own the purchasing capacity of homeowners based only on the country of origin cues they have.

To ensure that the script used represents a realistic email and reduces the possibility that sellers flag the message, I consulted a Puerto Rican realtor. Most of the emails the realtor reviewed had expressed the intention of purchasing the specific house that potential homebuyers were inquiring about. According to the realtor, this behavior has been increasing in recent years due to heightened competition in the Puerto Rican property market. The realtor has indicated that

Table 1. Scripts used in emails

English	Spanish
Hi there, I'm interested in buying this house. Is this property still on the market? And if so, could you please show me the house? Sincerely, [Full name]	Saludos, Estoy interesado en comprar esta casa. ¿La propiedad aún está a la venta? Y si es así, ¿podrías por favor mostrarme la casa? Gracias, [Full name]

many homebuyers, while in the process of purchasing a house in Puerto Rico, have had other buyers offer cash immediately and at a premium, resulting in the swift purchase of the house and forcing them to restart the purchasing process. Consequently, many potential buyers in Puerto Rico are attempting to acquire a house as quickly as possible to secure it before another buyer does so with cash. The realtor even mentioned that some buyers arrive at the house offering a down payment to secure it. These desperate behaviors have been reflected in the title of a recent *New York Times* article: “*The Rush for a Slice of Paradise in Puerto Rico*” (Murphy Marcos and Mazzei 2022). As a result of that conversation, I decided to use a message expressing interest in buying the specific house in question, rather than just mentioning a generic interest in buying a house. The realtor consulted agreed that the script used seemed like an email they would receive.

Inquiries Sent to Home Sellers

I automated the process of scraping data and sending emails in ClasificadosOnline with Scrapy and Selenium frameworks in Python 3.11. On August 28, 2023, I downloaded all single-family houses posted on ClasificadosOnline. I scrapped each house’s neighborhood and municipality, price, number of rooms, selling party, and the short description. Then, I coded the language of the description as Spanish or English.⁷

The selection of houses was critical in this experimental design. As expected, many real estate agents publish more than one advertisement. To determine if more than one house corresponded to the same seller, I relied on the home seller’s name and telephone included in each house advertisement. For those home sellers who advertised more than one house, I randomly selected one, avoiding the possibility that home sellers would receive more than one email with either the same profile or the same wording and inquiry, which might arouse suspicion. Finally, I used stratified sampling to randomly divide all houses that met the criteria into two groups. I included houses for sale by owner for two reasons. First, property owners in Puerto Rico who want to sell their property tend to do so either by themselves or through a real estate agent. Consequently, houses for sale by owners are a significant share of the housing market in Puerto Rico. Second, I do not expect homebuyers to discriminate against houses for sale by owner or to prefer houses managed by realtors.

To send an email through the real estate website, the website offers two textboxes: email address and message for the home seller.⁸ The agent then receives an email

Table 2. Measurement of outcomes

Main outcomes	Description	Scale
1) Receiving a response	Any email response from a home seller. I did not count automatic replies.	0–1
2) Time to response	Responded in two days or not.	0–1
3) House availability	Directly or indirectly mentioned that the house is still on the market.	0–1
4) Invitation to showing	Mentioned willingness or offered an invitation to showings.	0–1
5) Proof of funds or bank pre-approval	Mentioned the need to show proof of funds or bank pre-approval	0–1

from *automatico@clasificadosonline.com*. The webpage does not allow editing for font (such as font, font size, or italic or bold font), so this is not a factor to consider.

On August 28, 2023, 1,512 emails were sent to the selected selling parties. Half of them were sent from a fictitious Puerto Rican profile, and the other half from an American one. Randomizing the perceived homeseeker's home country made it possible to determine whether home sellers responded differently to Puerto Ricans and Americans. Automating the sending of emails has two main benefits. First, I avoided potential manual mistakes in collecting data and sending emails (Crabtree, 2018, p. 109). Second, automating the process allowed me to send 1,512 emails on the same day. Even with several assistants, sending 1,512 emails manually on ClasificadosOnline would have taken several days and might have been impractical (Butler and Crabtree 2017). Having realtors receive their emails on different days might have affected the results. In addition, the electrical grid infrastructure in Puerto Rico is fragile, and the country suffers constant blackouts (Tormos-Aponte et al., 2022). Had I sent all emails in several days, it would have increased the risk of some agents receiving their emails while they had electricity, while other agents did not. Having electricity or not might have influenced how long realtors took to respond.⁹

Measuring Replies from Home Sellers

Table 2 outlines the outcome measures of interest. First, I recorded whether home sellers responded via email in the 14 days following the intervention. A 14-day window goes in accordance with previous audit studies that test discrimination in the housing market (Kukucka *et al.* 2021). I recorded the response date of those who responded and coded the responses based on their content. Specifically, I recorded whether home sellers stated the house was on the market and whether they explicitly mentioned the possibility of scheduling a showing. In addition, I noted whether the email mentioned the necessity of providing proof of funds or bank pre-qualification either for a showing or to continue the buying process. To avoid conditioning on post-treatment and break randomization in time to response, I have coded the time to response so that if agents responded within two days = 1, otherwise 0. Regarding house availability, willingness to show the property, and bank evidence requirement,

Table 3. Responsiveness descriptive statistics

	Puerto Rican (N = 756)	American (N = 756)	Difference	Total (N = 1,512)
	%	%	p-value	%
Response	56.22%	48.94%	.005	52.58%
Time to respond	49.21%	45.24%	.122	47.22%
House availability	39.55%	44.58%	.048	42.06%
Willingness to show house	22.88%	27.38%	.044	25.13%
Pre-approval or proof of funds	11.51%	10.45%	.511	10.98%

I coded all non-replies as 0. This approach follows established practices (Coppock 2019; Montgomery, Nyhan, and Torres 2018).

Ethical Considerations

Research involving human participants requires maximal care to comply with strict ethical considerations. I complied with the standards specified in the American Political Science Association Principles and Guidance for Human Subject Research. In this field experiment, participants tested were involved without their knowledge or consent, which required additional measures to reduce any possible harm to participants. The contact with home sellers was limited to sending and receiving emails sent through the platform. As an extra consideration, I replied quickly to all home sellers who responded to my first email regarding availability or offering and rejected the offer.¹⁰ I gathered all the information from the online advertisements along with the first email response that realtors sent. The experiment did not aim or expect to change home sellers' behavior, only to measure it. The University of California, Los Angeles Institutional Review Board reviewed and approved the audit experiment described in this study (IRB#23-001159). The pre-registration of this study is available through Open Science Framework Registries,¹¹ but it remained embargoed during the experiment to avoid the possibility that realtors would become aware of it.

Responsiveness to Homeseekers

Of 1,512 emails sent, I received responses from 795 home sellers (52.6% response rate). Following the preregistered design, I estimated five Welch's two-tailed *t*-tests to test for significant differences in responsiveness to Americans and Puerto Ricans (Table 3). These *t*-tests estimate significant differences in the treatment of Americans and Puerto Ricans. I employed five indicators of discrimination: (1) *responses*, (2) *time to respond*, (3) *house availability*, (4) *willingness to show the house*, and (5) *inquiries about proof of funds or bank pre-approval*.

Figure 2 presents differences in responsiveness rates to inquiries from Puerto Ricans and Americans about house availability and a showing. Figure 2A shows that

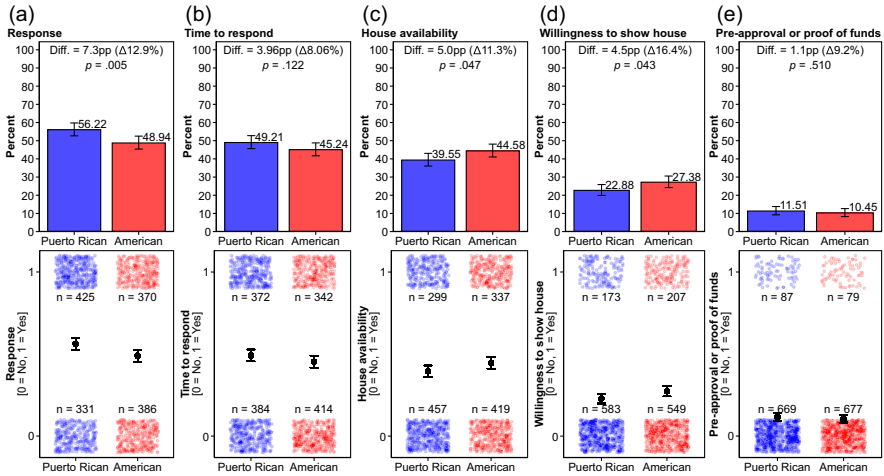


Figure 2. Differential Responses to Inquiries about House Availability and a Showing by Homebuyer’s Country of Origin. *Note:* Differences are reported in percentage points, and *p*-values are based on Welch’s two-tailed *t*-tests. The outer lines represent the 95% confidence interval using Welch’s two-tailed *t*-tests. Scatterplot visualizations are adapted from Coppock (2021). Data was jittered for visualization purposes.

home sellers’ response rate to inquiries increased from 48.9% for Americans to 56.2% for Puerto Ricans ($p < .05$). However, this does not necessarily translate into a privilege. Figure 2B shows no difference in means regarding time to response (Figure 2B). Figure 2C shows that when Americans inquired, 44.6% were told the house was available, while Puerto Ricans only received 39.6% with availability. This 5% difference is equivalent to a sizable increase of 11.3% ($p < .05$). Similarly, Figure 2D shows that Americans received more invitations to showings than Puerto Ricans (27.4% versus 22.8%, $p < .05$). Figure 2E shows no difference regarding the necessity of showing proof of funds or bank pre-approval. These results suggest that in Puerto Rico, home sellers’ practices translate into Americans having more access to the real estate market than Puerto Ricans. Country of origin has a strong correlation with rates of house availability and willingness to show a house.

As a robustness check, the pre-registration includes logistic and ordinary least squares (OLS) regression analyses for the five indicators of discrimination considered in this study with the following control variables: price advertised, Airbnb density, number of rooms, language in the advertisement description, and whether a licensed professional realtor or private owner advertised the house. OLS regression was to be used with a continuous measure of time to response. However, this approach does not allow the inclusion of non-respondents in the analysis. Following emerging practices, I have coded time to response as a dichotomous variable indicating whether a response arrived within the first two days or not. The preregistered model is included in the Online Appendix.

To control for Airbnb density, I relied on a report from a consulting firm based in Puerto Rico that analyzed the distribution of Airbnb properties in Puerto Rico and identified the ten zones with the highest concentration of Airbnb properties as a

Table 4. Regressions predicting home seller responsiveness

	Response	Time to response	House availability	Willingness to show house	Pre-approval or proof of funds
	(1)	(2)	(3)	(4)	(5)
Country of origin	.741**	.873	1.272*	1.299*	.887
(1 = American)	(.08)	(.09)	(.14)	(.16)	(.15)
Advertised price	1.00***	1.00***	1.00***	1.00*	1.00
	(.00)	(.00)	(.00)	(.00)	(.00)
Airbnb density	1.165	1.360	.983	.551*	.511
	(.30)	(.34)	(.24)	(.15)	(.21)
Rooms	1.078	1.096	1.076	1.070	1.104
	(.05)	(.05)	(.05)	(.06)	(.08)
Language of advertisement	1.567*	1.592**	1.445*	2.291***	1.392
(1 = English)	(.28)	(.28)	(.25)	(.40)	(.33)
Agent or owner	1.331*	1.300*	1.340*	1.015	1.930**
(1 = Agent)	(.16)	(.15)	(.16)	(.14)	(.41)
Constant	.622*	.444***	.306***	.184***	.055***
	(.13)	(.09)	(.06)	(.04)	(.02)
N	1,468	1,468	1,468	1,468	1,468

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$. Odds ratios are shown. 95% confidence intervals in parentheses. Listwise deletion of missing observations reduced the samples by 44 in all models. All these missing values correspond to houses announced without price advertised. I do not expect listwise deletion to produce significant bias estimates.

percentage of all housing (Estudios Técnicos 2019). I coded a control variable for Airbnb density as 1 for houses within these ten zones and 0 for houses outside these zones.

Results from the regression models are shown in Table 4. Americans were 26% less likely than Puerto Ricans to receive a response (Model 1), and no difference was found in the likelihood of receiving a response within two days of the initial inquiry (Model 2). However, Americans were 27% more likely than Puerto Ricans to receive an affirmative answer to the house availability inquiry and 29.9% more likely to be offered a showing. No difference was found concerning the requirement for bank pre-approval or proof of funds based on country of origin.

Higher prices are associated with homesellers being more responsive, likely to reply in a 2-day period, reporting the house as available, and willing to show the property. This may be explained as an expected behavior in which agents put more effort into selling more expensive houses because these are presumably harder to sell and represent more profitable transactions. However, additional analyses to test for any significant interactions between different ranges of advertised prices and key outcomes did not indicate statistically significant differences in patterns of discrimination between Puerto Ricans and Americans across different price

ranges.¹² This suggests that the observed patterns of discrimination are consistent across the spectrum of property prices. Additional considerations must be given to the language of description, as it is associated with four of the five outcomes. Further, additional analyses are warranted for the dynamics concerning who is selling the house. Our analyses suggest that realtors are more likely to answer inquiries. Given that most of the properties are sold by realtors (80%) and these are the most expensive ones, the dynamics underlying these sales underscore the need for such studies.

Practices of Statistical Discrimination

In the U.S., there is a documented practice that consists of real estate agents telling whites but not Blacks that a house is not on the market and then showing a more expensive unit (Ondrich, Ross, and Yinger 2003). This is presumably because real estate agents practice statistical discrimination based on a preconception that white people have greater purchasing power, so they can buy a more expensive unit, thus increasing agents' earnings in commissions. The opposite happens with Blacks: agents often tell Black homeseekers that the property is not available and show them a cheaper unit.

Responses to my fictitious homebuyers offered limited qualitative insights about these practices in Puerto Rico. Six licensed real estate agents offered Americans another house, in three cases a more expensive one, and in three other instances without mentioning the price:

1. *"That property is not currently available, but I can show you on other properties in the area. Please feel free to reach out to me with the features that you're looking for your next property in Puerto Rico."*
2. *"The property is optioned. If you need help searching for properties, I am available. I have another one in [omitted neighborhood] in [another municipality]. I remain at your service."*
3. *"Regarding [house in specific location] (\$410k), it has been optioned already. I have another house but in [neighboring municipality] at [neighborhood]. This one should be gone out to the market next week. Asking price could be \$470k approximately."*
4. *"Regrettably, the mentioned property is currently under contract after being on the market for just 4 days. However, I'll soon have another identical property available, which includes [identifiable information omitted], all for a price of \$795K. Please inform me if you're interested."*

—Advertised price of house originally inquired property was \$750,000.

5. *"This house is under contract and about to close in the next few weeks. I do have another property located in the same neighborhood, it is listed for \$199,900."*

—Advertised price of house originally inquired property was \$129,900.

6. *"I was contacting the owner. [...] This time they said that is not time to sell. I will send you a nice alternative from another agent that can be an option for you.*

While Puerto Ricans received 55 more responses than Americans, only one of the home sellers reported the house as not available and offered an alternative property (a private owner in this case, not a professional real estate agent). However, this alternative property, although more expensive, was not a house but a camper with a deck:

1. *"I have two properties in [omitted neighborhood]. The house is in the selling process. I have a camper/deck that is also for sale but is worth more."*

These responses provide some qualitative insight into the importance home sellers place on the expected purchasing power of American homebuyers versus Puerto Ricans, reinforcing what was found in the regression models. In only one of the 126 responses to Puerto Ricans about houses not being available did a home seller explicitly offer another property. In contrast, home sellers offered another property in 6 of 33 responses to American buyers when the property of interest was unavailable. The number of agents offering alternative properties to American buyers was relatively small, especially considering the total sample size of 756 English-language emails and the lower non-response rate. However, it is found more than among Puerto Ricans, underscoring the need for more research on the matter.

Discussion

This paper studies the effects of country of origin on home sellers' responses to home buyers in Puerto Rico. It advances previous research by being the first study to explore discrepancies in the treatment of Puerto Rican home sellers toward fellow nationals and Americans. This randomized experiment provides causal evidence of discrimination against Puerto Ricans and favoring Americans in the real estate market in Puerto Rico. Homeseekers' country of origin resulted in a significantly higher house availability and willingness to show a house.

Puerto Rican home buyers received more responses. These results do not, of course, prove that agent prejudice is not at work. Many of these responses to Puerto Ricans contain replies reporting houses were not available. It is possible that the fact that Puerto Ricans received more responses (although saying that the house is not available) is simply because, for home sellers, responding to an email in Spanish requires less effort. The greater effort that represents replying in English might discourage responses, especially when the house is not available while responding in Spanish about the unavailability of a house as a courtesy without impacting the outcome of the exchange requires less effort. This extra effort may also translate into extra time to craft a reply, which may explain why this research did not find evidence that home sellers in Puerto Rico respond faster to Americans than to Puerto Ricans.

The extra effort it took for some home sellers to send emails in English was evident in dozens of responses to Americans in which home sellers apologized in advance for their limited English or explicitly mentioned that they used Google Translate or asked family members for help to write the email response. Even with the extra effort it can take for a home seller to send an email in a language that is not their first language, they reported more available houses to Americans and were more willing to show houses.

Although these findings do not provide causal evidence about home seller motivations, the differential treatment identified is generally consistent with practices of statistical discrimination. All findings mentioned in this paper align with the proposed hypothesis that home sellers in Puerto Rico treat American and Puerto Rican home buyers differently. As with customer-prejudice and agent-prejudice theories of real estate agent discrimination, it is not possible to directly test and measure the effects of colonized mentality in discrimination with a housing audit study. However, adopting a behavior that treats and privileges settlers from the metropolis better than locals is consistent with theories of colonialism and the colonized mentality of colonial subjects.

The findings of the experiment in this study do not distinguish between the extent to which home seller responsiveness was influenced by homebuyers' country of origin or the expectations of purchasing power that those different countries of origin represent. Would the effect have been different had the homebuyers been equally qualified? Two findings indicate that home sellers assume American settlers are more qualified to buy a property. First, the average price for houses with a description in English is more than five and a half times higher than for houses with a description in Spanish. Second, a limited qualitative analysis of the responses detected six instances in which home sellers who reported a house to an American home buyer as not available offered another house, either more expensive or without mentioning a specific price. The study of how wealth or economic signals are associated with real estate dynamics in Puerto Rico lies beyond the scope of this preregistered study and warrants further attention.

Scholars have conducted online audit studies to measure discrimination in various contexts in many housing markets. This study has been designed following the latest methodological and standard practices in audit studies (Gaddis 2018). Despite these strengths, there are numerous limitations to be noted. First, I did not directly indicate ethnicity or home country in the emails. Instead, I relied on cues inserted into the script. I believe that home sellers easily and correctly associate emails in English and sign with common American names with an American homebuyer (see, e.g., Greiner and Rubin 2011). They would also have no reason to think that an email in Spanish with a common name in Puerto Rico is not from a Puerto Rican.

Second, the first and main language of Puerto Rico is Spanish. This represents both an advantage and a limitation in this study. The advantage is that home sellers might intuitively associate the emails received in Spanish with Puerto Rican profiles and emails in English with American profiles. The limitation that language represented in this study is that I could not measure the English fluency of home sellers. However, this is less significant for the experimental design because English is taught as a second language in schools in Puerto Rico (Correa 2019). Even if home

sellers' English proficiency is limited, it would not be inconvenient for them to communicate with monolingual English speakers via email or execute a sale in English (McCroskey, Fayer, and Richmond 1985). In addition, current technology allows the use of a virtual translator to write an email.

A third concern relates to sample size and representativeness of the website selected. The sample size is slightly below the target sample size included in the pre-registration (Castro Irizarry 2023). This is because more houses were listed than when the experiment was launched. The website selected has been the main one for selling homes in Puerto Rico since 1999. Most recent is the incorporation of the Puerto Rican estate market on U.S. platforms, where different dynamics may emerge as they continue to go. Despite these strengths and limitations, this study provides important information about dynamics in the Puerto Rican real estate market.

Supplementary material. The supplementary material for this article can be found at <https://doi.org/10.1017/rep.2024.25>.

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Ethical standards. The author declares the human subjects research in this article was reviewed and approved by the University of California, Los Angeles Institutional Review Board (IRB#23-001159). The author affirms that this article adheres to the APSA's Principles and Guidance on Human Subject Research.

Notes

1 In countries where housing studies have been developed, it is common practice that homeowners sell their property through a private licensed real estate agent. Therefore, much of what we know about home sellers' behavior come from studies solely on licensed professional real estate agents. In Puerto Rico, homeowners sell their properties either through a professional licensed real estate agent or by themselves. For that reason, I include in this study real estate agents and private homeowners selling their houses. I use *home sellers* as a broader term that includes both real estate agents and private owners selling their properties.

2 Arabs and Muslims are different concepts, but Western social scientists often use them interchangeably (Bonilla-Silva 1997; Wimmer 2008)

3 <https://twitter.com/adrianaDesala/status/1483228628758536195>

4 Translated from Spanish.

5 All decrees granted by the government of Puerto Rico are public data provided upon request.

6 Table A1 in the Online Appendix shows the names used by the fictitious American and Puerto Rican homebuyer.

7 Seventy-seven houses had the description in both languages. I coded these 77 houses as Spanish since having descriptions in both languages does not represent a barrier to Puerto Ricans buying a house.

8 See the Online Appendix for screenshots with examples.

9 Luma Energy, the operator of the Puerto Rico's electricity grid, did not report any blackouts on August 28, 2023, the day emails were sent.

- 10 This approach follows the established practice in audit studies about housing. Not rejecting potential offers could increase the burden as home sellers could decide to invest additional time in follow-ups. This approach reduces the possibility of pursuing a fictitious client.
- 11 The pre-registration of this study can be found at <https://doi.org/10.17605/OSF.IO/SXF4D>.
- 12 See the Online Appendix for additional analyses.

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