Designing Online Marketplaces

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Online marketplaces have proliferated over the past decade, evolving far beyond the pioneers such as eBay and Amazon. Specialized platforms such as Airbnb, Uber, and Upwork have created new markets where none existed and pushed a growing fraction of the economy online. In contrast with most offline markets, online marketplaces are designed by organizations whose rules shape market outcomes. Market designers wield considerable power. Their rules determine whether a given platform is better for newcomers or experienced participants, or buyers or sellers, and whether participants abide by or break the law. Over time platforms have become increasingly "social," providing information not only about the products or services being sold but also about buyers and sellers. The sharing of user information can increase trust (one market-design goal), but it may also facilitate discrimination (an unintended side effect). This paper provides an economist's toolkit for designing an online marketplace, focusing on building trust and reputation while avoiding discrimination and inequality.

1 Introduction

Suppose that a senior executive at a hotel chain were to propose the following change to its reservation policy.

Let's start encouraging guests to upload their pictures, and let's allow branch managers to reject guests if they don't like the way they look. Potential guests would continue to make reservations through the website as before, but they would be nudged to upload pictures and links to Facebook pages or LinkedIn accounts. Branch managers would then have 24 hours to decide whether the guest looked sufficiently trustworthy. If the guest looked trustworthy, he or she would be accepted for a reservation. If not, the guest would be rejected. Managers would like the policy because they could accept the guests that they are most comfortable with. We'd also save money because the most costly guests would go elsewhere. What could go wrong?

Of course, this idea sounds unrealistic. While it is conceivable that a branch manager could distinguish some of the trustworthy guests from the bad on the basis of looks or name, the adoption of screening on this basis seems like a recipe for disaster. In particular, what sorts of pictures and names should a manager screen for? The Civil Rights Act of 1964 prohibits discrimination on the basis of race, color, religion, or national origin. While the manager could certainly look for subtler cues, incorporating appearance in the reservations process would likely be too risky for any benefit the hotel might receive.

Yet this has become a routine design choice made by online marketplaces that facilitate transaction between buyers and sellers. For example, Airbnb is an online platform for people to list and find short-term lodging; it attempts to build trust by

allowing would-be renters to present personal profiles and post pictures of themselves. Hosts can then accept or reject guests based on their pictures and profiles. This design choice is the norm on such platforms – indeed, it represents a broader trend of platforms' providing more information to market participants – and it demonstrates the large degree of flexibility that online marketplaces enjoy, and leverage, in their market-design choices (much more than can be found in traditional markets). The rules established by designers of online marketplaces determine whether a given platform is better for newcomers or experienced participants, or buyers or sellers, and whether participants abide by or break the law.

The design choice of allowing hosts to reject guests on the basis of profile elements such as name, picture, and number of Facebook friends is a double-edged sword. Across a pair of papers (Edelman and Luca 2014; Edelman, Luca, and Svirsky 2016), my collaborators and I find that the design choice also facilitates discrimination – African-American guests (and hosts) are discriminated against on Airbnb. Overall, this pair of papers suggests that there is a tradeoff for managers: while information can facilitate transactions, it also facilitates bias. This is part of a broader, troubling trend of discrimination that has been documented in online marketplaces including eBay (Nunley et al., 2011), Craigslist (Doleac and Stein, 2013), and Prosper (Pope and Sydnor, 2011). In labor market contexts, there is extensive evidence of discrimination against minority job applicants (Bertrand and Mullainathan 2004). Online labor markets such as Upwork are designed in a way that makes it easy for discrimination to manifest in online contexts as well. For example, Ghani et al (2014) find that employers of Indian ethnicity are more likely to hire workers from India.

These findings highlight the promise and peril of online marketplaces. The existence of new online markets, with their sophisticated reputation systems and trust mechanisms, creates value for a society as a whole. However, the same reputation systems allow for unintended consequences such as discrimination.

In this paper, I document the evolution of new online markets, as well as the design choices that enable them. I highlight the key features of reputation systems and the problems that can arise. I then survey the evidence on discrimination in online markets and consider three sets of solutions – those generated by the platforms themselves, by policymakers, and by users.

2 The Rise of Online Marketplaces

The founding of Amazon and eBay in 1994 and 1995, respectively, ushered in the first generation of online marketplaces. These platforms were remarkable in their ability to facilitate transactions between strangers. Someone in upstate New York could order a used book from a stranger in southern California and trust that it would arrive in a few days. In the 20 years since, a variety of more specialized platforms such as Airbnb, Uber, and Upwork have emerged, creating new markets and pushing a growing proportion of the economy onto the Internet. To give context for how quickly that industry is growing: Airbnb was founded in 2008, was valued at roughly $2 billion when I wrote my first case study on it (Edelman and Luca 2011), and is now valued at $25 billion. Airbnb has more than 2 million listings, which is more than the largest hotel chain. Similarly remarkable is the statistic that there are now more Uber drivers than traditional taxis in New York City. Table 1 provides a sample of marketplaces that are active as of 2016. Table 2 provides data on the annual revenue of a subsample of those.

3 Reputation Systems

A market cannot exist without trust. Buyers need to trust that sellers are accurately describing the products or services they are offering and that they will fulfill the transaction as promised. Sellers need to trust that buyers will pay as promised, and in the case of services and rentals, will abide by the agreed-upon rules. To facilitate trust, online platforms create *reputation systems,* which allow buyers and sellers to build reputations on the platform.

Historically, reviews have formed the backbone of reputation systems. Sellers on platforms ranging from eBay to Airbnb to Uber are rated and reviewed by buyers, and buyers can use this information to choose whom to interact with. Likewise, buyers are reviewed by sellers. Reviews allow buyers and sellers to make sure they are transacting with someone trustworthy. Reviews also create incentives for quality, as behavior of users is made more public. This can allow for better sorting, as users vary in risk tolerance and may have different willingness to pay to transact with users with an established reputation.

Yet many problems arise in reputation systems. In this section, I highlight the main challenges – and potential solutions – to building a robust reputation and review system in an online marketplace. Broadly speaking, there are two main mechanisms that a platform can use to improve the quality of its review system. First, it can improve the incentives to leave high quality reviews. Second, taking the reviews as given, it can aggregate the reviews in a way to increase its informational content. I discuss four

potential sources of bias in light of these two mechanisms. I then look beyond reviews for other tools to facilitate trust.

3.1 Reciprocal Reviewing

The process of reciprocal reviewing (i.e., of buyers and sellers reviewing each other) is valuable because it builds trust on both sides of the market. However, it can create strategic incentives for upward-biased reporting if reviewers fear retaliation. For example, when Airbnb's policy allowed renters' reviews to be posted before hosts' (as was previously the case), guests might have been hesitant to leave bad reviews out of concern that hosts would retaliate.

To circumvent this problem, platforms such as Airbnb have moved to a system sometimes referred to as "simultaneous reveal": they do not display ratings until both sides have left a review. Simultaneous revelation of reviews reduces the strategic problems associated with reciprocal reviewing (Bolton et al. 2013, Fradkin et al. 2015). However, even in a simultaneous-reveal system, strategic incentives persist. For example, buyers may be reluctant to provide negative feedback if they suspect that it would discourage other sellers from transacting with them.

One potential solution to the problems created by reciprocal reviewing would be to allow users to leave anonymous ratings (in situations where this is feasible), which could allow users to be more honest without fearing indirect retaliation. To increase anonymity, platforms might consider showing only aggregated feedback. While this reduces the total amount of information being provided to users, it may increase the quality of that information.

3.2 Social Distance

Beyond strategic incentives, one might expect social distance between buyers and sellers to play an important role. In particular, evidence suggests that social distance affects a variety of other regarding behavior. For example, changing social distance affects generosity (Hoffman et al 1996) and reciprocity (Charness et al 2007) – even in one-shot games. With pictures and profiles becoming an increasingly common design choice, online marketplaces are beginning to shrink the social distance between buyers and sellers. One might expect this to lead to higher ratings than the true experience. This suggests that increasing social distance may increase the accuracy of feedback.

3.3 Self-Selection

Because reviews in online marketplaces are voluntary, they can suffer from selection bias , in that reviews are left by users who both chose to purchase the product or service and to leave a review online. In particular, users may be more likely to leave a review after an especially positive or negative experience. Indeed, Hu et al. (2009) find that reviews on Amazon tend to exhibit an asymmetric bimodal (J-shaped), with more positive than negative reviews. They argue that experiences for many products are more likely to resemble a normal distribution, and hence the J-shape suggests that people are more likely to leave reviews after extreme experiences**.** Masterov et al. (2015) find consistent evidence from eBay, where buyers are more likely to leave a review after a good experience.

There are a variety of tools that online marketplaces can use to improve this selection problem, ranging from sending repeated email notifications encouraging people to report their experiences to paying people who leave reviews. Alternatively, to the

extent that platforms know who is leaving a review, they can incorporate this information into the reputation score – for example, penalizing sellers who receive low rates of feedback.

3.4 Promotional Content

A third potential bias in online reviews occurs when people or businesses surreptitiously leave reviews about themselves or competitors. While this has been shown to occur in review platforms (Mayzlin, Dover, and Chevalier 2014; Luca and Zervas 2015), marketplaces have a stronger ability to reduce promotional reviews since they can more easily verify whether a transaction has occurred. Nonetheless, many online marketplaces (such as Amazon) allow people to leave reviews without verifying the purchase. Even on platforms such as Airbnb that only allow verified reviews, promotional can still be a potential problem if hosts are able to create transactions with themselves or their friends simply to have the opportunity to leave a promotional review.

Beyond verification of transactions, there are several other potential approaches to reducing promotional content: spam can be identified through algorithms that mine reviews' text and characteristics (e.g. Ott et al. 2011, Akoglu et al. 2013), and platforms can "review the reviewers" and give more weight to those with longer transaction histories.

3.5 Beyond Reviews

Online marketplaces can supplement reviews through other trust-building mechanisms. The marketplace itself can do more to screen or authenticate information about buyers and sellers. For example, Airbnb could conduct interviews of renters and hosts, or they could run background checks. Care.com, a marketplace for childcare

providers, has incorporated a greater degree of platform-driven screening. The platform can also provide insurance – and clear liability rules - for situations where something does go wrong.

4 Discrimination in Online Marketplaces

Should we expect the Internet to increase or decrease the amount of discrimination in a market? In the early days of electronic commerce, economists hypothesized that online platforms might decrease the amount of discrimination. For example, consider a customer looking to purchase a car. This is a market where prices are negotiated separately for each buyer, and the final price paid is opaque. This is also a market where racial discrimination is prevalent (Ayres and Siegelman 1995). However, when a purchase is initiated through an online platform, Morton et al. (2003) find no racial difference. Similarly, eBay has less scope for discrimination – both because of the way that transactions occur and because of the fact that indicators of race and gender are generally not very salient on the platform. In other platforms, such as Amazon and Expedia, sellers essentially pre-commit to accept all buyers regardless of race or ethnicity.

Over time, the design of online platforms has changed – moving toward systems with less anonymity and fuller profiles of users, coupled with more flexibility on the part of sellers and buyers to do business based on these attributes. For example, Expedia effectively prevents hotel from rejecting a guest based on perceived race, ethnicity, or almost any other factor. But if the same hotel lists a room on Airbnb (which some hotels have begun to do), it could reject a guest based on these factors or others. This highlights the fact that while the Internet has the potential to reduce discrimination; this benefit

depends on the design choices made by platforms. And, in fact, discrimination has now been documented in a variety of online marketplaces. Table 3 summarizes the evidence on discrimination across different online marketplaces. This section documents the evidence, as well as design features that might facilitate discrimination.

4.1 Housing rental markets

Most searches for accommodations – both short term and long term – now begin online. For long-term apartment leases, platforms including Craigslist, Zillow, and many of their competitors provide rental information. In these markets, the platform typically provides the initial connection between potential landlords and lessees (and often charges a fee for advertising), but does not facilitate actual payment or charge fees based on transacted leases.

In short-term rentals on marketplaces such as Airbnb and HomeAway, the market looks very different. Transactions are often agreed upon from afar, and the platform does facilitate payment. On Airbnb, prospective hosts and guests provide information not just about their listings and preferences, but also about themselves – often posting photos, providing their name etc. All of these factors are provided before a host decides whether to reject a guest.

Across a pair of papers (Edelman and Luca 2014, Edelman, Luca, and Svirsky 2016), my collaborators and I find that these design choices matter – African-American guests (and hosts) are discriminated against on Airbnb in a way that would be infeasible under different design choices. Looking at listings in New York City, Edelman and Luca 2014 find that African-American hosts earn about 12% less than White hosts for similar listings. Edelman, Luca, and Svirsky (2016) implement a field experiment across five

cities, varying only the race of the person requesting to stay with a host. African-American guests are roughly 15% less likely to be accepted relative to White guests, holding all else constant.

4.2 Labor markets

Looking at the online labor market Upwork (which was called oDesk at the time), Ghani et al (2014) find that relative to other employers, employers of Indian descent are more likely to hire Indian nationals.[1] Given the design of Upwork, which provides pictures of employees during the recruiting process, one might expect other forms of discrimination to be prevalent as well. Figure 2 presents results from a search for potential employees on Upwork. A variety of more specialized labor markets have arisen in the digital age as well, ranging from Topcoder (specializing in programmers) to Uber and Lyft (specializing in drivers). As of 2015, roughly 0.5% of all U.S. workers provided contract services through online marketplaces (Katz and Krueger 2016).

The rapid growth of online labor markets has the potential to increase or decrease discrimination. For example, consider the taxi industry – an industry in which men are historically overrepresented. As of 2014, there were more females on Uber relative to the traditional taxi industry (Hall and Krueger 2015). New data from a survey done by the Benenson Strategy Group shows that these numbers are far from static – in fact, there has been a 30% increase in female Uber drivers in the past year alone.[2]

Online labor markets have a unique opportunity to prevent discrimination using various tools, some of which we discuss in the next section

[1] There is extensive evidence of discrimination in offline labor markets, which is
[2] Benenson Strategy Group: Uber The Driver Roadmap 2.0

4.3 Credit markets

Credit and funding markets are rapidly changing as peer-to-peer lending and crowdfunding platforms are on the rise. On peer-to-peer lending platforms such as Proper.com, would-be borrowers post profiles and an amount they are looking to borrow. Would-be lenders select among borrowers that they would like to fund. Looking at Prosper, Pope and Snydor (2011) find that loan listings for black borrowers are 25-35% less likely to get funded than loan listings for white borrowers with similar credit scores. However, black borrowers are also more likely to default on a loan through Prosper, leading the authors to conclude that this is statistical discrimination. In their context, reducing discrimination would also reduce efficiency unless the platform were to supplement listings with further information to predict default rates.

4.4 Other markets

Other markets face discrimination challenges as well. For example, Doleac and Stein (2013) implement a field experiment on Craigslist in which they sell used iPods. In the posted pictures, they vary the hand that is holding the iPod. They find that the demand for the iPod is lower when the hand holding it is African-American. Looking at sales of baseball cards on eBay using a similar design, Ayres et al find that cards held by African-American sellers earn roughly 20% less. Nunley et al. (2011) also find discrimination on eBay, but note that the extent of discrimination also depends on the amount of competition. In their design, the name of the seller is varied (as opposed to the picture). Relative to platforms such as Airbnb and Upwork, both eBay and Craigslist have less of a norm for sellers to post personal pictures of themselves. Hence, while discrimination can exist on eBay and Craigslist, these platforms are doing less to facilitate it than are

platforms that encourage (and in some cases require) users to publicly post information that signals their race, gender, or other personal information.

5 Debiasing Marketplaces

While they refer to the importance of inclusion and non-discrimination in their marketing materials, Airbnb has thus far taken the implicit stance that it is not their responsibility to enforce antidiscrimination regulation or norms on their platforms. In other words, Airbnb has thus far allowed users to make independent decisions about whether to discriminate.

There are many market design solutions that online platforms could implement in order to reduce discrimination. Moreover there is variation in the choices that platforms make in this area that can influence the extent of discrimination. In this section, I lay out four market design solutions that can reduce discrimination in an online marketplace, focusing on Airbnb as an example.

5.1 Optimal information provision

Until recently, most musicians within major symphony orchestras were male. Over time, gender equality has increased. Goldin and Rouse (2001) find that roughly 25% of the change in composition was driven by one simple change – blind auditions. Historically, when a musician would audition for the orchestra, he or she would be both heard and watched by the evaluating committee. Over time, there has been a shift in norms toward blind auditions; now, there is typically a screen between the musician and the evaluating committee – this makes factors such as looks, race, and gender less salient while allowing the committee to focus on the quality of the music.

This highlights the fact that while information is necessary to make markets function, more information is not always better. Providing information about factors such as race and gender can facilitate discrimination; removing this information can moderate discrimination effects.

In offline settings, it is often difficult to blind transactions. For example, it would be challenging for me to put a screen up in front of a candidate that I am interviewing. One of the unique features about *online* marketplaces is that they provide an opportunity to decide when and where virtual screens should be placed. In the context of Airbnb, it would be a trivial exercise to remove identifying information about guests and hosts. For example, they could limit pictures, names, and racial identifiers of hosts until after a transaction is completed. Similarly, they could remove elements of guest profiles that provided race information until after the host had accepted a reservation request.

In practice, there is considerable variation in the amount and timing of information that is provided to buyers and sellers in online marketplaces. For example, Airbnb and HomeAway (a major competitor of Airbnb) take different approaches to information provision. For example, complete guest profiles (many of which have pictures – in our sample, we saw roughly 40% had pictures) are more the norm on Airbnb. Figures 1 and 3 display typical guest profiles on Airbnb, highlighting the differential prevalence of pictures and social profiles across the two platforms. Differences also become apparent when looking at the search process. When searching on Airbnb, results show the pictures of hosts along side pictures of listings on the main results page. In contrast, HomeAway shows only the pictures of listings; users need to

click on a listing before seeing host information. Figures 4 and 5 provide sample results for each platform.

One can imagine a world in which online platforms do not provide any identifying characteristics of buyers and sellers until after the transaction is completed. For example, both eBay and Amazon function successfully with little information to identify personal characteristics such as race and gender and rely mostly on user ratings.

5.2 Personalized reporting

Discrimination is often implicit, meaning that people may not even realize that they are discriminating. On Airbnb, a host may be influenced by a guest's race or gender without even realizing that this is occurring. Implicit bias may occur across a variety of contexts, such as when deciding whom to hire on Upwork or whether to pick up a passenger through Uber.

One possible tool to combat implicit bias is to assess discrimination at the user level, and provide personalized reports so that users can diagnose their own biases. For example, Airbnb could develop a personalized (and confidential) report for all hosts and guests documenting their level of implicit bias based on an implicit bias test. This report could provide users with a record of their search history, including their record of choosing properties or accepting reservation requests.

This flavor of intervention has been implemented in other contexts. For example, at my home institution, our faculty-recruiting committees are encouraged to take an Implicit Bias Assessment before recruiting. Moreover, we keep track of faculty whom we have interviewed, whom we rejected, and why we rejected them (when we do). In my

personal experience, our searches aim to be unbiased but this is a tool to help us understand our own decision making experience.

While individual organizations can (and sometimes do) implement this type of practice, online marketplaces have the unique ability to diffuse this to all of their users.

5.3 Increasing salience of diversity goals

An alternative (and potentially complementary) approach would be to make the objective of increasing diversity more top-of-mind for users. For example, Airbnb could require hosts to check an acknowledgment box that says, “Airbnb prohibits discriminatory behavior” each time that a host chooses whether to accept or reject a guest. Similar to the way that priming ethics can induce ethical behavior (Shu et al 2014), this might prime users to think more carefully about the possibility that bias is creeping into their decisions. Similarly, Airbnb could create a badge that says, "I embrace diversity," and let hosts elect to add this to their profiles.

5.4 Penalties for discrimination

A platform can also use analytics to identify – and discourage - discriminatory behavior. For example, Airbnb has an algorithm that determines the order in which listings are shown during a search. The algorithm takes into factors such as the location of the listing, rating, and number of reviews. Initially, Airbnb penalized hosts who rejected guests. Airbnb could show listings of discriminating hosts lower in the search order, effectively penalizing discriminating hosts and helping guests to match with hosts who do not discriminate.

6 Other solutions

While redesigning the market is one possible approach to reducing discrimination, there are at least two other approaches. First, in some contexts, legal action could be taken – either against the platform or against the people and companies interacting on the platform. Second, third-party developers can create tools to allow users who fear that they are discriminating or being discriminated against to proactively address their concerns.

6.1 Legal solutions

The rules around liability are complicated in this context. As we lay out in Edelman and Luca (2014), platforms generally have strong protection against liability in this context. Within the context of housing markets in the United States, Craigslist was found not to be liable for discriminatory messages from users. However, Roommates.com was found liable for discrimination on their platform when they asked users for preferences about their age, gender, etc., and asked their preferences along the same dimensions in a search for roommates. Regulatory requirements of platforms vary based on the market the platform is operating in. For example, labor markets and housing markets have different regulatory requirements around discrimination. Requirements also vary by country. Moreover, requirements are changing over time.

Liability of sellers is similarly complicated. Discrimination against protected classes in short-term rental markets is prohibited within the United States, but small landlords are exempt (i.e. those with very few listings). On Airbnb and HomeAway, there is a combination of small hosts and larger ones with multiple listings. Hence only some hosts would be held legally accountable if found to be discriminating. Of course, this exemption predates the rise of online marketplaces, which have led to a shift from a small

number of major hotels to a large number of small landlords. As is the case with platform liability, regulation around the liability of participants depends on the market and the country.

6.2 Third-party solutions

Suppose a host on Airbnb does not intend to discriminate, but fears that he or she may have implicit biases that manifest in the booking process. To avoid this, the host could implement versions of some of the tools described above. As a proof of concept, we developed a browser extension for Chrome called DebiasYourself[3], which allows users to see messages and applications without identifying information such as names and pictures until after a transaction has been completed. By using the extension, hosts receive messages and applications without the name or picture of the prospective guest. Similarly, guests see listings and messages without the name or picture of the host. Full information is revealed after the transaction is completed. This would eliminate discrimination by removing the information that would facilitate discrimination. Third parties could develop a variety of tools such as this, which would be optional for users to adopt.

7 Conclusion

The evolution of trust on the Internet and development of principles for developing reputation systems have allowed online marketplaces to thrive. Early work suggested that the arms-length nature of online transactions would reduce the amount of discrimination we see. And in some cases, platforms likely are bringing us closer to the

[3] http://www.debiasyourself.org

bias-free ideal. For example, Ayres et al (2005) find evidence of racial bias in the context of tipping taxi drivers. Because it disallows tipping and instead provides market prices, Uber's design choice will eliminate inequality among driver wages.

But the amount of discrimination in an online marketplace is a choice variable, determined by the design features that the marketplace selects. Ultimately, the decisions made by platforms will depend on ethical considerations, legal considerations, operational considerations, competition considerations, and public relations considerations. This paper has provided insight into the design principles underlying robust reputation systems, and a toolkit for helping to reducing discrimination in the digital age.

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Figures

Figure 1: Sample guests on Airbnb

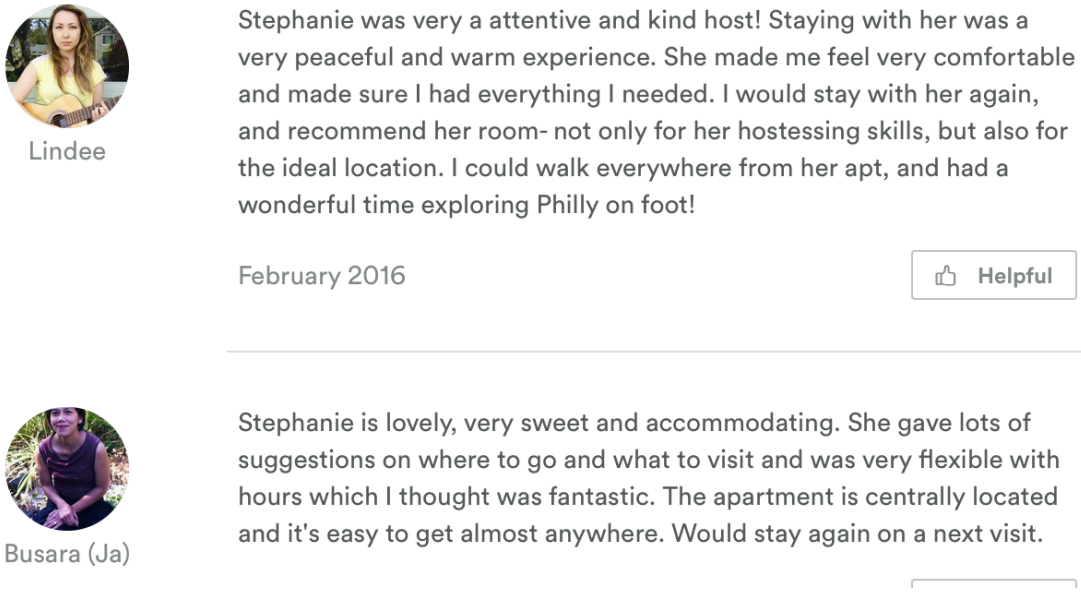


Figure 2: Applicants on Upwork

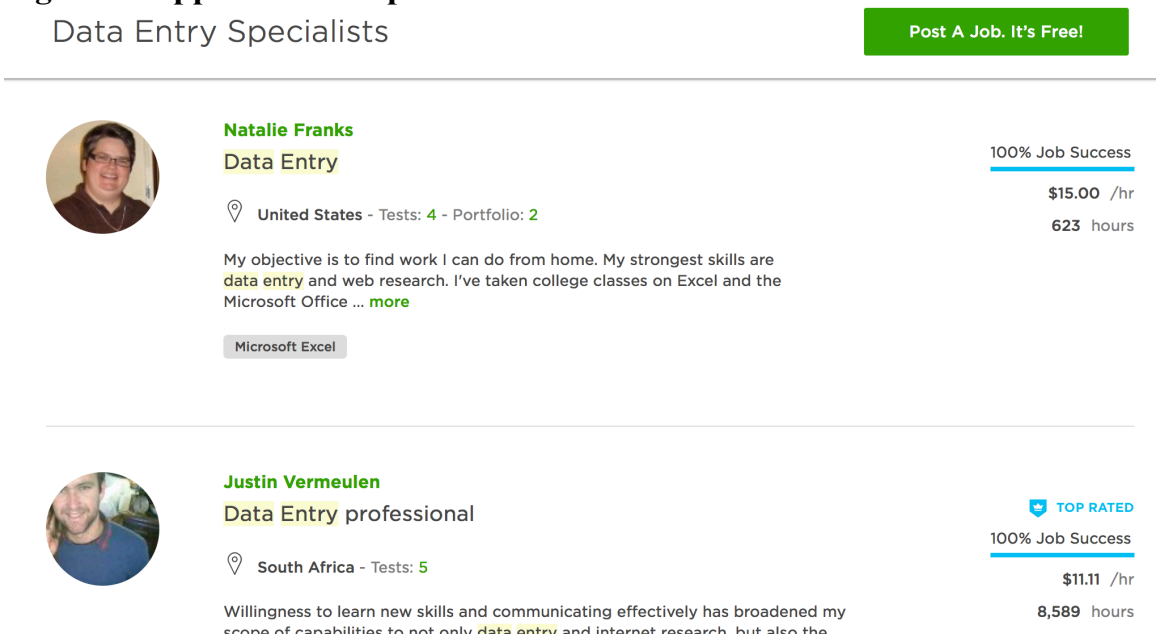


Figure 3: Sample guests on HomeAway

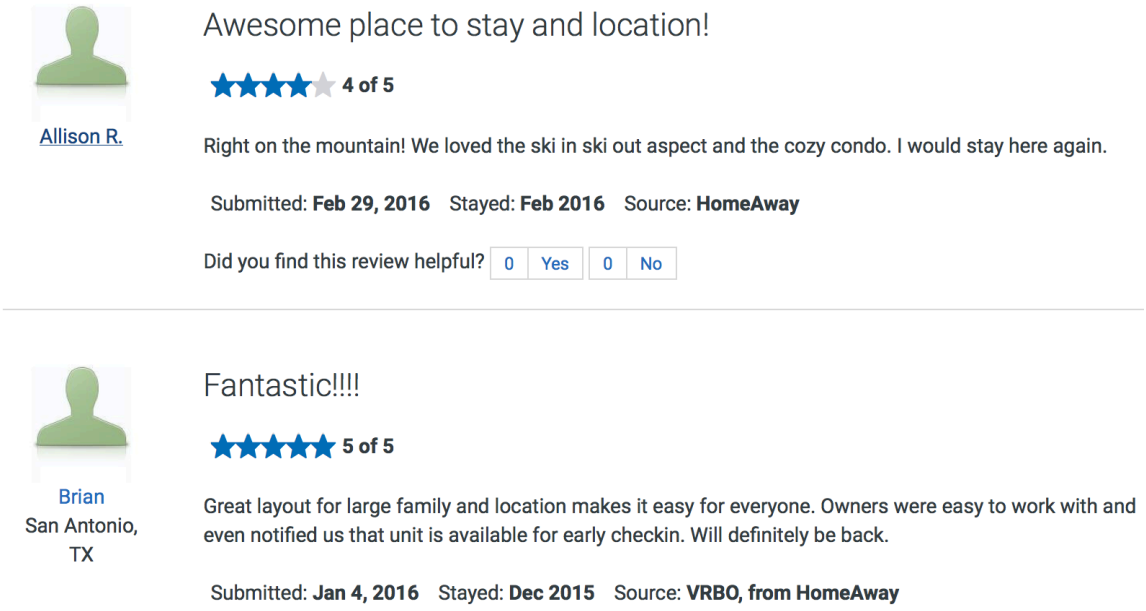


Figure 4: Sample search result on Airbnb

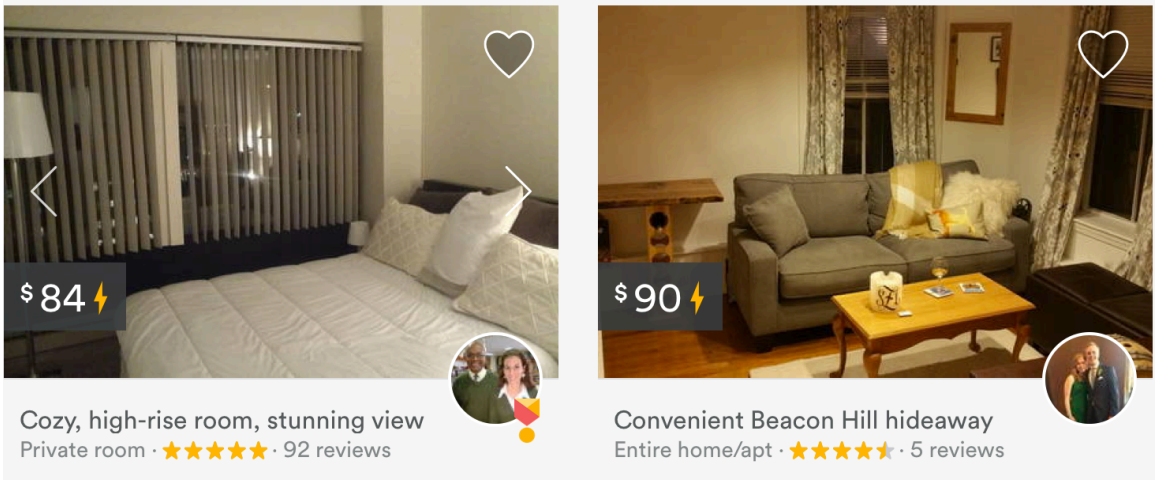
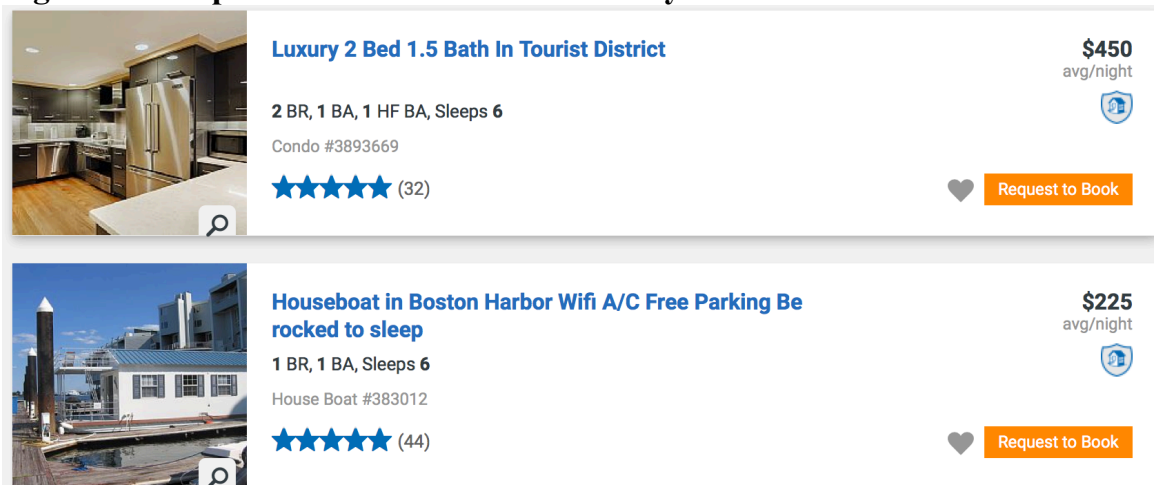


Figure 5: Sample search result on HomeAway



Tables

Table 1: Sample Marketplaces

Market	**Sample Platforms**
Short-term Housing	Airbnb, HomeAway, Couchsurfing
Labor	TaskRabbit, Upwork, MechanicalTurk
Pet sitting	Dogvacay, rover, fetch!
Home Services	HouseCall, Handy
Senior and Child Care	Care.com
Food Delivery	Grubhub, Postmates, Eat24
Credit	Prosper, Lending Club, Kickstarter, Indiegogo
Dating	Tinder, OkCupid, Grindr, CoffeeMeetsBagel,
Handmade Goods	Etsy, CustomMade
Fashion	Renttherunway, Rocksbox, LeTote
Car Rentals	Getaround, car2go
Car Rides	Uber, Lyft
Carpools	PickupPal, BlaBlaCar

Table 2: Reach of Online Marketplaces

Market	# Users	2015 Revenue
Amazon	304 M/+ active customer accounts	107 010 M
eBay	162 M total active buyers	6 103 M
Airbnb	60 M users	900 M est.
Craigslist	60 M/+ users in US alone	381 M
Uber	8 M/+ riders	2 000 M est.

Table 3: Discrimination in Online Marketplaces

Airbnb	African-American guests 15% less likely to be accepted.
eBay	Bids 20% lower for identifiably African-American sellers.
Craigslist	Buyers less likely to contact identifiably African-American sellers.
Upwork	Employers of Indian ethnicity more likely to hire workers from India.
Prosper	Loan listings for black borrowers are 25-35% less likely to get funded than loan listings for white borrowers with similar credit scores