DEPARTMENT OF ECONOMICS AND FINANCE WORKING PAPER SERIES • *April 2010*

The Effects of Competition and Information on Racial Discrimination: Evidence from a Field Experiment

John M. Nunley *
University of Wisconsin-La Crosse, La Crosse, WI

Mark F. Owens **
Middle Tennessee State University, Murfreesboro, TN

R. Stephen Howard ***
Middle Tennessee State University, Murfreesboro, TN

Abstract

We conduct a field experiment to determine whether racial discrimination can be identified in product-market auctions and, if so, under what conditions it is more likely to emerge. We compare the prices paid for perfectly substitutable products sold on eBay between sellers with distinctively white and distinctively black names. Price differences arise in favor of sellers whose names match the expected racial characteristics of buyers. However, the price differences only emerge in markets characterized by low levels of competition, and eBay's feedback system, which reduces asymmetric information between buyer and seller, is successful at mitigating these differences. The results suggest, rather strongly, that competitive forces and market mechanisms designed to reduce informational asymmetries both can aid in promoting non-discriminatory outcomes in markets.

Key words: Racial Discrimination; Statistical Discrimination; Asymmetric Information; Competition; eBay

JEL categories: C93, J15, D82

* John M. Nunley, Assistant Professor Department of Economics, University of Wisconsin—La Crosse, La Crosse, WI 54601, phone: 608-785-5145, fax: 608-785-8549, email: nunley.john@uwlax.edu

** Mark F. Owens, Assistant Professor Department of Economics and Finance, Middle Tennessee State University, Murfreesboro, TN 37132, phone: 615-898-5617, fax: 615-898-5596, email: mfowens@mtsu.edu

*** R. Stephen Howard, Professor Department of Biology, Middle Tennessee State University, Murfreesboro, TN 37132, phone: 615-898-2044, fax: 615-898-5093, email: rshoward@mtsu.edu

THE EFFECTS OF COMPETITION AND INFORMATION ON RACIAL DISCRIMINATION: EVIDENCE FROM A FIELD EXPERIMENT

John M. Nunley
Department of Economics
College of Business Administration
University of Wisconsin—La Crosse
La Crosse, WI 54601
Phone: 608-785-5145
Email: nunley.john@uwlax.edu
Website: www.uwlax.edu/faculty/nunley

Mark F. Owens*
Department of Economics and Finance
Jennings A. Jones College of Business
Middle Tennessee State University
Murfreesboro, TN 37132
Phone: 615-898-5617
Email: mfowens@mtsu.edu
Website: www.mtsu.edu/~mfowens

R. Stephen Howard
Department of Biology
College of Basic and Applied Sciences
Middle Tennessee State University
Murfreesboro, TN 37132
Phone: 615-898-2044
Email: rshoward@mtsu.edu
Website: www.mtsu.edu/~rshoward

This Draft: April 23, 2010

*Corresponding author.

*** We thank Middle Tennessee State University's Jennings A. Jones College of Business for generous funding. We thank Adam Hogan for his help with data collection. We also thank Sheryl Ball, Glenn Dutcher, Nick McKinney, other seminar participants at the 2009 Southern Economic Association annual meeting, seminar participants at Middle Tennessee State University and Florida State University, and numerous colleagues at Middle Tennessee State University and University of Wisconsin—La Crosse for helpful suggestions and comments. We also thank Laron Kirby for editorial assistance.

1. Introduction

Racial discrimination has been studied extensively in economics and other social sciences, but parsing racial discrimination from other influences is difficult. Experiments have become increasingly popular ways to isolate racial discrimination, as these techniques circumvent many of the limitations associated with other methodological approaches by providing greater control over the variables of interest. We build on this literature by conducting a field experiment to determine whether racial discrimination can be identified in product-market auctions and, if so, under what conditions it is more likely to emerge. To investigate these questions, we sell a variety of products on eBay under different seller names. In particular, we pair auctions such that a seller with a distinctively black name and a seller with a distinctively white name sell perfectly substitutable products simultaneously. This design holds constant numerous potential confounds by constructing a direct comparison of prices received by white- and black-named sellers, which presents a way to test for the presence of racial discrimination.

Much of the experimental literature on racial discrimination investigates whether individuals who are members of a particular group treat those who are members of other groups differently. The bulk of these studies provide support for "in-group" biases.[1] In our case, we would observe in-group bias in favor of "same-race" sellers if white-named sellers receive higher prices than black-named sellers when prospective buyers are more likely to be white, and black-named sellers receive a premium when they are selling products more likely purchased by blacks. We select our products such that the expected racial composition of buyers varies, which provides an opportunity to examine whether same-race biases are present in our data.

[1] In-group biases exist when individuals of certain groups are more generous toward or prefer to interact with members of the same group. The psychology literature typically finds strong evidence supporting in-group biases, while the economics literature suggests that the impact of group status depends on the origins of status and incentives. See Anderson et al. (2006) for a review of these literatures.

Theoretical work, primarily in the context of labor markets, suggests that racial discrimination can persist in markets characterized by low levels of competition or asymmetric information. In most contexts, it is difficult, perhaps impossible, to isolate and test directly for the influences of these forces on racial discrimination. The features of eBay and the flexibility of our experimental design allow us to examine how competition and asymmetric information directly affect the price differences between white- and black-named sellers.

Becker's (1957) seminal theory of discrimination suggests that competition lessens the impact of the "marginal discriminator" in the market.[2] However, to our knowledge, racial differences in outcomes have not been directly compared across markets characterized by high and low levels of competition.[3] We investigate this question in product markets by selecting goods such that the level of competition varies between markets. This variation provides a way to test whether the price differences between white- and black-named sellers are more pronounced in markets characterized by lower levels of competition relative to markets characterized by high levels of competition. We expect racial discrimination in product markets to operate in much the same way theory suggests: discrimination is less likely to emerge in markets that are highly competitive and more likely to emerge in markets characterized by relatively less competition.[4]

[2] In labor markets, competition could affect discrimination through its impact on firm profits. Discriminating firms incur additional costs by opting to pay perfectly substitutable workers different wages, which places them at a cost disadvantage relative to non-discriminating firms. As competition increases, discriminating firms may exit the market. In an auction market setting, discriminating bidders do not leave the market. Instead, they either pay higher prices or decrease their probability of winning an auction.

[3] Most field experiments on racial discrimination have focused on labor markets (Bertrand and Mullainathan 2004; Carlsson and Rooth 2007), housing markets (Ahmed and Hammarstedt 2008), or on a single product market (List 2004). In these contexts, it is difficult, to measure differences in the level of competition between markets.

[4] All else equal, a discriminating bidder must have a lower willingness-to-pay for the same product sold by a particular seller. Under eBay auction rules, the maximum willingness-to-pay of the second highest bidder determines the selling price; thus, price differences can be observed if the second highest bidders are frequently drawn from the distribution of discriminatory bidders. Since non-discriminating bidders have a higher willingness to pay, increasing the number of bidders competing in a market raises the probability that the two bidders with the highest willingness-to-pay for a given product are non-discriminating.

The nature of eBay's feedback system provides a clear method for summarizing all the observable information regarding a seller's reputation, which is available to bidders. Much of the recent literature on discrimination focuses on whether the type of discrimination observed is the result of tasted-based or statistical discrimination.[5] We are able to use sellers' feedback scores to identify whether gains in information influence the prices received by white- and black-named sellers. When price differences are observed between white- and black-named sellers, changes in information provide a way to determine whether the type of discrimination observed is consistent with the predictions made by discrimination models based on tastes and/or asymmetric information. In addition, we are able to examine whether market mechanisms designed to reduce informational asymmetries are successful at mitigating racial discrimination.

Our field experiment has some additional advantages over previous studies. First, we are able to observe actual bidding decisions made by real buyers in a naturally occurring environment. The bidders are unaware that they are part of an economic experiment focusing on racial discrimination and are, to a large extent, anonymous participants in the market. In addition, there are no legal consequences for choosing, for example, to pay higher prices to white-named sellers or for refusing to bid on products sold by black-named sellers.[6] Therefore, bidders will not adjust their behavior to appease either the experimenter or other bidders in the market. Second, we enter the product markets as passive sellers without the ability to bargain with or discriminate against buyers. This approach eliminates the influence of the bargaining ability of sellers and their knowledge of the underlying distributions of the willingness-to-pay for different demographic groups, which List (2004) identifies as important factors that can lead to profitable

[5] For example, see Antonovics et al. (2005), Antonovics and Knight (2009), Fershtman and Gneezy (2001), Levitt (2004), and List (2004).

[6] The markets studied are relatively free of government regulation relative to housing and labor markets, which have been the focus of a large portion of the research on discrimination. In housing and labor markets, participants are legally required to consider laws designed to reduce discrimination.

statistical discrimination. Lastly, the auction framework facilitates efficient market outcomes and provides a way to observe the preferences of buyers more fully than posted-price markets.

Our data indicate that statistically significant price differences can emerge between white- and black-named sellers. The direction of the effect is consistent with same-race biases: white-named sellers receive higher prices than black-named sellers for products that are expected to be purchased by whites at greater rates, and black-named sellers receive higher prices for products that are expected to be purchased by blacks at greater rates. However, the price differences observed between white- and black-named sellers are identified only when certain market conditions are present. In particular, price differences emerge in our data in markets characterized by low levels of competition, but we find no evidence of racial discrimination in markets characterized by high levels of competition. These findings are consistent with Becker's model of discrimination, which suggests that higher levels of competition reduce the impact of the "marginal" discriminator. Further, the price differences found in less-competitive markets appear to be driven primarily by the lack of seller credibility, as the price differences dissipate as sellers accumulate credible reputations through eBay's feedback system. While the finding that racial differences are only present at low levels of feedback is entirely consistent with statistical models of discrimination, we are unable to determine whether the discrimination observed is derived from preferences, past experiences, or some combination of both. In either case, our results suggest, rather strongly, that competitive forces and market mechanisms designed to reduce informational asymmetries can aid in promoting non-discriminatory outcomes in markets.

2. Background

There are two primary economic models of conscious discrimination: one based on tastes (Becker 1957) and the other based on statistical discrimination arising from incomplete or asymmetric information (Arrow 1973; Phelps 1972).[7] In the taste-based model, different economic outcomes emerge for majority and minority groups because of animosity. Economic agents pay a premium, either in terms of lost revenue or higher prices, to avoid trading with individuals from a particular class of people. By contrast, discriminatory models emphasizing incomplete information rely on making inference about an individual's unobservable characteristics by using observable characteristics, such as race or gender. Models based on statistical discrimination assume economic agents have no animosity. Nevertheless, statistical discrimination results in differential treatment of persons who differ based on observable characteristics.

Much of the theoretical and empirical literature on discrimination has focused on labor markets. Researchers have established that wage discrimination can persist under either taste-based or statistical models of discrimination in the long run, assuming at least one of the following conditions is met: (*i*) markets are not perfectly competitive or (*ii*) asymmetric information is persistent (see Charles and Guryan 2008). These characteristics are not specific to the labor market, and they can also be present in product markets.

Statistical discrimination can arise in any market affected by asymmetric information, and it occurs when market participants use observable characteristics as a signal to infer unknown

[7] An alternative theory of discrimination, which originated from psychological research, is one based on implicit biases (Bertrand et al. 2005). Individuals may discriminate implicitly or unintentionally against members of a particular group, especially when choices are made impulsively. It is unlikely that implicit discrimination arises for products sold in online auctions, as buyers have opportunities to examine the products, the seller's characteristics, and whether identical products or close substitutes are being sold by other sellers. Prospective buyers would likely examine these characteristics before making a conscious decision to bid on a product. Our data, which are discussed in Section 4, indicate that winning bidders made 5.17 bids on average and only 13 percent of winning bidders placed only one bid. Bidding multiple times on a product is highly suggestive of "conscious" decision-making.

information. In our context, a prospective buyer shopping on eBay may use the racial distinctiveness of sellers' names as a proxy for the expected probability that the product will arrive in the stated condition. If discrimination is rooted in differences in information, there is an opportunity to minimize discrimination through market mechanisms designed to reduce informational asymmetries (e.g., eBay's feedback system).

Attempts to examine racial discrimination, in general, have used regression analysis, laboratory experiments, and field experiments. The regression approach traditionally uses an economic outcome, often a wage, as the dependent variable and controls for observable characteristics.[8] The key explanatory variable of interest is typically membership in a minority group (e.g., Hispanic or black). However, in the regression framework, unobserved differences between majority and minority groups could lead to differences in the outcome of interest not attributable to discrimination.

Laboratory experiments circumvent many of the problems inherent in regression studies by providing a way to hold constant many potential confounds. In addition, cleverly designed laboratory experiments are able to determine whether the type of discrimination observed is the result of in-group preferences (Ball et al. 2001) or statistical discrimination (Fersthman and Gneezy 2001). While laboratory experiments provide the experimenter with a great deal of experimental control, the ability of researchers to extrapolate the results from some of these experiments to naturally occurring markets has been questioned (Levitt and List 2007).

More recently, field experiments have been employed to investigate discrimination in labor, housing, and automobile markets. Several studies have used the audit framework, which

[8] Altonji and Blank (1999) present a comprehensive review of regression studies focusing on the labor market. For the most part, these studies find lower wages and poorer job opportunities for minorities. An obvious issue arising in the regression framework is the influence of omitted variables. Regression studies on discrimination have come under serious criticism, as estimates are sensitive to the data set used and choice of independent variables (Riach and Rich 2002).

physically sends individuals who differ by observable characteristics such as race or gender (but are otherwise not distinguishable from one another), to test for differences in market outcomes.[9] The main concern in audit studies is ensuring that the auditors only differ by race or gender and not by other observable or unobservable characteristics. In attempt to minimize these differences, auditors are trained to use the same bargaining strategy. Despite this training, the audit approach has been criticized because the auditors could differ in unobserved ways, perhaps in terms of perceived lower reservation prices (Heckman 1998).

Many of the criticisms of audit studies have been averted by experiments that, instead of sending people to apply for jobs, send résumés that differ only by the racial distinctiveness of the applicants' names. Bertrand and Mullainathan (2004) find that applicants with distinctively white names receive 50 percent more interviews than comparable applicants with distinctively black names. In addition, they show a similar racial bias for applicants with different levels of socioeconomic status and skill-sets.[10] They attribute their findings to preference-based discrimination rather than statistical discrimination.[11]

List (2004) makes a number of important contributions to the study of discrimination with a field experiment conducted at a baseball card show. Subjects of different races, genders, and ages are recruited to record information as they buy and sell cards. List (2004) shows that non-majority buyers (sellers) are initially quoted higher (lower) prices. However, complementary

[9] Riach and Rich (2002) provide an extensive review of audit studies that examine discrimination in product, housing, and labor markets. These studies typically find preferential treatment for members of majority groups relative to members of minority groups.

[10] It is an open question as to whether the large difference in interview rates between white- and black-named applicants leads to sizeable racial differences in the long run. Fryer and Levitt (2004) examine the impact of having a distinctively black name on a number of long-run outcomes. They find that having a distinctively black name has a small effect on the type of neighborhood in which an individual lives and a positive but small effect on the likelihood of single motherhood. For other outcomes, including education and income, racially distinct names appear to have no long-run effects.

[11] It is still possible for these findings to be attributable to statistical discrimination if employers interpret the names to reflect some other unobservable characteristics, such as the ability to relate to coworkers. This logic highlights the difficulty in isolating taste-based discrimination. Likewise, implicit discrimination could be present in this context, as Bertrand et al. (2005) suggest.

experiments demonstrate that differences in the quotes made by experienced traders to different groups are consistent with differences in the underlying reservations values of the group members. Since experienced traders use race, gender, and age as proxies for unknown reservation values, the price differences are consistent with statistical discrimination rather than taste-based discrimination.

Our study builds on the existing racial discrimination literature by investigating whether own-race biases found in other contexts arise in a natural market setting with real monetary consequences. In addition, we extend this literature by comparing the prices received by white- and black-named sellers in markets with low and high levels of competition, which, to our knowledge, has yet to be studied. Lastly, we use eBay's feedback system as an observable measure of information regarding the credibility of sellers to capture how changes in information influence discriminatory outcomes in markets.

3. Experimental Design

We conduct a field experiment by performing a series of auctions using eBay to create a direct comparison of prices paid for perfectly substitutable products sold by white- and black-named sellers. We use the standard eBay auction format which has ascending English auction rules and a computerized proxy-bid system, which does not require bidders to monitor the auctions continuously.[12] The price for an item sold in an eBay auction reveals the willingness-to-pay of the bidder with the second highest value for the item.[13] By contrast, posted-price markets only convey whether buyers have a willingness-to-pay which equals or exceeds the price. For

[12] See Lucking-Reiley et al. (2007) for further discussion on the proxy-bid system.

[13] To be precise, eBay requires prospective buyers to bid in excess of the existing bid by a minimum amount in order to become the leading bidder. The minimum bid increment is a function of the current price. A buyer must bid in increments of $0.05 when the price is between $0.01 and $0.99; $0.25 if the price is between $1.00 and $4.99; and $0.50 if the price is between $5.00 and $24.99. All of our products sold for less than $25.

our purposes, posted-price markets would capture racial price differences only if the willingness-to-pay to a seller with a racially distinct name (perhaps, a white name) is greater than or equal to the posted price and the willingness-to-pay to a seller with a racially distinct name signifying a different race (perhaps, a black name) is less than the posted price. The auction framework provides a unique opportunity to study racial discrimination, as it identifies a more complete picture of buyers' preferences.

We sell various products (discussed in detail in section 4) under different seller names, which are selected from the list of distinctively black and distinctively white names provided by Levitt and Dubner (2005). The names chosen to represent our "white" sellers are Jake and Dustin, while the names chosen to represent our "black" sellers are DeShawn,[14] Tyrone, and Jamal.[15] For each group of products, we open new seller accounts using the chosen racially distinct names for each market. As a result, each seller account begins with a feedback score of zero for each group of products. We schedule the auctions such that each seller within a given market posts only one auction per week. We pair white- and black-named sellers who are selling perfectly substitutable products at the same time, which provides prospective buyers, who may have a racial preference, with a choice between two sellers.[16]

[14] After some initial results, we felt that "DeShawn" may not be recognized as a distinctively black username. In particular, buyers may focus primarily on "Shawn," which is not identified by Levitt and Dubner (2005) as being a distinctively white or distinctively black name. DeShawn was replaced with Jamal later in the experiment.

[15] The actual seller names used in the experiment begin with the racially distinct first names followed by an underscore and a random number (e.g., *tyrone_123* and *jake_456*). Jake and Dustin are first and sixth on the distinctively white name list, respectively. DeShawn, Tyrone, and Jamal are first, eighth, and 13th on the list of distinctively black names, respectively. Because "usernames" are not necessarily first names, we exclude names on the lists which could also represent last or family names. For example, the second name on the "Whitest" list is Connor and the third name on the "Blackest" list is Marquis, which could be interpreted by prospective buyers as family names. Using these names in our experiment may not be perceived by buyers as racially distinct.

[16] It is possible for a buyer to enter a bid in both auctions simultaneously. Over 1000 different people bid on our items, and about 80 percent of them bid on only one item. Less than 10 percent of our high bidders won more than one of our auctions. There were five pairs of auctions in which both items were won by the same buyer but the second highest bidder differed in each case.

The auctions are constructed so that the only characteristic that differs in a meaningful way is the seller's username. Many features of the auctions are identical across sellers. For example, the auctions last five days and begin with an initial price of $0.01, with free shipping and no minimum bid or reserve price set.[17] The products are shipped "first-class" through the United States Postal Service (USPS) and are only sold to buyers in the continental United States. Each of the sellers lists "Southeastern USA" as their location, instead of a more specific geographic location (e.g., a city and/or state). Payments are received via Pay Pal. We handle inquiries from potential bidders as uniformly as possible so that all bidders have the same information at their disposal.

There are some features of the auctions which cannot be made identical without alerting buyers that two seller accounts are from the same source. For example, our design necessitates differences in the appearance of the auction advertisements.[18] We include a picture and fact-based description, which provide details on the product and its manufacturer, model, quality, and appearance. The format, background color, and the order of presentation of facts about the product differ, but the content is identical. We test these auction descriptions in a separate experiment to ensure the characteristics of the advertisements do not influence the prices received. The details of these tests are discussed in the Appendix. The results from these tests indicate that our auction advertisements are visibly different within a given pair but are not statistically different from one another in terms of the prices they will receive (See Appendix Table A1).

[17] In prior studies, auctions with minimum bids and reserve prices receive either the same or lower selling prices than those without price restrictions (Bajari and Hortacsu 2003; Lucking-Reiley et al. 2007; Katkar and Reiley 2005). Likewise, previous studies show that buyers are sensitive to differences in shipping costs (Hortacsu et al. 2009; Hossain and Morgan 2006). We offer free shipping, in part, because our products are inexpensive and a shipping charge would be a large fraction of the cost to the buyer.

[18] Each seller uses the same description each time a particular product is sold. See Figure A1 in the Appendix for two examples of auction descriptions. The auction descriptions for the other products sold are similar to these layouts.

It is also necessary to end the auctions at different times to reduce the chance that buyers recognize that two sellers' accounts are from the same source.[19] One of the auctions, within a given pair, begins and ends two days prior to the other auction. We post the first auction on Thursday afternoon so that it ends on Tuesday afternoon. The second auction begins on Saturday afternoon and ends on Thursday afternoon.[20] We alternate the order in which the auctions of sellers, within a given pair, are posted. White- and black-named sellers are paired in subsequent weeks. For example, if the white-named seller's auction ends first in the first week, the black-named seller's auction ends first in the second week. The sellers also rotate between two different but related products so that the same two sellers are not paired more than two weeks consecutively selling the same product.[21] This rotation of sellers by product and timing, which we refer to as a cycle, is illustrated in Table 1. In our regressions, we are able to hold constant the differential timing of the auctions start and end dates.

Using eBay as a research platform provides two features which allow us to examine how the characteristics of markets affect racial differences in prices received. First, using eBay allows us to select products which vary by the level of competition present in the market, which provides a way to test whether differences in the prices received by white- and black-named sellers are more pronounced in less competitive markets relative to more competitive markets.

[19] While it may seem an unnecessary complication to run auctions at different times, we conducted a set of auctions which ended within a few hours from each other on the same day in an initial pilot study. After several weeks, we found large differences in the prices received between white- and black-named sellers in markets characterized by low levels of competition. However, one buyer expressed suspicion that our seller accounts were operated by the same person. We discontinued this setup and do not consider the data from the pilot study.

[20] There is an exception. We initially scheduled the auctions to begin on Fridays and Sundays and end on Wednesdays and Fridays. However, this was changed after finding that price differences arose due to the end date of the auctions. However, we control for the ordering of the auctions in all regressions.

[21] We do not pair the same sellers with the same products for multiple weeks consecutively for two reasons. First, this may raise suspicion of buyers that our accounts are from the same source. Second, this limits one potential source of endogeneity: If price differences between the names were to emerge, sophisticated bidders could easily compare the selling prices between the two accounts and place their bid with the seller who had been receiving lower prices.

Table 1—Timing of Auction Cycles

Week	Product 1		Product 2	
	Thursday/ Tuesday	Saturday/ Thursday	Thursday/ Tuesday	Saturday/ Thursday
1	Jake	Jamal	Tyrone	Dustin
2	Jamal	Jake	Dustin	Tyrone
3	Jamal	Dustin	Jake	Tyrone
4	Dustin	Jamal	Tyrone	Jake
5	Dustin	Tyrone	Jamal	Jake
6	Tyrone	Dustin	Jake	Jamal
7	Jake	Tyrone	Jamal	Dustin
8	Tyrone	Jake	Dustin	Jamal

The number of auctions selling the same and similar products varies greatly across goods and markets, which provide a basis for comparison (discussed in more detail in Section 4). For the purposes of clarity, our goal is to create comparative statics, not to identify the size of a market required to eliminate price differences between white- and black-named sellers.

Second, eBay's feedback system provides a metric for a measurable gain in information, which provides a potential way to distinguish between alternative theories of discrimination and to test whether market mechanisms designed to reduce informational asymmetries are successful at mitigating discrimination. eBay's feedback system works to increase information regarding the credibility of buyers and sellers, including publicizing their feedback scores and the comments provided by previous trading partners.[22] Upon completion of an eBay auction, the buyer and seller have the opportunity to leave feedback for each other.[23] Sellers receive '-1' if the buyer is displeased with the transaction; a '+1' if the buyer is satisfied with the transaction;

[22] Internet auctions, which match buyers and sellers from across the globe, are characterized by significant informational asymmetries. Both eBay and PayPal have constructed profitable businesses by helping their customers overcome informational asymmetries. Resnick et al. (2006) demonstrates the ability of eBay's feedback system to help promote seller credibility.

[23] Our sellers never provide feedback on buyers to ensure that the behavior of our sellers is as uniform as possible.

or a ‘0’ if the buyer is neutral regarding the transaction. Buyers can also leave detailed comments describing their experience with the seller. After receiving a positive feedback score of 10, eBay users receive a yellow-star award, which appears alongside their usernames. Because we carefully coordinate the auctions and ship the products in a timely manner, our sellers never incur negative feedback. However, buyers are not required to rate a seller and slight differences emerge that are beyond our control. Since feedback differences are observable, we are able to hold constant differences in the feedback scores of sellers by including a measure of seller feedback as an explanatory variable.

Preserving the important aspects of our field experiment imposes some costs. Conducting auctions on eBay dictates that we have limited information about, and no control over, who bids in our auctions. There is no way to observe the racial characteristics of our bidders without compromising other features of the experimental design. Our strategy to overcome this limitation is to select groups of products for which the relative racial compositions of the bidders are likely to differ. We want to be clear that the racial categorization of the products sold refer to our prior beliefs concerning the expected relative rates of bidding activity by race. Selling products that are targeted to different racial groups provides a way to examine whether same-race biases found in laboratory experiments can be identified in naturally occurring markets. This also allows us to observe whether the same trends in racial discrimination with respect to competition and informational asymmetries emerge across products which vary by the expected purchasing rates of buyers by race.

4. Data

Over a period of 11 months, we conducted 288 auctions (144 pairs) selling various goods from three different sets of products: fishing lures, distinctively black toys, and distinctively white toys. We sell new, unopened products with retail prices ranging from $5.00 to $7.00. The auctions for the fishing lures were conducted over 24 weeks from February 2009 to July 2009. The distinctively black products were sold over the course of 32 weeks from May 2009 to December 2009. The distinctively white toys were sold over the course of 16 weeks from August 2009 to December 2009. A detailed list of the products sold is shown in Table 2.

The first group of products is fishing lures, which are commonly used for bass fishing. These products can be categorized as either "Plastic Worms" which sold in our auctions for a mean price of $5.74 (0.14) or "Spinner Baits" which sold in our auctions for a mean price of $5.50 (0.24) (standard errors of the means in parentheses). We sold two fishing lures per auction and selected identical brands, sizes, and color combinations within each pair to ensure that the products sold by the paired white- and black-named sellers are perfect substitutes. While fishing lures have no inherent race-specific characteristics, marketing research by Mediamark Reporter (2008) indicates that whites are more than twice as likely to buy fishing lures as blacks.[24] Thus, we categorize bass-fishing lures as products that are predominately bought by whites in our analysis.

In the auctions for distinctively black toys, we sell toy figurines, which are clearly representative of individuals that are of black or African descent. We suspect that these products

[24] To put this in context, the difference in the purchasing rates of fishing lures between blacks and whites is even larger than the difference in purchasing rates of fishing lures between males and females.

Table 2—Products Sold and the Level of Competition

Product	Product Category	N	Expected Race of Buyers	Search Terms	Number of Other Sellers	Market Size
Culprit 7.5” Worms	Fishing	32	White	Culprit Worms	143	Large
Berkley Powerbait 7” Worms	Fishing	16	White	Berkley Worms	424	Large
Strike King Mini-King Spinners	Fishing	10	White	Strike King Mini	26	Small
Strike King Bleeding Bait	Fishing	8	White	Strike King Bleeding	35	Small
Chatterbait	Fishing	8	White	Chatterbait	163	Large
Chatterfrogs	Fishing	8	White	Chatterfrog	33	Small
Stanley Spinners	Fishing	8	White	Stanley Spinnerbait	18	Small
Mini-King Bleeding Bait	Fishing	6	White	Strike King Bleeding Mini	4	Small
Beach Party Barbie	Doll	32	White	Beach Party Barbie Beach Barbie	114 910	Large
Loving Family Mom and Toddler	Doll	12	White	Loving Family Dolls Loving Family Dolls Mom	652 70	Large
Loving Family Dad and Sister	Doll	12	White	Loving Family Dolls Dad	53	Large
Loving Family Grandma and Brother	Doll	8	White	Loving Family Dolls Grandma	16	Small
Barbie Beach Party Nikki	Doll	34	Black	Barbie African Barbie Nikki	1037 274	Large
Loving Family Brother and Sister	Doll	32	Black	Loving Family African Brother	3	Small
Fisher Price Little People AA Husband and Wife	Doll	14	Black	Little People African Little People African (new)	67 16	Small
Loving Family Mom and Baby	Doll	8	Black	Loving Family African Mom	42	Small
Loving family Dad and baby	Doll	8	Black	Loving Family African Dad	29	Small
Peek-a-boo Barbie—Jemila of Johannesburg	Doll	8	Black	Peek a boo Barbie African	7	Small
Beach Party Steven	Doll	8	Black	Barbie Beach Steven	38	Small
Ballerina Nikki	Doll	6	Black	Ballerina Barbie African	56	Large
Barbie Fairy	Doll	4	Black	Fairy Barbie African	6	Small
Bratz Angelz	Doll	2	Black	Bratz lil Angelz Doll	629	Large
Bratz Ballerinaz Sasha	Doll	2	Black	Bratz Ballerinaz	31	Small
Sweet Secrets Morgan	Doll	2	Black	Sweet Secrets Morgan	6	Small

Notes: The heading ‘Product’ lists the names of the products sold; ‘Product Category’ defines whether the good is a fishing product or a doll; ‘N’ is the number of auctions for each product; ‘Expected Race of Buyers’ lists our expectations regarding whether the buyers of the product are expected to be white or black; ‘Search Terms’ indicate the terms used to search for the number of competing sellers; ‘Number of Other Sellers’ show the results from the product searches on eBay; and ‘Market Size’ identifies whether the product is highly competitive (i.e. Large) or less competitive (i.e. Small).

are more likely to be purchased by blacks.[25] The majority of the data are from auctions selling Barbie Nikki dolls, (i.e. the African-American Barbie Dolls) which sold for a mean price of $5.80 (0.31) and African-American Fisher-Price Loving Family Dollhouse figurines which sold for a mean price $8.16 (0.32) (standard errors of the means in parentheses). In the auctions for distinctively white toys, we sell the white versions of the Barbie Dolls for a mean price of $5.98 (0.34), and white Fisher-Price Loving Family Dollhouse figurines for a mean price of $7.76 (0.55) (standard errors of the means in parentheses). We suspect that whites are more likely to buy distinctively white toys.[26]

Since we are unable to observe the actual racial characteristics of the bidders without compromising other important aspects of the experiment, we analyze the racial characteristics of the winning bidders' zip codes as a rough proxy for the racial characteristics of the bidders in these markets. The data appear consistent with our prior expectations about the race of buyers in our markets. The mean percentage of the population that is black in the buyer's zip code is 8.03 (1.24) for the fishing products, 11.44 (1.83) for the distinctively black toys, and 6.60 (1.52) for the distinctively white toys (standard deviations of the means are in parentheses).[27]

All products were purchased at large retail chains except the African-American Loving Family Dollhouse figurines, which were purchased online. Since our bidders likely have some idea about the prices of these items, it is unlikely that a buyer would have a substantially higher

[25] Females may be more likely to purchase toys than males and could have a different willingness-to-pay for goods sold by male and female sellers. Since each of our sellers have male names, differences in buyers' preferences for male or female sellers will likely have similar effects on both sellers in a pair.

[26] In fact, a study by Hraba and Grant (1970) shows that black children prefer black dolls to white dolls, while white children prefer white dolls to black dolls. This provides some, although not conclusive, support that blacks are more likely to buy distinctively black toys and whites are more likely to buy distinctively white toys.

[27] These percentages are meant to be descriptive, and one must not draw strong inference from them as they have clear limitations. First, we do not have specific information on the race of any of the bidders, only the overall demographic characteristics of the zip code. Second, we only have the zip code for winning bidders, not for all bidders in an auction. The winning bidder is not necessarily representative of all bidders, and the second highest bidder determines the selling price in a second price auction.

willingness-to-pay than other prospective buyers, which may work against finding evidence of racial discrimination. This is unlikely to be the case for collectable items (e.g., coins, paintings), which buyers value differently and a common retail price is unknown.

One of our main goals is to quantify the level of competition present in each product market; however, this is difficult. Ideally, we would like to know the number of potential bidders for our products, but this is unobservable. We observe a similar number of bidders in each of our auctions regardless of the product being sold. However, the number of bidders is likely endogenous; that is, many interested bidders may not bid on our auctions if the price is high. As a result, the number of bidders observed in our auctions may not categorize the level of competition in a given market.

We are able to observe the numbers of auctions for perfect and close substitutes that are posted on eBay's website simultaneously. This provides a proxy for the number of competing sellers, which is also indicative of the number of potential bidders in the market. As an alternative, we conduct various eBay searches for the products being sold to determine the number of competing sellers for each product. We use the results from these searches as proxies for the numbers of potential bidders, as the number of sellers is likely correlated, albeit imperfectly, with the number of potential bidders.[28]

It is a matter of some interpretation as to which auctions and products to consider as the relevant competing sellers.[29] For our primary results, we define a market with more than 50

[28] The number of competing sellers may also influence the price differences between white- and black-named sellers within a pair of auctions. A taste-based discriminator may not place a bid on an auction when a seller has a racially distinct name which is associated with a minority. However, in less competitive markets, the probability is higher that bidders will place bids on products sold by our sellers with racially distinct names which are associated with the majority group, because there are fewer sellers from which to choose. Thus, we are more likely to observe price differences between white- and black-named sellers in less competitive markets than in highly competitive markets.

[29] For example, it is not clear whether new and used products should be treated as substitutes, or whether Beach Barbies are substitutes for Ballerina Barbies. Further, it is not clear how to treat other auctions that bundle one of the

competing sellers on eBay as highly competitive. By contrast, when the number of sellers is less than 50, we consider this market to be relatively less competitive.[30] The number of sellers present in the market varies by season for our products. Our main classification using 50 sellers as the cutoff point maintains that the number of sellers in a given market rarely switches between what we consider high- and low-competition markets. There is little variation in the number of sellers of a product within a given week. We recognize the limitations of using measures that are somewhat subjective. As a result, we check the robustness of our findings to a variety of alternative classifications of high- and low-competition markets. We present results from an alternative classification in the Appendix, which groups all products within a broad group as either high or low competition markets.[31] We find qualitatively similar results across these different classifications.

Our seller feedback scores are determined in accordance with eBay procedures. The feedback scores lag behind the number of actual auctions completed because buyers leave feedback after they receive the product. In addition, not all buyers choose to leave feedback for sellers. The feedback levels between two sellers within a pair of auctions are similar, with a difference in feedback scores between sellers of three or less for 90 percent of the auction pairs. This is a small difference relative to the seller feedback scores found on eBay, which can range from zero to over one million. It is worth noting that our black-named sellers accumulated feedback at a

products we are selling with a related good. We collected information on all other auctions listing identical search terms as ours for each week, but upon review we found this approach to be limited.

[30] The numbers of competing sellers for each product are listed in Table 2.

[31] In this alternative classification, we group products into categories so that all members of the group fit under a fairly broad definition of substitutes. For example, we treat all the large dolls sold under the Barbie brand name (i.e. all Barbie dolls, Steven Dolls and Nikki dolls) as a single market and consider it as a high competition market and we consider all the spinner baits as a single, low competition market. We also performed regressions using over 20 different market-size classifications and product groupings. The results from the other product classifications are available upon request from the authors.

faster rate than our white-named sellers across all groups of products. We control for these differences in our regressions.

Upon completion of each auction, we collect information on the transaction price, the number of bids, the number of bidders, the winning bidder's feedback score, the winning bidder's zip code, the seller's feedback score, the number of identical competing auctions at the time that the auction ends, the duration of the auctions, and the name of the seller associated with the account.

5. Results

5.1. Empirical Strategy

In our baseline model specification, we estimate the following ordinary least squares (OLS) regression model:[32]

$$\begin{aligned} Price = \beta_0 + \beta_1\, Same\,Race + \beta_2\, Ends\,First + \beta_3\, Yellow\,Star \\ + \beta_4\, Product \times Week + \varepsilon. \end{aligned} \tag{1}$$

The variable *Price* is the price received; *Same Race* is an indicator variable which equals one if the racial distinctiveness of the seller's name matches the expected racial characteristics of the buyers and zero otherwise; *Ends First* is an indicator variable which equals one when an auction within a given pair ends first and zero when it ends last; *Yellow Star* is an indicator variable which equals one when sellers accumulate positive feedback scores of 10 or more and zero when sellers have yet to accumulate a positive feedback score of 10; *Product* × *Week* represents product-week fixed effects, which capture the influence of other determinants of the price, including seasonal variation and other competitors in the market which are common to both

[32] While this specification only includes the controls listed in equation (1), we also checked the robustness of the results to the inclusion of a number of other control variables, including product fixed effects and week fixed effects. The results are very similar, regardless of which controls are included. Equation (1) provides the best statistical fit.

sellers of a product in a given week; ε is the error term; and the β_i are parameters to be estimated. We are primarily interested in the parameter β_1, which captures the difference in prices received between sellers whose racially distinct names match the expected racial characteristics of buyers and sellers whose racially distinct names do not match the expected racial characteristics of buyers.

In supplemental models, we estimate equation (1) for subsamples partitioned by the levels of competition present in a given market. We also augment equation (1) to estimate the effects of *Same Race* by the feedback scores received by sellers. In particular, we make use of the "yellow star" received by sellers who accumulate a positive feedback score of 10. To obtain a better idea of how the feedback scores interact with the racial distinctiveness of the sellers' names, we also estimate the effects of *Same Race* by low, medium, and high levels of feedback.[33] Because each of our sellers accumulates similar feedback over the course of the experiment, we are able to compare sellers with credible reputations who only differ by the racial distinctiveness of their usernames. The results from our primary regressions are presented in Tables 3, 4, and 5, which are discussed in more detail in the following subsections.

We check the sensitivity of the estimates reported in the next section to the exclusion of three auction pairs (six total observations) identified as potential outliers.[34] We present the results from

[33] Feedback scores of 0-6 are coded as low; feedback scores of 7-12 are coded as medium; and feedback scores of 13 or greater are coded as high. The same categories are used for each set of products. These cutoffs are empirically motivated, as they provide three groups with similar numbers of observations. Regressions with other categorizations of feedback yield qualitatively similar results. All of our feedback scores are low in comparison to most eBay sellers. As a result, our labeling of low, medium, and high levels of feedback reference our data, not the feedback levels of "experienced" eBay sellers.

[34] The procedure to test for influential observations developed by Belsley et al. (1980) can be carried out by using the `dfbeta` command in STATA. There are no firm statistical criteria for determining which observations are outliers. Belsley et al. (1980) suggest a "rule of thumb" for labeling an observation as an outlier if it influences the coefficient by more than $|2/\sqrt{N}|$ its standard error. Since our sample is relatively small, we would eliminate 48 observations (16.7 percent of the full sample) by using this cutoff. Instead, we set the cutoff at $|4/\sqrt{n}|$, which is double the Belsley et al. (1980) rule of thumb. This cutoff identifies three auction pairs (2 percent of the full sample) as outliers which have the greatest influence on the *Same Race* coefficient. These pairs are from markets classified

these regressions in Appendix Tables A2, A3, and A4. These results are largely consistent with the results presented in Tables 3, 4, and 5, but the smaller standard errors make them much "cleaner".[35] In some cases, the sizes of the coefficients change, but statistical significance of the estimates is generally consistent. We highlight the instances in which the estimates have substantive differences in the sections that follow. In addition to these sensitivity checks, we also check the robustness of our estimates to different categorizations of competition. One set of these results are presented in Appendix Tables A5 and A6.

5.2. Pooled Results

We analyze the impact of racially distinct names on prices received by pooling all available data from each product market. We estimate three different specifications to investigate the impact of the *Same Race* variable on the prices received by white- and black-named sellers. The first specification is equation (1), the second specification augments equation (1) to estimate separate coefficients for *Same Race* with and without a yellow star, and the third specification augments equation (1) to estimate separate coefficients for *Same Race* by low, medium, and high levels of feedback. We estimate each of these specifications for the full sample of auctions and for subsamples partitioned by the level of competition present in a market. Table 3 displays the

as highly competitive. Two of the pairs identified as outliers were Nikki (i.e. black Barbie) dolls. In the same week, one sold for a price of $1.25 (by far the lowest observed price for any Barbie) to a black-named seller name versus $9.85 to a white-named seller. In a different week, a Nikki doll sold for $6.55 to a black-named seller versus $13.50 ($3.00 more than the next highest price for a Nikki doll) to a white-named seller. The final pair is a white Barbie sold by a white-named seller for $5.51 versus $13.50 ($4.50 more than the next highest price for a white Barbie) from a black-named seller. Each of the pairs identified as outliers work against finding a positive impact of *Same Race* on the prices received.

[35] Given the details of the excluded observations, the reader may prefer to focus on the results in the Appendix, rather than the results reported in the text. It is unclear whether the results from the full sample or the sample which excludes the six observations (3 pairs of auctions identified as outliers. We present the results from all available data for the purposes of completeness and transparency.

Table 3—The Effects of Same Race Names on Prices Received

	Full Sample			Low Competition			High Competition		
Explanatory Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Same Race	0.015	--	--	0.441**	--	--	−0.376	--	--
	(0.18)	--	--	(0.22)	--	--	(0.26)	--	--
Same Race without	--	0.018	--	--	0.712**	--	--	−0.591*	--
Yellow Star	--	(0.22)	--	--	(0.28)	--	--	(0.33)	--
Same Race with	--	0.009	--	--	−0.046	--	--	0.063	--
Yellow Star	--	(0.31)	--	--	(0.38)	--	--	(0.47)	--
Same Race with	--	--	0.217	--	--	0.925***	--	--	−0.544
Low Feedback	--	--	(0.25)	--	--	(0.29)	--	--	(0.38)
Same Race with	--	--	−0.384	--	--	−0.545	--	--	−0.276
Medium Feedback	--	--	(0.31)	--	--	(0.43)	--	--	(0.43)
Same Race with	--	--	0.154	--	--	0.307	--	--	−0.065
High Feedback	--	--	(0.44)	--	--	(0.48)	--	--	(0.72)
Ends First	−0.119	−0.119	−0.111	0.118	0.113	0.114	−0.333	−0.344	−0.329*
	(0.18)	(0.18)	(0.18)	(0.22)	(0.22)	(0.21)	(0.26)	(0.26)	(0.26)
Yellow Star	0.260	0.263	0.033	0.402	0.743	0.071	0.025	−0.217	0.100
	(0.57)	(0.59)	(0.59)	(0.75)	(0.78)	(0.73)	(0.82)	(0.85)	(0.87)
Constant	5.682***	5.680***	5.577***	6.220***	1.837**	4.324***	9.859***	4.542***	6.942***
	(1.06)	(1.06)	(1.06)	(0.93)	(0.92)	(1.19)	(1.14)	(1.14)	(1.16)
R-squared	0.815	0.815	0.818	0.912	0.915	0.922	0.599	0.606	0.601
Observations	288	288	288	134	134	134	154	154	154

Notes: Standard errors are in parentheses. *, **, and *** indicate statistical significance at the ten, five, and one percent levels, respectively. Each specification also includes product-week fixed effects as controls.

results for each specification for the full sample (Columns 1, 2 and 3), the low-competition subsample (Columns 4, 5, and 6) and the high-competition subsample (Columns 7, 8 and 9).

The estimated overall effect of *Same Race* in the full sample is positive but not statistically different from zero (Column 1). This indicates that sellers whose racially distinct names match the expected racial characteristics of buyers do not receive different prices than sellers whose racially distinct names do not match the racial characteristics of buyers. The results in Columns 2 and 3 also fail to indicate statistically significant effects of *Same Race* when it is allowed to vary by seller feedback. However, the results from the full sample mask some important patterns in the data. In particular, price differences between white- and black-named sellers emerge in markets characterized by low levels of competition but do not in highly competitive markets

The results for markets characterized by lower levels of competition (Columns 4, 5, and 6) indicate statistically significant price differences in favor of *Same Race* sellers. Overall, *Same Race* sellers in low-competition markets receive a premium of $0.44 (7.2 percent of mean) per auction, and this effect is statistically significant at the five-percent level (Column 4). However, the statistically significant effect of *Same Race* on the prices received in Column 4 is driven by the price differences between white- and black-named sellers at low levels of feedback. In particular, Columns 5 and 6 indicate price differences in favor of *Same Race* sellers at low levels of feedback, but these differences dissipate as sellers accumulate credible reputations through eBay's feedback system. *Same Race* sellers without a yellow star earn $0.71 (11.7 percent of mean) more per auction than low-feedback sellers whose racially distinct names do not match the expected racial characteristics of buyers (Column 5). This effect is statistically significant at the five-percent level. The effect of *Same Race* is larger for sellers with feedback scores of less than seven, in which the premium is $0.92 (15.2 percent of mean) per auction. The *Same Race*

variable at the lowest levels of feedback is statistically significant at the one-percent level. In low-competition markets, the effects of *Same Race* are not statistically different from zero for sellers who have received a yellow star or have achieved a positive feedback score of seven or more.

The results are different for the subsample based on the auctions from highly competitive markets, in which the overall effect of *Same Race* is not statistically different from zero at conventional levels (Column 7). The effect of the *Same Race* variable without a yellow star is actually negative and statistically significant at the 10-percent level (Column 8). The statistical significance of this counterintuitive, negative effect hinges entirely on the three pairs of auctions identified earlier as outliers. The same coefficient is not statistically different from zero in an identical specification which excludes the six observations identified as potential outliers (Table A2). Furthermore, in Column 9 of Table 3, no statistically different prices are found when the *Same Race* variable is estimated by low, medium, and high levels of feedback, which further supports the conclusion that the negative, counterintuitive result shown in Column 8 of Table 3 is not robust. Similar to the results from the full sample and the subsample for low-competition markets, statistically significant price differences between white- and black-named sellers are not found at higher levels of feedback.

In addition, we check the robustness of our findings to alternative categorizations of the products and find remarkably similar results across each categorization. Appendix Tables A5 and A6 present results for one alternative, in which we categorize the level of competition in a given market more broadly. In these regressions, similar products are grouped into markets identified as low or high competition. For example, all Barbie Dolls are considered a part of the highly competitive markets, rather than having certain types of Barbie dolls grouped in the less

competitive markets and others in the more competitive markets. Changing the ways in which the products are grouped into competition categories does not materially affect the sign or statistical significance of the estimates, although the magnitudes of the effects change slightly in some cases.

5.3. Results from Markets with Predominately White Buyers

In this section, we repeat the analysis conducted in Section 5.2 for observations from the fishing lure and distinctively white toy markets (i.e. distinctively white products), which consist of 160 auctions. We partition the sample in this way to investigate whether the patterns in the "white-product" markets are consistent with the patterns found for the full sample of auctions. When analyzing only distinctively white products, the *Same Race* variable shown in equation (1) measures the impact on prices of having a white name relative to a black name. In the interest of clarity, we switch the notation from *Same Race* to *White Name*.

The findings for this subsample presented in Table 4 are strikingly similar to the results shown in Table 3. The impact of having a white name is not statistically different from zero in Columns 1, 2, or 3, which show the estimates for the full sample of distinctively white products. This finding is robust when the effect of having a white name is allowed to vary by seller feedback (Columns 2 and 3). By contrast, in markets characterized by less competition, white-named sellers receive a premium of $0.55 (9.0 percent of mean) over comparable black-named sellers (Column 4). However, the statistically significant effect of having a white name is driven by the lack of seller credibility, as price differences in favor of white-named sellers are present only at low levels of feedback (Columns 5 and 6). In Column 5, white-named sellers who have yet to receive a yellow-star award receive $0.91 (14.2 percent of mean) more than comparable

Table 4—The Effects of Distinctively White Names on Prices Received for the Predominately White Products

	Full Sample			Low Competition			High Competition		
Explanatory Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
White Name	−0.055	--	--	0.551*	--	--	−0.299	--	--
	(0.21)	--	--	(0.32)	--	--	(0.26)	--	--
White Name without	--	−0.085	--	--	0.912**	--	--	−0.489	--
Yellow Star	--	(0.26)	--	--	(0.39)	--	--	(0.32)	--
White Name with	--	0.000	--	--	−0.033	--	--	0.062	--
Yellow Star	--	(0.36)	--	--	(0.50)	--	--	(0.45)	--
White Name with	--	--	0.189	--	--	1.277***	--	--	−0.264
Low Feedback	--	--	(0.30)	--	--	(0.41)	--	--	(0.38)
White Name with	--	--	−0.451	--	--	−0.526	--	--	−0.423
Medium Feedback	--	--	(0.34)	--	--	(0.58)	--	--	(0.40)
White Name with	--	--	0.186	--	--	0.232	--	--	0.096
High Feedback	--	--	(0.54)	--	--	(0.53)	--	--	(0.84)
Ends First	0.140	0.140	0.152	0.485	0.470	0.531*	−0.028	−0.038	−0.019
	(0.20)	(0.20)	(0.20)	(0.230)	(0.29)	(0.27)	(0.25)	(0.25)	(0.25)
Yellow Star	0.522	0.490	0.197	1.696*	2.062**	0.604	0.083	−0.128	−0.010
	(0.56)	(0.59)	(0.60)	(0.90)	(0.90)	(0.96)	(0.68)	(0.72)	(0.73)
Constant	6.980***	6.985***	5.102***	1.286	1.220	3.574**	5.989***	5.638***	5.517***
	(1.08)	(1.08)	(1.13)	(1.20)	(1.17)	(1.32)	(0.94)	(0.95)	(0.97)
R-squared	0.824	0.824	0.829	0.953	0.900	0.965	0.602	0.610	0.605
Observations	160	160	160	48	48	48	112	112	112

Notes: Standard errors are in parentheses. *, **, and *** indicate statistical significance at the ten, five, and one percent levels, respectively. Each specification also includes product-week fixed effects as controls.

black-named sellers, and this estimated effect is statistically significant at the five-percent level. The price differences between white- and black-named sellers are larger at lower levels of feedback, in which case white-named sellers receive $1.28 (19.9 percent of mean) more than comparable black-named sellers. This estimated effect is statistically significant at the one-percent level. The patterns found for the distinctively white products in the highly competitive markets are also similar to the results found for the full sample of auctions. In particular, Columns 7, 8, and 9 indicate that impact of having a white name is not statistically different from zero, even when the effects of having a white name are allowed to vary by seller feedback. The exclusion of outliers does not materially affect the estimates (See Table A3).[36]

5.4. Results from Markets with Predominately Black Buyers

In this section, we repeat the analyses conducted in Sections 5.2 and 5.3 for observations from the distinctively black toy market (i.e. distinctively black products), which consists of 128 auctions. We partition the sample in this way to investigate whether the patterns in "black-product" markets are consistent with the patterns found in the full sample and subsample consisting of only distinctively white products. When analyzing only distinctively black products, the *Same Race* variable shown in equation (1) measures the impact on prices of having a black name relative to a white name. In the interest of clarity, we switch the notation from *Same Race* to *Black Name*.

The results for this subsample presented in Table 5 are remarkably similar to the results shown in Tables 3 and 4. The impact of having a black name is not statistically different from zero in Columns 1, 2, or 3, which shows the estimates for the full sample of distinctively black

[36] In addition, we also check the sensitivity of the estimates shown in Table 4 and 3A to alternative classifications of products into markets with different levels of competition. Similar to the full sample, the results are not materially different, but in some cases the magnitudes of the estimates change slightly.

products. This finding is robust when the effect of having a black name is allowed to vary by seller feedback (Columns 2 and 3). By contrast, in markets characterized by less competition, black-named sellers receive a premium of $0.52 (8.4 percent of mean) over comparable white-named sellers (Column 4). However, the statistically significant effect of having a black name is driven by the lack of seller credibility, as price differences in favor of black-named sellers are present only at low levels of feedback (Columns 5 and 6). In Column 5, black-named sellers who have yet to receive a yellow-star award receive $0.70 (11.8 percent of mean) more than comparable white-named sellers. The price difference between black- and white-named sellers is larger at lower levels of feedback: black-named sellers with feedback scores less than seven receive $0.81 (13.3 percent of the mean) more than comparable white-named sellers, and this estimated effect is statistically significant at the five-percent level.

The results from the highly competitive markets are also similar to the results found for the full sample and for the distinctively white products. In particular, Columns 7, 8, and 9 show that the impact of having a black name is not statistically different from zero, even when the effects of having a black name are allowed to vary by seller feedback. The exclusion of potential outliers identified earlier from the sample of distinctively black products alters the estimates somewhat (Table A4). In particular, the overall effect of having a black name leads to a premium for black-named sellers of $0.41 (Column 1). However, this estimated effect is only statistically significant at the 10-percent level. The statistical significant difference in prices received appears to be driven entirely by observations in which sellers have yet to accumulate credible reputations (Column 2).[37]

[37] In addition, we also check the sensitivity of the estimates shown in Table 5 and 4A to alternative classifications of products into markets with different levels of competition. Similar to the full sample, the results are not materially different, but in some cases the magnitudes of the estimates change slightly.

Table 5—The Effects of Distinctively Black Names on Prices Received for the Predominately-Black Products

	Full Sample			Low Competition			High Competition		
Explanatory Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Black Name	0.167	--	--	0.518*	--	--	−0.606	--	--
	(0.30)	--	--	(0.30)	--	--	(0.66)	--	--
Black Name without Yellow Star	--	0.180	--	--	0.703*	--	--	−0.848	--
	--	(0.37)	--	--	(0.37)	--	--	(0.79)	--
Black Name with Yellow Star	--	0.139	--	--	0.153	--	--	−0.000	--
	--	(0.55)	--	--	(0.53)	--	--	(1.25)	--
Black Name with Low Feedback	--	--	0.242	--	--	0.806**	--	--	−1.235
	--	--	(0.40)	--	--	(0.37)	--	--	(0.93)
Black Name with Medium Feedback	--	--	0.034	--	--	−0.228	--	--	0.503
	--	--	(0.66)	--	--	(0.66)	--	--	(1.39)
Black Name with High Feedback	--	--	0.078	--	--	0.324	--	--	−0.343
	--	--	(0.71)	--	--	(0.73)	--	--	(1.39)
Ends First	−0.528*	−0.528*	−0.524*	−0.236	−0.231	−0.211	−1.155**	−1.166*	−1.225*
	(0.31)	(0.31)	(0.32)	(0.31)	(0.31)	(0.31)	(0.66)	(0.67)	(0.68)
Yellow Star	−1.460	−1.437	−1.413	−1.285	−0.976	−1.012	−0.865	−1.974	−1.311
	(1.42)	(1.49)	(1.47)	(1.17)	(1.23)	(1.19)	(2.13)	(2.29)	(2.34)
Constant	6.149***	6.136***	5.995***	8.894***	9.270***	8.705***	5.755***	6.567***	6.105***
	(1.89)	(1.91)	(1.27)	(1.55)	(1.56)	(1.62)	(1.58)	(1.62)	(1.65)
R-squared	0.821	0.821	0.821	0.899	0.901	0.904	0.638	0.645	0.661
Observations	128	128	128	86	86	86	42	42	42

Notes: Standard errors are in parentheses. *, **, and *** indicate statistical significance at the ten, five, and one percent levels, respectively. Each specification also includes product-week fixed effects as controls.

6. Summary and Discussion

We conduct a field experiment to investigate racial discrimination in product markets by selling perfectly substitutable goods in auctions on eBay under different seller names. In particular, we pair one seller who is assigned a distinctively black name with another seller who is assigned a distinctively white name. This allows us to sell identical products simultaneously, providing buyers with a choice between white- and black-named sellers. This design creates an opportunity to compare directly the prices received by white- and black-named sellers, which provides a way to test for racial discrimination. In addition, we are able to investigate how competition and informational asymmetries, which are highlighted in theoretical models of discrimination as potential conditions for racial discrimination to emerge, affect price differences between white- and black-named sellers.

Our study examines markets for products which differ in terms of the expected racial characteristics of the buyers. This allows us to examine whether "same-race" biases, which have been identified in a number of studies in the economics literature (e.g., Antonovics and Knight 2009; Donahue and Levitt 2001; Price and Wolfers 2010), emerge in a natural market setting with real monetary consequences. We find evidence indicative of same-race biases: white-named sellers can earn higher prices than black-named sellers for products that are expected to be purchased by whites at greater rates, and black-named sellers can earn higher prices for products that are expected to be purchased by blacks at greater rates. However, the price differences observed are identified only when certain market conditions are present.

Price differences between white- and black-named sellers emerge in our data only in markets characterized by low levels of competition. We find no evidence of racial discrimination in markets characterized by high levels of competition. This finding is consistent with Becker's

(1957) seminal theory of discrimination, which suggests that competition can reduce the impact of the "marginal" discriminator in the market. To our knowledge, researchers have yet to compare racial discrimination across markets characterized by different levels of competition.

eBay's feedback system, which provides a metric for a measurable gain in information regarding a seller's reputation, provides a unique way to examine how changes in information regarding the credibility of sellers influence discriminatory outcomes in naturally occurring markets. Our data indicate that as sellers in less competitive markets accumulate a credible reputation through eBay's feedback system, the prices differences between white- and black-named sellers dissipate. Because the prices received by white- and black-named sellers converge as more information concerning the credibility of sellers becomes available, our results are consistent with theories of statistical discrimination arising from incomplete or asymmetric information (Arrow 1973; Phelps 1972).

Our results are consistent with those in List (2004), who also finds support for statistical discrimination in a baseball card market. However, the information conveyed by the seller's race differs between his study and this one. In List (2004), buyers use race as a signal for the unknown reservation value of the sellers. Differences in reservation values are not relevant for our experiment, as our sellers are passive in the auctions and no bargaining takes place. Perceived race in our markets appears to be used as a signal for whether the transaction is likely to be fulfilled, with the product being delivered on time in the condition described by the seller. The uncertainty that buyers associate with the prospect of receiving the good in the stated condition is diminished as sellers accumulate credible reputations. However, it is unclear whether buyers formed their beliefs that "same-race" sellers are more likely to deliver a product from past experiences, animosity, or other factors.

Some patterns in our data are inconsistent with taste-based discrimination. First, if buyers were to exhibit taste-based preferences for discrimination, the price differences between white- and black-named sellers would likely persist over time. This is clearly not the case in our data. Second, the cost of discriminating is low for buyers in our markets because the products sold are relatively inexpensive. This low cost of discrimination may, if anything, encourage taste-based discriminators with slight racial preferences to bid differently based on the racial distinctiveness of the seller name. As a result, our design could overstate the role of taste-based discrimination relative to a market in which more expensive products are sold. At the same time, low-priced products could make it less likely for statistical discrimination to arise because the value risk-averse buyers place on successful shipment is likely to increase as the price of a good increases. Our experimental design and the choice of low-priced products provide a prime opportunity for taste-based discrimination to arise and may limit the impact of statistical discrimination. Yet, we find limited support for taste-based discrimination and fairly strong evidence of statistical discrimination.

It is possible for our findings at low levels of seller feedback to reflect some presence of taste-based discrimination. For example, buyers who are more likely to "statistically discriminate" against sellers may abstain from bidding on auctions posted by sellers who lack credible reputations. As a result, this may leave fewer prospective buyers, some of whom may have animosity toward a particular group, to determine the prices received by comparable white- and black-named sellers. As sellers acquire feedback, statistically discriminating bidders may enter the market and bid up the price to a level above which taste-based discriminators are willing-to-pay.

In sum, we detect racial discrimination in our auctions but only under certain market conditions. We find evidence of discrimination in markets with low levels of competition for sellers who have yet to develop credible reputations. As sellers establish more credibility, these differences are no longer observed. Although we cannot be certain whether discriminatory findings in markets characterized by less competition are the result of taste-based or statistical discrimination, our results do suggest, rather strongly, that higher levels of competition and market mechanisms designed to reduce informational asymmetries can aid in minimizing and/or eliminating discriminatory outcomes in markets.

References

Ahmed, Ali M. and Mats Hammarstedt. 2008. "Discrimination in the Rental Housing Market: A Field Experiment on the Internet." *Journal of Urban Economics*, 64(2): 362-372.

Altonji, Joseph G. and Blank, Rebecca M. 1999. "Race and Gender in the Labor Market." In *Handbook of Labor Economics*, Volume 3, eds. O. Ashenfelter and D.Card, 3243-3259. Elsevier.

Anderson, Lisa R., Roland G. Fryer, Jr., and Charles A. Holt. 2006. "Discrimination: Evidence from Psychology and Economics Experiments." In *Handbook on Economics of Racial Discrimination*, ed. W. Rogers, 97-115. Edward Elgar Publishing: Northampton.

Antonovics, Kate and Brian G. Knight. 2009. "A New Look at Racial Profiling: Evidence from the Boston Police Department." *Review of Economics and Statistics*, 91(1): 163-177.

Antonovics, Kate, Peter Arcidiancono, and Randall Walsh. 2005. "Games and Discrimination: Lessons from the Weakest Link." *Journal of Human Resources*, 40(4): 919-947.

Arrow, Kenneth J. 1973. "The Theory of Discrimination." In *Discrimination in Labor Markets*, eds. Orley Ashenfelter and Albert Rees, eds. Princeton, NJ: Princeton University Press, 3-33.

Ball, Sheryl B., Catherine Eckel, Philip J. Grossman, and William Zane. 2001. "Status in Markets." *Quarterly Journal of Economics*, 116(1): 161-188.

Bajari, Patrick and Ali Hortacsu. 2003. "The Winner's Curse, Reserve Prices, and Endogenous Entry: Empirical Insights from eBay Auctions." *RAND Journal of Economics,* 34(2): 329-355.

Bajari, Patrick and Ali Hortacsu. 2004. "Economic Insights from Internet Auctions*." Journal of Economic Literature*, 32(2): 457-486.

Becker, Gary S. 1957. *The Economics of Discrimination*. University of Chicago Press: Chicago and London.

Belsley, David A., Edwin Kuh, and Roy E. Welsch. 1980. *Regression Diagnostics: Identifying Influential Data and Sources of Collinearity*. John Wiley & Sons, Inc.: New York.

Bertrand, Marianne and Sendhil Mullainathan. 2004. "Are Emily and Greg More Employable than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination." *American Economic Review*, 94(4): 991-1013.

Bertrand, Marianne, Dolly Chugh, and Sendhil Mullainathan. 2005. "Implicit Discrimination." *American Economic Review: Papers and Proceedings*. 95(2): 94-98.

Carlsson, Magnus, and Dan-Olof Rooth. 2007. "Evidence of Ethnic Discrimination in the Swedish Labor Market Using Experimental Data." *Labour Economics*, 14(4): 716-729.

Charles, Kerwin Kofi and Jonathan Guryan. 2008. "Prejudice and Wages: An Empirical Assessment of Becker's *The Economics of Discrimination*." *Journal of Political Economy*, 116(5): 773-809.

Donahue, John and Steven D. Levitt. 2001. "The Impact of Race on Policing and Arrests." *Journal of Law and Economics*, 44: 367-394.

Fershtman, Chaim and Uri Gneezy. 2001. "Discrimination in a Segmented Society: An Experimental Approach." *Quarterly Journal of Economics*, 161(1): 351-377.

Fryer, Roland G. and Steven D. Levitt. 2004. "The Causes and Consequences of Distinctively Black Names." *Quarterly Journal of Economics*, 119(3): 767-805.

Heckman, James J. 1998. "Detecting Discrimination." *Journal of Economic Perspectives*, 12(2): 101-116.

Hortacsu, Ali, Asis Martinez-Jerez, and Jason Douglas. 2009. "The Geography of Trade in Online Transactions: Evidence from eBay and MercadoLibre." *American Economic Journal: Microeconomics*, 1(1): 53-74.

Hossain, Tanjim and John Morgan. 2006. "…...Plus Shipping and Handling: Revenue (Non) Equivalence in Field Experiments on eBay," *Advances in Economic Analysis & Policy*, 6(2): Article 3.

Hraba, Joseph and Geoffrey Grant. 1970. "Black is Beautiful: A Reexamination of Racial Preferences and Identification." *Journal of Personality and Social Psychology*, 16(3): 398-402.

Katkar, Rama and Reiley, David H. 2006. "Public Versus Secret Reserve Prices in eBay Auctions: Results from a Pokémon Field Experiment." *Advances in Economic Analysis & Policy*, 6(2): Article 7.

Levitt, Steven D. 2004. "Testing Theories of Discrimination: Evidence from the Weakest Link." *Journal of Law and Economics*, 47(Oct): 431-452.

Levitt, Steven D. and Stephen J. Dubner. 2005. *Freakonomics: A Rogue Economist Explores the Hidden Side of Everything*. Harper Collins: New York.

Levitt, Steven D. and John A. List. 2007. "What Do Laboratory Experiments Measuring Social Preferences Reveal About the Real World?" *Journal of Economic Perspectives*, 21(2): 153-174.

List, John A. 2004. "The Nature and Extent of Discrimination in the Marketplace: Evidence from the Field." *Quarterly Journal of Economics*, 119(1): 49-89.

Lucking-Reiley, David, Doug Bryan, Naghi Prasad, and Daniel Reeves. 2007. "Pennies from eBay: The Determinants of Price in Online Auctions." *Journal of Industrial Economics*, 55(2): 223-233.

Phelps, Edmund S. 1972. "The Statistical Theory of Racism and Sexism." *American Economic Review*, 62(4): 659-661.

Price, Joseph and Justin Wolfers. 2010. "Racial Discrimination among NBA Referees." *Quarterly Journal of Economics*, forthcoming.

Resnick, Paul, Richard Zeckhauser, John Swanson, and Kate Lockwood. 2006. "The Value of Reputation on eBay: A Controlled Experiment." *Experimental Economics*, 9(2): 79-101.

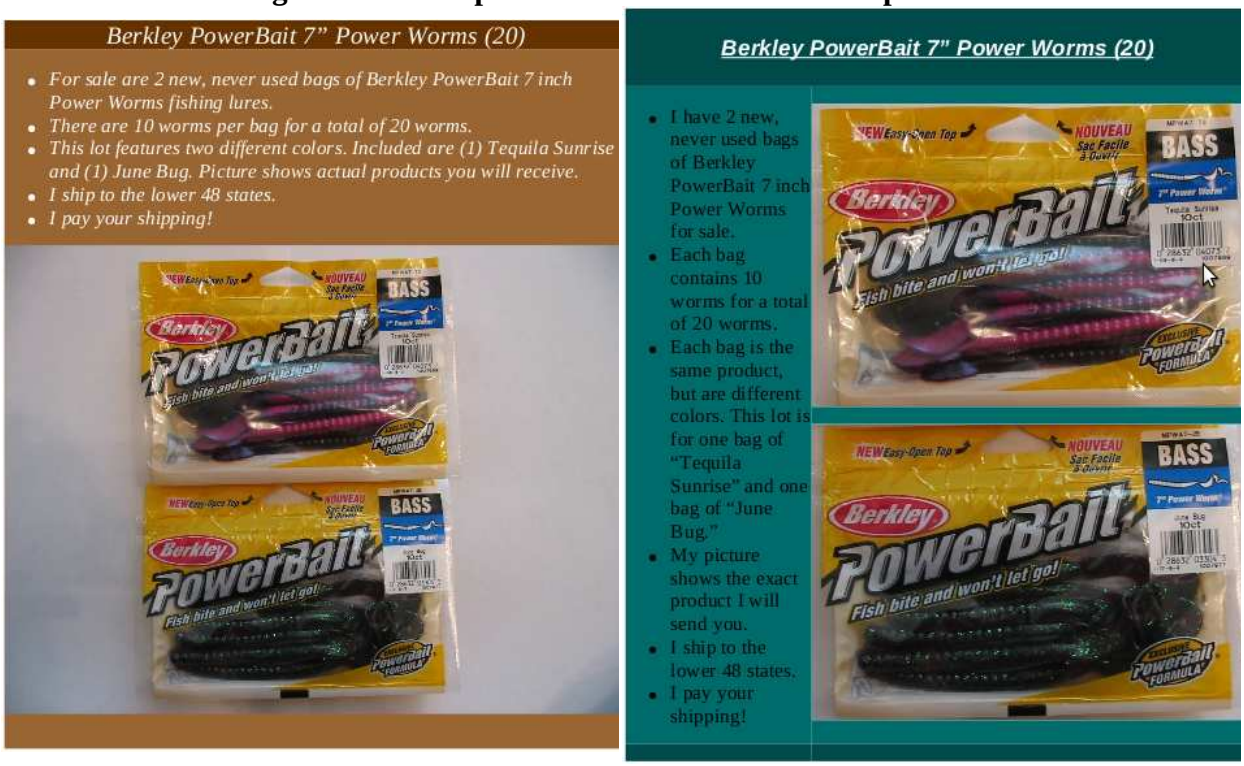
Riach, P. A. and Rich, J. 2002. "Field Experiments of Discrimination in the Market Place." *Economic Journal*, 112(483): F480-F518.

Appendix

Testing Auction Descriptions

In order to ensure that our auctions look natural and that buyers are unaware that they are participating in an experiment, we use auction descriptions that vary cosmetically. While the information displayed in each auction of a given pair is the same, the font, layout, and color scheme are changed such that their appearance differs. Figure A1 below provides an example of two such descriptions.

Figure A1: Example of Different Auction Descriptions



Prior to posting the auctions, 269 undergraduate students examined a series of paired-auction descriptions (such as those shown in Figure A1) and completed a survey. The students answered the question "Which of the two items would you be more likely to bid on in an auction?" The

data were analyzed (using a Wilcoxon matched-pairs, signed-rank test) to determine if respondents preferred one auction description over the other. The initial set of descriptions was given to approximately 100 students from Middle Tennessee State University (MTSU). After these ratings were analyzed, we selected the most similar descriptions and made small changes to others for which raters had a preference. We then presented the revised set to the remainder of the participants. Auction descriptions from this refined set of advertisements that were not statistically different from one another were selected and assigned randomly to our seller names.

After completing approximately 70 auctions, the data for some products indicated significant differences in the prices received by white- and black-named sellers. We re-examined the validity of the initial tests by conducting a second round of tests of our auctions' descriptions. In this round of tests, we recruited students and faculty from MTSU to participate in an experiment for cash. Each participant was asked to examine a series of pairs of product descriptions and to select the description that received a higher price. The auctions did not include the name of the seller associated with the advertisements and the raters did not know the purpose of our primary experiment. The order of the descriptions within a pair of auctions and the order of the auction pairs were randomized to eliminate any potential difference in response resulting from the order of the product advertisements. The subjects were paid $5 for participating and earned $0.50 for correctly selecting the auction which received a higher price within a pair. Each subject rated 20 pairs of auctions. Fifteen of the pairs had already been conducted and we included five additional auction advertisements, which had yet to be posted. Participants were paid $0.50 to rate the auction advertisements which yet to be posted. We collected data on from 39 participants, over three sessions lasting an average of 30 minutes. The average total payout to participants was $11.50.

The results of these tests are displayed in Table A1. Respondents had a statistically significant difference in selecting one description to receive higher prices than the other for two pairs of advertisements. Sixty-four percent of the raters were correct in choosing one of the advertisements that had been assigned to a black-named seller of Fisher-Price Little People as the one earning a higher price. This difference is statistically significant at the 10-percent level (z = 1.76, p = 0.08). This advertisement for Little People potentially affected seven auction pairs for which the mean price for the black-named seller was higher 3.29 (0.44) to 2.92 (0.24) (standard errors in parentheses). However, the differences in prices received between white- and black-named sellers are not statistically different from one another. The white-named and black-named sellers each earned a higher price in three of the weeks and they received the same price in one week.

Sixty-seven percent our raters incorrectly chose an advertisement for a Peek-a-Boo Barbie Jemila of Johannesburg miniature to earn a higher price. This difference is statistically significant at the five-percent level (z = 2.08, p = 0.04). In this case, our white-named seller was at an advantage, but received a lower price in the market. The description for Peek-a-Boo Barbie potentially affected four auction pairs. The mean price for black sellers was higher 3.95 (0.89) than for white-named seller 3.63 (0.72) but the difference is not significant. Each name earned a higher price in two of the four weeks.

Given the absence of statistically significant differences in the auction advertisements prior to running the auctions with these descriptions, we are confident that the advertisements are not driving the results observed. Dropping these 11 auction pairs does not change the results presented in the paper.

Table A1 : Advertisement Tests

Product	Mean	*z*-statistic	*p*-value
Berkley Worms	0.59	1.12	0.26
Berkley Worms	0.59	1.12	0.26
Berkley Worms	0.49	−0.16	0.87
Stanley Spinners	0.59	1.12	0.26
Stanley Spinners	0.62	1.44	0.15
Strike King Spinners	0.51	0.16	0.87
Strike King Spinners	0.59	1.12	0.26
Culprit Worms	0.38	−1.44	0.15
Chatterfrog Spinners	0.54	0.48	0.63
Chatterbait Spinners	0.59	1.12	0.26
Little People	0.64	1.76	0.08*
Peak a Boo Barbie	0.33	−2.08	0.04**
Barbie	0.44	−0.80	0.42
Bratz	0.46	−0.48	0.63
Sweet Secrets	0.49	−0.16	0.87
Loving Family	0.49	−0.16	0.87
Loving Family	0.62	1.44	0.15
Loving Family	0.62	1.44	0.15
Loving Family	0.49	−0.16	0.87
Loving Family	0.41	−1.21	0.26

Notes: The mean represents the proportion of times a participant selected the advertisement that was randomly given to the same-race seller name in the pair. The z statistic is determined using a Wilcoxon-matched-pairs, signed-rank test for whether the mean is 0.5. There are 39 observations for each description.

Table A2—The Effects of Same Race Names on Prices Received (Excluding Outliers)

	Full Sample			Low Competition			High Competition		
Explanatory Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Same Race	0.191	--	--	0.441**	--	--	−0.050	--	--
	(0.15)	--	--	(0.22)	--	--	(0.21)	--	--
Same Race without	--	0.297	--	--	0.712**	--	--	−0.093	--
Yellow Star	--	(0.19)	--	--	(0.28)	--	--	(0.26)	--
Same Race with	--	−0.007	--	--	−0.046	--	--	0.030	--
Yellow Star	--	(0.26)	--	--	(0.38)	--	--	(0.36)	--
Same Race with	--	--	0.342*	--	--	0.925***	--	--	−0.299
Low Feedback	--	--	(0.21)	--	--	(0.29)	--	--	(0.29)
Same Race with	--	--	−0.054	--	--	−0.545	--	--	0.262
Medium Feedback	--	--	(0.27)	--	--	(0.43)	--	--	(0.34)
Same Race with	--	--	0.175	--	--	0.307	--	--	−0.005
High Feedback	--	--	(0.37)	--	--	(0.48)	--	--	(0.54)
Ends First	0.051	0.055	0.052	0.118	0.113	0.114	−0.026	−0.030	−0.031
	(0.15)	(0.15)	(0.15)	(0.22)	(0.22)	(0.21)	(0.20)	(0.20)	(0.20)
Yellow Star	0.384	0.511	0.244	0.402	0.743	0.071	0.270	0.223	0.504
	(0.48)	(0.50)	(0.50)	(0.75)	(0.78)	(0.73)	(0.62)	(0.65)	(0.66)
Constant	3.954***	4.609***	6.308***	6.220***	1.837**	4.324***	4.918***	6.176***	4.530***
	(0.89)	(0.89)	(0.89)	(0.93)	(0.92)	(1.19)	(1.08)	(0.88)	(1.134)
R-squared	0.860	0.860	0.861	0.912	0.915	0.922	0.675	0.675	0.682
Observations	282	282	282	134	134	134	148	148	148

Notes: Standard errors are in parentheses. *, **, and *** indicate statistical significance at the ten, five, and one percent levels, respectively. Each specification also includes product-week fixed effects as controls.

Table A3— The Effects of Distinctively White Names on Prices Received for Predominately White Products (Excluding Outliers)

	Full Sample			Low Competition			High Competition		
Explanatory Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
White Name	0.058	--	--	0.551*	--	--	−0.144	--	--
	(0.18)	--	--	(0.32)	--	--	(0.21)	--	--
White Name without	--	0.097	--	--	0.912**	--	--	−0.245	--
Yellow Star	--	(0.23)	--	--	(0.39)	--	--	(0.27)	--
White Name with	--	−0.010	--	--	−0.033	--	--	0.041	--
Yellow Star	--	(0.31)	--	--	(0.50)	--	--	(0.37)	--
White Name with	--	--	0.189	--	--	1.277***	--	--	−0.264
Low Feedback	--	--	(0.26)	--	--	(0.41)	--	--	(0.32)
White Name with	--	--	−0.165	--	--	−0.526	--	--	−0.072
Medium Feedback	--	--	(0.30)	--	--	(0.58)	--	--	(0.33)
White Name with	--	--	0.194	--	--	0.232	--	--	0.124
High Feedback	--	--	(0.46)	--	--	(0.53)	--	--	(0.69)
Ends First	0.243	0.224	0.247	0.485	0.470	0.531*	0.114	0.11	0.119
	(0.17)	(0.17)	(0.17)	(0.230)	(0.29)	(0.27)	(0.21)	(0.21)	(0.21)
Yellow Star	0.606	0.647	0.422	1.696*	2.062**	0.604	0.119	0.088	0.253
	(0.48)	(0.51)	(0.52)	(0.90)	(0.90)	(0.96)	(0.56)	(0.59)	(0.60)
Constant	7.360***	7.340***	7.292***	1.286	1.220	3.574**	5.390***	7.579***	7.583***
	(0.77)	(0.78)	(0.78)	(1.20)	(1.17)	(1.32)	(0.78)	(0.79)	(0.80)
R-squared	0.862	0.862	0.863	0.953	0.900	0.965	0.651	0.654	0.654
Observations	158	158	158	48	48	48	110	110	110

Notes: Standard errors are in parentheses. *, **, and *** indicate statistical significance at the ten, five, and one percent levels, respectively. Each specification also includes product-week fixed effects as controls.

Table A4—The Effects of Distinctively Black Names on Prices Received for the Predominately Black Products (Excluding Outliers)

	Full Sample			Low Competition			High Competition		
Explanatory Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Black Name	0.411*	--	--	0.518*	--	--	0.146	--	--
	(0.25)	--	--	(0.30)	--	--	(0.51)	--	--
Black Name without	--	0.558*	--	--	0.703*	--	--	0.217	--
Yellow Star	--	(0.31)	--	--	(0.37)	--	--	(0.63)	--
Black Name with	--	0.113	--	--	0.153	--	--	−0.000	--
Yellow Star	--	(0.45)	--	--	(0.53)	--	--	(0.92)	--
Black Name with Low	--	--	0.473	--	--	0.806**	--	--	−0.473
Feedback	--	--	(0.33)	--	--	(0.37)	--	--	(0.65)
Black Name with	--	--	0.507	--	--	−0.228	--	--	2.060*
Medium Feedback	--	--	(0.57)	--	--	(0.66)	--	--	(1.02)
Black Name with High	--	--	0.118	--	--	0.324	--	--	−0.195
Feedback	--	--	(0.58)	--	--	(0.73)	--	--	(0.91)
Ends First	−0.273	−0.263	−0.285	−0.236	−0.231	−0.211	−0.403	−0.392	−0.486
	(0.26)	(0.26)	(0.26)	(0.31)	(0.31)	(0.31)	(0.51)	(0.52)	(0.47)
Yellow Star	−1.286	−1.028	−1.330	−1.285	−0.976	−1.012	1.310	1.418	1.171
	(1.18)	(1.23)	(1.21)	(1.17)	(1.23)	(1.19)	(1.54)	(1.682)	(1.54)
Constant	6.046***	5.967***	7.043***	8.894***	9.270***	8.705***	3.323**	3.283**	3.675***
	(1.01)	(1.02)	(1.64)	(1.55)	(1.56)	(1.62)	(1.16)	(1.21)	(1.10)
R-squared	0.869	0.871	0.870	0.899	0.901	0.904	0.719	0.720	0.785
Observations	124	124	124	86	86	86	38	38	38

Notes: Standard errors are in parentheses. *, **, and *** indicate statistical significance at the ten, five, and one percent levels, respectively. Each specification also includes product-week fixed effects as controls.

Table A5—The Effects of Same Race on Prices Received by the Level of Competition (Broad Product Categorizations)

	Low Competition			High Competition		
Explanatory Variable	(1)	(2)	(3)	(4)	(5)	(6)
Same Race	0.549**	--	--	−0.334	--	--
	(0.25)	--	--	(0.24)	--	--
Same Race without Yellow Star	--	0.946***	--	--	−0.496*	--
	--	(0.32)	--	--	(0.29)	--
Same Race with Yellow Star	--	−0.042	--	--	0.044	--
	--	(0.39)	--	--	(0.44)	--
Same Race with Low Feedback	--	--	1.230***	--	--	−0.428
	--	--	(0.32)	--	--	(0.33)
Same Race with Medium Feedback	--	--	−0.303	--	--	−0.409
	--	--	(0.42)	--	--	(0.42)
Same Race with High Feedback	--	--	0.117	--	--	0.178
	--	--	(0.52)	--	--	(0.63)
Ends First	0.321	0.330	0.327	−0.402	−0.405*	−0.390*
	(0.25)	(0.24)	(0.23)	(0.23)	(0.23)	(0.23)
Yellow Star	0.070	0.546	−0.100	0.170	−0.016	0.113
	(0.82)	(0.84)	(0.77)	(0.74)	(0.77)	(0.80)
Constant	3.555***	5.467***	8.343***	5.583***	4.241***	5.436***
	(0.93)	(0.91)	(1.20)	(1.34)	(1.34)	(1.42)
R-squared	0.886	0.894	0.903	0.815	0.781	0.780
Observations	112	112	112	176	176	176

Notes: Standard errors are in parentheses. *, **, and *** indicate statistical significance at the ten, five, and one percent levels, respectively. Each specification also includes product-week fixed effects as controls.

Table A6—The Effects of Same Race by Seller Feedback on Prices Received by the Level of Competition (Broad Product Categorizations, Excluding Outliers)

	Low Competition			High Competition		
Explanatory Variable	(1)	(2)	(3)	(4)	(5)	(6)
Same Race	0.549**	--	--	−0.053	--	--
	(0.25)	--	--	(0.19)	--	--
Same Race without Yellow Star	--	0.946***	--	--	−0.090	--
	--	(0.32)	--	--	(0.23)	--
Same Race with Yellow Star	--	-0.042	--	--	0.028	--
	--	(0.39)	--	--	(0.35)	--
Same Race with Low Feedback	--	--	1.230***	--	--	−0.241
	--	--	(0.32)	--	--	(0.26)
Same Race with Medium Feedback	--	--	−0.303	--	--	0.143
	--	--	(0.42)	--	--	(0.34)
Same Race with High Feedback	--	--	0.117	--	--	0.221
	--	--	(0.52)	--	--	(0.49)
Ends First	0.321	0.330	0.327	−0.139	−0.140	−0.133
	(0.25)	(0.24)	(0.23)	(0.18)	(0.18)	(0.18)
Yellow Star	0.070	0.546	−0.100	0.418	0.376	0.571
	(0.82)	(0.84)	(0.77)	(0.58)	(0.60)	(0.62)
Constant	3.555***	5.467***	8.343***	7.606***	5.940	7.697
	(0.93)	(0.91)	(1.20)	(0.85)	(0.86)	(0.86)
R-squared	0.886	0.894	0.903	0.815	0.845	0.847
Observations	112	112	112	170	170	170

Notes: Standard errors are in parentheses. *, **, and *** indicate statistical significance at the ten, five, and one percent levels, respectively. Each specification also includes product-week fixed effects as controls.