RACIAL DISPARITIES IN TAXICAB TIPPING*

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Abstract: Data from over 1000 taxicab rides in New Haven, Connecticut reveal two potential racial disparities in tipping: (1) black cab drivers were tipped approximately one-third less than white cab drivers; and (2) drivers who are "rational" statistical discriminators would expect African Americans to tip 55% less than white passengers Both black and white passengers participated in the discrimination against black drivers. These findings suggest that requiring a "tip included" decal might reduce both the passenger discrimination against black drivers documented in this study and the widely-documented tendency of drivers to refuse to pick up black passengers.

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I. Introduction

It has become increasingly common to test whether sellers in retail markets discriminate against buyers [Siegelman 1998; Yinger 1998; Ayres 2001]. But this paper, to our knowledge, is the first to test the other side of the market.[1] We test whether retail consumers discriminate against sellers on the basis of the seller's race. Gary Becker [1971] long ago understood that consumers' "taste for discrimination" could cause sellers to discriminate against other customers – for example, leading restaurant owners to maintain racially segregated lunch counters. But consumers' taste for discrimination might also be directed at a seller's race itself (or the race of a seller's employees).

There have been some important sociological studies analyzing consumer preferences for dealing with sellers of particular ethnic and/or racial groups [Lee 2002; McCormick & Kinlock 1986.] More recently, there has been discussion of the rise of FUBU ('For Us, By Us') consumerism which at heart is a movement of race-contingent consumer choice [Swann et al. 2001, p.787, 802]. But these studies tend to be qualitative, failing to measure the degree of preference or statistical tests of its significance.

There have also been recent studies on the determinants of labor supply for taxi drivers (*e.g.*, Camerer et al. [1997] & Farber [2004]). But the datasets for these studies did not include tipping information. Other studies have examined the impact of regulations on the industry [Cole 2000; Harris 2002]. And other studies have explored the relationship between taxicab drivers and their passengers, but not the determinants of taxi cab tipping [Davis 1959]. There have also been some studies of tipping generally. The majority of the theoretical papers have proposed economic models suggesting

motivations for tipping (*e.g.*, Bradley [1988], Jacob & Page [1980], and Estreicher & Nash [2004]). The leading tipping empiricist Michael Lynn has carried out several analyses documenting tipping behavior as determined by the race of customer (*e.g.*, Lynn & McCall [2000] and unpublished papers [Lynn & Thomas-Haysbert 2003; Lynn 2000a, 2000b, 2003a, 2003b]) but none on race of server as determinant. We find no studies directly measuring consumer side discrimination.

We collected data on over 1000 tips to 12 taxicab drivers in New Haven, Connecticut in 2001. Audit testing of the participating drivers provides anecdotal evidence that the quality of service was not influenced either by the race of the driver or the race of the passenger. After controlling for a host of other variables, we find two potential racial effects: (1) African-American cab drivers were tipped approximately one-third less than white cab drivers; and (2) African-American and Hispanic passengers tipped approximately one-half the amount of white passengers. African-American passengers also seemed to participate in the racial discrimination against African-American drivers. While African-American passengers generally tipped less, they also tipped black drivers approximately one-third less than they tipped white drivers.

The propensity to "stiff" – by which we mean to leave no tip – was particularly racialized. African-American drivers were 80% more likely to be stiffed than white drivers (28.6 vs. 15.8%). And African-American passengers were almost 4 times more likely than white passengers to leave no tip at all (39.9 vs. 10.6%).

Our finding that African-American and Hispanic passengers tend to tip less should be interpreted as an estimate of the inferences that would be made by a driver who was a "statistical discriminator." Because we do not observe (and hence cannot

accurately control for) passenger wealth or income, it is possible that passenger poverty instead of race may be driving this result. But cab drivers also cannot directly observe passenger wealth. They can only infer a prospective tip based on visible characteristics such as passenger demographics and transactional factors (such as weather, pickup location, etc.). Our limited data allow us to estimate what kind of statistical inferences a cab driver would make about the size of the likely tip and fare given the observable characteristics of the passengers. This paper cashes out the inferences that a retail seller would make about its potential customers. Our "statistical" discrimination regressions suggest that "rational" drivers might expect to earn a 55% lower tip from an African-American passenger than fom a white passenger (after controlling for a host of non-racial observable characteristics). Overall in our data a driver reasoning as a "rational" statistical discriminator, should expect about a 20% lower revenue when stopping to pick up an African-American passenger (relative to a white passenger).

This result has policy relevance because such driver inferences may play a role in the well-documented refusal to deal with minority passengers. The data suggest that at least a portion of driver-side discrimination may be caused by inferences about how much passengers of different races are likely to tip. Indeed, we will show that this revenue effect is orders of magnitude greater than any rational inferences that might be made about the propensities of passengers of different races to rob cab drivers.

The evidence from this paper suggests that the institution of tipping may facilitate two types of discrimination: (i) allowing customers to discriminate against minority drivers and (ii) giving cab drivers a revenue-based incentive to refuse to pick up minority passengers.

The remainder of this Article is divided into six parts. Part II briefly reviews the role of race in the history of tipping in the United States. Part III describes the data collected for this study. Part IV presents the core tests of passenger discrimination. Part V tests whether rational drivers would expect minority passengers to tip less. And finally, Part VI considers alternative hypotheses.

II. Race and the History of Tipping

Tipping is a substantial component of the United States economy. More than thirty service professions are regularly tipped [Lynn et al. 1993, p. 478]. Restaurant tips alone have been estimated at $26 billion a year [Azar 2003]. Researchers have explored a variety of server strategies (touching, drawing "a smiley face on bill") that can enhance restaurant tipping [Grimes 1999, p. A16]. The tipping norm is now broadly accepted both as a matter of equity – to increase the wages of workers in the service industry – and as a matter of efficiency – to increase the quality of service. [Zion & Karni 1977, p. 37].

But what is less well known is that tipping was much more controversial 100 years ago. Critics referred to the practice as "un-American" and incompatible with democracy [Scott 1916, p. 43]. William Howard Taft was the "patron saint of the anti-tip crusade" and Ralph Waldo Emerson roundly condemned the practice: "I sometimes succumb and give the dollar, yet it is a wicked dollar which by and by I shall have the manhood to withhold" [Segrave 1998, p. 5-6]. Tipping was attacked as bribery and as "training school for graft" [Id. at 43].

In the early twentieth century seven states and the District of Columbia passed "anti-tipping" statutes that to varying degrees outlawed the practice [Cook 2000]. The Anti-Tipping Society of America claimed 100,000 members. Tipping was often viewed

as a marker of degradation. In *The Itching Palm*, a 1916 manifesto against the practice, William R. Scott said that tipping is "[the] willingness to be servile for a consideration."

This degradation conception of tipping was intimately tied to race. For some, the practice of tipping was closely connected to the perceived inferiority of African Americans. In 1902, for example, a Southern journalist named John Speed remarked:

> Negroes take tips, of course; one expects that of them -- it is a token of their inferiority. But to give money to a white man was embarrassing to me. I felt defiled by his debasement and servility. Indeed, I do not know how any native-born American could consent to take a tip. Tips go with servility . . . [Speed 1902, p. 748].

The Pullman Company in particular was repeatedly singled out for fostering the tipping norm for its all black workforce as a way of economizing on its wage bill. The *St. Louis Republic* newspaper concluded: "It was the Pullman Company which fastened the tipping habit on the American people and they used the negro as the instrument to do it . . ." [Scott 1916, pp. 111-12]. When the Pullman porters organized into the Brotherhood of Sleeping Car Porters in 1925, one of the first things they did was to petition the Interstate Commerce Commission asking for an order *prohibiting* tips.

This brief detour reminds us that the norm of tipping 1) took hold less than 100 years ago; 2) was initially quite controversial; and 3) has long been tied to issues of race.

III. Description of Data

In April and May 2001, we collected tipping data from 1066 surveys completed by 12 different New Haven medallion taxicab drivers (six black men, four white men, two "other minority"[2] men). Like most other localities, New Haven regulates both the number of taxies on the road and the price the taxis can charge [Harris 2002]. The taxis are common carriers who have a duty to "service all" customers [Cole 2000, p. 22].

There are about 140 medallions in New Haven, predominantly owned by the MetroCab Company. The cabs in our study were leased from MetroCab on a fixed cost basis – meaning that the drivers were the residual claimants of all revenues including tips.

The drivers were instructed to complete the surveys immediately after dropping off their passengers and were paid one dollar per survey. The amount tipped was calculated as the difference between the amount due ("the fare") and the total amount paid by the passenger to the driver. Drivers reported information on passenger and driver profiles, including sex, race, age, passenger dress (as a proxy for wealth), and driver experience. Drivers were also asked to indicate if they knew the passengers, if the passengers were regular clients, if conversation took place between them, if the pick-up was in response to a call and if the passenger paid cash. Other data included pick-up and drop-off neighborhoods, travel times, day of week, time of day, temperature, and weather.

Table I reports summary statistics for this survey dataset. Overall, the average tip was $1.23, and the average tip as a percentage of fare was 16%. Twenty-four percent of the passengers left no tip (the mean "stiffing rate"). The data contain substantial numbers of both male and female passengers and are also well balanced with regard to black and white driver observations (N = 510 and 444, respectively), which aids greatly in developing statistically reliable tests of whether consumers discriminate in tipping.

Our two central results are visible even in simple cross tabs of Table I. Minority drivers were tipped a third less than white drivers (12.8% and 12.5% respectively for "Black" and "Other" drivers vs. 20.4% for "White" drivers). Minority passengers tipped

substantially less than white passengers (9.4% "Black"; 10.7% "Other"; 12.0% "Hispanic"; and 16.4% "Asian"; versus 21.7% for "White" passengers).

Table I also reveals dramatic differences in stiffing rates. Minority drivers were stiffed roughly twice as often as their white counterparts (28.6% "Black"; 36.7% "Other" vs. 15.8% "White") while minority passengers stiffed up to approximately 4 times more often than white passengers (39.9% "Black"; 35.7% "Other"; 34.3% "Hispanic"; and 16% "Asian" vs. 10.6% for "White" passengers).

Unlike New York or Washington cab drivers who sometimes obtain a substantial portion of their fares from passengers who hail them from the street, New Haven cab drivers obtain fares predominantly by responding to a radio call or by waiting at a designated stand (for example, at the New Haven train station or airport). More than two thirds of our observations come from responses to a dispatcher's call and the remainder are mostly from drivers waiting their turn at cab stands. Because both the dispatcher and cab stand calls are distributed on a queued basis and because New Haven drivers do not have as much discretion (as hailed cab drivers) in turning down fares, the structure of the service provision tends to randomize driver-customer pairings. The tendency toward randomization increases the power of our test of consumer discrimination.

IV. Tests of Passenger Discrimination

Table II reports the result of three nested regressions that relate the tipping percentage to the passenger and driver race as well as an increasing number of non-racial independent variables.[3] The first regression specification (reported in column 1) simply regresses the tipping percentage on passenger and driver racial indicator variables. The raw means of this first specification highlight our core results. The mean tipping

percentage for African-American drivers were 6.7 percentage points lower than the 25.2% mean tip for white drivers ($p < 0.01$).[4]

The second specification used a random-effects regression to control for potential individual driver effects. A Hausmann test did not reject our null hypothesis that the random-effects regression is specification appropriate (relative to a fixed-effects regression). The second specification also added dozens of non-race controls: (1) twenty-six variables related to non-racial demographic characteristics of passenger and driver (such as age and gender) and to characteristics of the ride itself; (2) four variables related to the crime rate (measured by number of 911 calls per resident) found in the pickup or drop off neighborhood; and (3) 61 pick-up and drop-up neighborhoods fixed effects.

This specification suggests that, after controlling for random driver effects and a host of time, manner and place effects, the customer discrimination result is robust. Adding these additional variables to the regression in fact increases the estimated size and statistical significance of the driver race variables. In specification 2, we find that black drivers are tipped 9 percentage points less than white drivers (and that this result is statistically significant at the 1% level). Evaluated at the means of the non-race variables, this regression predicts that an African-American driver would be tipped 39.9% less than a similarly-situated white driver (14% vs. 23.3%) and that this tipping shortfall causes the overall revenue per fare for African-American drivers to be 6.6% less than that of white drivers.[5] The passenger discrimination in effect imposes the economic equivalent of a 6.6% tax on the income of black cab drivers.

The regressions also suggest that customers discriminate against older drivers. Specification 2 shows that a driver whose age is one standard deviation (about 8 years)

above the mean driver age (about 39) should expect to receive tips that are 5 percentage points less than average; this disparity is statistically significant at the 5% level. However, older passengers tip a higher percentage, approximately 3 percentage points more with an increase in one standard deviation or roughly 13 years. We also learn that the tipping percentage is statistically higher during inclement whether (14.9 percentage points), for acquaintances (10.2 percentage points) and for lower fairs (9.7%). In contrast, we found no passenger gender effects. Men and women seem to tip roughly the same percentage in all of our specifications.

Specification 3 by adding passenger and driver race interactions tests specification 2's implicit assumption of independent effects. In this specification, the individual interactions were neither individually nor jointly ($p = 0.97$) statistically significant – indicating that regression 2 is the more appropriate specification. This non-significance of these interactions also provides some evidence that minority passengers also discriminate against black drivers. Indeed, Table III shows that that black passengers and white passengers both tip black drivers approximately 1/3 less than white drivers.

Stiffing is an important component of our data. Nearly 40% of African American passengers left no tip (vs. 10.6% of white passengers). Table IV decomposes the second specification of Table II into two parts. The first specification is a probit regression of the stiffing indicator against the same set of independent variables. The second reruns the specification on those observations where a positive tip was left. (The third, included for comparison, is the core regression, the second specification of Table II.)

The decomposition shows passenger discrimination – both in choosing whether to tip and in how much to tip. The probit specification shows that black and "other

minority" drivers are respectively 11.4 and 28 percentage points more likely to be stiffed than a white driver ($p < 0.01$). The second regression on positive tips by comparison to the third central regression shows an increase in the black driver effect (from 9 to 9.5%, both significant at the 1% level) and a decrease in the magnitude and significance of the black passenger effect (from 8.9% to 6.7%, dropping from significance at the 1% to significance only at the 5% level). This suggests that a significant portion of the white/black passenger disparity is driven by the stiffing behavior of black passengers. All in all, these regressions -- after controlling for a variety of non-racial factors -- robustly suggest that passengers in tipping discriminate against minority drivers.

V. Tests of Driver "Statistical Discrimination" Inferences

The negative coefficients of the passenger race variables in the previous regressions indicate that minority customers tipped a lower percentage than white customers. For example, the least controlled regression in Table II indicated that the average African-American and Hispanic passenger tipping percentages were respectively 11 and 7.9 percentage points less than those of white passengers. But the minority passenger coefficients are not as robust to the inclusion of additional right-hand side controls. As additional controls are added, the size of the coefficients in specification 2 become smaller (the black passenger effect is diminished from 11 percentage points in the first specification to 8.9 percentage points in the second) and the Hispanic and Asian passenger coefficients become statistically insignificant.

Because we do not observe passenger wealth or income, it is possible that passenger poverty (or other omitted variables such as driver service) instead of race may really be driving this minority passenger result.[6] But our limited data allow us to estimate

what kind of statistical inferences a cab driver would make about the size of the likely tip and fare given the observable characteristics of the passengers. To do this, we ran "observational" regressions controlling only for the factors that a driver could observe about a passenger when pulling up to the curb.[7]

Because the salience of race may swamp the informational content of other variables, we ran the observational or statistical discrimination regressions two different ways. First, we estimated the racial inferences that a driver who was an "irrational" statistical discriminator would make if he saw only passenger race (and ignored all non-racial factors). Second, we estimated the racial inferences that a driver who was a "rational" discriminator would make after taking into account our full panoply of curbside observable information. The results of these regressions are reported in Table V.

The first two columns of Table V report the inferences that a driver would make about the relative size of dollar fares and tips that different passenger races would produce. The top panel estimates that an "irrational" statistical discriminator (who sees only passenger race) would, for example, expect African-American passengers to have fares that were $1.87 lower than white passengers and to leave tips that were $1.20 less.[8] And both these effects are statistically significant ($p < 0.05$). The raw fare differential turns out be bigger than the tipping differential (which is only 39.1% of the overall revenue shortfall) and hence would loom large in the inferences of this type of a discriminator. Analogous results are found for Hispanics and Asian passengers. Indeed, the irrational statistical discriminator would expect the fares of Asian passengers to be

almost $2.50 less than white passengers and would expect the tip to be only 78 cents less.[9]

The second panel, however, tells a very different story. A rational discriminator (who takes into account not only passenger race but non-racial factors as well) would come to very different conclusions. Most importantly, the rational discriminator would not infer that minority passengers would have smaller fares. The fare shortfalls in the size of the expected fares are more modest, and none of these shortfalls are statistically significant. In contrast, the tipping shortfalls remain highly significant (in the statistical sense) and represent a higher proportion of the overall revenue shortfall. In short, while both rational and irrational discriminators would infer that minority passengers are likely to tip less, irrational discriminators would be much more concerned by revenue shortfalls caused by lower fare amounts (that statistically disappear after controlling for observable non-racial factors).

The fourth column of Table V reports the statistical inferences that drivers would make about the relative likelihood of being stiffed. Here, we find that both rational and irrational discriminators would make largely the same kind of inference: African-American and Hispanic passengers are much more likely than white passengers to leave no tip. Indeed, the likelihood that these minority passengers will stiff more than whites is in all estimates on the order of 20 to 30 percentage points higher.

Hyper-rational, risk-averse drivers would discount the importance of these racialized stiffing inferences. They would care only about expected total revenue and put no independent weight on whether part of the expectation concerns stiffing fares. But a slightly more behavioral approach suggests that the stiffing disparity might powerfully

complement the overall estimates of revenue shortfalls. Incidents of stiffing are likely to be particularly salient and galling to drivers. ("Why should I pick up this person, who's so much more likely to insult me by stiffing me?") These estimated tipping and stiffing differentials are the strongest evidence that revenue-based statistical discrimination may play a part in the observed reluctance of drivers to service minority passengers.

Finally, Table V estimates the likelihood that different passenger types will ask to be driven to far suburbs. The idea here was to assess the inference that a cab driver would likely make about the cost of having to deadhead back without a return fare.[10] Approximately 1% of our pickup dispatches were to the far suburbs. A cabdriver dropping off in these suburbs had virtually no chance of picking up a return fare for the long ride back to New Haven. On this dimension, we found that either a rational or irrational discriminator would infer that African Americans were statistically less likely to be dropped off in the far suburbs. So at least on this dimension, African-American passengers should be favored (in comparison with white passengers) as having a lower expected deadhead cost on the return trip. But on net, deadhead inferences are likely to be second-order effects. White passengers are only about 5 percentage points more likely to ask to go to the far suburbs. This small difference would not substantially affect expected revenue.

In the end, these estimates of racial inferences suggest that a previously unreported form of statistical discrimination may be driving some of the well-documented reluctance of cab drivers to serve minority passengers.[11] Instead of cost-based inferences about the probability of crime, driver discrimination may in part be actuated by revenue-based inferences about the likely tips that will be earned. On net,

Table VI shows that rational discriminators would expect that African-American tips will be 55% less than white passenger tips, and that this tipping shortfall causes the overall revenue from an African-American passenger to be 8.3% less than that of a white passenger. Analogous calculations suggest that rational discriminators would expect Hispanics to tip 43.6% less than whites, which represents a 6.6% shortfall in revenue.

Moreover, the size of the inferences that rational and irrational drivers would make about shortfalls in minority tipping are an order of magnitude larger than the inference that rational drivers might make about the heightened crime risk of serving African-American passengers. There have not been more than 5 robberies of cab drivers in any recent year. There are approximately 3000 fares in New Haven each day – suggesting that there is one robbery for every 219,000 fares. Even if we assume that all robberies are committed by minorities, the inferred additional cost of serving minority passengers would only be 3.8 cents per fare.[12] Of course, for irrational or particularly risk-averse drivers, inferences about the additional crime "costs" of serving minorities might loom particularly large. But the difference in the magnitude of what a rational discriminator would infer about tipping shortfalls and heightened crime costs is striking.

Statistical discrimination by employers is often criticized as being irrational because it would often be more efficient to ask job applicants another question about their ability rather than to rely on race. But statistical discrimination may be more rational for cab drivers deciding whom to pick up. Cab drivers do not have the option of interrogating potential riders – but must instead make a curbside pickup decision based on a fixed set of observational factors.

Our data do not allow us to test whether drivers in fact make these kinds of inferences or whether such inferences translate into discriminatory behavior by the cab drivers against minority passengers. But inferred tip revenue disparities of this magnitude might be responsible for at least part of the driver discrimination. A movement toward mandated tipping service compris regulation by reducing this perceived racial disparity in tipping might accordingly reduce the amount of revenue-based discrimination.

VI. Alternative Hypotheses

This section considers major alternative hypotheses and assesses with the best data available the extent to which they qualify the results of the previous sections.

A. Selected Data?

All the results reported above are based on surveys filled out by individual cab drivers. Either misreported or censored data would importantly reduce our confidence in the results. A weak indication of survey reliability can be found in the non-significance of the "Survey Experience" variable reported in both the Table II and IV regressions. The coefficients on this variable are both very small and not statistically significant. This indicates that reported tips of the drivers did not vary as they filled out more surveys. If the drivers were misreporting fares, they at least seem to be consistently misreporting them over time.

The previously mentioned rejection of individual driver random effects (as evinced by rejecting the hypothesis that the random-effects variance was different from zero) also provides some small measure of assurance that drivers were accurately reporting fairs. The random-effects regressions suggest that drivers of the same race

were treated similarly: If white drivers were misreporting fare data, they seemed to be doing it consistently as a group.[13] The possibility that drivers explicitly colluded to misreport is unlikely, for the simple reason that the drivers in the survey probably did not have good information on the universe of drivers participating in the study. Nor did the drivers have any obvious motive to act collectively in such a manner.

But beyond misreporting of the data, there is also the possibility that drivers reported only a non-random sample of their total universe of fares. If drivers "censored" the transactions that they reported, we would be less sure whether the results reported in the previous section would be robust to analysis of a broader (less censored) sample.

Unfortunately, although drivers were instructed to collect data for their "next 50 rides," there is evidence of driver censoring. To begin, we find that there are a disproportionate number of integer fares reported in the data. Fares (not including tip) are regulated in New Haven to come in 25 cent increments. A full 44.1% of our observations were reported to have final meters equal to integer amounts (*e.g.*, $6.00).[14] The length of trips, however, may not be random -- so there are some benign reasons to explain why the trailing digits of the final meter would not be random. But still the disproportionate number of integer fairs – far exceeding 25% of the data – strikes us as some evidence of censoring.

But even more directly we found that some of the drivers reported relatively few fares per day. Indeed, in the full dataset, we find that almost half (50 out of 105) of the driver-day observations included fewer than 10 fares a day. This suggests that at least some of the time our drivers were not reporting the universe of fares encountered on a particular shift.[15]

This evidence of censoring importantly qualifies the reliability of the foregoing results. It is possible, for example, that drivers were more likely to record the results of outlier fares that made more of an impression on them, or that black drivers were more suspicious of the motives of the white male co-author who solicited their participation in the study and sought to conceal the full magnitude of their tipping income out of, say, fear of being audited by the IRS. (That every driver reported some substantial tips, however, argues against this troubling hypothesis.) If the recorded fares are not representative of the larger universe, then the prior results may not be indicative of the broader tipping experience. However, as one of the first studies of taxicab tipping practices and the first quantitative study of consumer-side discrimination, even qualified results raise important concerns about the possibility of disparate treatment (and at a minimum suggest the appropriateness of further testing).

B. Individual Driver Effects

It is important to ask whether what we reported as driver race effects might instead be caused by idiosyncratic characteristics of the twelve individual drivers in the data. As an initial matter, we found for the full dataset that our random-effects models, controlling for an increasing range of non-racial factors, rejected the presence of individual driver effects (and after attempting to control for them nonetheless found pronounced evidence of customer discrimination). Second as shown if Table VII, if we simply calculate mean tipping percentage for each of 4 white and 6 black drivers, we find that white drivers garnered three of the four highest tipping percentages, while black drivers garnered three of the four lowest tipping percentages. But one of the white

driver's average tipping percentage was particularly high (30.7%) and one of the black driver's average tipping percentage was particularly low (6.8%).

In non-random effect specifications, it is also possible to alternatively control for individual driver effects by asking the regression to "cluster" the data by individual driver. When we rerun the regressions on the full dataset clustering by individual cab drivers, we still find evidence of customer discrimination but the results are not as statistically significant. In the clustering regressions that parallel the first specification in Tables II and IV, we still find that black and other minority drivers receive lower percentage tips and are more likely to be stiffed, but the results for the first specification of Table II are only marginally statistically significant.[16]

To further explore the possibility of individual driver effects, we also reran the regressions in Table II controlling for native status of drivers for whom we had reliable information. In our data, all of the white drivers appeared to be native born. But of the black drivers, two were born outside of the United States; two were native born (and we lacked reliable place-of-birth information for two drivers). We found in all regressions that passenger discrimination was more pronounced against native-born black drivers than non-native black drivers. For example, in the analog to specification 2 in Table II, tips to native black drivers were 11.1 percentage points less than tips to native white drivers, while tips to non-native black drivers were only 4.6 percentage points less than tips to native white drivers. This means that when we compare just the tips to native drivers, we find even large estimates of customer discrimination.

On net, we still have some lingering concerns about individual driver effects. But using a variety of reasonable approaches that alternatively control for these effects, we

still find what seems to be an independent and statistically significant disparity in the tips received by minority and non-minority drivers.

C. Disparate Driver Quality

The driver race disparity might alternatively be explained by potential differences in the quality of service that minority and non-minority drivers provided. If minority drivers provided systematically poorer service than white drivers, then minority drivers may have received lower tips not because of their race, but because passengers may give lower tips for poorer service.

We do not have much information to respond to this theoretical possibility. The speed variable and the indicator variable for whether the driver conversed with the passenger crudely control for two dimensions of quality. Also, other studies of tipping generally have found that variation in service quality does not explain a very large percentage of differences in the amounts that people tip.[17] These studies suggest that the degree of the racial disparity observed here is not likely to be caused by differences in quality.

We also attempted to audit some of the drivers in our study for gross differences in the quality of service they provided. Based on a total of just ten audit rides with participating drivers (six rides with white drivers, four rides with black drivers), we did not find support for the hypothesis that minority drivers provided lower quality service. Indeed, our testers subjectively rated the quality of service higher for black drivers than for white drivers (average 4.5 out of 5 for black drivers vs. an average rating of 3.3 for white drivers). This miniscule sample does not allow us to confidently test for quality differences. But when combined with the authors' own experiences taking numerous

cabs in New Haven, we are fairly confident that the driver race effect is not well explained by racial disparities in driver quality.

D. Disparate Customers

Finally, we considered whether the driver-race disparity might be caused by minority drivers serving different types of customers than non-minority customers. Under this hypothesis, minority drivers would receive lower tips than white drivers not because customers discriminate but because minority drivers tend to provide service to low-tipping customers while non-minority drivers tend to provide service to high-tipping customers.

As discussed above, there are some structural variables that tend to push New Haven drivers toward a more random selection of customers. Both dispatchers and cab stands purport to operate on a queued basis – allocating the next customer to the next driver in line. And when we restrict our analysis to either dispatched or non-dispatched calls (which should be predominantly cab stand fares), we continue to find in the most controlled specification that African American drivers are tipped significantly less (9.4% for dispatched fares and 6.9% for non-dispatched fares) and that this disparity was statistically significant at the 5% level.[18]

But there are several dimensions on which non-random allocations of passengers might still occur within these subsamples. Dispatchers may, contrary to stated policy, give poorer fares to minority drivers. And passengers may directly call a driver to schedule service.[19] Drivers may engage in different strategies as to which cab stand they wait at or whether they queue for the next dispatchers call. Waiting at the airport may

expose drivers to a different mix of passengers than choosing to wait at the train station or at the Shubert theater.[20]

Table VIII shows that passenger races were not in fact randomly distributed across driver races. Black drivers were more likely than white drivers to have black passengers (34.7 vs. 25.4%) and white drivers were more likely than black drivers to have white passengers (50.8 vs. 44.5%). But drivers of each race were still exposed to substantial numbers of black, Hispanic and white customers (which again aids in testing for the existence of customer discrimination).[21] We found, for example, that a Pierson chi-squared test of statistical independence rejected the hypothesis that African-American and white drivers pickup passengers from the same neighborhoods ($p = 0.01$). But we found no statistical difference in the average fare of black, white or other minority drivers.

One way to reduce the risks that the driver-race disparity might be driven by non-random allocation of passenger is to see whether the result persists in subsets of the data that have even better indicia of random allocation. We pursued this strategy by extracting from the full dataset the non-dispatched fares where the pickup occurred at the New Haven train station data. These 242 observations (preserved by the most controlled regression) have fairly strong indicia of random assignment – because the train station cab stand uses a strict first in line principle and neither drivers nor passengers have much discretion to pass on a fare. Restricting our attention to this subsample, we continue to find in our most controlled specification that African American drivers are tipped less than white drivers (7.2%) – and this disparity is still statistically significant at the 7% level.[22]

While the evidence of non-randomized allocations makes it more difficult to test for customer discrimination, our regressions controlled for a host of non-racial differences and still found robust statistical evidence that minority drivers were tipped less – even after controlling for the heightened chance that minority drivers have of serving minority customers and even after controlling for their non-random allocation of neighborhoods. Accordingly, the disparate customer hypothesis does not, in the end, present a strong challenge to our earlier results.

Stepping back, we are most concerned about the possibility that drivers non-randomly censored the data in ways that might undermine the reliability of our primary results. This censoring effect by itself should qualify anyone's reading of the data and underscores the preliminary nature of this study. In contrast, we are less troubled by the various omitted variable concerns discussed with regard to the driver-race and passenger-race effects. The evidence of customer discrimination against minority drivers is relatively stable and robustly significant. The evidence that African-American and Hispanic passengers tip less is slightly less stable – and declines in size as better controls for class (captured by pickup and drop-off locations) are added. But even after taking out the class component (to the extent our data permit), there seems to be an independent and robustly significant passenger-race disparity in tipping (particularly with respect to stiffing propensities).

VII. Conclusion

In this preliminary study (of just one thousand fares in a single city), we have shown that discretionary tipping facilitated prejudice in two different ways: (i) allowing customers to discriminate against minority drivers and (ii) possibly giving cab drivers a

revenue-based incentive to refuse to pick up minority passengers. These results suggest two new rationales for requiring "tip included" decals to be prominently displayed in all cabs. *Service compris* decals of this kind would likely reduce two types of disparate racial treatment. It would reduce passengers' opportunity to discriminate against minority drivers. And secondly, it might reduce some driver discrimination against minority passengers.[23]

Of course, one might reasonably ask whether the findings of small single city study are representative of a larger phenomenon. To address this question, we looked at the year 2000 5% data sample from the Census Integrated Public Use Microdata Series. While we found that black drivers in New Haven earn 6.6% less per fare than white drivers, the reported hourly income African Americans taxi and limousine drivers in the national data was not statistically different from white drivers. The census variables do not, however, distinguish between taxicab drivers and chauffeurs, or separate out tipping from total income. We also found no evidence that African Americans substitute toward other jobs where consumer discretion might be a less important determinant of their compensation. For the nation on the whole 18.4% of tax drivers and chauffeurs were black and that this was about one half of a standard deviation above the mean black percentage (15.2%) for approximately 30 comparably skilled job categories.

While there are some important qualifications to our results, this paper provides an initial test of consumer-side discrimination. It also provides the first quantitative estimates of "rational" statistical discrimination. It is our belief that exposing the dual racial determinants of tipping suggests more generally that consumer discretion in retail transactions may give rise to unexpected civil rights concerns.

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Table I
Summary Statistics

Continuous Variables	Obs	Mean	Std. Dev	Min	Max
Tip ($)	1052	1.23	2.25	0	27.5
Tip as % of Fare	1052	0.16	0.27	0	5.22
Stiffing Rate	1052	0.24	0.43	0	1
Travel Time (min)	945	9.93	11.91	1.5	200
Travel Distance (mil)	936	4.57	7.72	0.2	90
Amount Due ($)	1057	9.25	11.51	2.5	150
Amount Paid ($)	1052	10.48	12.88	3	170
Temperature (F°)	1037	52.28	10.39	28	80
Passenger Age*	1032	32.81	13.48	5	85
Driver Age	1010	39.77	7.95	24	51
Driver Exp (wks)	1059	62.54	53.35	2	192

Indicator Variables	Obs	Percent	Mean Tip	Mean Tip%	Stiff%
Passenger Sex:					
Female	501	53.4%	0.98	15.6%	24.4%
Male	437	46.6%	1.48	16.8%	22.4%
Passenger Race:					
Asian	94	9.1%	1.04	16.4%	16.0%
Black	311	30.0%	0.63	9.4%	39.9%
Hispanic	137	13.2%	0.81	12.0%	34.3%
Other	14	1.4%	0.84	10.7%	35.7%
White	479	46.3%	1.82	21.7%	10.6%
Driver Race:					
Black	510	48.5%	1.05	12.8%	28.6%
Other	98	9.3%	0.77	12.5%	36.7%
White	444	42.2%	1.54	20.4%	15.8%
Passenger Dress:					
Below Average	41	4.0%	0.79	12.8%	41.5%
Average	847	82.2%	1.18	15.2%	24.8%
Above Average	143	13.9%	1.77	22.2%	8.4%
Respond to Call	639	68.8%	1.25	16.1%	27.1%
Luggage	194	20.5%	1.63	15.5%	17.5%
Regular Customer	183	17.4%	1.90	25.4%	21.9%
Acquaintance	247	24.5%	1.91	25.1%	21.5%
Conversation	712	69.3%	1.38	17.4%	22.2%
Rain or Snow	26	2.5%	2.37	39.3%	23.1%
Cash	923	87.7%	1.23	16.7%	22.8%

*For multiple passenger rides, drivers were instructed to record information only for the passenger who paid the fare.

Table II

Regressions with Tipping Percentage as Dependent Variable

			1	2*	3*
Racial Effects:					
Driver Black			**-0.064**	**-0.090**	**-0.107**
Driver Other			-0.055	**-0.132**	**-0.156**
Passenger Black			**-0.110**	**-0.089**	**-0.113**
Passenger Hispanic			**-0.079**	-0.042	-0.039
Passenger Asian			-0.061	-0.045	-0.067
Passenger Other			-0.094	-0.024	-0.016
Driver Black, Passenger Black Interaction					0.039
Driver Black, Passenger Hispanic Interaction					0.007
Driver Black, Passenger Asian Interaction					0.064
Driver Black, Passenger Other Interaction					-0.036
Driver Other, Passenger Black Interaction					0.077
Driver Other, Passenger Hispanic Interaction					-0.007
Driver Other, Passenger Asian Interaction					0.028
Driver Other, Passenger Other Interaction					0.028
Other Variables:**	Mean	Std. Dev			
Passenger Female				-0.008	-0.007
Passenger Age	32.382	13.228		**0.030**	**0.031**
Driver Age	38.972	8.186		**-0.051**	**-0.051**
Below Average Dress				-0.022	-0.022
Above Average Dress				0.039	0.039
Weeks Driving Cab	64.917	57.067		0.036	0.036
Survey Experience†				-0.015	-0.015
Conversation (1=yes)				0.018	0.019
Repeat Passenger (1=yes)				0.056	0.053
Acquaintance (1=yes)				**0.102**	**0.101**
Multiple Passengers (1=yes)				**0.043**	**0.046**
Dispatched Pick-up (1=yes)				0.004	0.005
Amount Due	9.133	11.601		**-0.097**	**-0.098**
Amount Due Squared	217.834	1204.969		**0.055**	**0.055**
Fare 25¢				**0.057**	**0.059**
Fare 50¢				0.044	0.045
Fare 75¢				0.016	0.017
Cash (1=yes)				0.002	-0.005
Travel Time	9.609	11.221		-0.007	-0.007
Travel Distance	4.327	7.572		0.028	0.028
Night (Between 7PM and 7AM; 1=yes)				0.025	0.024
Late (Between 11PM and 5 AM; 1=yes)				-0.026	-0.027
Temperature	52.487	10.378		-0.005	-0.005
Rain/Snow (1=yes)				**0.149**	**0.151**
Luggage (1=yes)				0.006	0.008
Pick-up Nghbd with Below Average 911 Calls‡				-0.072	-0.063
Pick-up Nghbd with Above Average 911 Calls‡				0.012	**0.009**
Drop-off Nghbd with Below Average 911 Calls‡				0.164	0.159
Drop-off Nghbd with Above Average 911 Calls‡				0.015	0.007
Train Pick-up				**0.970**	**1.014**
Train Drop-off				**-0.602**	**-0.622**
Number of Observations[a]			835	835	835
R-Squared			0.061	0.307	0.264
Random Effects			N	Y	Y

Underlined coefficients are significant at the 10% level, coefficients in bold are significant at the 5% level, and coefficients underlined and in bold are significant at the 1% level.

*Neighborhood dummies were included in this regression -- the coefficients are not reported. The omitted categories for the indicator variables are Driver White, Passenger White, Average Dress, Pick-up And Drop-off Neighborhood variables with Average 911 Calls. To avoid losing observations and to keep the omitted category pure, indicator variables equal to one for missing data were also included but are not reported.

**For continous variables, the effects of a one standard-deviation change are reported.

†Survey Experience is defined on a scale of 1-3, depending on whether the driver was filling out his first, second or third set of surveys

‡Categories are based on Total year 2000 911 calls divided by neighborhood population, with extrapolations to missing data/suburbs.

Table III
Average Tipping Percent by Passenger and Driver Race

Passenger Race	Driver Race	Avg. Tip %	Observations	Race Disparity Ratios*
White	White	26.7%	224	
	Black	18.0%	221	0.67
	Other	13.2%	34	0.49
Black	White	11.1%	111	
	Black	7.8%	172	0.70
	Other	13.1%	28	1.18
Hispanic	White	17.5%	57	
	Black	7.1%	63	0.41
	Other	11.3%	17	0.65
Asian	White	16.1%	42	
	Black	18.1%	36	1.12
	Other	13.3%	16	0.83
Other	White	14.8%	6	
	Black	11.0%	5	0.74
	Other	1.8%	3	0.12

* Disparity is defined as the given (Black or Other) statistic divided by the white statistic

Table IV
Decomposition of Central Regression

Tipping Percentage	dF/dx* for Stiffing Regressions	Coef. For Core Regression w/o Stiffs	Core Regression
Racial Variables:			
Driver Black	**0.114**	**-0.095**	**-0.090**
Driver Other	**0.280**	**-0.143**	**-0.132**
Passenger Black*	**0.215**	**-0.067**	**-0.089**
Passenger Hispanic*	**0.126**	-0.039	-0.042
Passenger Asian*	**0.110**	-0.038	-0.045
Passenger Other*	0.175	0.005	-0.024
Other Variables Unreported**			
Number of Observations	799	641	835
R-Squared	0.417	0.333	0.307

Underlined coefficients are significant at the 10% level, coefficients in bold are significant at the 5% level, and coefficients underlined and
* dF/dx is for discrete change of dummy variable from 0 to 1 - significance tests the under lying coefficient being 0
**These regressions included all the regressors of specification 2 in Table 3, but the coefficients are not reported.

Table V

Estimating the Differences (relative to White Passengers) in Fare, Tip Amounts, Probabilities of Far Suburb Destinations and Stiffing that Drivers Could Expect Observing Minority Status of Customer

	Irrational Statistical Discriminator: Uncontrolled observational regressions				
Outcome Variables	Fare ($)	Tip ($)	Tip %	Stiff Indicator*	Far Suburb Indicator*
Passenger Black	**-1.873**	**-1.195**	0.389	**0.324**	**-0.053**
Passenger Hispanic	-1.882	**-1.013**	0.350	**0.293**	-0.019
Passenger Asian	-2.473	**-0.783**	0.240	0.079	-0.023
Passenger Other	-1.004	-0.982	0.494	**0.320**	n/a
Observations	1057	1052	n/a	1052	832
R Squared	0.064	0.061	n/a	0.100	0.064
	Rational Statistical Discriminator: Controlled observational regressions**				
Outcome Variables	Fare ($)	Tip ($)	Tip %	Stiff Indicator*	Far Suburb Indicator*
Passenger Black	-1.272	**-0.931**	0.422	**0.274**	**-0.049**
Passenger Hispanic	-0.572	**-0.729**	0.560	**0.239**	0.002
Passenger Asian	-0.588	-0.445	0.431	0.099	-0.017
Passenger Other	-1.217	-0.857	0.413	0.217	n/a
Observations	962	957	n/a	947	436
R Squared	0.170	0.229	n/a	0.240	0.212

*Coefficients reported here are the changes in the probability resulting from discrete changes in the indicator variables from 0 to 1.

**Other variables in the controlled regression are passenger sex, age, and dress indicators; driver age, experience and survey experience; repeat passenger, acquaintance night, late, snow/rain, and luggage indicators; and continuous pick-up location variables, categorical pick-up location variables and pick-up location specific indicator variables.

Underlined coefficients are significant at the 10% level, coefficients in bold are significant at the 5% level, and coefficients underlined and in bold are significant at the 1% level.

Table VI

Estimating Percentage Shortfall in Tips ($) and as Percentage of Total Revenue ($) (relative to White Passengers) that Would Be Inferred by "Rational Discriminators"

	Inferred Percentage Shortfall	
Passenger Race	Tip ($)	% of Total Revenue($)
Passenger Black	-55.0%	-8.3%
Passenger Hispanic	-43.6%	-6.6%
Passenger Asian	-26.6%	-4.0%
Passenger Other	-51.3%	-7.7%

Table VII

Driver Specific Average Tips and Tipping Percentages by Passenger Race

	White Drivers					Black Drivers							Other Drivers				
ıCE	w1	w2	w3	w4	White Average	b1	b2	b3	b4	b5	b6	Black Average	o1	o2	Other Average	Total
ıite	15.8%	39.5%	19.2%	21.1%	26.7%	13.4%	13.5%	17.8%	23.6%	19.5%	20.8%	18.0%	27.2%	8.1%	13.2%	21.7
	50	88	54	32	56	52	27	24	30	42	46	36.83	9	25	17	4
ian	17.7%	17.7%	14.9%	7.7%	16.1%	19.5%	7.5%	27.4%	16.1%	21.6%	18.4%	18.1%	14.3%	10.3%	13.3%	16.4
	20	11	6	5	10.5	5	6	5	5	5	10	6	12	4	8	
ѕpanic	15.6%	26.3%	9.7%	0.0%	17.5%	6.0%	1.8%	6.2%	11.7%	6.5%	14.9%	7.1%	16.4%	4.1%	11.3%	12.0
	7	25	24	1	14.25	18	11	5	10	13	6	10.5	10	7	8.5	1
ıck	13.8%	9.6%	10.7%	10.2%	11.1%	4.4%	3.9%	10.7%	4.5%	8.4%	17.0%	7.8%	19.2%	2.3%	13.1%	9.4
	23	23	59	6	27.75	25	44	14	23	37	29	28.67	18	10	14	3
ıer		0.0%	17.8%		14.8%					0.0%	13.8%	11.0%		1.8%	1.8%	10.7
		1	5		3					1	4	2.5		3	3	
tal	15.7%	30.7%	14.1%	17.6%	20.4%	10.1%	6.8%	15.5%	14.8%	13.5%	18.7%	13.0%	18.9%	6.1%	12.5%	16.1
	100	148	148	44		100	88	48	68	98	95		49	49		1,0

Table VIII
Driver and Passenger Race Frequency

	Passenger Race					
Driver Race	White	Black	Hispanic	Asian	Other	Number of Fares
White	50.8%	25.4%	13.0%	9.4%	1.4%	445
Black	44.5%	34.7%	12.6%	7.2%	1.0%	499
Other	34.7%	28.6%	17.4%	16.3%	3.1%	98
Number of Fares	482	314	138	94	14	1042

Pearson Test of Independence: chi2(8) = 23.6272 Pr = 0.003

Endnotes

1. Some studies have indirectly inferred the presence of consumer discrimination [Nardinelli & Simon 1990, p. 576 ("The appeal of sports for the study of discrimination is that it is possible to separate consumer discrimination from the ability to do the work."); Kahn & Sherer 1988, p. 42 ("[A]ll else equal, white representation on a team contributes to home attendance, providing evidence consistent with the idea of consumer discrimination.")]. Employment audits are non-retail tests of whether consumers of labor (*i.e.*, employers) discriminate on the basis of seller race [Ihlanfeldt & Young 1994, p. 425 ("Evidence on discrimination suggests that consumer prejudice affects the wages paid to black workers"); Yinger 1986, p. 881 ("Housing agents cater to the racial prejudice of current or potential white customers.")].

2. In this "other minority" racial category, one of the cab drivers self-reported his race as being "Arab (Franco-Moroccan)" and the other reported his race as being "Asian (Indian)." The racial composition of New Haven cab drivers (who are predominantly white or black) differs markedly from that of New York or Washington D.C. [Shenoy 1999 ("About 40 per cent of New York's 25,000 drivers of yellow and livery cabs are from the Indian subcontinent.")].

3. The number of observations falls in these regressions relative to the full dataset because (i) of incomplete driver surveys, and (ii) the exclusion of 7 observations where the reported amount received was less than the stated fare.

4. We also ran the regressions in Table II using a Tobit analysis that controls for censored data. The coefficients on minority passenger and driver variables were larger and more statistically significant using this procedure. To ensure that the core results were not driven by outlier tips, we also reran the most controlled regression after imposing filters on the data that dropped observations with tipping percentages of over 200%, 150%, and so on (even checking the results when censoring tipping percentages larger than 25%). The racial effects remained highly significant in every case and the magnitude of the effects did not vary strongly for filters preserving tipping percentages greater than 50% of the fare.

5. The revenue shortfall of $.71 divided by the predicted white driver revenue (evaluated at the means of the non-driver race variables) of $10.8 equals 6.6%.

6. A national telephone survey of approximately 900 consumers about tipping behavior toward 9 different service providers – including taxi cab drivers – suggests, however, that neither income or service differences are driving the minority passenger result [Lynn 2003b]. The respondents were asked not only their race, sex, and age, but also their income (in ten ordered categories) and education (in seven ordered categories). The survey additionally controlled for service quality in the way the tipping question was framed: "If you received good service from a cab or limousine driver would you tip a percent of the total cost of the service, tip them a flat amount or not give them a tip?" Lynn found that after controlling for income and education that African-American respondents were 11% more likely than white respondents to say that they would stiff a cab or limo driver ($p < 0.03$). See also Lynn [2003a, p. 3], and Lynn & Thomas-Haysbert [2003], analyzing five studies indicating lower tipping by minorities.

7. In these regressions, we ignored information (such as drop-off location, conversation, and distance) that only became knowable during or after the fare.

8. Because cab fares are non-linear, starting with a fixed $2 amount (commonly referred to by cab drivers as "the drop"), it might be more profitable for drivers to service a larger number of small fares than a smaller number of large fares. But in New Haven, the likelihood of finding numerous small fares is low so that profitability is largely monotonic with total revenue.

9. Many Asian passengers were likely Yale University students making relatively short trips between the train station and campus. This hypothesis is also consistent with the diminution and loss of statistical significance of the passenger Asian effect when, among other things, pick-up location and age are controlled for.

10. In an independent analysis, we did find that white passengers asked to be dropped off in neighborhoods that were slightly more likely to have a dispatch pickup request than the drop-off neighborhoods of the average African-American or Hispanic passenger. The average white passenger asked to be dropped off in neighborhoods that generated 15.2% of the pickup dispatch requests, while the average African-American and Hispanic passenger asked to be dropped off in neighborhoods that generated only 11.1 and 9.1 percent of the pickup dispatch requests, respectively. But these drop-off disparities are

not good measures of the true deadhead cost because most New Haven drop-off neighborhoods are so close to high dispatch areas.

11. See Cole [2000]. Several prominent African-American men – including Harry Belafonte, David Dinkens, Danny Glover and Denzel Washington – have reported cab drivers refusals to serve [Shenoy 1999]. The TLC at the time was averaging seven complaints of driver discrimination each day [Fields 2000, p. 3]. A 1989 statistical audit study in Washington, D.C. found that taxis were 11.2 percent more likely to stop for whites than blacks and that as a result blacks had to wait, on average, 27 percent longer for a cab to stop [Siegelman 1998, p. 77].

12. The probability of a robbery (.0000046) multiplied by a standard measure of robbery costs ($8416) yields an expected cost of .038 (1997) dollars per fare [Ayres & Donohue 2003].

13. In sharp contrast, an earlier pilot study conducted by Suzanne Perry found that one of the drivers' surveys had markedly different (and implausible) survey answers. This driver reported that virtually all of his passengers failed to tip. Our impression from interacting with the participating drivers in the present study was that each took the study seriously. Most asked questions about the study and several expressed interest in obtaining a copy of the results. One driver returned a subset of his 50 surveys, apologizing that he could not complete the set because he was going to be unable that month to make the lease payment on his cab.

14. Nineteen percent of the fares were 25 cents over the dollar; 20.9% of the fares were 50 cents over the dollar; and, only 15.5% of the fairs were 75 cents over the dollar.

15. The selected nature of the data can also be seen in our inability to audit the reporting of the drivers participating in our sample. We sent a handful of student testers to take cab rides during the period our drivers were filling out forms. It proved to be logistically difficult to put one of the auditors into the cab of a participating driver. We ultimately were able to match testers to drivers for only ten fares. *See* Section IV.C. We had hoped to check whether the drivers' surveys matched with the testers' reports (same fare, same tip, etc.). But none of the ten testers' fares were reported by drivers in their survey data. Again, this strongly suggests that drivers were not reporting the full universe of fare data during the period in which they were participating in the project. However, a likely cause of censoring would seem to be insufficient time between rides for a driver to fill out the survey. Our testing regime, in which the second of two paired testers caught the same cab immediately after the first tester exited it, may have contributed to this problem.

16. The Table II analog suggests that the Black Driver tipping percentage result is only significant at the 11.9% level, while the Other Minority Driver result was no longer statistically significant. The analog of the controlled stiffing regressions yield Black and Other Minority Driver results that remain significant at the 1% level. The much smaller pilot study of Suzanne Perry, discussed *supra* note 9, also was not able to identify statistically significant customer discrimination against minority drivers.

17. See Lynn & McCall [2000, p. 212] ("Although the average relationship between tip size and service evaluations was statistically significant in this review, it was also quite small—accounting for less than two percentage of the variability in tip percentages."), and Lynn & Graves [1996].

18. The African-American passenger coefficients in these regressions also remain large and significant at the 1-5% level.

19. But this last possibility may still be an example of customer discrimination, if customers systematically prefer to schedule with white drivers.

20. Steve Salop helpfully suggested that we reanalyze the data to try to better control for more aggregated driver strategies over the course of a shift. In this more aggregated analysis, we would have tested whether driver racial disparities persist at the shift level when we take into account that waiting at the airport takes longer but is expected to generate a larger fare. However, the problem of incomplete shift data, discussed *supra* Section IV.A, unfortunately precludes us from analyzing shift data in a systematic way.

21. There was a substantially higher percentage of African Americans and Asians among our passengers (30% and 9.1% respectively) than is found in the Greater New Haven population (11.2% and 2.4% respectively) – and there was a substantially lower percentage of whites (46.3% in our sample vs. 74.8% in the general population) [Census Table 2003].

22. The African American passenger coefficient also remains large (7.4%) and significant at the 1% level.

23. Of course, these new rationales in favor of mandated tipping must be weighed against pre-existing rationales for discretionary tipping – such as creating incentives for enhanced service.