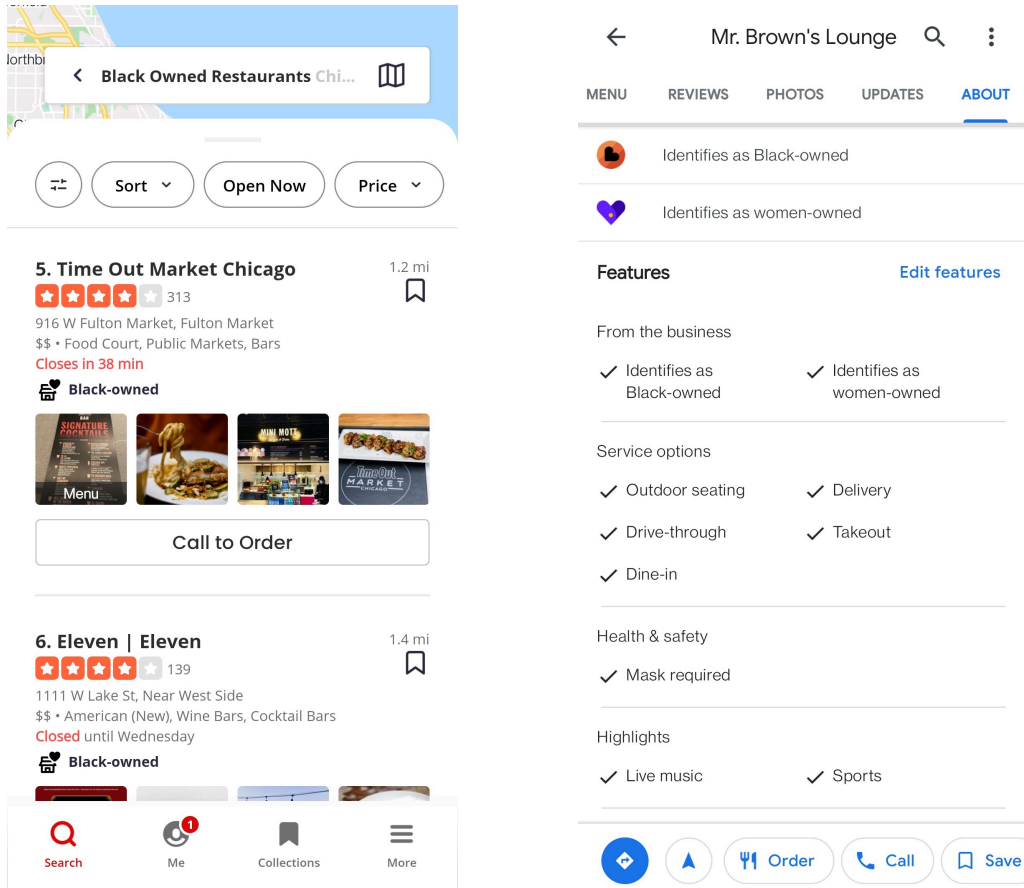


# Appendices

*Online Appendix for: The Effects of Online Social Identity Signals on Retailer Demand*

## A. Examples of Business Labels at Google Places and Yelp



(a) Yelp black-owned Business Label      (b) Google Places Black & Women-Led Label

**Figure A1**      **Mobile screenshots of Yelp and Google Social Identity Labels.**

## B. Study 1 Experiment Design & Flow

Subjects were initially presented with simple instructions, as follows, once they consented to participation.

### Figure B1 Instructions

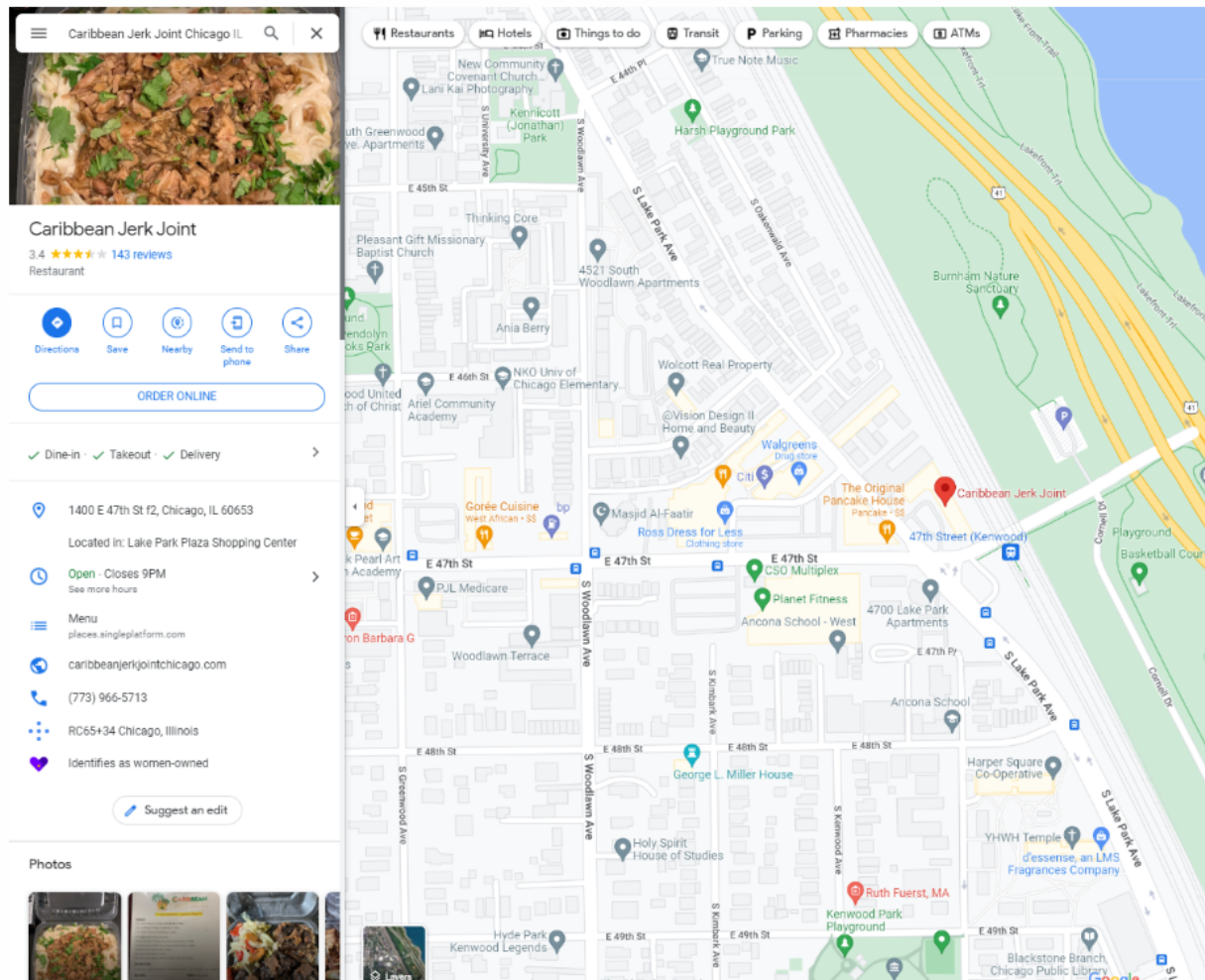
We will first ask you to answer some questions about yourself. Then, we will show you a series of 16 screenshots of Google Places business profiles, for a set of cafes, bars, and restaurants. We will ask you to answer a few questions, to indicate your perception of each business. Please note that the information provided may be hypothetical and should not be relied on to make any purchase decisions.

**NOTE: It is important that you carefully consider each business. As such, an attention-check question has been embedded in the survey. Should you fail to answer the question correctly, payment may be withheld.**

*Note.* Respondents were made aware of standard IRB-approved consent form and demographic details regarding their Prolific ID, age, and household income were asked before the start of the actual treatment.

**Figure B2 Sample Profile and questions from the "W" condition.**

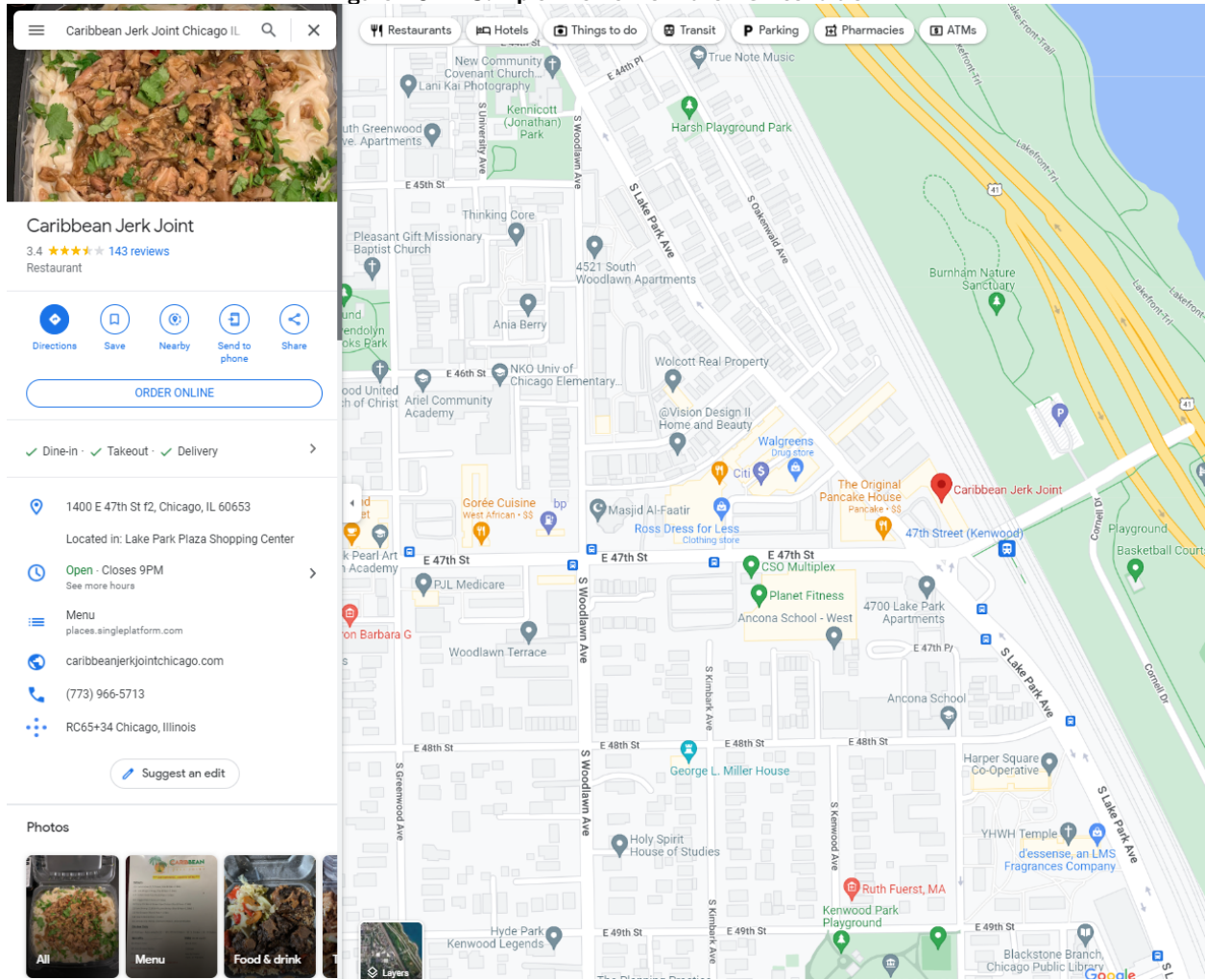
Considering this Google Places business profile, indicate your level of agreement with each of the statements below.



	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I would go here	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My friends would go here	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would like the food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would like the service	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would like the atmosphere	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

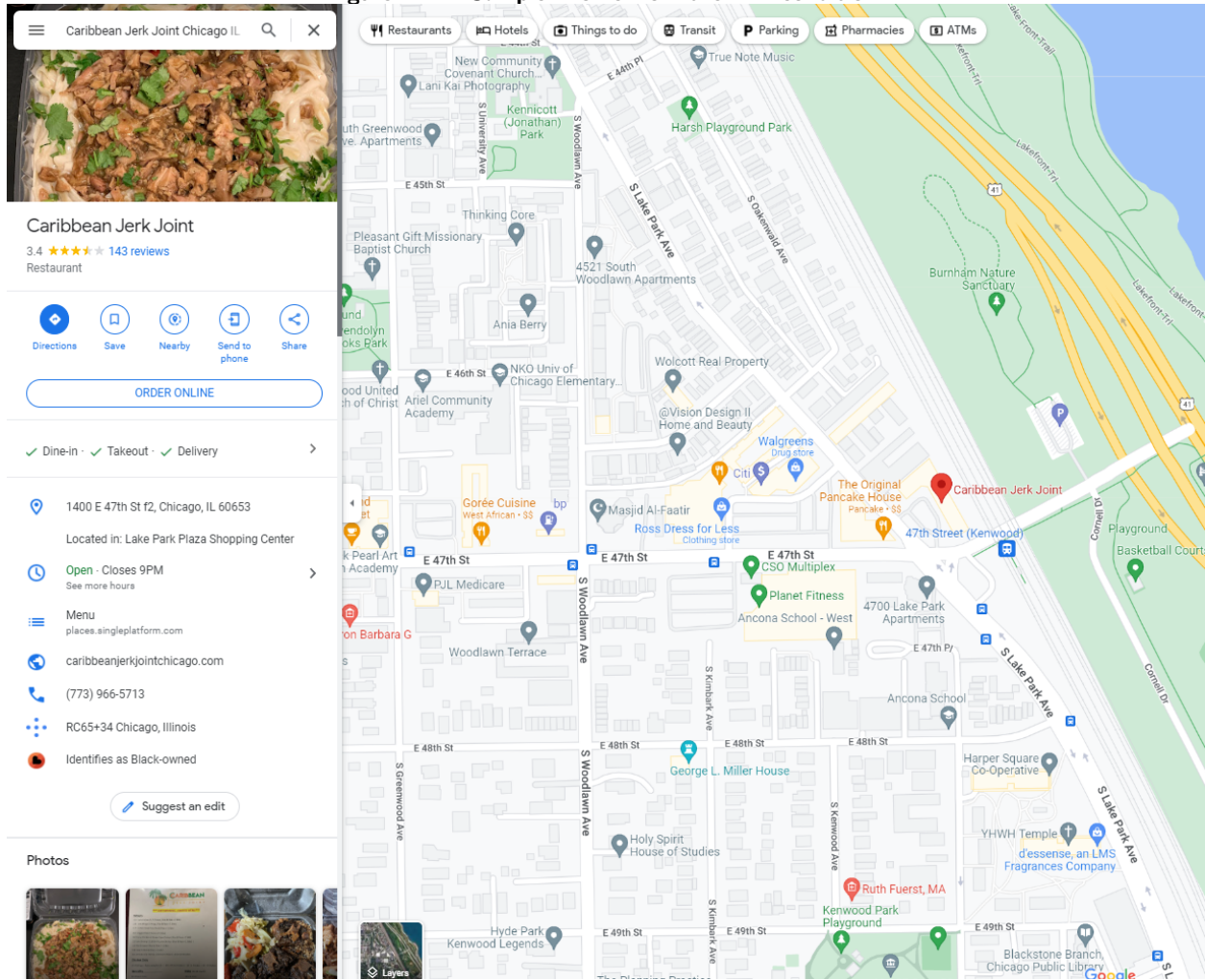
*Note.* 16 profiles and associated questions were shown in random order to each respondent, randomly incorporating some combination of Black- and/or Woman-owned business labels (or neither). No place was ever repeated for a particular respondent and each respondent saw different combinations of black-owned, women-owned Google labels per place.

Figure B3 Sample Profile from the "C" condition.



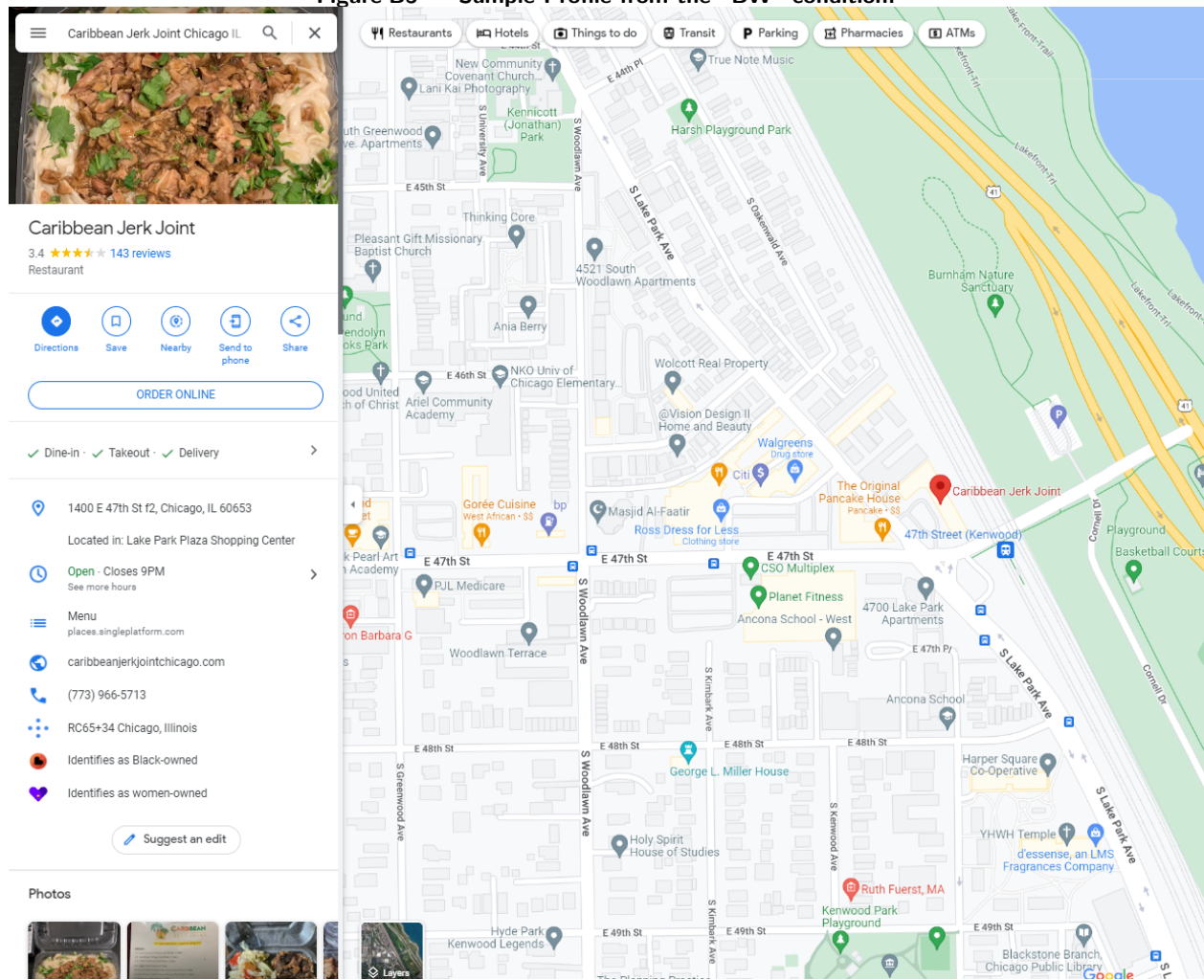
Note. 16 profiles were shown in random order to each respondent.

Figure B4 Sample Profile from the "B" condition.



Note. 16 profiles were shown in random order to each respondent.

Figure B5 Sample Profile from the "BW" condition.








Note. 16 profiles were shown in random order to each respondent.

**Figure B6 Attention Checks**

What type of business did you evaluate on the prior page?

- Bar
- Restaurant
- Cafe
- Hair Salon
- Hardware Store

Which of the following flags did you notice **throughout all the pages** shown? You can select more than one.

 Identifies as LGBTQ+ owned <input type="checkbox"/>	 Identifies as Women-owned <input type="checkbox"/>	 Women -Led <input type="checkbox"/>	 On critic's lists <input type="checkbox"/>	 Black -owned <input type="checkbox"/>
--	---	--	---	--

*Note.* 84.2% of respondents correctly denoted noticing at least one of the two treatment labels.

**Figure B7 Self-reported measure of political stance.**

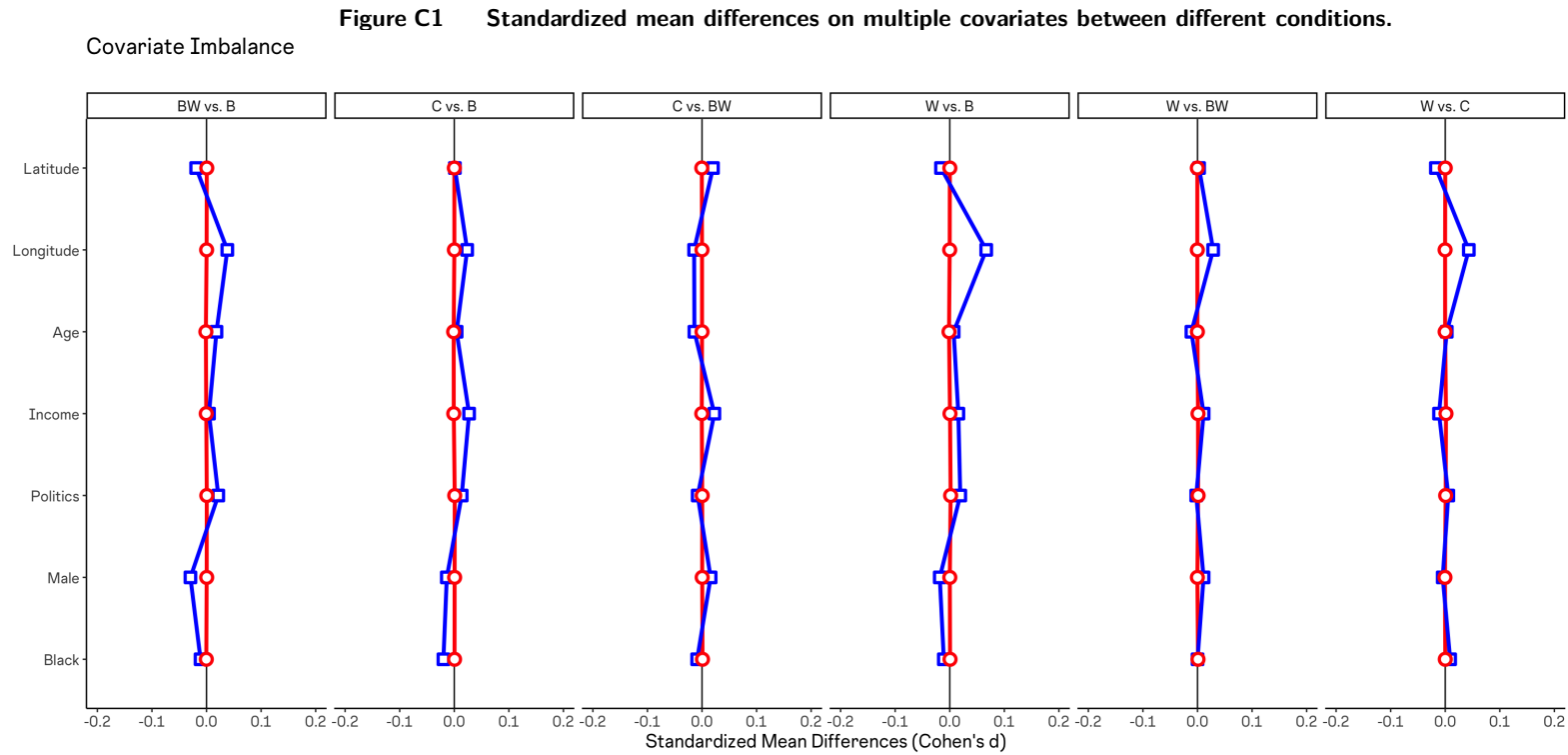
Please indicate your political stance among the options below:

Very Liberal <input type="radio"/>	Somewhat Liberal <input type="radio"/>	Somewhat Conservative <input type="radio"/>	Very Conservative <input type="radio"/>
---------------------------------------	---	--	--

*Note.* This question was asked at the very end of the survey so as to not prime a particular response on any other questions.

### C. Study 1 Additional Tables & Figures

We present a graphical depiction of covariate imbalance among subjects in our primary experiment. All values reflect standardized mean differences. Importantly, our experimental sample exhibits no meaningful differences in terms of any subject characteristics.



*Note.* The two lines show the unweighted (blue) sample and inverse propensity score re-weighted sample (red). All SMDs are well below 0.2.

**Table C1** Descriptive statistics for primary experiment by subject demographics (N=1,030)

Demographic	Sample	Black, Females			Black, Males			White, Females			White, Males		
Variable	Mean	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Age (years)	39	267	36	13	272	35	11	250	43	16	240	41	14
Income* [1-6]	3	256	2.7	1.4	268	2.9	1.5	247	3.1	1.6	237	3.1	1.6
Politics [0-3]	1	267	0.9	0.8	272	1	0.76	250	1	0.87	241	1.2	0.88
Dependent Variables, 16 observations/respondent													
Self [1-5]	3.7	4,272	3.7	1.3	4,352	3.7	1.2	4,000	3.7	1.3	3,856	3.6	1.3
Others [1-5]	3.8	4,272	3.8	1.1	4,352	3.8	1.1	4,000	3.8	1.1	3,856	3.7	1.1
Food [1-5]	3.8	4,272	3.8	1.1	4,352	3.8	1.1	4,000	3.8	1.2	3,856	3.8	1.1
Service [1-5]	3.7	4,272	3.7	1	4,352	3.8	0.96	4,000	3.8	0.97	3,856	3.7	0.92
Atmosphere [1-5]	3.7	4,272	3.7	1.1	4,352	3.7	1.1	4,000	3.7	1.1	3,856	3.6	1.1

\* Income was measured as a categorical variable.

## D. Study 1 Replication with Economic Incentives

Surveys or experiments involving social signals have the potential to elicit socially desirable responses, rather than responses that are aligned with real beliefs or behavior (Heckman et al. 2021). We therefore undertake a replication experiment of sorts, to again test the effects of the Black-owned business label. We also undertake this experiment in the context of Yelp business pages, to inform generalizability. We develop a design inspired by that of (Gneezy et al. 2014). In our setup, each subject is presented with triples of synthetic Yelp business profiles. Subjects are told that they would be allocated \$30 to allocate toward gift cards associated with each of three restaurants. Further, subjects were told that 10% of subjects would be selected at random to have one of their responses implemented, such that their allocations would be paid out to them as real gift cards tied to the restaurants in question.

### Figure D1 Replication Experiment Instructions.

We are conducting a study on what aspects of a restaurant's Yelp profile are desirable/attractive to consumers. As part of this study, we are working with a large number of restaurants/food establishments.

In the survey that follows, you will be presented with three sets (of 3) restaurants. **The restaurants' names, photos, and details have been modified carefully and different versions of each will be presented to different participants (so you may not be able to locate them online with the information provided).** You will be asked to allocate \$30 across each set of restaurants, based on how interested you are in dining at each establishment. For example, in a given set, you might allocate \$5 to the first restaurant, \$25 to the second, and \$0 to the third.

Choose carefully, i.e., clicking on each profile to view its details, because 1 in 10 respondents will be randomly selected to have one of their allocations paid out (within 15-20 days of survey completion, through Prolific), as real gift cards (in total worth 30\$), purchased from the actual restaurants in question. Following completion of the survey, we will provide you with additional information about the details of the study and gift card payment.

**Note:** All restaurants you will see in the study are (or soon will be) located within 25 miles of your location (  ), as calculated based on your IP address.

*Note.* These instructions were preceded by a standard IRB-approved consent form. Respondents were also asked about their household income and age. Each individual was shown the name of the "City, State" based on the IP address to emulate

As context, and as indicated in Figure D1, we informed subjects that we had partnered with a large number of restaurants to experimentally test candidate names, photos and profile descriptions, to inform the design of an ideal Yelp profile for each. Further, subjects were told that all restaurants they would shortly observe were presently (or soon would be) located within 25 miles of the subject's location (displayed on the survey page dynamically), as inferred from the subject's IP address. Here, we were careful to omit map and address information, the stated rationale being that we did not wish subjects to recognize the restaurant, else prior experience at the establishment might bias their responses.

Under this setup, subjects were thus incentivized to make a careful allocation, as their choices were quite likely to have a real economic impact on them. Further, subjects had no expectation they would be able to recognize the restaurant profiles. Of course, in reality, we had not partnered with any restaurants, thus our study design employs a degree of deception. Subjects were thus debriefed following the experiment, and a random selection of subjects was selected to receive a simple (cash) bonus payment of \$30 via Prolific.

In total, each subject was asked to consider three allocations. The Yelp black-owned label was prominently displayed on the right-hand side of the profile randomly. Each subject was shown only one version of a particular place (treated: with the label or untreated) and different combinations of places were assembled in groups of 3 to avoid the choice set presented driving our results. The final survey screens as visible to subjects via a Qualtrics survey are shown below.

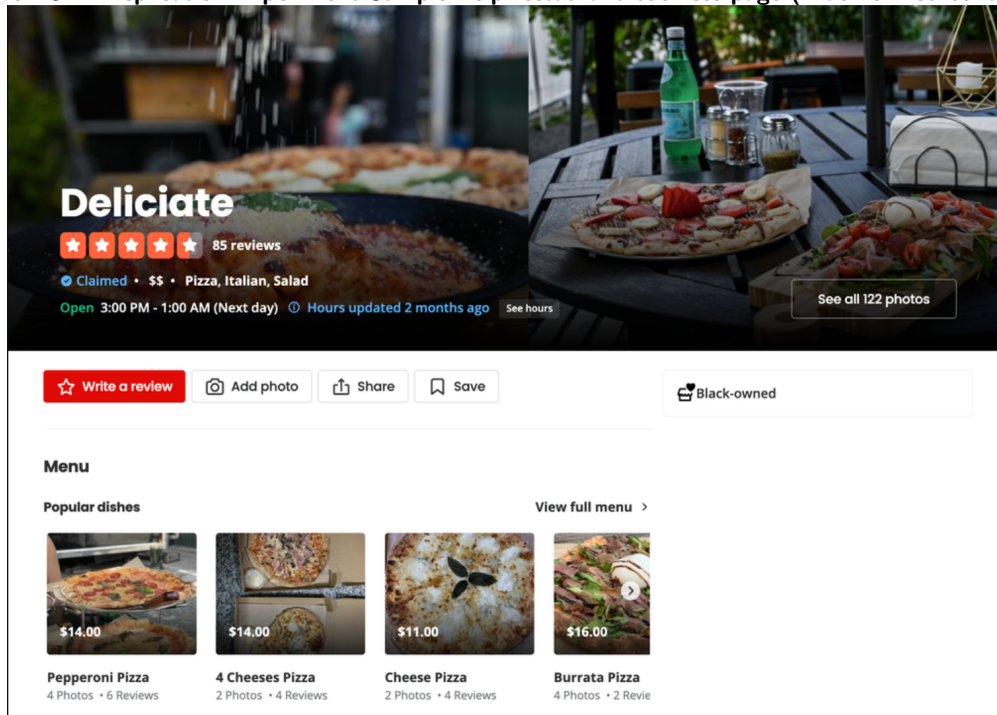
**Figure D2 Replication Experiment Sample Question with sample Bid-Value responses.**

You have \$30 to allocate toward gift cards from the restaurants below. Choose how much you would like to spend at each restaurant, based on your interest in visiting. Choose carefully (i.e., click into the restaurant profile to view the details), because these allocations may be randomly selected to be paid out as actual gift cards, purchased on your behalf from the restaurants in question.



*Note.* Each subject was shown three such screens. Each screen comprised 3 Yelp restaurant page mockups. Each subject saw different random permutations and combinations of the same 9 fictional restaurants. The Yelp Black-owned flag was randomly shown per restaurant. At the end of the 3 questions subjects were asked two text form questions: “Please mention the main things you considered while making your choice in 1-2 lines” and “In 1-2 lines please summarize what aspect of restaurant related information do you think this study is trying to examine.”

**Figure D3 Replication Experiment Sample Yelp restaurant business page (Black-owned condition)**



*Note.* This is the expanded view, visible upon clicking each image in the previous view. The position of the Black-owned label on a Yelp page is in the “Attributes” section of the Yelp page. We made the position of the label more salient.

In March of 2023, we recruited 300 Black<sup>19</sup> and 300 White respondents (gender balanced) from our pool of respondents to the original experiment (Study 1). Descriptive statistics for the final sample are presented below, in Table D1.

<sup>19</sup> 281 of the initial 600 black respondents agreed to participate in Study 2, 19 other black US adult participants were recruited via Prolific.

**Table D1** Descriptive statistics for replication experiment by demographics (N=600)

Demographic	Sample	Black, Females			Black, Males			White, Females			White, Males		
Variable	Mean	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Age(years)	39.6	138	37	13	159	35	10	145	45	15	146	41	13
Income[1-6]	3.1	119	2.9	1.3	139	3.1	1.5	137	3.2	1.5	139	3.2	1.6
Politics [0-3]	0.9	133	0.8	0.79	150	0.9	0.74	147	0.9	0.85	149	1.1	0.88
Dependent Variable, 9 observations/respondent													
Allocation(\$)	10	1,260	10	9	1,431	10	8	1,332	10	9.2	1,377	10	9.5

To analyze the results, we regress the dollars allocated to a particular restaurant,  $p$ , by a subject,  $i$ , when presented as the choice  $c$  (1st, 2nd, 3rd in viewing order) and as a the  $q$  question (1st, 2nd or 3rd allocation set) as a function of whether or not the place was treated for the individual,  $treat_{i,p}$ , and fixed effects for individual  $\alpha_i$ , place  $\delta_p$ , choice option  $\gamma_c$ , question order  $\omega_q$ . Standard errors were clustered by subject. Since the outcome was monetary and only positive values up to 30 USD were allowed, we tried OLS, log-linear and Poisson models. The results are shown in Table D2. The results indicate around 6.5% (average) increase in allocation when the retailer is marked as black-owned.

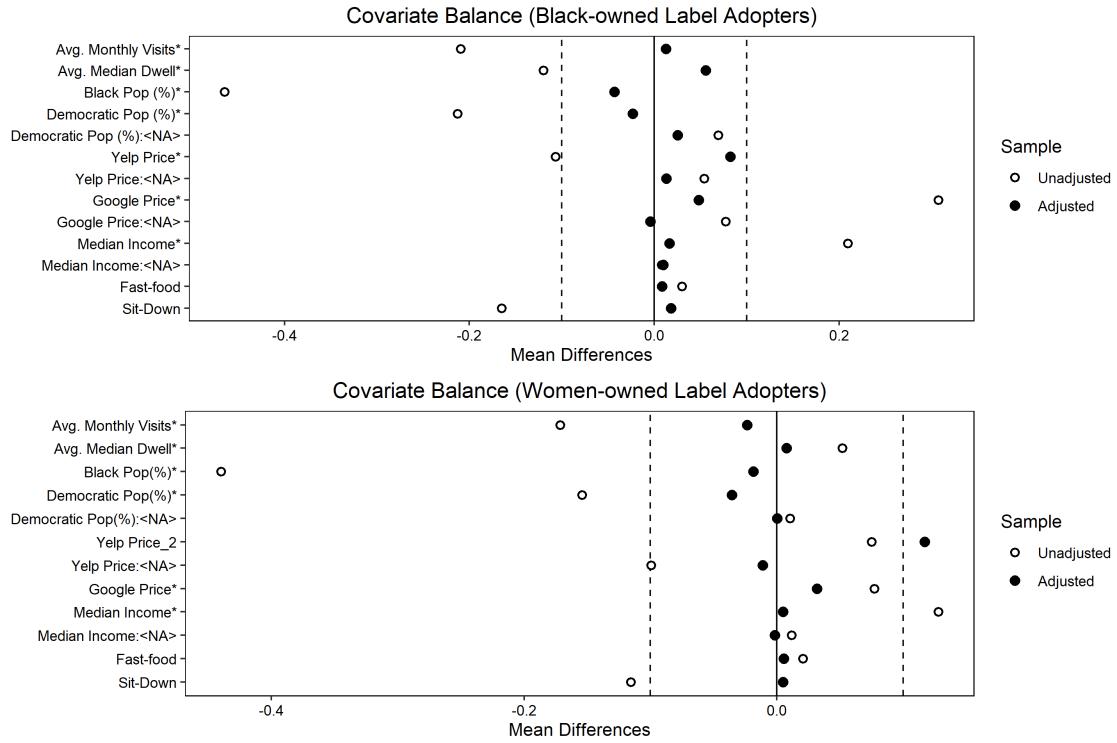
**Table D2** Replication Study: Impact of Black-owned Yelp label on money allocated to procure a gift card.

$DV = Allocation$	OLS (1)	Log Linear(2)	Poisson (3)
Black-owned Label	0.635 <sup>+</sup> (0.317)	0.090* (0.039)	0.065* (0.033)
Num. obs.	5,400	5,400	5,400
Adj. R <sup>2</sup> (full model)	-0.055	0.065	
Adj. R <sup>2</sup> (proj model)	0.001	0.001	
Pseudo R <sup>2</sup>			0.027
Fixed Effects	Place,Choice-set,Subject		

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$ ; + $p < 0.1$

## E. Study 2 Additional Tables & Figures

**Figure E1** Mean differences on place characteristics in unweighted (Unadjusted) and reweighted (Adjusted) samples.



*Note.* For each set, we consider only identity-verified places and consider a place as treated if it adopts either the Google or Yelp label for the particular social identity. <NA>'s indicate missing values.. Variables with \*'s are continuous and the plot shows standardized mean differences for them, whereas the rest use raw mean differences.

**Table E1** Impact of social identity labels (chain and independent restaurants).

	Full		Black-verified				Female-verified			
	Full	Unadjusted		Adjusted		Unadjusted		Adjusted		
		Full	Full	6 Months	Full	6 Months	Full	6 Months	Full	6 Months
Yelp Black-owned	20.22 (16.47)	46.70** (16.64)	13.93+ ( 7.13)	48.33** (18.16)	12.58 ( 7.90)	44.99 (37.47)	24.36 (19.89)	62.55 (42.51)	37.59+ (20.49)	
Google Black-owned	4.84 (15.98)	46.89*** (13.01)	20.15** ( 6.24)	27.33+ (15.91)	15.29* ( 5.99)	-37.76 (45.41)	-18.05 (33.64)	-17.59 (45.19)	-21.25 (42.97)	
Yelp Women-owned	16.09 (12.84)	-23.36 (22.45)	1.73 (16.60)	-18.86 (18.70)	4.50 (14.63)	44.12* (21.00)	64.49*** (16.05)	36.25 (22.91)	65.39*** (17.07)	
Google Women-owned	-27.44** (10.01)	-9.37 (10.22)		-4.49 (10.45)		-23.53+ (12.97)		-14.79 (15.80)		
Yelp LatinX-owned	33.33*** ( 9.51)	-22.85 (35.94)	-21.30 (25.39)	-25.29 (36.89)	-22.68 (27.17)	45.82* (21.85)		62.35*** (16.52)		
Yelp Asian-owned	21.57+ (12.52)					-11.28 (18.36)		-3.67 (18.86)		
Google Veteran-led	5.89 (14.88)	54.80* (25.04)		58.21* (25.71)		-21.19 (45.28)		-12.57 (43.33)		
Google LGBTQ+ Friendly	-16.44 (17.60)	12.58 (11.03)		11.08 (12.06)		-11.25 (16.80)		-12.72 (15.75)		
Num.Obs.	301,051	21,759	5,455	21,759	5,455	12,272	3,068	12,272	3,068	
Adj. R <sup>2</sup> (full model)	0.437	0.688	0.829	0.595	0.824	0.658	0.734	0.671	0.724	
Adj. R <sup>2</sup> (proj model)	0.000	0.012	0.005	0.005	0.003	0.008	0.010	0.007	0.008	
Fixed Effects	Place, City-Month-Year									

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$ ; + $p < 0.1$ , Standard errors clustered by retailer

The adjusted samples consist of the particular identity-verified samples each propensity weighted by the propensity of adopting either of Yelp/Google's labels corresponding to the relevant identity.

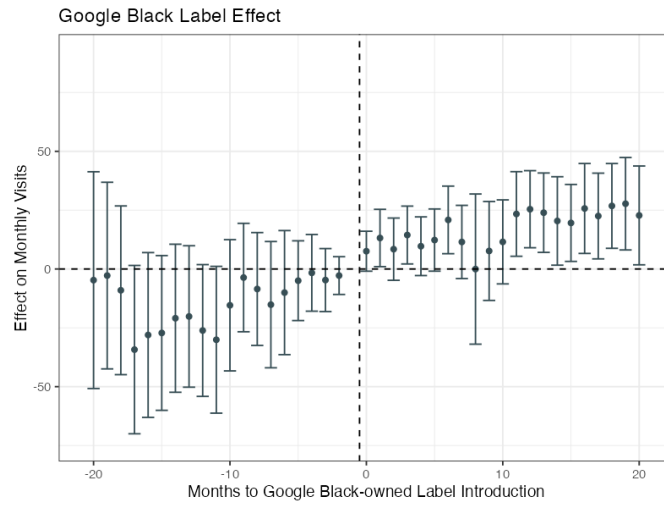
**Table E2** Impact of Yelp & Google's labels (sample includes only chain restaurants).

DV = Monthly Visits	Whole Sample All Cities	Black Verified All Cities	Female Verified Chicago
Yelp Black-owned	-18.108 (85.231)	16.044 (9.870)	
Google Black-owned	49.779 (42.413)	37.120 (40.350)	
Yelp Women-owned	-39.255 (50.686)		
Google Women-owned	74.742+ (45.171)	5.144 (87.116)	-102.335 (72.957)
Yelp Asian-owned	-32.434 (88.608)		
Google Veteran-led	-9.450 (77.344)	49.032 (121.951)	
Google LGBTQ+ Friendly	-7.133 (15.427)	-118.349 (95.412)	-25.705 (49.963)
Num.Obs.	81,851	812	572
R2 Adj.	0.741	0.897	0.799
R2 Within	0.000	0.022	0.006
Fixed Effects	Place, City-Month-Year		

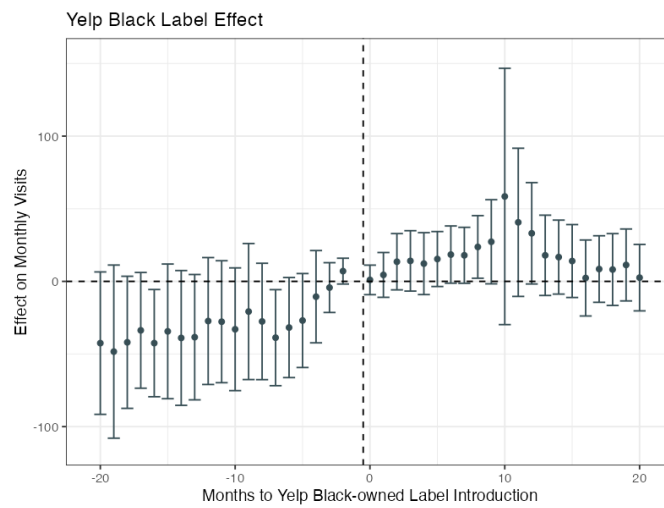
\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$ ; + $p < 0.1$ , Standard errors are clustered by retailer

**Figure E2 Additional Event Study Plots (TWFE)**

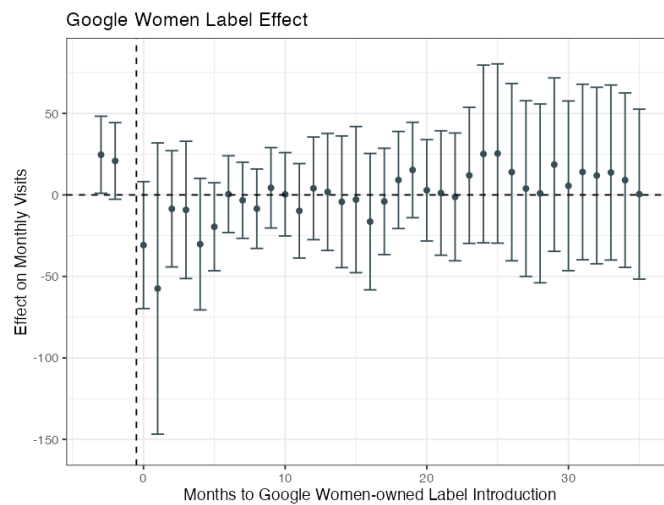
(a) Google Black-owned label



(b) Yelp Black-owned label



(c) Google Women-owned label



**Table E3** Impact of flags on annual visit counts per retailer (aggregated panel)

<i>DV = AnnualVisits</i>	All All Cities	Black-Verified All Cities	Female-Verified Chicago
Yelp Black-owned	424.518 <sup>+</sup> (219.776)	587.909* (242.739)	614.024 (442.179)
Google Black-owned	169.992 (168.442)	514.594*** (149.262)	-325.860 (463.481)
Yelp Women-owned	261.720 (163.517)	-269.067 (288.094)	540.342* (268.787)
Yelp LatinX-owned	506.390*** (120.915)	-220.777 (521.102)	591.609* (261.235)
Yelp Asian-owned	549.044*** (138.057)		250.164 (309.104)
Google Veteran-led	187.147 (263.452)	514.537** (175.783)	-390.841 (963.160)
Google LGBTQ+ Friendly	1318.823*** (241.779)		
Num. obs.	21,765	2,048	1,125
Adj. R <sup>2</sup> (full model)	0.382	0.669	0.605
Adj. R <sup>2</sup> (proj model)	-0.000	0.019	0.009
Fixed Effects	Place, Year·City		

\*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$ ; <sup>+</sup>  $p < 0.1$

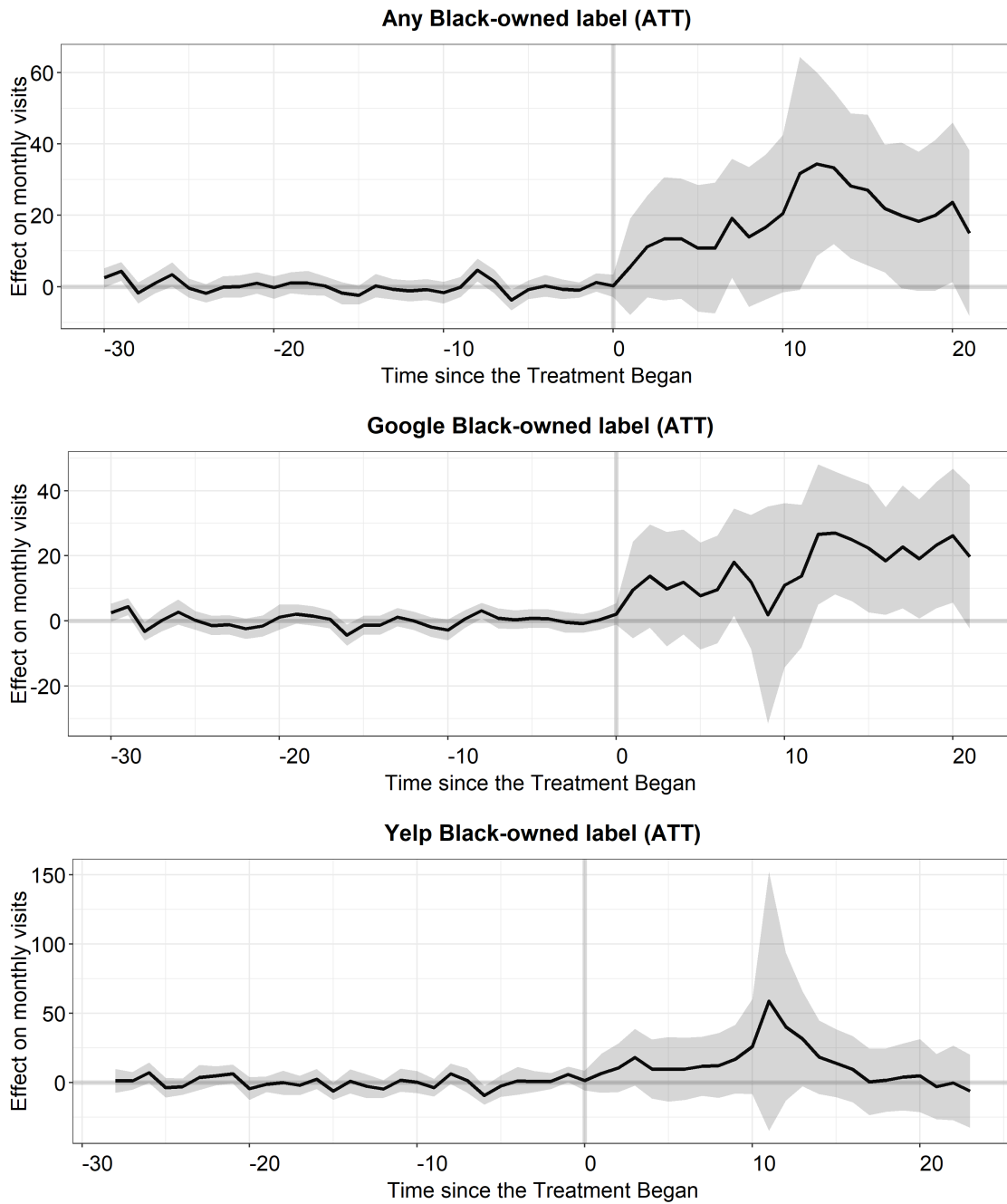
Standard errors clustered by retailer.

Each social identity label is considered as 1 if for the majority (>50%) of the year the label was available for the adopting retailer.

### **E.1. Fixed Effect Counterfactual Estimators**

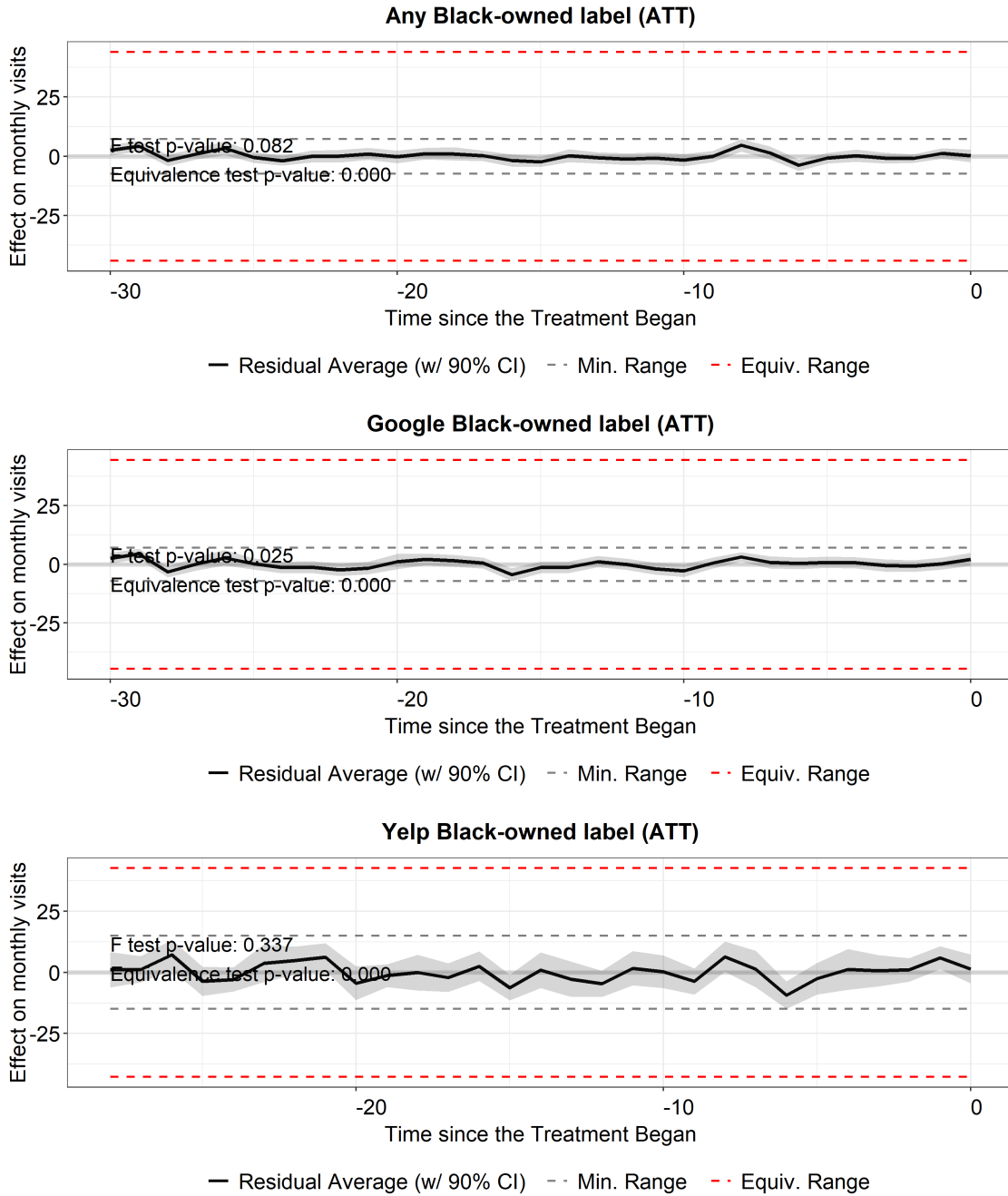
For each sub-sample for black-owned and women-owned flags we also performed event study estimation using Liu et al. (2022)'s R implementation (*fect*) of Athey et al. (2021)'s counterfactual matrix completion estimators (Figures E3 and E5). This estimator does not suffer from the possible bias of the two-way fixed effects estimator under heterogenous treatment effects with time-varying covariates, a concern recently highlighted in the econometrics literature (e.g., De Chaisemartin and d'Haultfoeuille 2022). The corresponding equivalence tests, Figures E4 and E6, show no significant pre-treatment trends.

**Figure E3** Event study plots, counterfactual matrix completion models for black-owned labels.



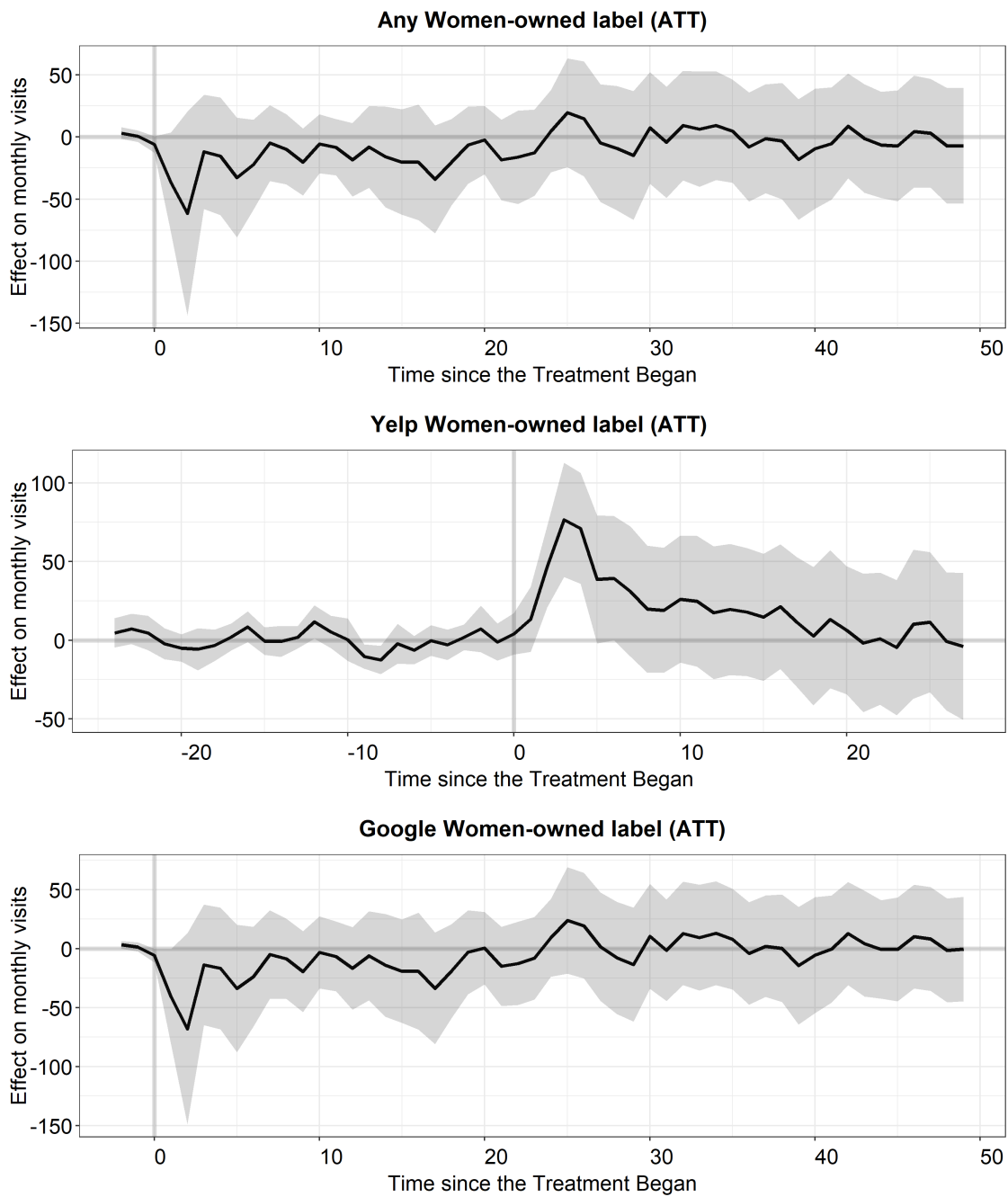
*Note.* Gray regions indicate 95% CIs. Sample restricted to Black-verified.

**Figure E4** Equivalence test plots, counterfactual matrix completion models for black-owned labels.



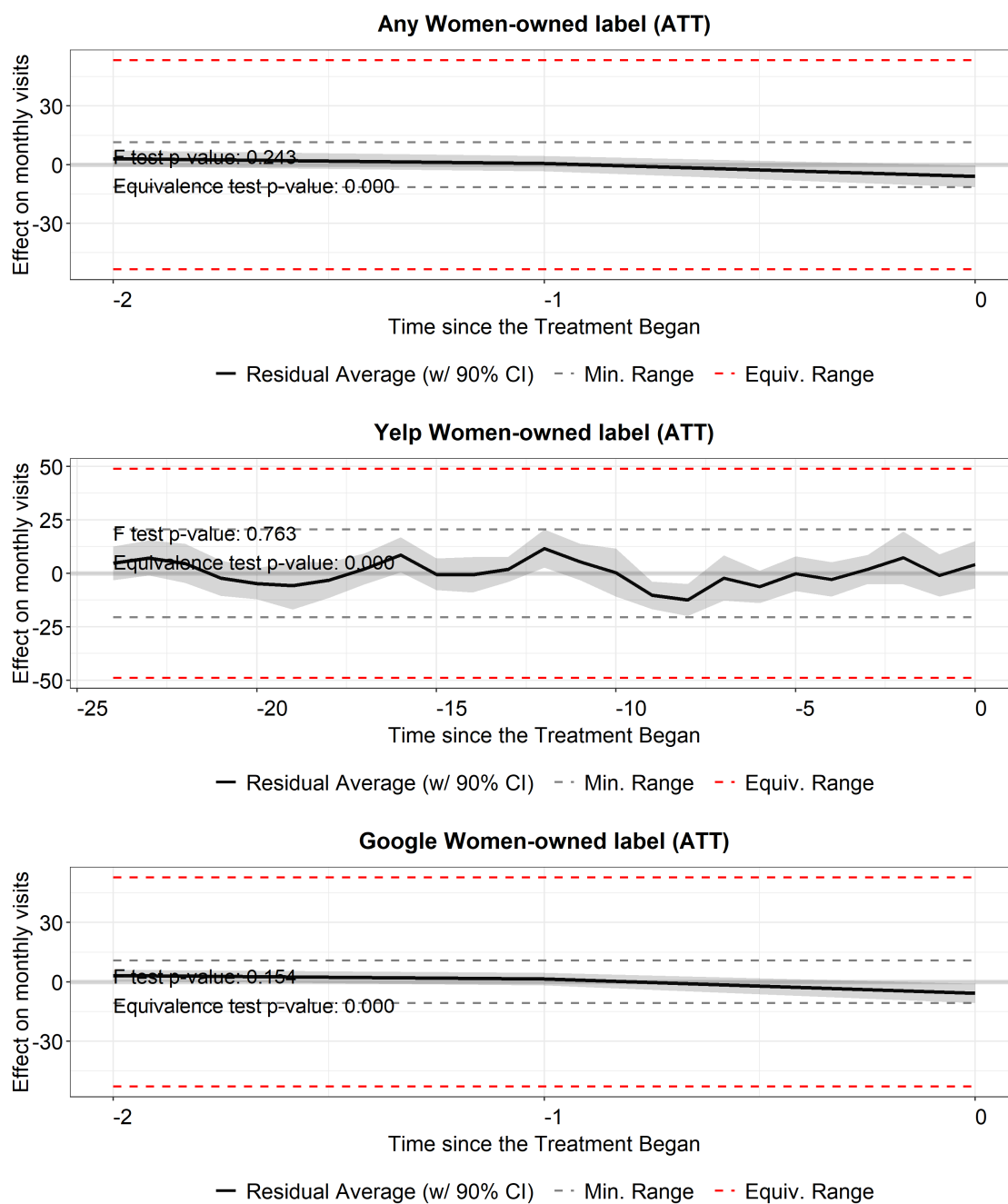
*Note.* Gray regions indicate 95% CIs. Sample restricted to Black-verified.

**Figure E5** Event study plots, Counterfactual matrix completion models for women-owned labels.



*Note.* Gray regions indicate 95% CIs. Sample restricted to female-verified.

Figure E6 Equivalence test plots, Counterfactual matrix completion models for women-owned labels.



Note. Gray regions indicate 95% CIs. Sample restricted to female-verified.