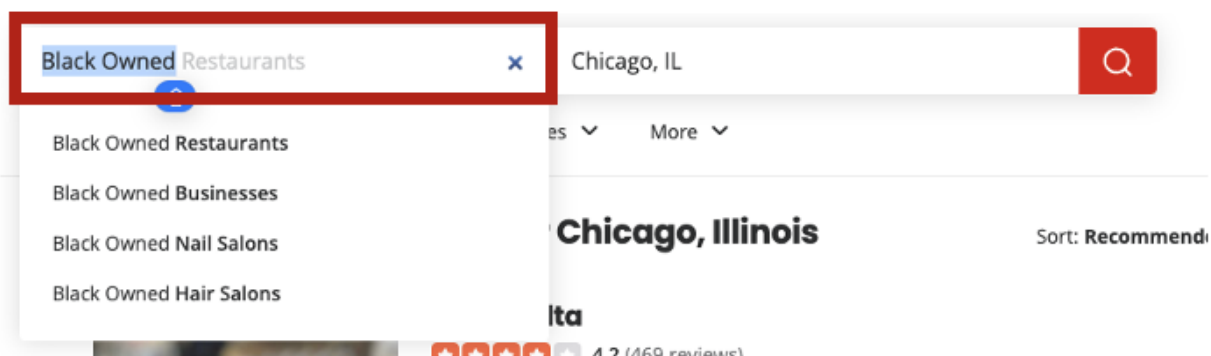


## Appendix 1

Yelp’s platform has significantly evolved to support the visibility and discovery of Black-owned businesses. Before the formal introduction of a “Black-owned” badge on June 19, 2020 (about four weeks after George Floyd’s murder), Yelp’s search algorithm relied heavily on user-generated content to identify businesses as Black-owned. When a user searched for “Black owned” as shown in Figure A1.1, the platform’s method involved parsing text in user reviews for mentions of “Black owned,” as shown in Figure A1.2. When users explicitly mentioned this feature in reviews, the algorithm would prioritize these businesses in search results related to those terms. This approach allowed users to find Black-owned businesses without an official badge or self-identification by the business owners themselves.

The formal recognition of Black-owned businesses on Yelp was enhanced by the introduction of the Black-owned badge, as shown in Figures A1.3 and A1.4. Following this introduction, Yelp’s search results for “Black owned” now include businesses that display the Black-owned badge as well as those without the badge but which are mentioned as Black-owned in customer reviews (see Figure A1.5).

**Figure A1.1.** Screenshot of Yelp’s Search Functionality



**Figure A1.2.** Yelp Review Mentioning “Black owned”**Sandeep C.** Elite 24

Chicago, IL

522
 235
 363

Feb 10, 2024

1 photo

Creole flavors designed on a pasta canvas!

Absolutely floored by the flavors and quality of seafood for the price. The fried lobster tail was better than RPM and about \$50 less.

Black owned and supported with a welcoming vibe but very busy on a Saturday night. Although we had reservations, we did wait for about 15 mins. Probably the only real feedback on managing reservations and walk ins better.

We were greeted with shot sized welcome drinks of one of their cocktails. Cocktails overall were ok and mainly tropical in nature.

The food really consists of picking a base pasta and then topping with various proteins. Definitely recommend adding a few items to get the full experience.

I went with the alfredo and topped it with lobster and a lamb chop. Others got the seafood trio and scampi.

Every dish was outstanding. By far the entrees are what earns the 4 stars here. Some reviews mentioned it being too salty. I did not find that to be the case. If you are familiar with Cajun spices then you'll understand that it involves more salt than usual but by no means unappetizing.

The restaurant should consider raising prices, increasing capacity and fine tuning the edges of service to stay in business for a long time. Truly a unique and incredible offering in Chicago!

Figure A1.3. Black-owned Badge in Yelp’s Search Results

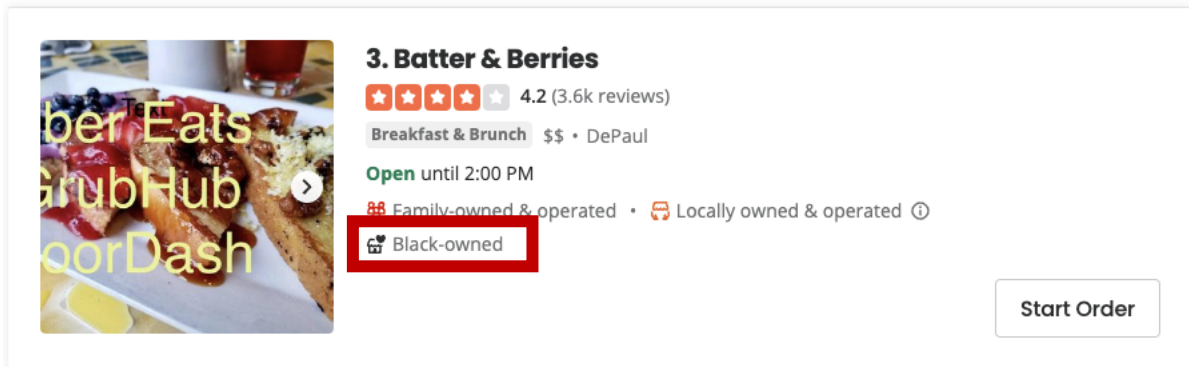


Figure A1.4. Black-owned Badge on Yelp’s Company Profile Page

### Amenities and More

- Offers Delivery
- No Reservations
- Many Vegetarian Options
- Accepts Android Pay
- Casual
- Good for Groups
- Good for Breakfast, Brunch
- Waiter Service
- Gender-neutral restrooms
- Women-owned
- Offers Catering
- No Happy Hour
- Dogs Not Allowed
- Bike Parking
- Provides reusable tableware
- Offers Takeout
- Vegan Options
- Accepts Credit Cards
- Accepts Apple Pay
- Moderate Noise
- Good For Kids
- Street Parking
- Wheelchair Accessible
- Black-owned**
- No Outdoor Seating
- No Wi-Fi
- No Alcohol
- No TV
- Compostable containers available



## Appendix 2 – Descriptive Statistics

The table below tabulates the cities in our sample, which were selected to get a variety of sizes, demographics, and partisan lean.

**Table A2.1:** Frequency Table of Cities

City	8-Week Sample		3-Week Sample	
	Freq.	Percent	Freq.	Percent
Chicago, IL	55,888	19.2	13,302	18.0
Los Angeles, CA	46,288	15.9	13,044	17.6
Houston, TX	44,448	15.3	11,712	15.8
Washington DC	41,072	14.1	9,750	13.2
Jacksonville, FL	19,040	6.5	4,752	6.4
Oklahoma City, OK	11,872	4.1	2,988	4.0
Colorado Springs, CO	11,856	4.1	2,970	4.0
Omaha, NE	11,344	3.9	2,922	4.0
Mesa, AZ	10,800	3.7	2,604	3.5
Virginia Beach, VA	10,224	3.5	2,514	3.4
Arlington, VA	7,472	2.6	2,028	2.7
Tulsa, OK	7,248	2.5	1,920	2.6
Aurora, CO	7,024	2.4	1,716	2.3
Anaheim, CA	6,448	2.2	1,716	2.3

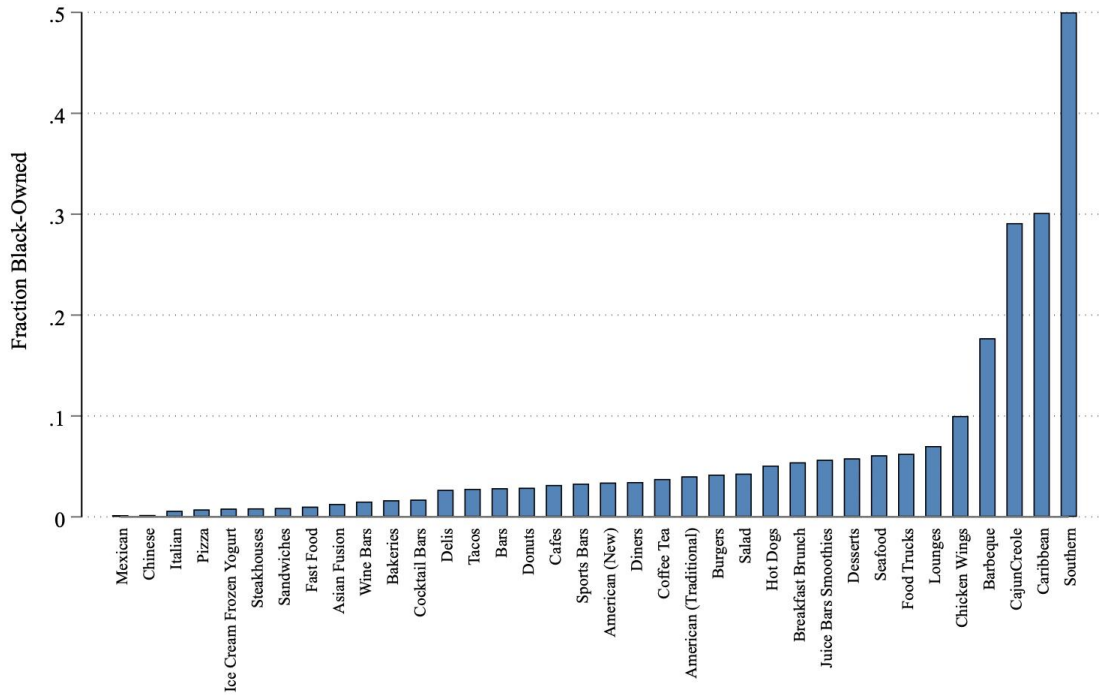
**Table A2.2:** Descriptive Statistics by Black-owned and Pre/Post Floyd's Murder

<b>(A) Black-owned Establishments</b>							
		Before May 25, 2020 (Pre Period)			After May 25, 2020 (Post Period)		
Statistic	Source	N	Mean	St. Dev.	N	Mean	St. Dev.
Number of Reviews	Yelp	3,792	0.484	1.059	3,792	1.304	2.082
Rating	Yelp	1,019	3.773	1.46	1,880	4.016	1.281
Revenue	SafeGraph	605	286.1	391.8	738	468.3	741.3
Foot Traffic	SafeGraph	2,162	55.65	68.35	2,180	50.9	62.25
Pct Democrat	Voter Registration	2,800	0.64	0.136	2,800	0.64	0.136

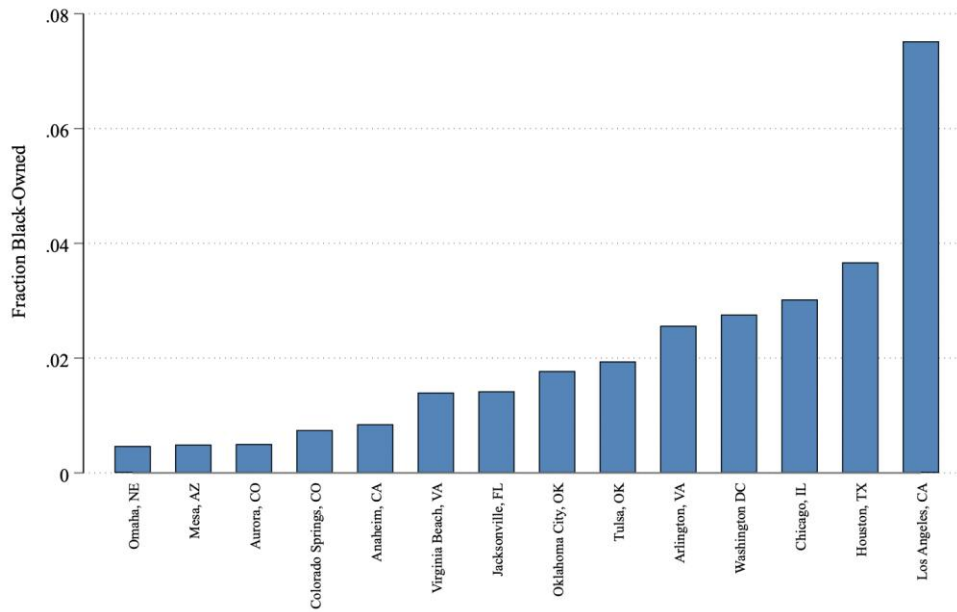
  

<b>(B) Non-Black-owned Establishments</b>							
		Before May 25, 2020 (Pre Period)			After May 25, 2020 (Post Period)		
Statistic	Source	N	Mean	St. Dev.	N	Mean	St. Dev.
Number of Reviews	Yelp	130,568	0.249	0.635	130,568	0.374	0.843
Rating	Yelp	24,294	3.86	1.489	33,157	3.85	1.461
Revenue	SafeGraph	25,942	465	935	31,601	703.8	1,280
Foot Traffic	SafeGraph	59,495	68.71	256	59,622	65.88	147.9
Pct Democrat	Voter Registration	91,232	0.614	0.143	91,232	0.614	0.143

**Figure A2.1:** Fraction of Black-owned Businesses in Sample, by Cuisine



**Figure A2.2:** Fraction of Businesses that are Black-owned in Sample, by City



### Appendix 3. Effect on Cumulative Ratings and Reviews

Table A3.1 examines the impact of George Floyd's murder using the 8-week sample on the *cumulative number of reviews* and the *cumulative average rating* for Black-owned businesses. The results indicate an economically small (<2%) but statistically significant increase in the cumulative number of reviews and no significant change in the cumulative rating.

**Table A3.1.** The Effect of George Floyd's Murder on Cumulative Reviews and Ratings

	8-Week Sample	
	Cumulative Number of Reviews	Cumulative Rating
	(1)	(2)
Black-owned × Post May 25	4.252** (1.260)	-0.004 (0.006)
Constant	223.6*** (0.018)	3.710*** (0.000)
Establishment FE	Yes	Yes
Zipcode-Week FE	Yes	Yes
Observations	268,720	262,403

\*\*\*p<0.001, \*\*p<0.01 (two-tailed). Standard errors are in parentheses. Robust standard errors, clustered by establishment and zipcode-week, are reported. The unit of analysis is the establishment-week. The independent variable is an interaction of a dichotomous variable, *Black-owned* (equals one if the firm identifies as Black-owned on Yelp) and *Post May 25* (equals one if the focal week falls after May 25, 2020). The main effects of *Black-owned* and *Post May 25* are absorbed by fixed effects.

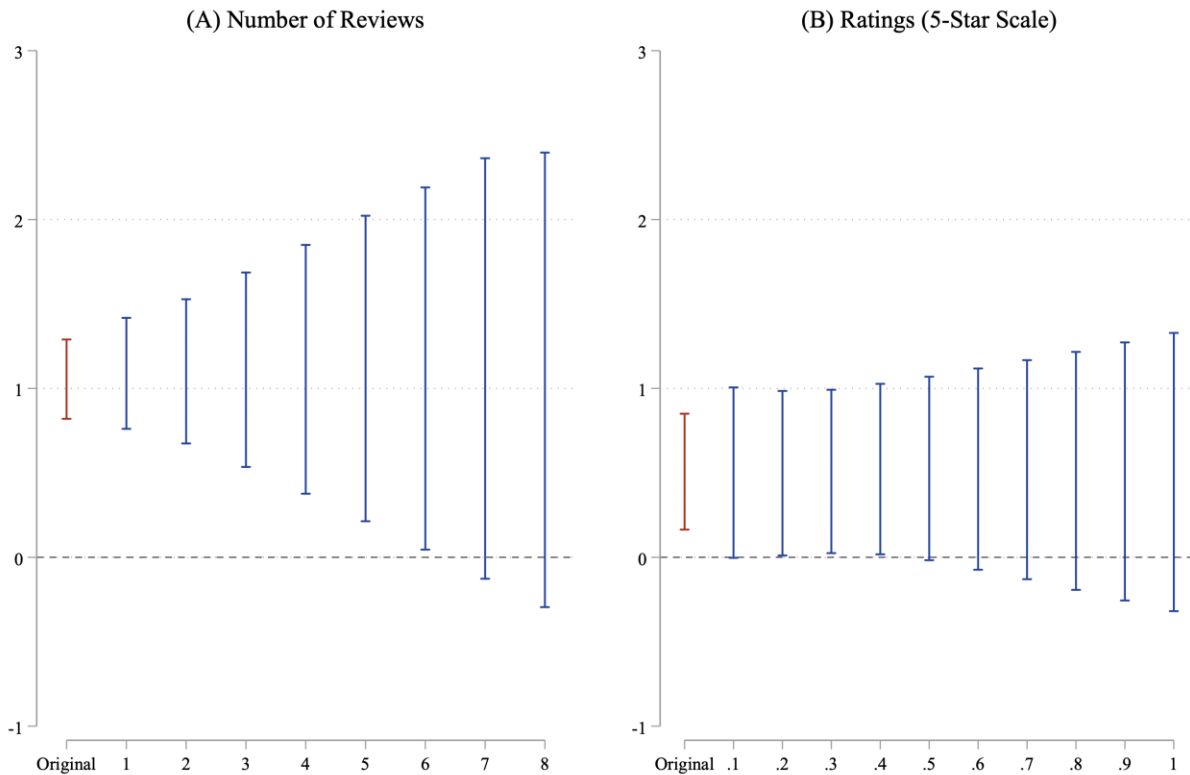
### Appendix 4 – Testing Identifying Assumptions

Table A4.1 shows the coefficients and standard errors used to create Figure 4.

**Table A4.1.** Event Study Coefficients and Standard Errors

Weeks from Treatment (Floyd's Murder)	Symbolic Action		Substantive Action	
	Number of Reviews	Rating	Revenue	Foot Traffic
	(1)	(2)	(3)	(4)
-7	0.0355 (0.066)	0.206 (0.236)	37.49 (66.33)	4.588 (2.819)
-6	-0.0383 (0.057)	-0.362 (0.248)	57.88 (65.61)	6.679 (5.174)
-5	0.0228 (0.059)	-0.0631 (0.212)	38.79 (70.10)	8.603 (5.699)
-4	0.0705 (0.060)	0.169 (0.230)	44.12 (63.96)	3.24 (4.317)
-3	0.0623 (0.060)	-0.035 (0.212)	35.95 (50.55)	4.496 (3.910)
-2	0.0958+ (0.057)	0.219 (0.225)	23.78 (62.47)	4.801 (4.225)
0	0.0705 (0.061)	0.0217 (0.203)	47.06 (49.20)	6.881 (5.056)
1	0.127* (0.057)	0.18 (0.206)	49.72 (90.57)	7.19 (5.261)
2	1.056*** (0.137)	0.507** (0.175)	133.7 (92.65)	6.571 (5.286)
3	0.919*** (0.111)	0.264 (0.169)	81.85 (100.9)	4.784 (4.338)
4	1.055*** (0.120)	0.280+ (0.167)	131.5 (97.19)	1.521 (3.765)
5	0.742*** (0.091)	0.247 (0.164)	122.1 (102.7)	1.334 (3.046)
6	0.637*** (0.100)	0.207 (0.167)	37.83 (89.51)	2.059 (2.050)
7	0.853*** (0.118)	0.244 (0.177)	56.45 (88.49)	-0.333 (1.977)
8	0.555*** (0.099)	0.0301 (0.176)	128.0 (146.0)	0 (.)

We also use several empirical approaches to quantify the potential effects of a SUTVA violation. The first empirical approach considers spillover effects as a general violation of the parallel trends assumption. If there are spillovers from Black-owned businesses to non-Black-owned businesses, then one way to think of this is that the post-treatment trends of the non-Black-owned businesses may no longer map out the counterfactual trends of Black-owned businesses had they not been treated. To assess how this violation would affect our results, we employed methods used by Rambachan and Roth (2023) for partial identification. This analysis quantifies how severe a violation of the parallel trends assumption would have to be to impact our conclusions about the direction and significance of the effect. Our findings in Figure A4.2 show that, for the number of reviews, even if we allow post-treatment trends to be violated more than six times the largest pre-treatment trend violation, the effect remains positive and statistically significant. Similarly, for the ratings analysis, assuming post-treatment trends are violated by about 50% of the maximum pre-treatment difference, the results remain positive and significant.

**Table A4.2.** Rambachan and Roth (2023) Relative Magnitude Analysis

Next, we conducted a simulation to quantify how our results would change under a scenario of perfect substitution. In other words, what would our effects be if we assume that every Black-owned rating and review after George Floyd’s murder came at the expense of a non-Black-owned business in the same area? To test how this would affect our results, we simulated the extreme case of perfect substitution whereby the number of reviews and average ratings directed toward a Black-owned firm resulted in one less review or rating for a non-Black-owned firm. This simulation represents the most severe, but theoretically possible, violation of the SUTVA assumption in our setting. We created a variable to simulate the number of reviews per firm, assuming a one-for-one substitution in our data. Specifically, for each zip code and week, we counted the total reviews for Black-owned businesses and increased the number of reviews for non-Black-owned businesses in the same zip code and week, randomly allocating these

additional reviews. For example, if all Black-owned businesses in a given zip code received 20 reviews in the week following George Floyd's murder, we randomly selected 20 non-Black-owned businesses in the same zip code and added a review to their count for that week.

We performed a similar simulation for the ratings analysis, assigning perfect five-star ratings to a number of non-Black-owned businesses equal to the number of ratings (of any value) for Black-owned businesses reviewed that week. For instance, if 20 Black-owned businesses in a given zip code were rated in the week following George Floyd's murder, we randomly selected 20 non-Black-owned businesses in that zip code and week and assigned them perfect five-star ratings for that week.

The results in Table A4.3 demonstrate that even under these extreme assumptions about the nature of the SUTVA violation, our results remain robust.

**Table A4.3.** SUTVA Violation Simulation Analysis

	8-Week Sample				3-Week Sample			
	Number of Reviews		Rating		Number of Reviews		Rating	
	Original (1)	Simulated (2)	Original (3)	Simulated (4)	Original (5)	Simulated (6)	Original (7)	Simulated (8)
Black-owned × Post May 25	0.703*** (0.063)	0.645*** (0.063)	0.217** (0.074)	0.191* (0.074)	0.645*** (0.074)	0.592*** (0.074)	0.324** (0.126)	0.275* (0.125)
Establishment FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Zipcode-Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

\*\*\*p<0.001, \*\*p<0.01, \*p<0.05 (two-tailed). Robust standard errors, clustered by establishment, in parentheses. The unit of analysis is the establishment-week. All dependent variables are standardized. The independent variable is an interaction of a dichotomous variable, *Black-owned* (equals one if the firm identifies as Black-owned on Yelp) and *Post May 25th* (equals one if the focal week falls after May 25, 2020). The main effects of *Black-owned* and *Post May 25th* are absorbed by fixed effects.

### Appendix 5. Alternative Black-owned Measure

Table A5.1 presents a summary of the distribution of firms based on whether they display the Black-owned badge on Yelp and whether any of their reviews mention "Black-owned" or "Black owned." Table A5.2 replicates the results from Table 2, Panel A, using this alternative measure.

**Table A5.1.** Crosstabs of Yelp's Black-owned Badge and Establishments with Reviews Mentioning "Black-owned" or "Black owned"

		Reviews mention "Black-owned"		
		0	1	Total
Black-owned Badge	0	104,544	72	104,616
	1	3,996	522	4,518
	Total	108,540	594	109,134

**Table A5.2.** Replicating Table 2, Panel A Using Alternative Measure of Black-owned

	8-week Sample				3-week Sample			
	Symbolic Action		Substantive Action		Symbolic Action		Substantive Action	
	Number of Reviews	Rating	Revenue	Foot Traffic	Number of Reviews	Rating	Revenue	Foot Traffic
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Reviews Mention Black-Owned × Post May 25th	1.553*** (0.267)	0.224* (0.082)	166.7 (151.6)	-4.292 (4.583)	1.475* (0.559)	0.229 (0.116)	57.61 (114.2)	-2.688 (3.346)
Establishment FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Zipcode-Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	289,152	56,472	59,900	127,753	108,432	16,961	22,702	47,983
R-Squared	0.382	0.501	0.854	0.690	0.472	0.584	0.895	0.941

\*\*\* p<0.001, \*\* p<0.01, \* p<0.05 (two-tailed). Robust standard errors, clustered by establishment, in parentheses. The unit of analysis is the establishment-week. The independent variable is an interaction of a dichotomous variable, *Reviews Mention Black-Owned* (equals one if the any Yelp reviews of the firm mention "Black-owned" or "Black owned") and *Post May 25* (equals one if the focal week falls after May 25, 2020). The main effects of *Reviews Mention Black-Owned* and *Post May 25* are absorbed by fixed effects.

### **Appendix 6. Local and Non-Local Reviews**

Table A6.1 presents the impact of George Floyd's murder on the number of reviews and ratings for Black-owned businesses, categorized by reviewer location (local vs. non-local) and time frame (3-week vs. 8-week samples). We define local as anyone sharing the same city as the reviewed establishment (we do not have the residential zip code of the reviewers). The results indicate that the effects on local and non-local consumers were similar, as the confidence intervals of models 1 and 5, 2 and 6, 3 and 7, and 4 and 8 overlap.

**Table A6.1.** The Effect of George Floyd’s Murder on Reviews from Local and Non-Local Consumers

	Local Reviewers Only				Non-Local Reviewers Only			
	8-Week Sample		3-Week Sample		8-Week Sample		3-Week Sample	
	Number of Reviews	Rating	Number of Reviews	Rating	Number of Reviews	Rating	Number of Reviews	Rating
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Black-owned × Post May 25	0.425*** (0.0463)	0.154 (0.101)	0.355*** (0.0500)	0.219 (0.189)	0.406*** (0.0422)	0.204+ (0.112)	0.427*** (0.0567)	0.139 (0.195)
Establishment FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Zipcode-Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	206,336	28,894	77,376	8,037	194,208	25,198	72,828	6,797
R-Squared	0.342	0.529	0.439	0.614	0.254	0.558	0.343	0.629

\*\*\*p<0.001, \*\*p<0.01, \*p<0.05, +p<0.1 (two-tailed). Robust standard errors, clustered by establishment, in parentheses. The unit of analysis is the establishment-week. All dependent variables are standardized to ease comparison between coefficients. The independent variable is an interaction of a dichotomous variable, *Black-owned* (equals one if the firm identifies as Black-owned on Yelp) and *Post May 25* (equals one if the focal week falls after May 25, 2020). The main effects of *Black-owned* and *Post May 25* are absorbed by fixed effects.

## Appendix 7. Logged Dependent Variables

Below, we replicate Table 2 using logged dependent variables. These results are largely consistent with our previous findings. Notably, the effect on revenue within the 8-week sample reaches statistical significance at the 5% level, although it remains insignificant within the 3-week sample.

Despite this, the interpretation of such results warrants caution, particularly within the context of difference-in-differences models utilizing log-transformed dependent variables. As discussed in McConnell (2024), the log transformation shifts the estimated difference-in-differences parameter from measuring absolute outcome differences to estimating proportional growth rate differences across groups. This distinction is critical as it diverges from our intended estimand.

The log transformation also inherently assumes a multiplicative effect across data points, suggesting that the impact of external factors, such as those examined in our study, scales with the size of the business. This assumption does not necessarily hold, particularly in our context, where smaller Black-owned businesses—typically those with fewer reviews—likely experience weaker, not stronger, effects due to the larger changes in their average cumulative ratings from marginal reviews.

Moreover, McConnell's work emphasizes significant concerns regarding baseline differences between treatment groups. If these pre-treatment levels differ substantially—as they do between Black-owned and non-Black-owned businesses—the difference-in-differences estimates derived from a log-transformed model might not only be biased, but could misleadingly exaggerate, diminish, or even reverse the true effect. Given the observed pre-period

discrepancies in our data, this potential bias underscores the need for careful interpretation of the results obtained from models with log-transformed dependent variables.

**Table A7.1.** Replication of Table 2 Using Logged Dependent Variables

	8-Week Sample				3-Week Sample			
	Symbolic Action		Substantive Action		Symbolic Action		Substantive Action	
	Number of Reviews	Rating	Revenue	Foot Traffic	Number of Reviews	Rating	Revenue	Foot Traffic
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Black-owned × Post May 25	0.268*** (0.035)	0.0870** (0.027)	0.184* (0.082)	0.00644 (0.020)	0.315*** (0.057)	0.133** (0.046)	0.138 (0.088)	0.0037 (0.022)
Establishment FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Zipcode-Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	53,929	53,926	57,886	122,928	16,306	16,306	21,933	46,166
R-Squared	0.495	0.508	0.775	0.934	0.597	0.588	0.815	0.953

\*\*\*p<0.001, \*\*p<0.01, \*p<0.05 (two-tailed). Robust standard errors, clustered by establishment, in parentheses. The unit of analysis is the establishment-week. The independent variable is an interaction of a dichotomous variable, *Black-owned* (equals one if the firm identifies as Black-owned on Yelp) and *Post May 25* (equals one if the focal week falls after May 25, 2020). The main effects of *Black-owned* and *Post May 25* are absorbed by fixed effects.