TITLE*

SUBTITLE

Lorena Almaraz De La Garza, Amy Farrow, and Kumalasari Sondjaja

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Abstract

Four sentences. 1) what was done, 2) what was found, and 3) why this matters (all at a high level). Top level finding

1 Introduction

««tells a reader everything they need to know, including putting it into a broader context.»»

The experiment was comissioned by _____.

«««you're interested in, what you did, what you found, why it's important, etc.»»»»

«»

2 Data

#TODO: citations for R and all packages used.

2.1 Methodology

This experiment used two-stage stratified cluster sampling with survey data collection.

The population was all restaurants in Ontario.

A list of Ontario local health authorities (LHAs) that carry out food inspections was used to identify units that inspect restaurants. Using census data from 2016, these LHAs were sorted by population covered by the LHA, and the list was stratified into equally sized strata of small (less than 150,000 population), medium (150,000 to 400,000 population), and large (more than 400,000 population) LHAs. This list of stratified LHAs was the frame at the cluster level.

From each strata, two LHAs were randomly sampled to participate in the treatment, and two LHAs were randomly selected to participate in the control. This was the sample at the cluster level. This sample is shown in Table 1.

The clusters were used because pandemic shutdowns operated based on LHA, and the goal was to recreate the effect as closely as possible.

The stratification was used because there were very differently sized LHAs, and randomly selecting only 12 LHAs from a list of 33 left too high a likelihood of nonequivalent treatment and control groups. Given the limitations of cluster sampling, stratifying the clusters by size helped ensure the experiment would be representative of Ontario. <stuff about the statistical properties of cluster and stratified sampling somewhere in here, cite textbook reading>.

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*Code and data are available at: github.com/amycfarrow/ontariorestaurantclosuresexperiment.

Table 1: Cluster sample randomly selecting Local Health Authorities from strata based on population size

Group	Large	Medium	Small
Treatment	Hamilton	Haliburton, Kawartha, Pine Ridge District	Algoma
Treatment	Simcoe Muskoka	Windsor-Essex County	Timiskaming
Control	Durham Region	Southwestern Ontario	Brant County
Control	Region of Waterloo	Sudbury and Districts	Northwestern Health

Table 2: Example segment of the unit level sampling frame

name	address	unit	group
17 Restaurant - Restaurant	2-Woodward Ave. Blind River ON P0R 1B0	algoma	treatment
A&W - Restaurant	496 Causley Street Blind River ON P0R 1B0	algoma	treatment
A&W - Restaurant	121 Great Northern Rd Sault Ste. Marie ON P6B 4Y9	algoma	treatment
A&W - Restaurant	659 Great Northern Rd Sault Ste Marie ON P6B 5Y1	algoma	treatment
A&W - Restaurant	201 Highway 17 White River ON P0M 3G0	algoma	treatment
Absolutely Delicious - Restaurant	2200 Queen Street East Sault Ste. Marie ON P6A 7B5	algoma	treatment
Agree Outpost Camp Food - Restaurant	PO Box 624 Wawa ON P0S 1K0	algoma	treatment
Airdale Hunting and Fishing Lodge Kitchen - Restaurant	1 Whitefish Lake Road Maness	algoma	treatment
AlgomaTrad - Restaurant	1249 F&G Line Road Richards Landing ON P0R 1J0	algoma	treatment
Annettes Diner - Restaurant	B-4683-Highway 17 Spragge ON P0R 1K0	algoma	treatment

Once the treatment and control LHAs were selected, each corresponding Food Inspection unit was contacting, and a list of all registered restaurants in each LHA was obtained. Each restaurant was listed by name and address. Once collected into one dataframe, this was the frame at the unit level. A sample of this frame is shown in Table 2.

A simple random sample of 15% of the treatment list and 15% of the control list was randomly selected to be surveyed. This was the sample at the unit level.

This selection was used to create a panel, so the same restaurants would be surveyed for the first survey and the second survey. Attempting to sample only 15% of the restaurants allowed time and money to be spent on follow-up and multiple methods of data collecting, reducing the non-response bias.

The randomly sampled restaurants were all assigned ID numbers in a random order.

The table for surveys was used to generate 2,006 mailers to be sent to each restaurant on the list. Each mailer was a small envelope containing a sheet that explained the survey, provided a link to the survey, and provided a QR code that went to the same place as the link. There was also a copy of the survey contained in a mailer envelope and a contact number, allowing restaurant owners to complete the survey by phone or mail if they did not feel able to complete it online. This procedure was repeated for Survey 1 and Survey 2.

If there was no response within two weeks, the restaurant was contacted by phone, and again if there was no response five days later.

Each link and paper survey was personalized to the restaurant's ID number. The link lead to the survey, which asked for confirmation of the last three letters of the restaurant's postal code. This was to ensure that no mailing mistakes were made, and to prevent duplicate data collection. Once verified, the survey-taker was given the main survey.

This survey cost $5,606. A detailed breakdown of costs can be found on Appendix A.

The data from the survey was tied to the ID number and last three digits of the postal code, but not the restaurant name or address. This was to ensure data privacy. The identifying information was kept in a separate dataframe (Table for Surveys) than the survey answers (Survey 1 Data, Survey 2 Data).

Survey 1 was conducted June 3rd to 27th 2021, and it asked about the month of May 2021.

Survey 1 Data was used to confirm that the two-stage stratified cluster sampling had created treatment and control groups that were roughly equivalent.

Survey 1 collected the following data:

- Demographic information
- Disability status: According to the UN Convention on the Rights of Persons with Disabilities, persons with disabilities are described as having "long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others."
- Indigenous status: According to the Government of Canada, Indigenous people include "First Nations (North American Indian), Métis or Inuit and/or those who reported Registered or Treaty Indian status, that is registered under the Indian Act of Canada, and/or those who reported membership in a First Nation or Indian band".
- Visible minority (non-Indigenous) status: "Visible minority" is defined by the Government of Canada as "persons, other than aboriginal peoples, who are non-Caucasian in race or non-white in colour."
- Gender identity
- Type of service provided (dine-in, take-out, or both)
- Revenue in May 2021
- Employees
- Number of full-time employees (30 hours/week or more)
- Number of part-time employees (less than 30 hours/week)

The demographic information was collected so that disparate impacts on different communities could be identified. Revenue and number of employees were collected as measures of the restaurant's performance and impact on the local employment levels. These were the primary indicators of interest, due to the »» focus on economic stability and employment levels.

After Survey 1 data was collected, on June 28th, shutdowns were announced for the six treatment LHAs. The shutdowns ran from July 1s to July 14th, inclusive. This length of time was considered to be the minimum effective length for a shutdown to stop circulation of the virus. During the shutdown, all restaurants in the treatment LHAs were officially banned from offering dine-in and patio services. Take-out and delivery were permitted. This type of partial shutdown was selected because it has been the most common type of shutdown since the pandemic began.

<Something about enforcement of closures– how have fines worked during covid closures?)

Because it is very difficult for a restaurant to move location in under two weeks, the control and treatment groups were effectively separated.

Survey 2 was conducted August 3rd to 27th 2021, and it asked about the month of July 2021.

Survey 2 collected the following data:

- Demographic information

Table 3: Summary statistics for treatment and control baselines

		Treatment	Control
		N = 392 (50.0)	N = 392 (50.0)
Service type	dinein	25 (6.4)	23 (5.9)
	takeout	125 (32.0)	137 (35.0)
	both	241 (61.6)	231 (59.1)
Owner has disability	yes	2 (0.5)	2 (0.5)
	no	385 (98.2)	386 (98.5)
	nonanswer	5 (1.3)	4 (1.0)
Owner identifies as woman	yes	59 (15.1)	63 (16.1)
	no	329 (83.9)	327 (83.4)
	nonanswer	4 (1.0)	2 (0.5)
Owner is indigenous	yes	4 (1.0)	4 (1.0)
	no	386 (99.0)	384 (98.2)
	nonanswer	0 (0.0)	3 (0.8)
Owner is a visible minority (non-Indigenous)	yes	22 (5.6)	30 (7.7)
	no	367 (93.9)	356 (91.5)
	nonanswer	2 (0.5)	3 (0.8)
Revenue	Mean (SD)	70117.3 (38823.8)	69198.2 (33456.7)
Number of full-time employees	Mean (SD)	8.1 (4.5)	8.0 (3.9)
Number of part-time employees	Mean (SD)	4.3 (2.4)	4.3 (2.1)

- Disability status
- Indigenous status
- Visible minority (non-Indigenous) status
- Gender identity
- Type of service provided (dine-in, take-out, or both)
- Closures (none, temporary, or permanent)
- Revenue in May 2021
- Employees
- Number of full-time employees (30 hours/week or more)
- Number of part-time employees (less than 30 hours/week)

«««««<»»»»»»

2.2 Survey 1 results

««<Consider: do we need to plot more raw data?»»»»»>

It was necessary to collect data before the intervention to establish that the treatment and control groups were in fact comparable.

Survey 1 data as baseline Table 3 Figure 1 Figure 2

Counterfactuals established.

2.3 Survey 2 results

««<Consider: do we need to plot more raw data?»»»»»>

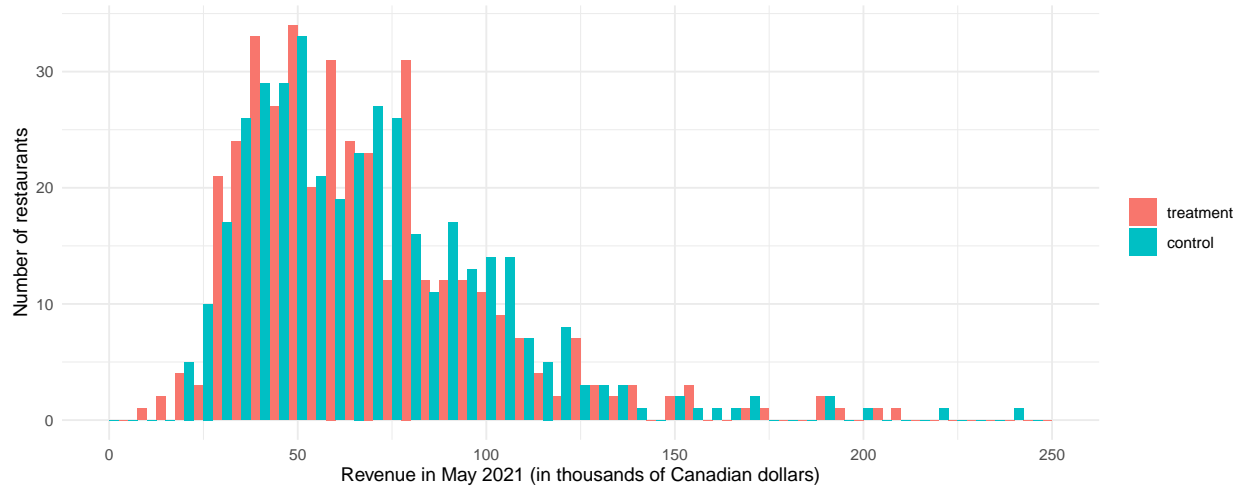Survey 2 data to contrast treatment and control. Table 4

Figure 1: Revenue distribution for treatment and control baselines, from Survey 1
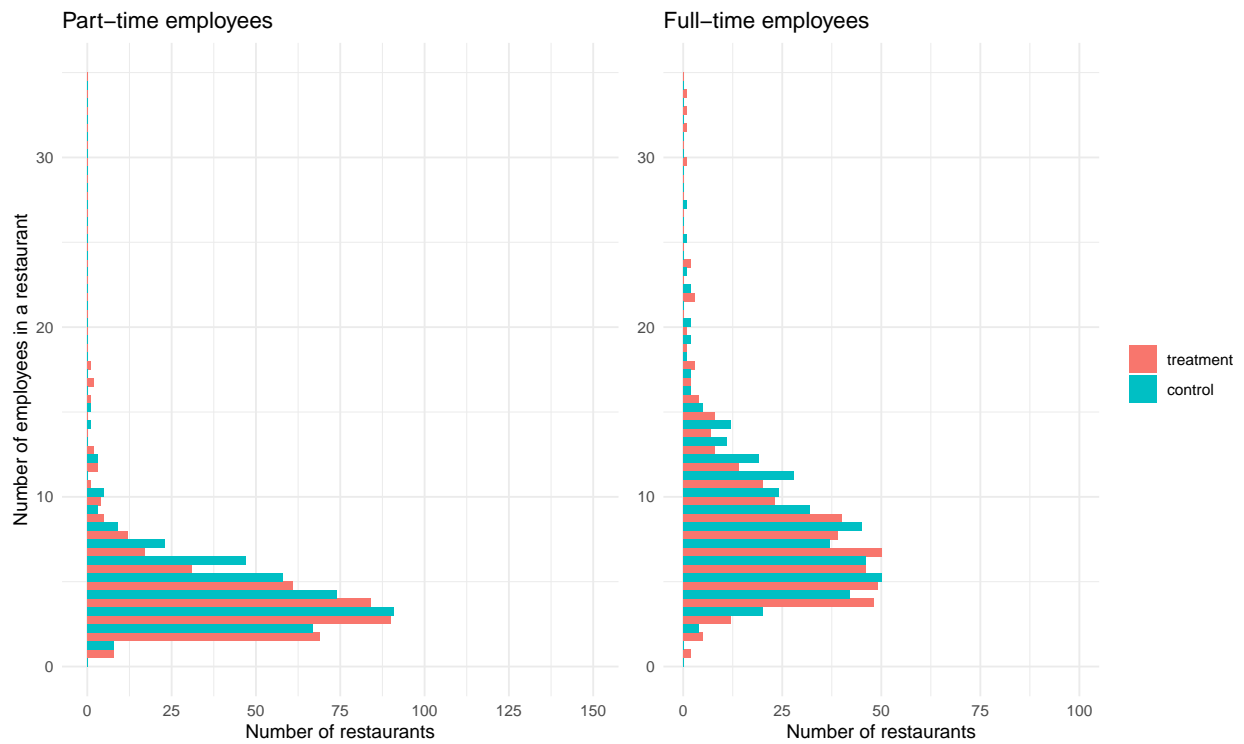

Figure 2: Employment distribution for treatment and control baselines, from Survey 1

Table 4: Summary statistics for treatment and control groups post-treatment

		Treatment	Control
		N = 408 (51.3)	N = 387 (48.7)
Service type	dinein	16 (3.9)	27 (7.0)
	takeout	133 (32.7)	111 (28.8)
	both	258 (63.4)	247 (64.2)
Owner has disability	yes	4 (1.0)	1 (0.3)
	no	399 (98.0)	381 (98.4)
	nonanswer	4 (1.0)	5 (1.3)
Owner identifies as woman	yes	65 (16.0)	58 (15.0)
	no	337 (82.8)	325 (84.2)
	nonanswer	5 (1.2)	3 (0.8)
Owner is indigenous	yes	4 (1.0)	5 (1.3)
	no	403 (98.8)	376 (97.7)
	nonanswer	1 (0.2)	4 (1.0)
Owner is a visible minority (non-Indigenous)	yes	28 (6.9)	38 (9.9)
	no	377 (93.1)	344 (89.4)
	nonanswer	0 (0.0)	3 (0.8)
Closure	none	235 (57.7)	383 (99.5)
	temporary	172 (42.3)	1 (0.3)
	permanent		1 (0.3)
Revenue	Mean (SD)	45959.6 (28892.6)	70675.6 (35646.6)
Number of full-time employees	Mean (SD)	5.2 (3.3)	8.0 (4.1)
Number of part-time employees	Mean (SD)	3.0 (1.9)	4.7 (2.4)

3 Discussion

3.1 Overview

«< overview of the results»>

«<how they fit in existing literature – need some references here»»

3.2 Findings

3.2.1 FINDING ONE

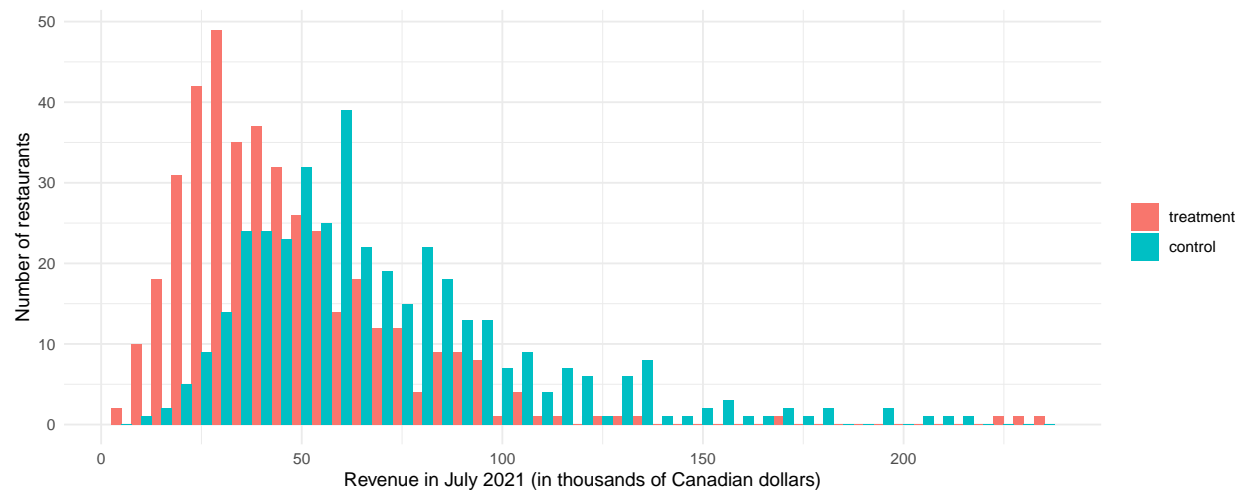Closures had a negative impact on revenues and employment counts Figure 3 Figure 4

Figure 3: Revenue distribution for treatment and control groups, from Survey 2

Suggestion: funding for businesses and temporary unemployment

3.2.2 FINDING TWO

Closures had a stronger negative impact on dine-in only restaurants Figure 5

Suggestion: technical support for restaurants to increase takeout business

3.2.3 FINDING THREE

Closures had a stronger negative impact on indigenous or visible minority-owned businesses. Figure 6

Suggestion: grants for minority business owners

3.3 Ethics ? Or integrate in other sections.

3.4 Limitations

External validity, internal validity, cluster sampling. Unavoidable because shutdowns were by health unit for COVID, and we were trying to replicate them. It was ethically unsound to run the experiment on the entire province, so sampling was necessary.

Legally registered businesses only.
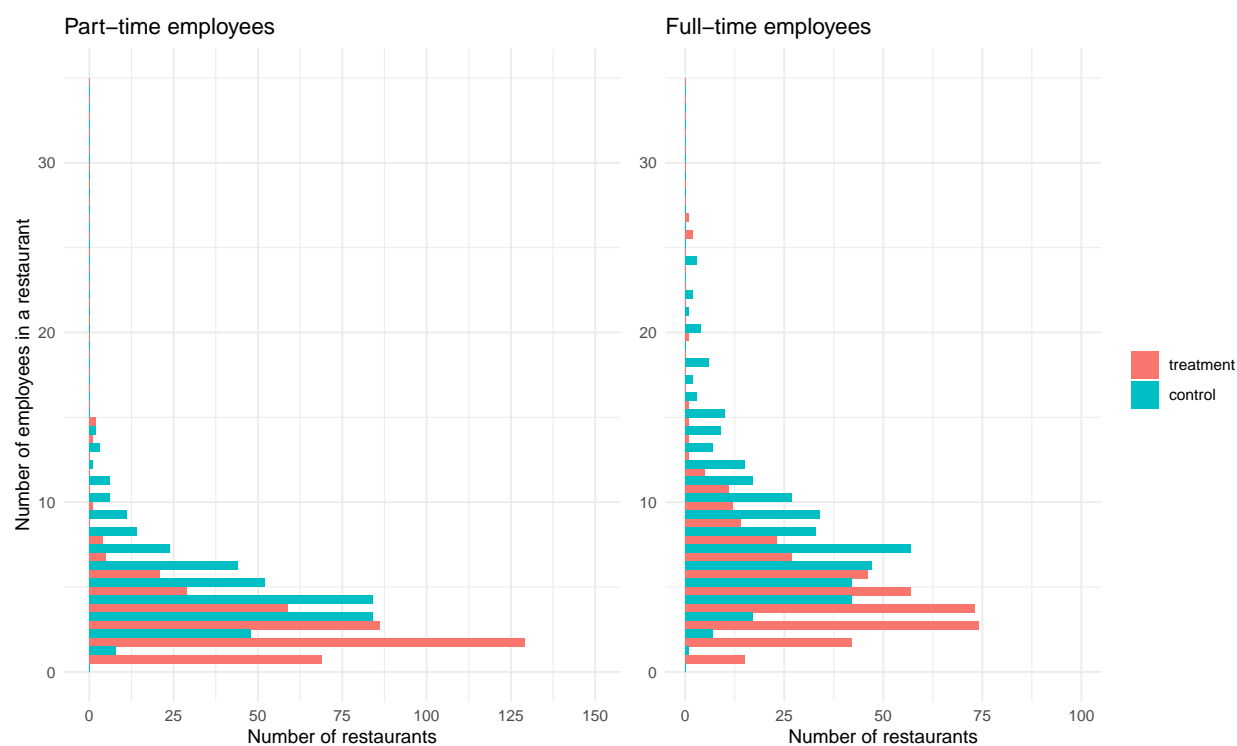
Survey non-response. Figure 7

Figure 4: Employment distribution for treatment and control groups, from Survey 2
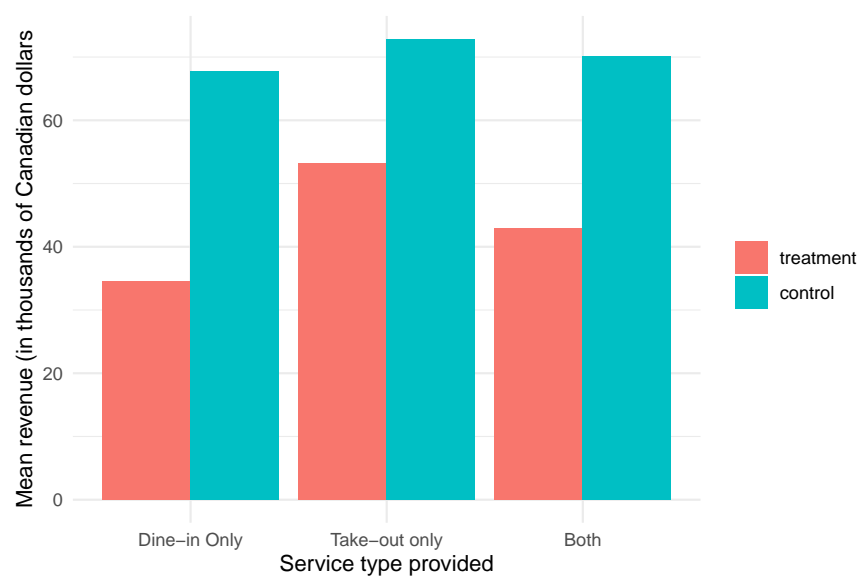

Figure 5: Revenues more heavily impacted for dine-in only establishments
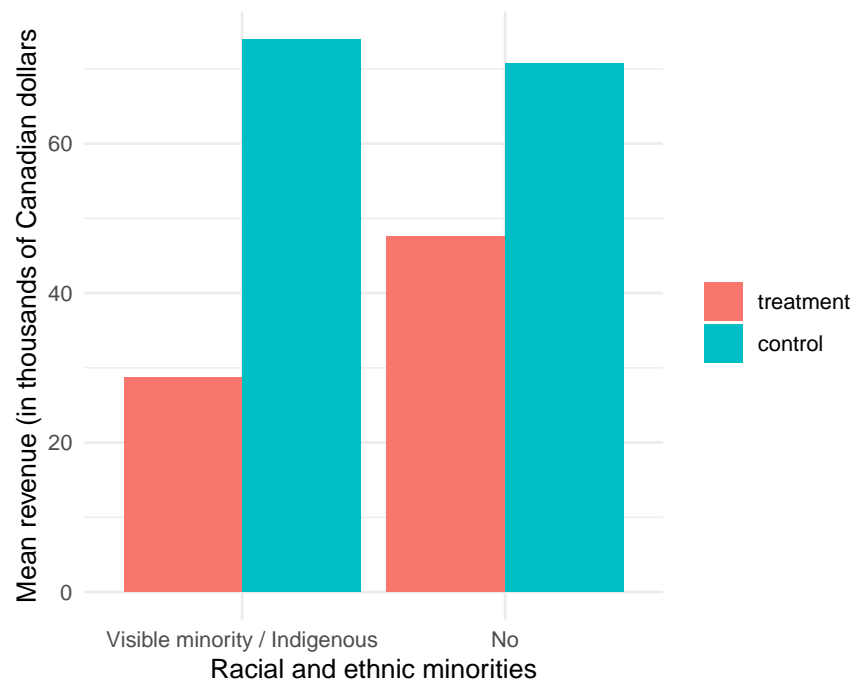
8

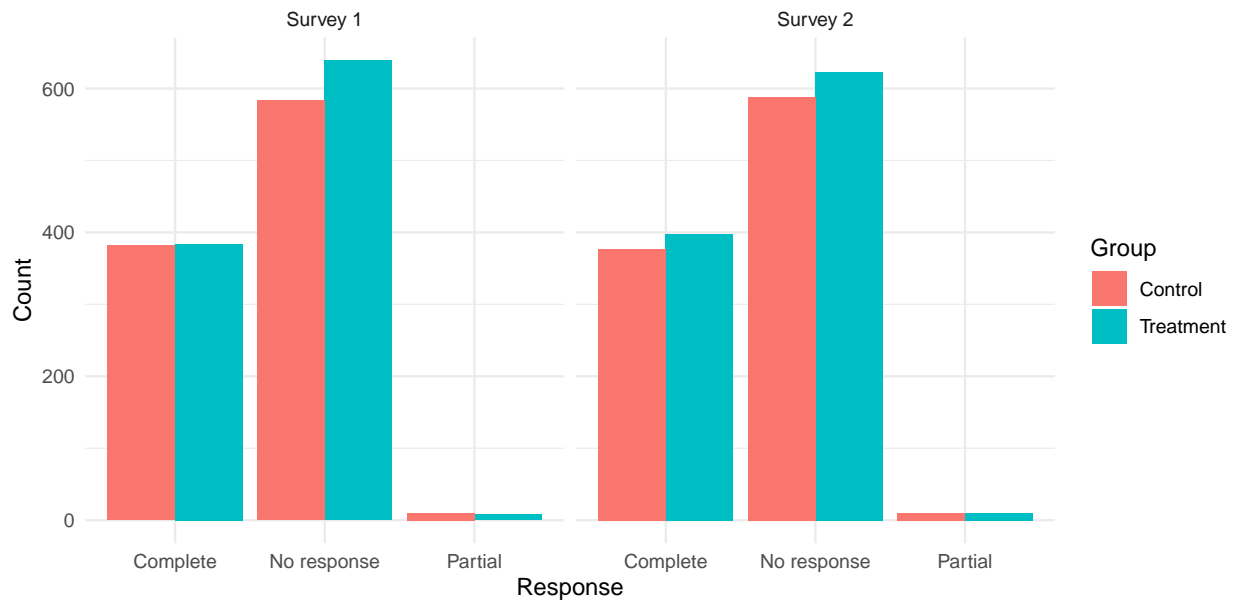Figure 6: Minority-owned businesses were more heavily impacted

Figure 7: More than half of surveyed restaurants did not respond

Self-reported information.

3.5 Future Directions

For statistical analysis, this would require propensity score weighting.

Appendix

4 Appendix A

Table 5: 2021 Ontario Restaurant Survey Budget

Item	Cost	Description
Data Management	195.00	Online survey management account fees
Phone Interviewer Wages	2000.98	1,203 calls (7 minutes on average) at $14.25/hr
Postage	3410.20	4,012 mailers at $0.85/ea
TOTAL	**5606.18**	

5 Appendix B

TODO: add survey screenshot

6 Appendix C

TODO: add complete list of survey questions

7   References