TITLE*

SUBTITLE

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

20 February 2021

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

The COVID-19 pandemic has presented challenges that continue to test our resilience, creativity, and ability to recover. From online learning to curbside shopping, the changes are tangible on a local level. To better understand the impact of intermittent lockdowns on restaurant businesses specifically, and to provide the Ontario Ministry of Economic Development, Job Creation and Trade with evidence-based advice, Petit Poll conducted a comprehensive study of over 1,200 restaurants in 12 regions of Ontario. This report describes the experiment design and rationale, measurement strategies, data characteristics, main findings, recommendations, limitations, and broader implications. Importantly, the intervention revealed three key effects of closures: (1) closures had a negative impact on revenues and employment counts, (2) closures had a stronger negative impact on dine-in only restaurants, and (3) closures had a stronger negative impact on Indigenous or visible minority-owned businesses. These findings provide more detail to an already stark picture: while the health of Ontarians has to be prioritized, and the transmission of COVID-19 has to be aggressively contained, it is impossible to ignore the economic consequences of prolonged business closures. In particular, support for Indigenous and visible minority-owned businesses is imperative, as these populations continue to bear the brunt of systemic inequalities. Preparing and supporting dine-in establishments to transition to takeout only, and providing furloughed workers with vital financial support, must be equally prioritized.

2 Data

#TODO: CITATIONS FOR R AND ALL PACKAGES LOADED ABOVE

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.

*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
	Simcoe Muskoka	Windsor-Essex County	Timiskaming
Control	Durham Region	Southwestern Ontario	Brant County
	Region of Waterloo	Sudbury and Districts	Northwestern Health

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.

#TO DO: ADD STUFF ABOUT STATISTICAL PROPERTIES OF CLUSTER AND STRATIFIED SAMPLING. CITE TEXTBOOK READING

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 $6711.18. 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.

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

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 Ontario Ministry of Economic Development, Job Creation and Trade's 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.

#TODO: ADD SOMETHING ABOUT ENFORCEMENT OF CLOSURES. FINES? HOW HAS IT WORKED SO FAR? CITE SOURCE.

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
- 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)

#TODO: ADD SURVEY STRENGTHS AND WEAKNESSES

2.2 Results[1]

2.2.1 Survey 1

#TODO: HOW CAN WE PLOT MORE RAW DATA?

The initial survey provided an overview of the characteristics of the treatment and control groups. As indicated in Table 3, the groups are equivalent, showing no notable differences across any of the variables studied. It was necessary to collect data before the intervention to ensure that the treatment and control groups were in fact comparable.

Survey 1 data was used to effectively establish a baseline for comparison. In addition to the use of random selection of participants and random assignment to either treatment or control, establishing a baseline allows for an accurate estimation of the counterfactual. The counterfactual – or the representation of what would have happened had the intervention not taken place – is essential to measuring, and reporting on, the effect of the mandated restaurant closures.

Figure 1 Figure 2

Counterfactuals established.

2.2.2 Survey 2

#TODO: HOW CAN WE PLOT MORE RAW DATA?

The second survey results showed marked differences between treatment and control groups in most areas. A summary of these results is found in Table 4. Naturally, a salient difference is found in service type, with

[1]More information about the Survey 1 and Survey 2 results can be found in the report *Data for the Ontario Restauarant Closures Experiment*.

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)
	both	241 (61.6)	231 (59.1)
	takeout	125 (32.0)	137 (35.0)
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)

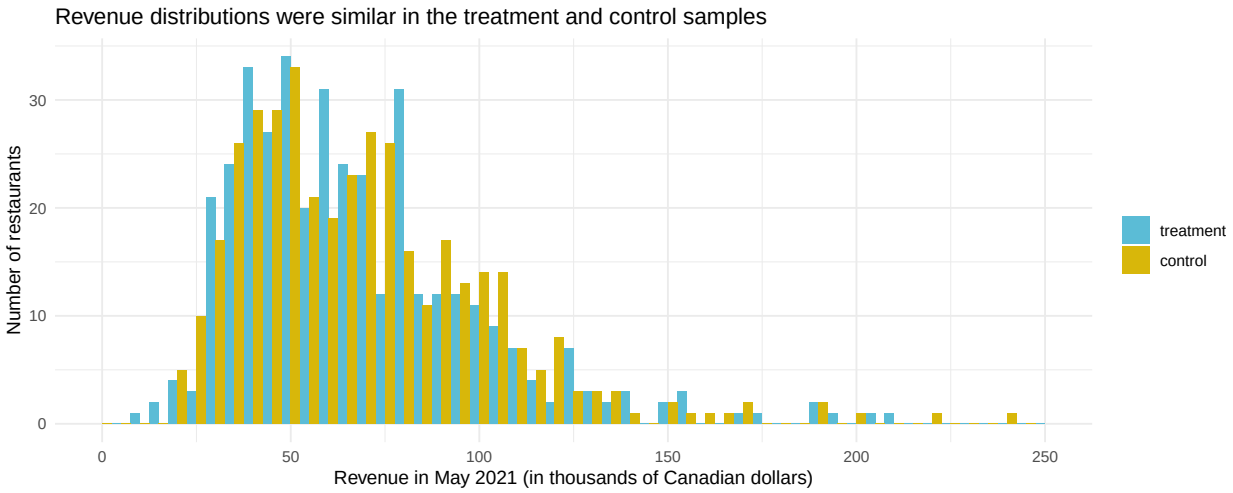

Figure 1: Revenue distribution for treatment and control baselines, from Survey 1

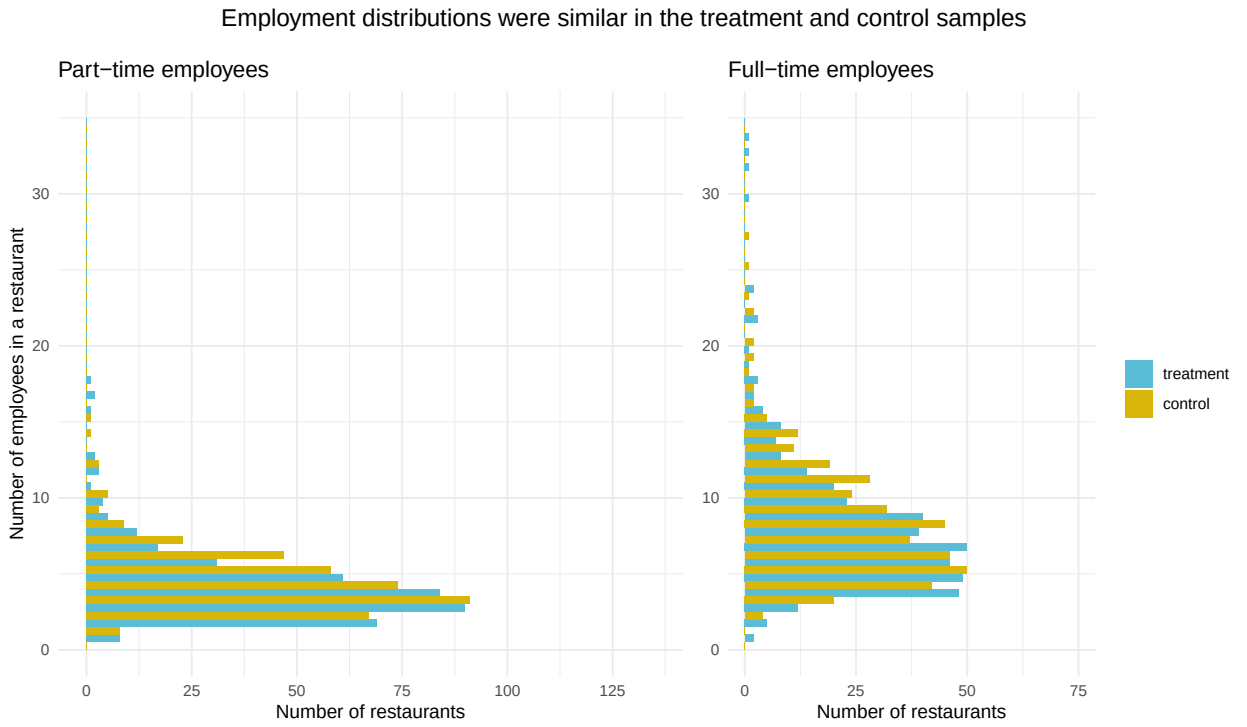

Figure 2: Employment distribution for treatment and control baselines, from Survey 1

dine-in restaurants decreasing due to mandated shutdowns – the intervention itself – with 7% of restaurants in the control group providing dine-in service, and only 4% in the treatment group. Similarly, the mean revenue decreases noticeably for the treatment group ($45,959.60) compared to the control group ($70675.60). The mean number of employees, both full-time and part-time, shows a decrease as well, from 8 and 5 respectively in the control group, to 5 and 3 for the treatment.

3 Discussion

3.1 Overview

Understanding the impact of COVID-19 closures of small businesses can help the Government of Ontario prepare to rebuild once the immediate health treat is contained. In particular, the contributions of restaurant businesses to the local economy have to be studied in terms of employment and revenue generation. According to The Associated Press, there was a 20% decline in employment in the restaurant, hotel, and entertainment sector between November 2019 and November 2020(Alexandra Olson 2020). The National Restaurant Association reports a total loss industry-wide of $120 billion between March and May 2020 alone (Jones 2020). Although these figures are based on United States data, the findings from our experiment show a similarly concerning reality in Ontario. Swift action to protect and uplift the local economy will be crucial in the upcoming months.

3.2 Findings

3.2.1 FINDING ONE

#TODO: WRITE ABOUT FINDING 1 Closures had a negative impact on revenues and employment counts Figure 3 Figure 4

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)
	both	258 (63.4)	247 (64.2)
	takeout	133 (32.7)	111 (28.8)
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)

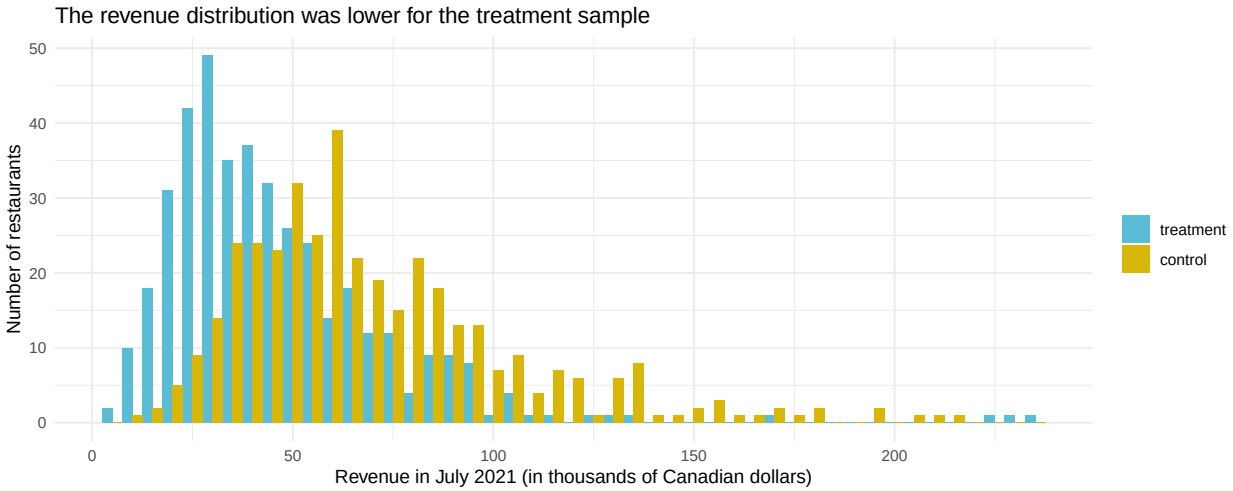

Figure 3: Revenue distribution for treatment and control groups, from Survey 2

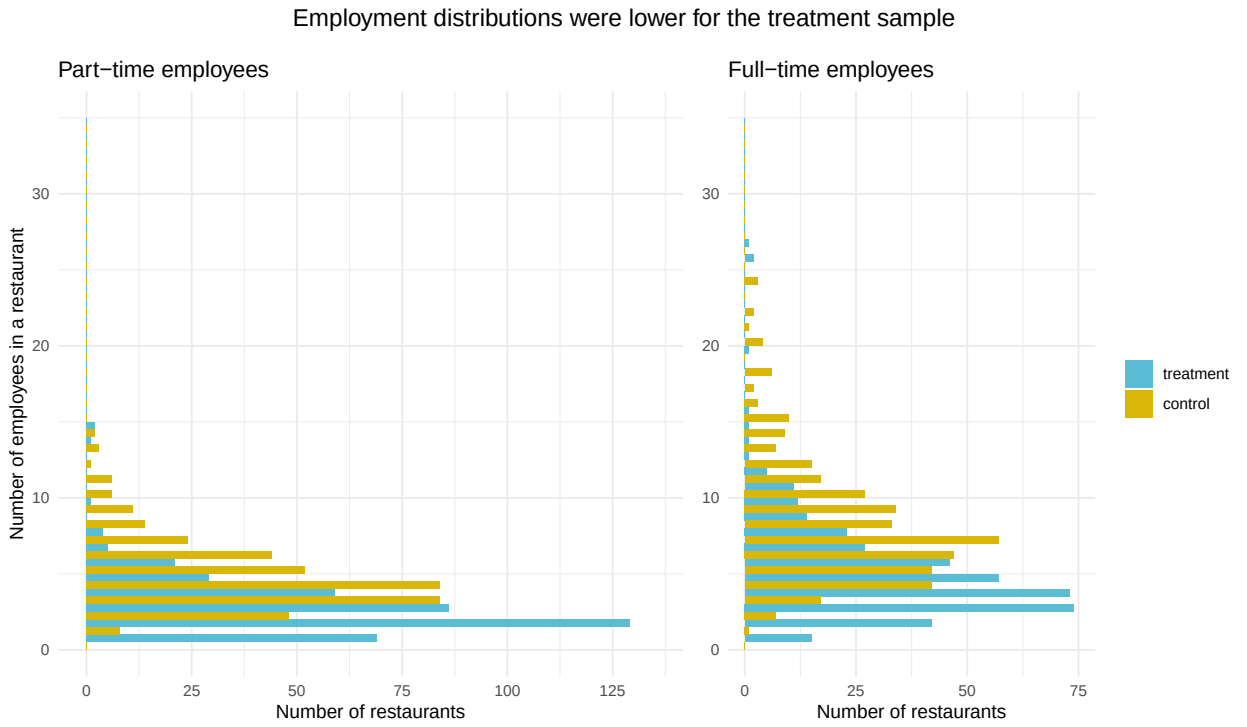

Figure 4: Employment distribution for treatment and control groups, from Survey 2

#TODO: WRITE ABOUT SUGGESTION Suggestion: funding for businesses and temporary unemployment

3.2.2 FINDING TWO

#TODO: WRITE ABOUT FINDING 2 Closures had a stronger negative impact on dine-in only restaurants Figure 5

#TODO: WRITE ABOUT SUGGESTION Suggestion: technical support for restaurants to increase takeout business

3.2.3 FINDING THREE

#TODO: WRITE ABOUT FINDING THREE Closures had a stronger negative impact on Indigenous or visible minority-owned businesses. Figure 6

#TODO: WRITE ABOUT SUGGESTION Suggestion: grants for minority business owners

##TODO: ADD AN ETHICS SECTION HERE? OR INTEGRATE IN THE REST?

3.3 Limitations

#TODO: TALK ABOUT EXTERNAL VALIDITY AND THE ISSUES WITH 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.

#TODO: TALK ABOUT HOW IT ONLY CATCHES LEGALLY REGISTERED BUSINESSES

#TODO: TALK ABOUT SURVEY NON-RESPONSE AND HOW IT AFFECTS ACCURACY. CITE READINGS. Figure 7

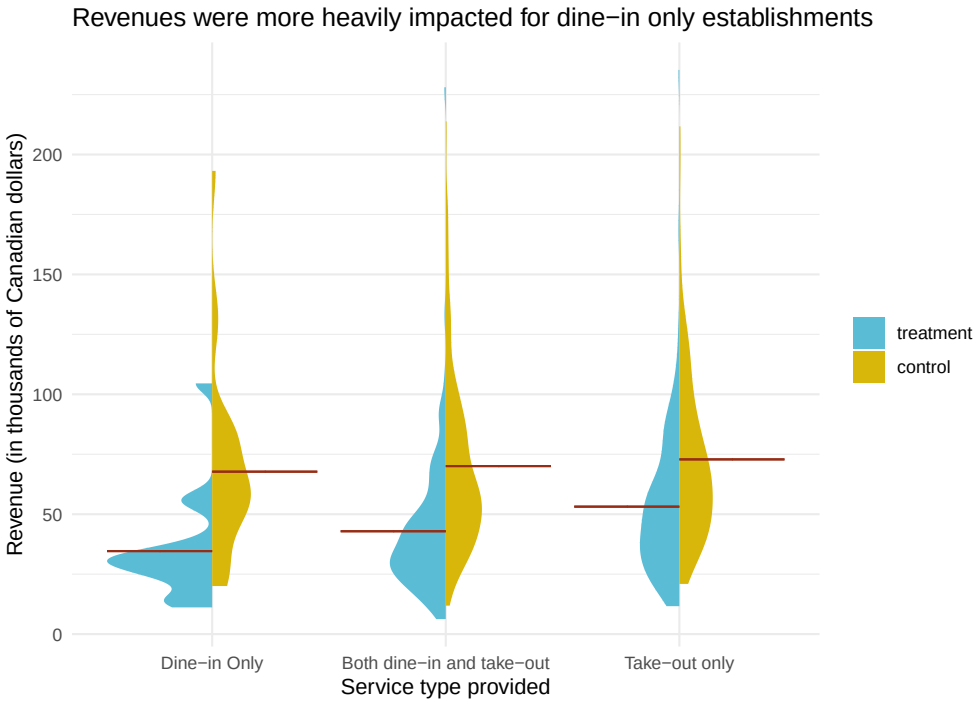

Figure 5: Survey 2 revenue distributions for service types with means marked

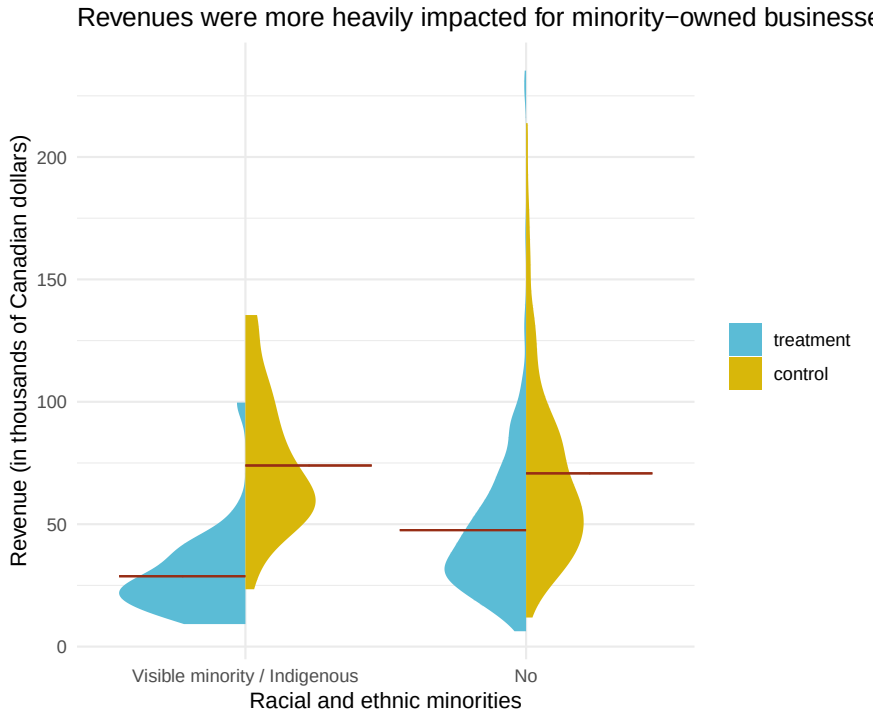

Figure 6: Survey 2 revenue distributions for minority status with means marked

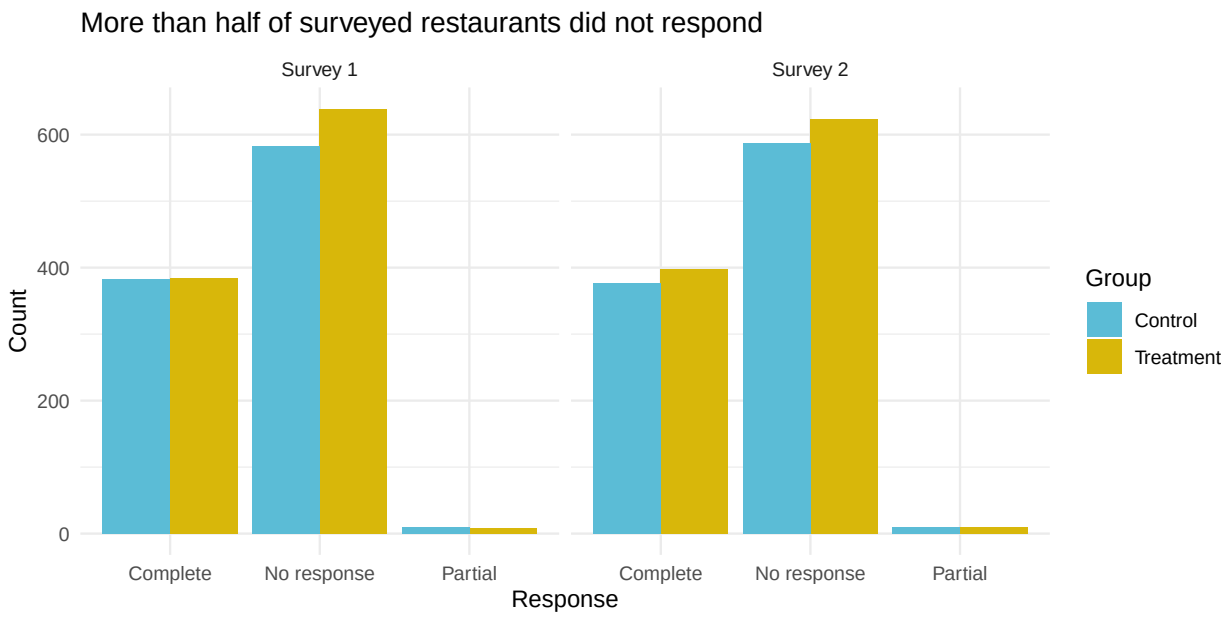

Figure 7: Nonresponse and partial response rates for Survey 1 and 2

#TODO: TALK ABOUT THE ISSUES WITH SELF-REPORTED INFORMATION. CITE READING.

3.4 Future Directions

#TODO: TALK ABOUT POTENTIALLY USING PROPENSITY SCORE WEIGHTING TO MAKE SURE THAT THE RESULTS REFLECT ONTARIO'S RACIAL DEMOGRAPHICS. SEE DATA_SIMULATION FILE FOR COMPARISON OF ONTARIO, TREATMENT, AND CONTROL. CITE READING.

#TODO: TALK ABOUT RESEARCH INTO HOW TO EFFECTIVELY SUPPORT BUSINESSES

Appendix

4 Appendix A

Table 5: 2021 Ontario Restaurant Survey Budget

Item	Cost	Description
Data Management	1300.00	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	**6711.18**	

5 Appendix B

TODO: ADD A SURVEY SCREENSHOT. REFERENCE IN THE MAIN PAPER.

6 Appendix C

TODO: ADD A COMPLETE LIST OF SURVEY QUESTIONS AND OPTIONS. REFERENCE IN THE MAIN PAPER.

References

Alexandra Olson, Paul Wiseman &. 2020. "From Restaurants to Retailers, Virus Transformed Economies." https://apnews.com/article/coronavirus-economy-restaurant-retail-08c5526535114232a1774440415261e4.

Jones, Meghan. 2020. "Here's How Much Money the Restaurant Industry Has Lost Due to Covid-19." https://www.rd.com/article/restaurant-industry-money-losses/.