

COVID Shutdown Regulations on Restaurants Decreases xx% of Average Total Sales in Ontario*

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Abstract

Since 2020, the world-wide COVID-19 pandemic has greatly influenced public health and healthcare, resulting in governments to impose regulations on social gatherings to eliminate further outbreaks. In Ontario, the provincewide stay at home order and shutdown restrictions on businesses and facilities has limited economic activities into a recession. This paper examines the shutdown effect on restaurants by reopening a city in Ontario (Peterborough) and comparing its restaurant operating situation with that of another city (Brantford) after three months reopening. The experiment results show that shutdown regulations on restaurants have decreased xxx%. . . .

1 Introduction

2 Data

Our data explores shutdown effects on restaurant businesses in Ontario. We analyzed it using R (R Core Team 2020), and packages `tidyverse` (Wickham et al. 2019), `here` (Müller 2020). We used R packages `cansim` (Shkolnik 2020) and `packagesxxx` to decide our intervention and sampling method, and packages `bookdown` (Xie 2016), `kableExtra`(Zhu 2020) to format the document.

2.1 Intervention

Partnered with the Ontario government, we want to examine the shutdown effects on restaurant businesses in Ontario. The plan of the experimental design was to reopen all restaurants (i.e. enable the dine-in option) in particular Ontario regions, while enforcing current provincewide shutdown restrictions (i.e. disable the dine-in option) on restaurants in the rest of Ontario regions. And after the three-month reopening, we compare restaurant operating situations in reopened regions with those in shutdown regions through data collected from online surveys of restaurant owners.

However, due to current COVID pandemic, any loosening of shutdown restrictions increases chances of COVID exposures, resulting in challenges on public health and healthcare of reopened regions. It is highly risky and hasty to reopen a large area of Ontario regions for the sole purpose of our experiment. Therefore, we mindfully chose Peterborough, a relative small size Single-tier¹ city 125 kilometers northeast of Toronto, as the only region to reopen in Ontario and then compared its restaurant operating situations with those in Brantford, another Single-tier city 105 kilometers southwest of Toronto with similar population. Since demographics, land areas and more importantly, restaurant operating situations between these two cities are quite similar with each other², we consider these two cities as valid comparison cities that could yield an accurate estimate of restaurant businesses shutdowns(Gertler et al. 2016). In our experiment, we assigned restaurants in Peterborough as the treatment group and those in Brantford as the control group.

*Code and data are available at: https://github.com/honn-ishinn/restaurants_covid_shutdown

¹Ontario's Municipal Act, 2001 defines a single-tier municipality as "a municipality, other than an upper-tier municipality, that does not form part of an upper-tier municipality for municipal purposes"

²Approach to examine the similarities of these two cities are further introduced in the discussion section

We also ensured restaurants within these two cities to have equal opportunities receiving government support (e.g. subsidies, grants, etc.) to estimate the true impact of shutdown effects on restaurant businesses after three-month reopening in Peterborough.

3 Discussion

3.1 Determine the Treatment Group and Control Group

To obtain an accurate estimate of the shutdown effect on restaurant businesses, average characteristics of restaurants in the reopening city and those in the shutdown city need to be identical in the absence of the reopen intervention under current COVID outbreak. Since businesses in the food service industry are highly labor intensive (Swayne 2016), the **total employment** on food service between selected cities is preferred to be equal as the identical characteristic. Besides, **population density** (**Total Population/ Total Land Area in squared kilometers**) also has significant organizational life-cycle effects(Parsa et al. 2011). At different population density levels, competitions for food services varies, leading to different restaurants mortality rates even without the reopen intervention. As a result, total employment on food service and population density serve as primary restaurant operation characteristics for the selection of treatment city and control city.

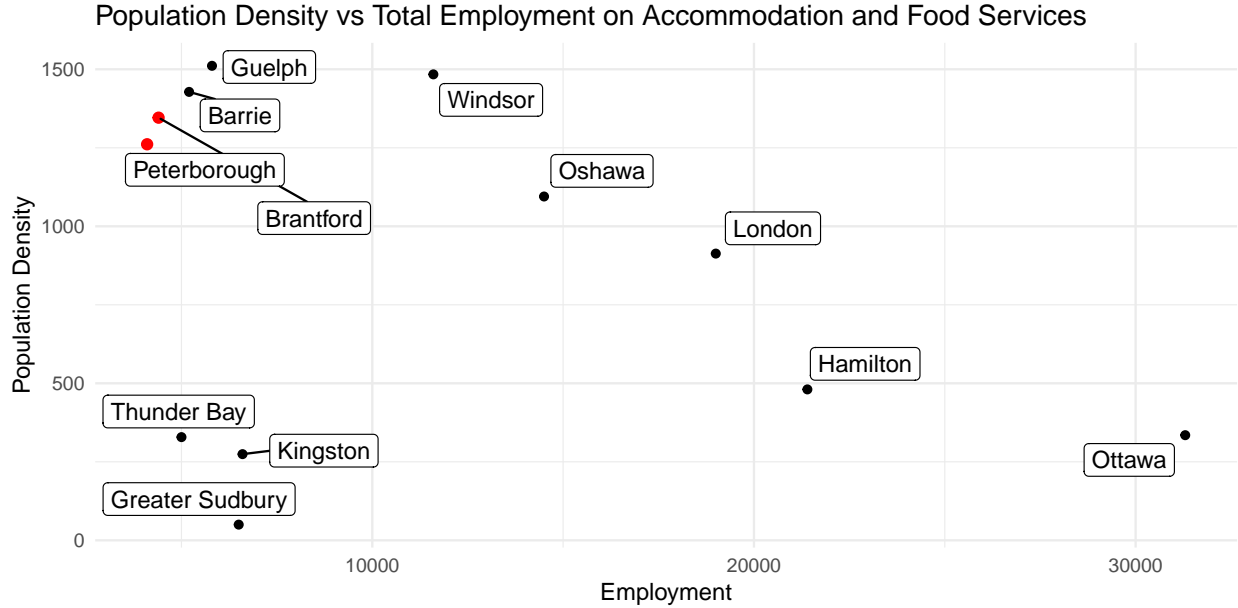


Figure 1: Population Density vs Employment on Accommodation and Food Services in Ontario Cities in 2016

We used the employment by industry data and 2016 Census data available at Statistics Canada to identify cities with similar total employment on food service and population density. The above point graph(Figure 1) indicates that Brantford and Peterborough have similar characteristics affecting the restaurant operations. In addition, the coefficient of the graph

$$\frac{\text{Population Density}}{\text{Total Employment}} = \frac{\text{Total Population/Total Land Area}}{\text{Total Employment}}$$

, which could be interpreted as the number of people served by a restaurant employee per square kilometers, helps to identify the restaurant operating situation in designated regions. Similar coefficients between Brantford and Peterborough (0.306 vs 0.308) also suggest close restaurant characteristics. Besides, there is neither significant demographics nor land areas difference between these two cities, so we consider these two cities as a valid comparison group and reopened Peterborough as the treatment group while maintaining Brantford shutdown as the control group.

Extra concerns when determining the treatment group and control group:

- The employment data at Statistics Canada uses the NAICS (North American Industry Classification System) standard and assigns employment services to Accommodation and Food Service category. So there is less employment in food services. We took the convention that the ratio between the accommodation employment and the food service employment between Peterborough and Brantford is the same.
- Since the distance between Brantford and Peterborough is more than 200 kilometers apart, residents in Brantford are unlikely to travel such long distance solely for a dine-in meal. So the treatment of reopening Peterborough would not affect the mealing behavior in Brantford. However, residents in shutdown regions near Peterborough might go for dine-in meals, increasing sales in Peterborough restaurants. The actual shutdown effect on restaurants could be overestimated due to possible increase in sales from nearby shutdown regions' residents.
- The mindful comparison between cities' similarities on employment, population density, etc. ensures the internal validity of our experiment so that we could accurately estimate the true impact of the shutdown restriction on restaurant. However, the shutdown effect evaluation may not be generalized to the entire population of interest, i.e. all restaurants in Ontario such as township regions or cosmopolitan city Toronto.

If my paper were 10 pages, then should be at least 2.5 pages. The discussion is a chance to show off what you know and what you learnt from all this.

3.2 Second discussion point

3.3 Third discussion point

3.4 Weaknesses and next steps

Weaknesses and next steps should also be included.

Appendix

References

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