

The battle of neighborhoods: Final Report*

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1 Introduction

Suppose we want to open a Chinese cuisine restaurant, which neighborhood in Downton Toronto is an better location?

Generally speaking, as an private, start-up entrepreneur, the question can be put in an cost-benefit analytics framework, with fundamental rule of profit maximization. Answer to the question depends on the following sub-questions: Update: From the demand side, we use number of inhabitants as a measurement, of demestic demand on Chinese restaurant.

However, due to the unfamiliarity of Toronto's Boroughs and Neighborhoods, I am not able to find such data... The website <https://www.toronto.ca/city-government/data-research-maps/neighbourhoods-communities/neighbourhood-profiles/> does not list data I need (I have never been to North America in my life...)

1. Demand side: Which neighborhood has the most demands on Chinese cuisine?
2. Supply side: Which neighborhood so far has the mildest competition regarding Chinese food?
3. Market side: The infrastructure, supply chain, consumer preferences, transportation, neighborhood security, etc

We make some further discussions one by one in the following.

1.1 Demand side

From the perspective of demand side, customers that may bring profits to restaurant are likely to be composed of two parts, domestic demand and external demand.

- Domestic demand refers to local demands on Chinese food, mainly from inhabitants. Here are some candidate factors to take into consideration

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– Domestic inhabitants.

– Ethnic composition.

It is safe to suppose that Asian descendants prefer Asian foods including Chinese cuisine.

– Other structural factors such as age, gender, occupation, income, and so on.

Due to data availability issues, in this assignment we only use the domestic inhabitants as a proxy to reflect domestic demand

- External demand refers to demands on Chinese food from those who come to this area for a short-period, for the purposes like tour, business trip, friend-visiting, and so on.

In this assignment, we do not pay much attention to the external demand. The main reason is fixed effects: the neighborhoods we compare all locate in Toronto, a nice city attracting tourists from all over the world. It is safe to assume that tourists who come to Toronto may go everywhere and eat everywhere around the whole city. In that sense, neighborhoods do not differ much from each other

1.2 Supply side

The level of competition imposes obvious impacts on location choice of our restaurant, from the perspective of supply side.¹

To put in more details, we assume that

- the more restaurants there already exist in the neighborhood, the more supply there is, and the less attractive it is for our choice, and
- of the total number of domestic restaurants, the more proportion of Chinese cuisines, the less attractive it is, as well.

1.3 Market trend

It is an interesting topic to discuss what the growth trend of Canadian economy will look like in the following years, which may produce positive effect on restaurant profitability. Other factors include immigrants level and composition, infrastructural improvement, sightseeing changes, and so on.

However, in order to keep our research focuses, in this assignment we do not pay much attention to that.

¹Update: From the demand side, we use number of inhabitants as a measurement, of domestic demand on Chinese restaurant.

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1.4 Sum-up

So we pay attention to the following factors, based on which to decide where to put our Chinese restaurant

1. number of restaurants
2. decomposition of Chinese restaurants relative to all restaurants

2 Methodology

The simple model could be written as

$$Attractiveness = F(ChnPercent), \quad (1)$$

where

- Attractiveness is our goal, used to measure whether it's a good idea to open the restaurant in this neighborhood
- ChnPercent is the percentage of Chinese restaurants in this neighborhood, calculated as

$$ChnPercent = \frac{numberofChineserestaurants}{totalnumberofrestaurants} \quad (2)$$

- For the sake of simplicity, we assume $F()$ is a linear function and $\partial F / \partial x < 0$, $\partial^2 F / \partial x^2 < 0$, $x = \{ChnPercent\}$.

3 Data description

Sources of the previously mentioned data where are needed in our research, include

- Population by Borough and Neighborhood. Statistics Bureau of Canada, UN Database.
- Restaurants by number, style, and locations. Collection from Foursquare API

4 Analytics and Results

4.1 Administrative data of Neighborhoods

In the Borough named Downtown Toronto, There are 16 neighborhoods, each with the following Postal Code and coordinates (latitude, longitude respectively), see Figure 1.

	index	PostalCode	Neighborhood	Borough	Latitude	Longitude
0	50	M4W	Rosedale	Downtown Toronto	43.679563	-79.377529
1	51	M4X	Cabbagetown, St. James Town	Downtown Toronto	43.667967	-79.367675
2	52	M4Y	Church and Wellesley	Downtown Toronto	43.665860	-79.383160
3	53	M5A	Harbourfront, Regent Park	Downtown Toronto	43.654260	-79.360636
4	54	M5B	Ryerson, Garden District	Downtown Toronto	43.657162	-79.378937
5	55	M5C	St. James Town	Downtown Toronto	43.651494	-79.375418
6	56	M5E	Berczy Park	Downtown Toronto	43.644771	-79.373306
7	57	M5G	Central Bay Street	Downtown Toronto	43.657952	-79.387383
8	58	M5H	Adelaide, King, Richmond	Downtown Toronto	43.650571	-79.384568
9	59	M5J	Harbourfront East, Toronto Islands, Union Station	Downtown Toronto	43.640816	-79.381752
10	60	M5K	Design Exchange, Toronto Dominion Centre	Downtown Toronto	43.647177	-79.381576
11	61	M5L	Commerce Court, Victoria Hotel	Downtown Toronto	43.648198	-79.379817
12	66	M5S	Harbord, University of Toronto	Downtown Toronto	43.662696	-79.400049
13	67	M5T	Chinatown, Grange Park, Kensington Market	Downtown Toronto	43.653206	-79.400049
14	68	M5V	CN Tower, Bathurst Quay, Island airport, Harbo...	Downtown Toronto	43.628947	-79.394420
15	69	M5W	Stn A PO Boxes 25 The Esplanade	Downtown Toronto	43.646435	-79.374846
16	70	M5X	First Canadian Place, Underground city	Downtown Toronto	43.648429	-79.382280
17	75	M6G	Christie	Downtown Toronto	43.669542	-79.422564

Figure 1: Neighborhoods of Downtown Toronto

Chinese Restaurant	40
Restaurant	39
Italian Restaurant	33
Japanese Restaurant	26
Steakhouse	20
Seafood Restaurant	20
American Restaurant	20
Pizza Place	19
Vegetarian / Vegan Restaurant	17
Thai Restaurant	17
Burger Joint	16
Breakfast Spot	15
Sushi Restaurant	14
Sandwich Place	12
Salad Place	10
Fast Food Restaurant	10
Diner	10
Mexican Restaurant	8
French Restaurant	8
Creperie	7
Indian Restaurant	7
Fried Chicken Joint	7
Vietnamese Restaurant	7
New American Restaurant	6
Burrito Place	5
Greek Restaurant	5
Plaza	5
Mediterranean Restaurant	4
Middle Eastern Restaurant	4
Comfort Food Restaurant	4
Caribbean Restaurant	4
Gluten-free Restaurant	3
Beer Store	3
Latin American Restaurant	3
Eastern European Restaurant	3
Belgian Restaurant	3
Soup Place	3
Taco Place	2

Figure 2: Restaurants of Downtown Toronto

4.2 Restaurants of Neighborhoods

In Downtown Toronto, we find 463 restaurants of 54 restaurant types. The restaurants locate in 16 neighbourhoods, as shown in Figure 2.

Furthermore, neighborhoods differ by restaurant types and densities, as shown in Figure 3.

By data analytics we see that Neighborhoods varies a lot, regarding crowdness of Chinese restaurants

1. There are 6 out of 16 neighborhoods in which Chinese restaurants consist of more than 9
 - Chinatown, Grange Park, Kensington Market
 - Harbord, University of Toronto

	Neighborhood	1th Most Common Venue	2th Most Common Venue	3th Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Adelaide, King, Richmond	Chinese Restaurant	American Restaurant	Thai Restaurant	Steakhouse	Burger Joint	Sushi Restaurant	Restaurant	Salad Place	Pizza Place	Breakfast Spot
1	Berczy Park	Seafood Restaurant	Steakhouse	Italian Restaurant	Creperie	Comfort Food Restaurant	Eastern European Restaurant	French Restaurant	Restaurant	Breakfast Spot	Diner
2	Cabbagetown, St. James Town	Chinese Restaurant	Pizza Place	Italian Restaurant	Restaurant	Indian Restaurant	Thai Restaurant	Beer Store	Japanese Restaurant	Breakfast Spot	Diner
3	Central Bay Street	Italian Restaurant	Chinese Restaurant	Burger Joint	Sandwich Place	Fried Chicken Joint	Japanese Restaurant	Salad Place	Indian Restaurant	Sushi Restaurant	Steakhouse
4	Chinatown, Grange Park, Kensington Market	Chinese Restaurant	Vegetarian / Vegan Restaurant	Vietnamese Restaurant	Mexican Restaurant	Burger Joint	Caribbean Restaurant	Pizza Place	Italian Restaurant	Japanese Restaurant	Doner Restaurant
5	Christie	Italian Restaurant	Diner	Restaurant	Wings Joint	Creperie	French Restaurant	Flower Shop	Filipino Restaurant	Fast Food Restaurant	Kalafel Restaurant
6	Church and Wellesley	Japanese Restaurant	Sushi Restaurant	Restaurant	Mediterranean Restaurant	Burger Joint	Chinese Restaurant	Fast Food Restaurant	Ethiopian Restaurant	Italian Restaurant	Vietnamese Restaurant
7	Commerce Court, Victoria Hotel	American Restaurant	Restaurant	Steakhouse	Seafood Restaurant	Salad Place	Chinese Restaurant	Breakfast Spot	Japanese Restaurant	Italian Restaurant	Thai Restaurant
8	Design Exchange, Toronto Dominion Centre	Italian Restaurant	Restaurant	American Restaurant	Japanese Restaurant	Steakhouse	Chinese Restaurant	Seafood Restaurant	Burger Joint	Pizza Place	New American Restaurant
9	First Canadian Place, Underground city	Steakhouse	Chinese Restaurant	American Restaurant	Restaurant	Seafood Restaurant	Sushi Restaurant	Burger Joint	Pizza Place	Japanese Restaurant	Thai Restaurant
10	Harbord, University of Toronto	Japanese Restaurant	Chinese Restaurant	Restaurant	French Restaurant	Flower Shop	Comfort Food Restaurant	Beer Store	Italian Restaurant	Sushi Restaurant	Sandwich Place
11	Harbourfront East, Toronto Islands, Union Station	Italian Restaurant	Pizza Place	Fried Chicken Joint	Baseball Stadium	Restaurant	Indian Restaurant	Salad Place	Japanese Restaurant	Chinese Restaurant	Mexican Restaurant
12	Harbourfront, Regent Park	Breakfast Spot	Mexican Restaurant	Restaurant	French Restaurant	Italian Restaurant	Beer Store	Event Space	Wings Joint	Diner	Flower Shop
13	Ryerson, Garden District	Chinese Restaurant	Fast Food Restaurant	Restaurant	Italian Restaurant	Japanese Restaurant	Middle Eastern Restaurant	Diner	Pizza Place	Ethiopian Restaurant	Burrito Place
14	St. James Town	Restaurant	Italian Restaurant	Breakfast Spot	American Restaurant	Japanese Restaurant	Diner	Seafood Restaurant	Creperie	Indian Restaurant	Fast Food Restaurant
15	Stn A PO Boxes 25 The Esplanade	Restaurant	Seafood Restaurant	Creperie	Fast Food Restaurant	Breakfast Spot	Italian Restaurant	Japanese Restaurant	Belgian Restaurant	Steakhouse	Vegetarian / Vegan Restaurant

Figure 3: Restaurants of Downtown Toronto

- Cabbagetown, St. James Town
 - Central Bay Street
 - First Canadian Place, Underground city
 - Ryerson, Garden District
- There are 7 out of 16 neighborhoods in which the percentage of Chinese restaurants is less than 5
 - Commerce Court, Victoria Hotel
 - Harbourfront East, Toronto Islands, Union Station
 - Stn A PO Boxes 25 The Esplanade
 - St. James Town
 - Berczy Park
 - Christie
 - Harbourfront, Regent Park
 - The remaining 3 neighborhood have mild competition and satisfactory demand scale, and are of our further consideration for location choice of opening a Chinese restaurant
 - Adelaide, King, Richmond
 - Design Exchange, Toronto Dominion Centre
 - Church and Wellesley

5 Conclusions and Discussions

5.1 Conclusions

In The Borough "Downtown Toronto" of Toronto, there are 3 neighborhoods we can choose to open a new Chinese Restaurant, which are

1. Adelaide, King, Richmond
2. Design Exchange, Toronto Dominion Centre
3. Church and Wellesley

5.2 Discussions

In the next phase we will research further with regard to other influencing factors about our location choice strategy, to alleviate risks.

1. Demand side
 - (a) Inhabitants and Tourists
 - i. Population structure, by age, income level, work, ethnicity
2. Supply side
 - (a) Materials
 - (b) Chefs, Waiters/Waitresses, cashiers
3. Market side
 - (a) Industry trend
 - (b) Economy trend
 - (c) Others...