

# **The business pattern change after the Covid-19: Evidence from Philadelphia**

**Start**

**MACS 30200  
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# Does the donut effect exist after the Covid-19? – Evidence from Philadelphia



Introduction

Data &  
Methods

Results

Limitation

# INTRODUCTION

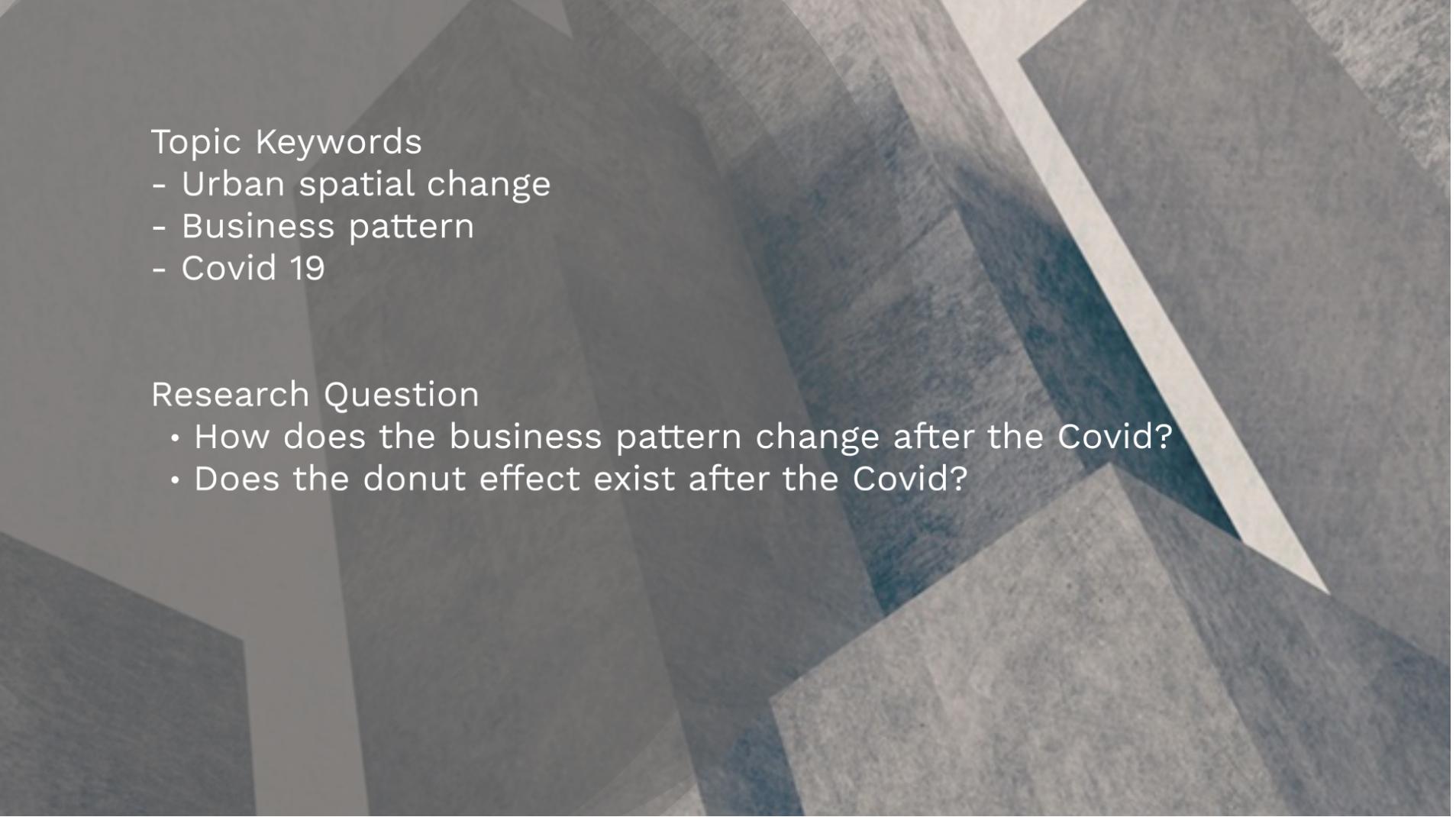
- Topic
- Research question
- Background
- Literature



A large, abstract graphic occupies the background of the slide. It features several overlapping circles in shades of grey and white. Two prominent diagonal arrows point from the bottom left towards the top right. The top arrow is light grey and has a thin black outline. The bottom arrow is dark blue and has a thick black outline. The text 'Topic & Research Question' is positioned in the upper right area of the graphic, and 'Background & Literature' is positioned in the lower right area.

Topic &  
Research  
Question

Background  
& Literature



## Topic Keywords

- Urban spatial change
- Business pattern
- Covid 19

## Research Question

- How does the business pattern change after the Covid?
- Does the donut effect exist after the Covid?

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## **Background**

### **Donut effect:**

Since the advent of the Covid, more people have been considering moving from the city center to suburban areas out of the reason of the popularity of work-from-home (WFH) and the health consideration.

- WHF ↑, to avoid risk of infection ↑ →
- Employees live further away from their place of work (CBDs) →
- Business flow out of CBDs

## **Literature**

The change in residential migration patterns after Covid:

- Reallocation of the real estate demands
- Relocation of people occurs within cities
- Pandemic can impact future urban design

The change in business patterns after Covid:

- Consumer service businesses flow from CBDs to the rings within big cities in the U.S. (Ramani and Bloom, 2021)
- There are a wave of exit in the first year of pandemic, while exit appears lower than widespread expectations from early in the pandemic

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## DATA & METHODS

- Data source
- Data summary
- Descriptive analysis
- Regression models

Data

Research  
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# DATA

## Sources

Business data:

- Online platform: Yelp.com: Customer check-in records
- Open Data Philly platform: Business license issued date

Population data:

- United States Census Bureau

City data:

- Open Data Philly platform: Philadelphia shape file (area, census tract)

## Data Summary:

- Objects: 352 census tracts in Philadelphia (Philadelphia has 384 tracts in total)
- Time: 2013- 2021 (treated time: 2020)
- CBD: City hall coordinates
- CBD areas: All census tracts with centroids within two kilometers of the CBD coordinates.  
(Ramani and Bloom, 2021)

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# METHODS

## 1. Descriptive analysis

- Business net inflows = new opens - close-downs
- Average net inflows across census tracts and years
- Average net inflows by category
- Inflow as a percent of total

## 2. Regression analysis

### • Linear regression with an interaction term

- To test the difference of business inflow change between CBD and non-CBD.

$$Y_{it} = \beta_1 Covid * CBD_{it} + \beta_2 CBD_{it} + \beta_3 Covid_{it} + \beta_4 Density_{it} + \beta_0$$

### • Interrupted time series regression

- To test the causal relationship of Covid and business inflow change.

$$Y_t = \beta_0 + \beta_1 \times T + \beta_2 \times X_t + \beta_3 \times T * X_t + \epsilon_t$$

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## FINDINGS & DISCUSSION

- Finding 1: Change in business net inflow varies across areas, time, categories.
- Finding 2: No significant gap in business net inflow percentage between CBD and non-CBD areas.
- Finding 3: Covid has more negative effect on non-CBD areas.
- Finding 4: Covid has more negative effect on open rate of CBD for non-food business, also has more positive effect on close rate of CBD for food business.

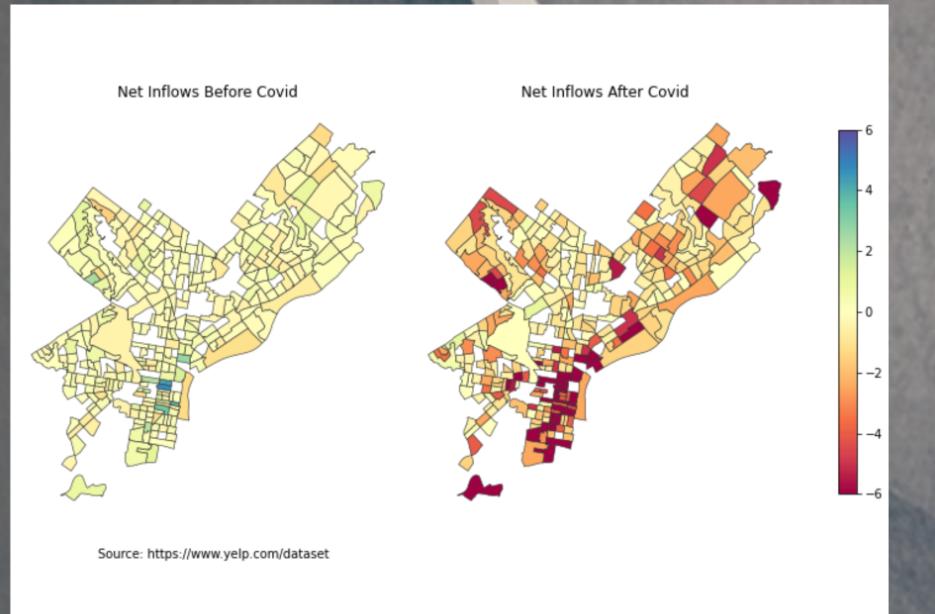
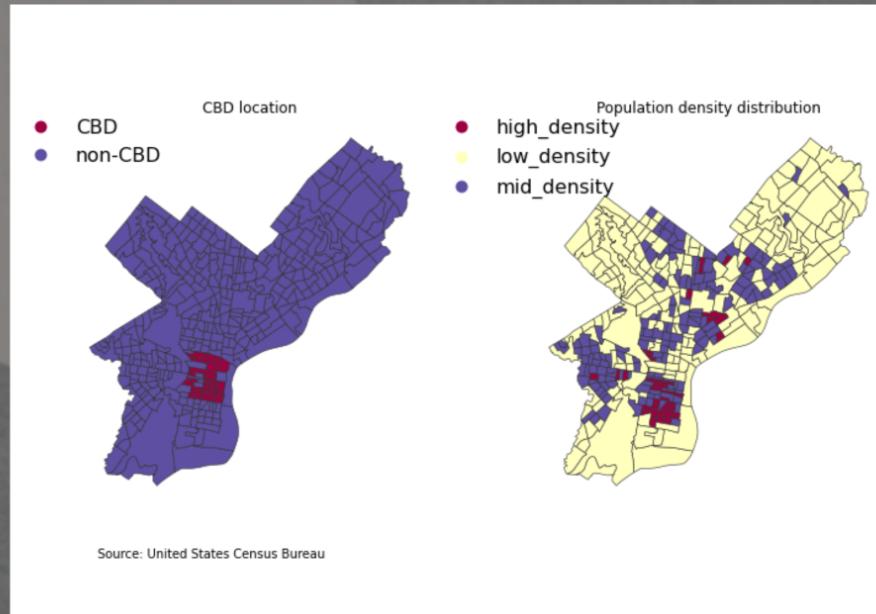
Finding 1

Finding 2

Regression  
results

# Finding 1: Net inflows change varies across areas, time, categories --> too intuitive

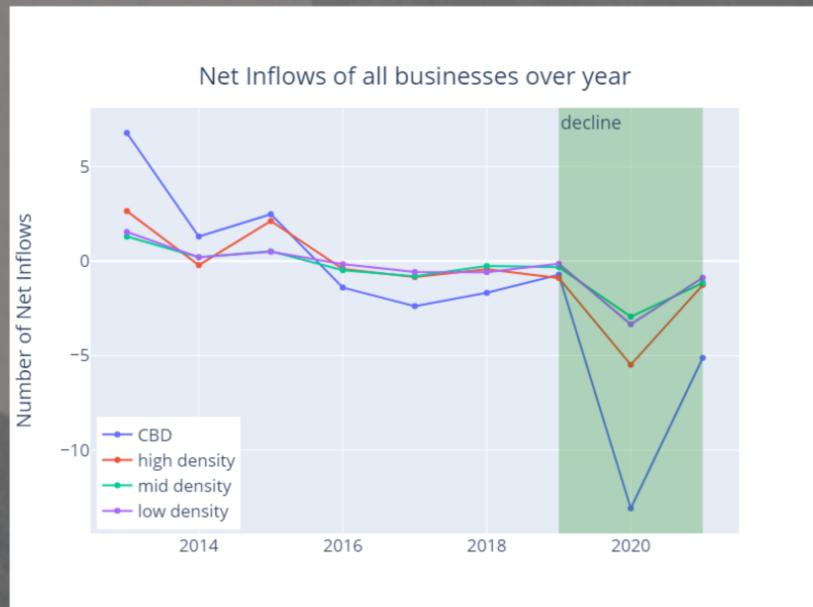
Trend chart



Group by category

Histograms

## Heterogeneity in Location

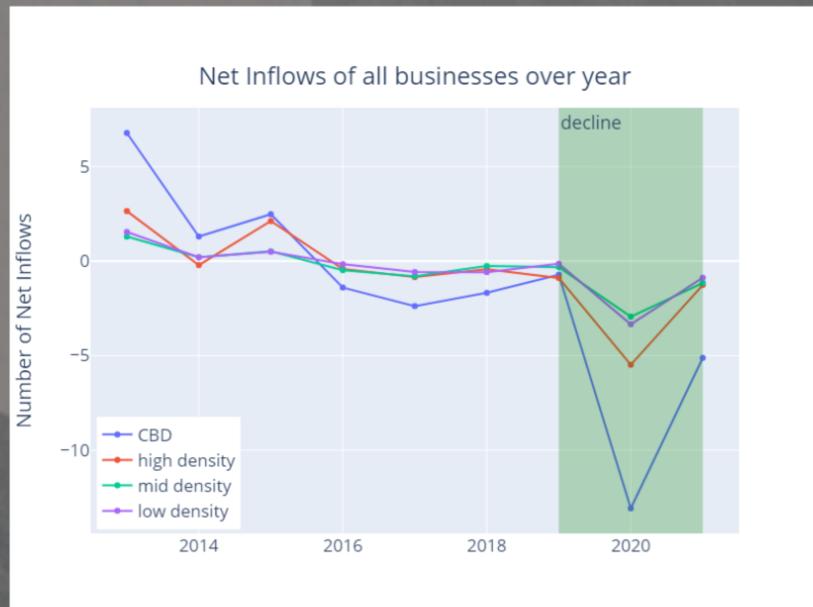


## Trend of new openings



Finding 1: Net inflows ↓, CBD > non-CBD  
--> Yet, it is too intuitive

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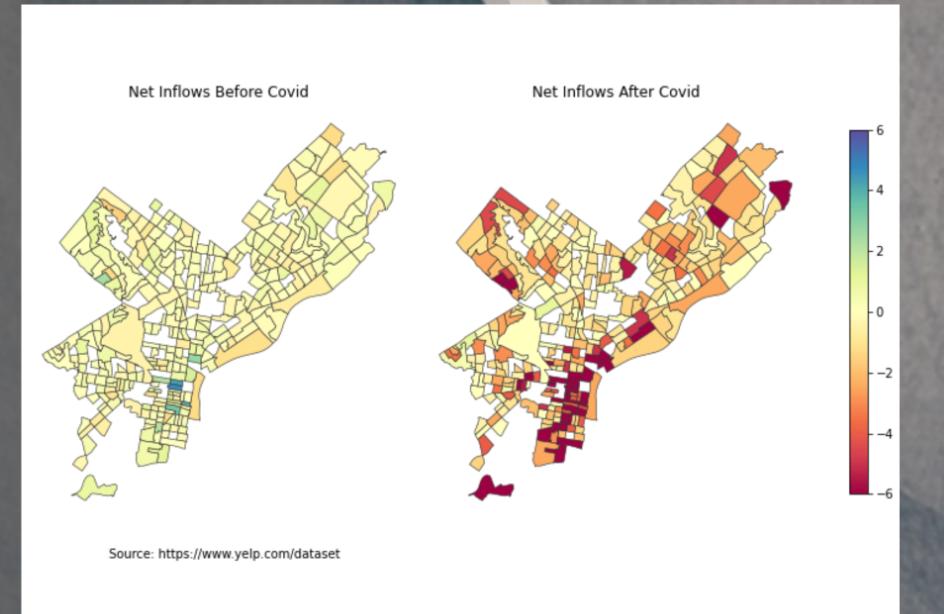
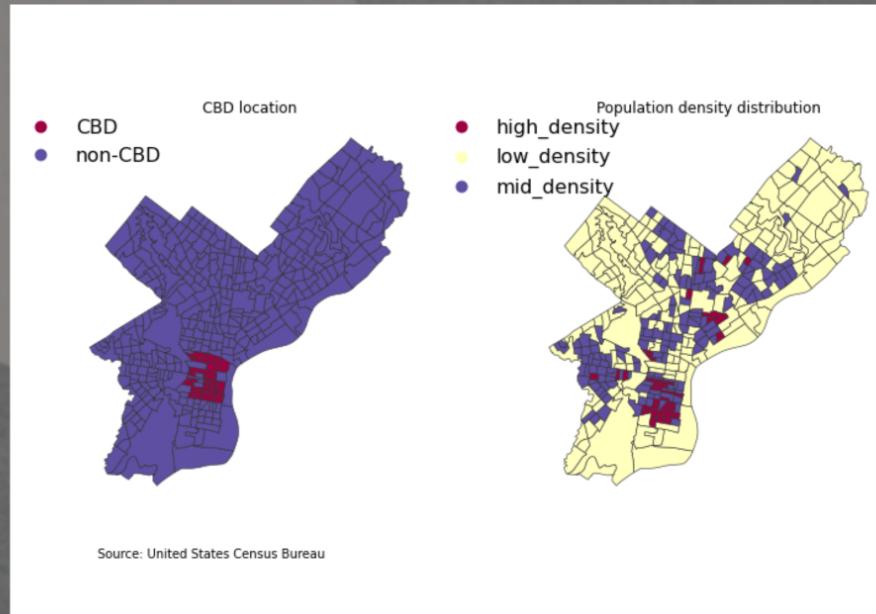
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