Data Translation Challenge

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Questions:

1. How has COVID affected the health of the retail industry, as measured by employment?
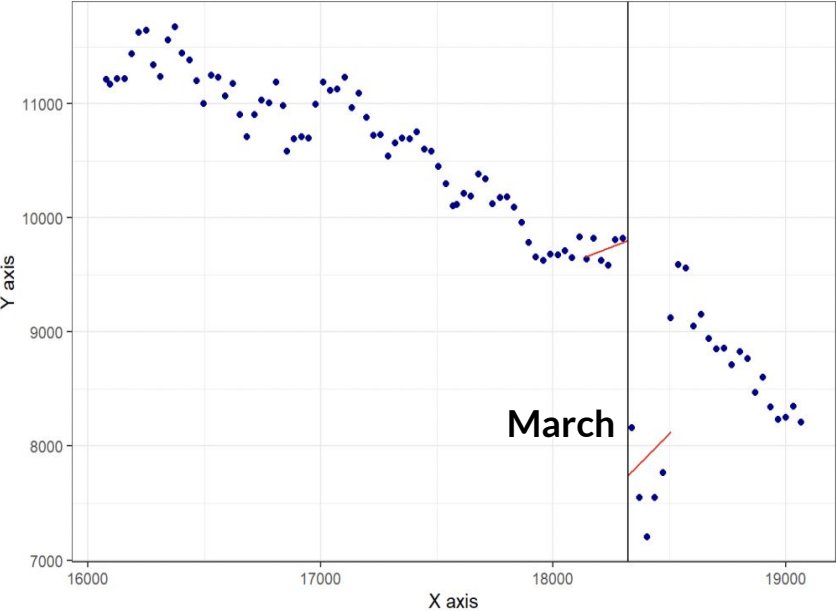2. How has retail fared relative to other industries?

How has COVID Impacted the Retail Industry?

- Gathered CPS Data for all people in the Retail Industry, for each month between 2014-2022.
- Calculated the Total employees in the Retail Industry for each month.
- Used an interrupted time series design (Regression Discontinuity) with the cutoff being March 2020.

REGRESSION RRD, EFFECT OF COVID

RD Plot

March

```
## Call: rdrobust
##
## Number of Obs.                 100
## BW type                     Manual
## Kernel                     Uniform
## VCE method                      NN
##
## Number of Obs.           74           26
## Eff. Number of Obs.       6            7
## Order est. (p)            1            1
## Order bias  (q)           2            2
## BW est. (h)         184.000      184.000
## BW bias (b)         184.000      184.000
## rho (h/b)             1.000        1.000
## Unique Obs.             74           26
##
## ===============================================================
##      Method    Coef. Std. Err.      z    P>|z|     [ 95% C.I. ]
## ===============================================================
## Conventional -2059.284   482.059  -4.272   0.000 [-3004.102 , -1114.465]
##     Robust       -          -     -1.962   0.050 [-2720.201 , -1.100]
## ===============================================================
```
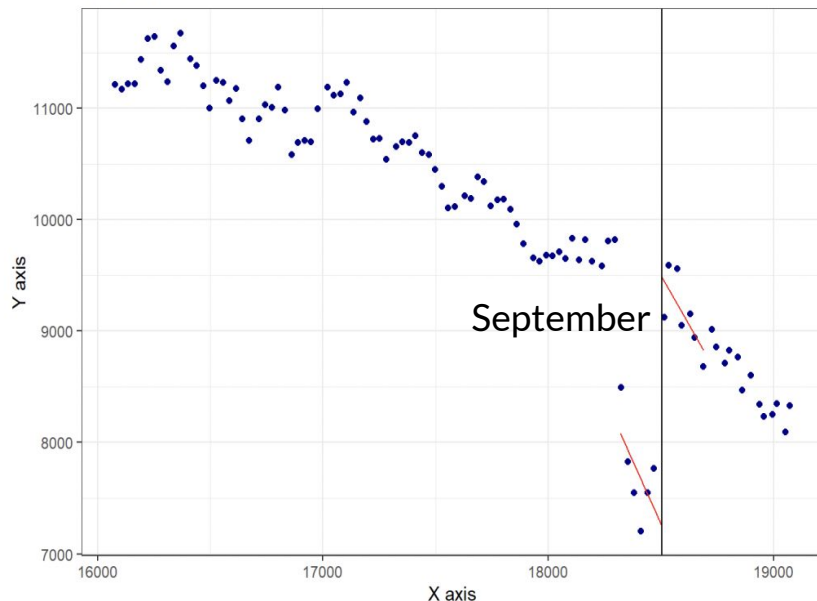
REGRESSION RDD, EFFECT
OF "END" of COVID

RD Plot

September

```
## Call: rdrobust
##
## Number of Obs.                 100
## BW type                     Manual
## Kernel                     Uniform
## VCE method                      NN
##
## Number of Obs.             80          20
## Eff. Number of Obs.         6           7
## Order est. (p)              1           1
## Order bias  (q)             2           2
## BW est. (h)           184.000     184.000
## BW bias (b)           184.000     184.000
## rho (h/b)               1.000       1.000
## Unique Obs.                80          20
##
## =================================================================
##     Method    Coef. Std. Err.        z    P>|z|      [ 95% C.I. ]
## =================================================================
##   Conventional 2233.426  405.421   5.509    0.000  [1438.815 , 3028.038]
##       Robust       -        -      1.289    0.197  [-455.259 , 2203.709]
## =================================================================
```

Long-term effects of Covid on Retail (Year and a Half) OLS.

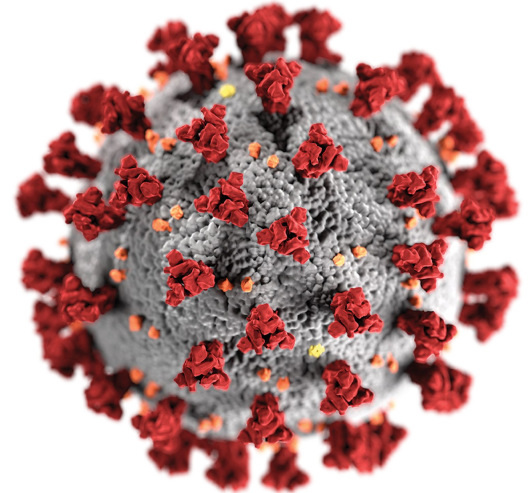|	Before	After
	Model 1	Model 2
(Intercept)	23669.20 ***	51965.93 ***
	(3844.42)	(4294.25)
date_number	-0.77 **	-2.30 ***
	(0.21)	(0.23)
nobs	19	19
r.squared	0.43	0.86
adj.r.squared	0.40	0.85
within.r.squared		
pseudo.r.squared		
sigma	155.04	166.03
nobs.1	19.00	19.00
AIC	247.47	250.07
BIC	249.36	251.96
logLik	-121.73	-123.03

*** p < 0.001; ** p < 0.01; * p < 0.05.

Interpretation

Initially: The impacts Covid drastically cut employment in the retail industry

Short-Term: Retail employment bounced back to around pre-covid levels

Long Term: The impacts of Covid seemed to accelerate people leaving the retail industry

How has retail fared relative to other industries?

- CPS Data for all people in the Retail Industry and 8 other industries, for each month between 2014-2022
- Comparing retail trade industry and other industries
- Categorical regression use March as COVID outbreak
- For Regression Discontinuity used 12 months before and after March, 2020

Categorical Regression
Retails Industries vs. Other Industries Before and After COVID

```
##                                            regression1
## Dependent Var.:                         avg_monthly_emp
##
## (Intercept)                          5,175.9*** (52.08)
## IndustryRetailTrade                  5,468.0*** (73.65)
## after_covidTRUE                       -958.4*** (102.1)
## IndustryRetailTrade x after_covidTRUE -1,172.5*** (144.4)
## _____  _____
## S.E. type                                           IID
## Observations                                         200
## R2                                               0.97337
## Adj. R2                                          0.97296
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

RDD FOR RETAIL TRADE

```
## Call: rdrobust
##
## Number of Obs.                    25
## BW type                       Manual
## Kernel                       Uniform
## VCE method                        NN
##
## Number of Obs.                    12            13
## Eff. Number of Obs.               12            13
## Order est. (p)                     1             1
## Order bias  (q)                    2             2
## BW est. (h)                   12.000        12.000
## BW bias (b)                   12.000        12.000
## rho (h/b)                      1.000         1.000
## Unique Obs.                       12            13
##
## =================================================================
##       Method     Coef. Std. Err.       z     P>|z|      [ 95% C.I. ]
## =================================================================
##   Conventional -2072.234   272.903   -7.593    0.000 [-2607.114 , -1537.353]
##        Robust        -         -     -4.730    0.000 [-3098.520 , -1283.099]
## =================================================================
```

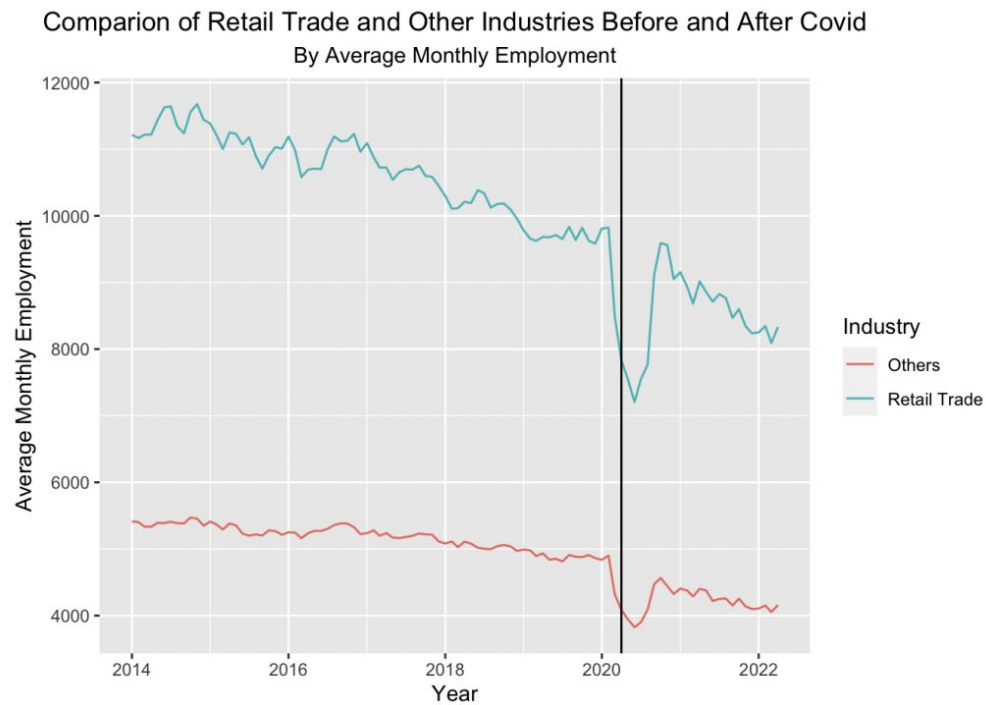**22.83% reduction in monthly employment**

RDD FOR OTHER INDUSTRIES

```
## Call: rdrobust
##
## Number of Obs.                    25
## BW type                       Manual
## Kernel                       Uniform
## VCE method                        NN
##
## Number of Obs.                    12            13
## Eff. Number of Obs.               12            13
## Order est. (p)                     1             1
## Order bias  (q)                    2             2
## BW est. (h)                   12.000        12.000
## BW bias (b)                   12.000        12.000
## rho (h/b)                      1.000         1.000
## Unique Obs.                       12            13
##
## =================================================================
##       Method     Coef. Std. Err.       z     P>|z|      [ 95% C.I. ]
## =================================================================
##   Conventional  -842.018   101.538   -8.293    0.000 [-1041.028 , -643.007]
##        Robust        -         -     -4.994    0.000 [-1205.661 , -526.011]
## =================================================================
```

18.5% reduction in monthly employment

Regression RDD

Comparion of Retail Trade and Other Industries Before and After Covid
By Average Monthly Employment

Question 2: Interpretation

Initial: Retail Trade experienced a more significant dip compared to other industries.

Short-term: Retail trade bounced back closer to pre-COVID level, similar to other industries.

Long term: Suffering from a more significant downward trend.