San Francisco Corridor Study (Reproducing Wei's Approach)

*Jamaal Green*

December 4, 2017

Introduction

As part of the piloting process for the project I've been assigned to attempt to reproduce Wei's analysis of Portland corridors using San Francisco data. I've identified three test corridors Post, Sutter, and 17th streets. All three corridors are in the Northeastern part of the city. Their comparison corridors were all on paralell streets within a few blocks of the treatment corridors. Unfortunately, San Francisco does not have an extensive network of protected bike lanes so I had to choose corridors with regular bike lanes listed (primarily paint on the side of the road, though the lanes are clearly demarcated). Finally, I collected LEHD data from 2005-2015 in order to measure changes in total, retail, and hospitality/accomodations employment.

Corridor Comparisons

Corridor General Trends

Overall, the study corridors track relatively closely to city employment growth as a whole except for the treatment corridors. Treatment corridors basically saw no positive accomodations employment growth compared to treatment corridors and the city. There is a similar divergence for total employment but this is less important for the study. On retail, both the treatment and control corridors largely lost employment whereas the city as a whole saw robust retail employment growth over the past ten years.

Corridor and City Employment Change (2005–2015)
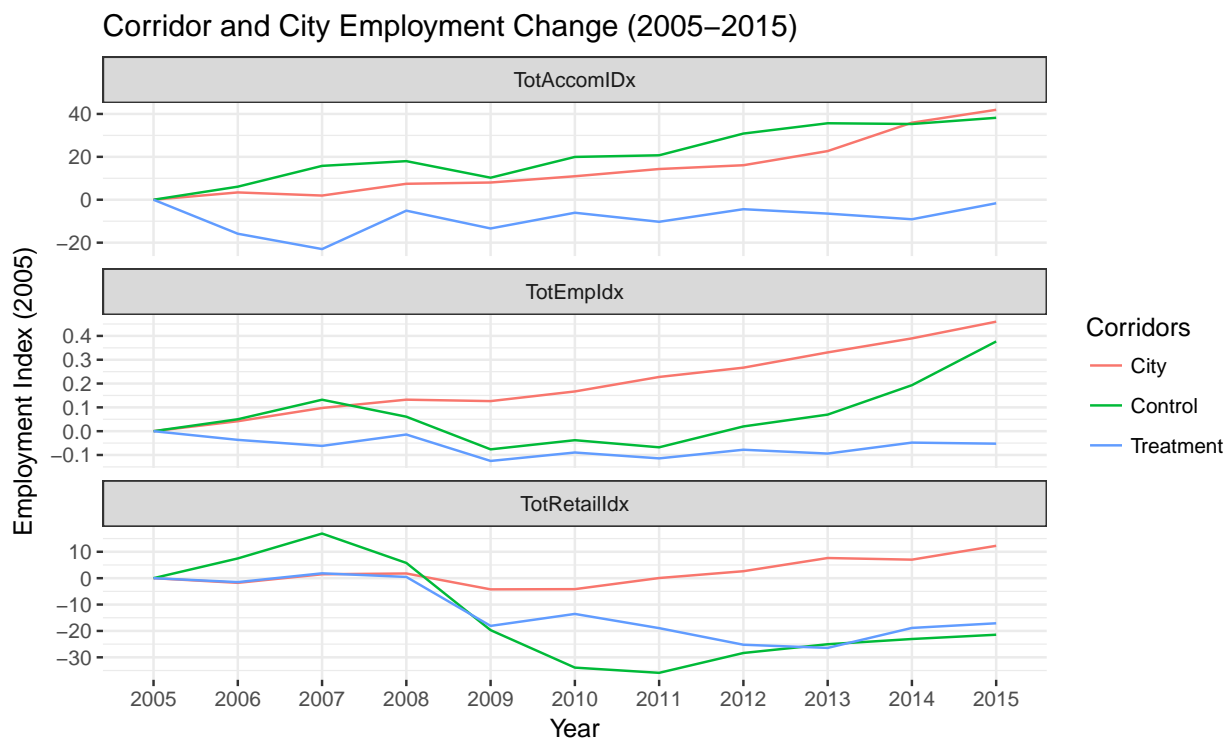
Looking at absolute employment growth between the study corridors shows that they seem to track each other relatively well. Interestingly, the treatment and control corridors switch places with respect to accomodations and retail employment as treatment corridors lead the way in accomodations employment and lag behind control corridors for retail.

Corridor Employment Comparison
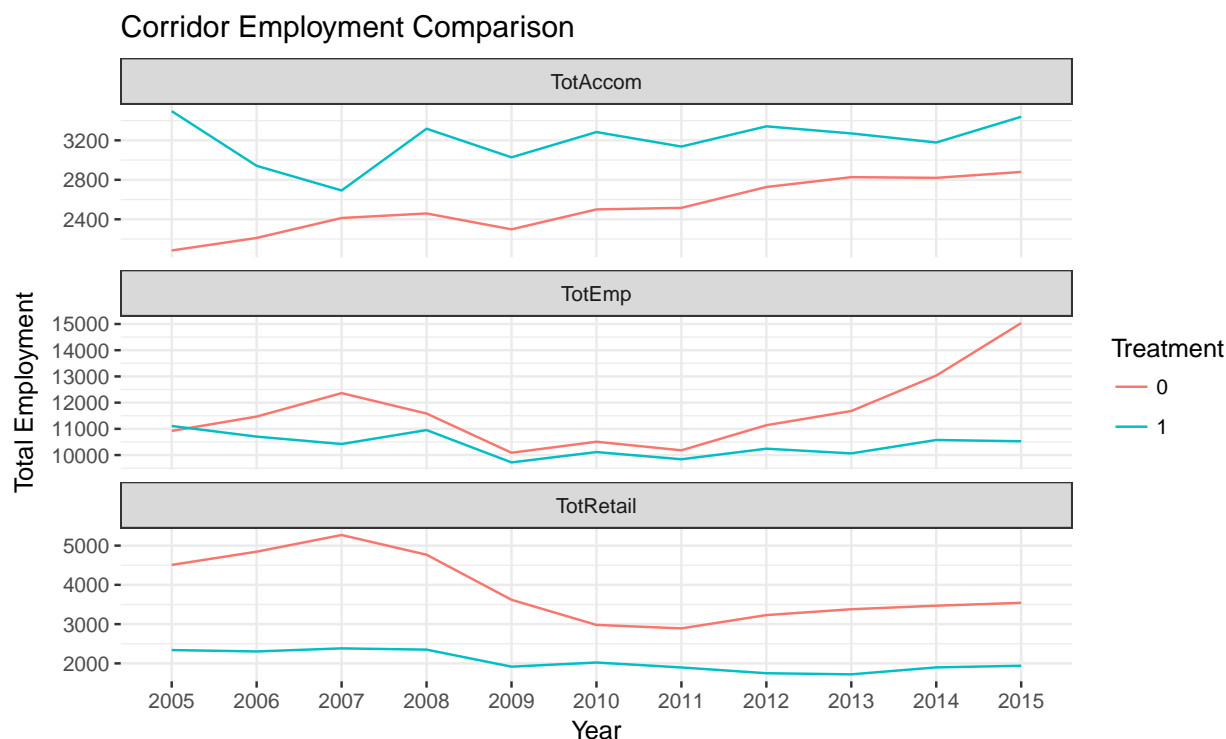
Beyond the industrial differences, attempting to compare the control and treatment corridors is further complicated when testing to see if they are equivalent. T-test results shift from significant to non-significant based on what industries are compared and how treatment and control corridors are aggregated or not.

For example, comparing total employment of the treatment and control corridors without aggregating blocks results in non-significant results, but comparing retail employment alone is significantly different.

Employment	Estimate	Statistics	Pval	Conf.Low	Conf.High
Total Employment	-32.01	-0.8041	0.4217	-110.2	46.17
Retail	-53.01	-2.147	0.03236	-101.5	-4.479
Accom.	21.54	1.697	0.09013	-3.381	46.46

These differences become more stark when the employment is aggregated at the corridor level where every employment type has statistically significant t-test results.

Employment	Estimate	Statistics	Pval	Conf.Low	Conf.High
Total Employment	-1248	-2.757	0.01755	-2236	-260.3
Retail	-1817	-6.967	1.635e-05	-2386	-1248
Accom.	671.9	6.288	4.161e-06	448.8	895

Running the Models

Difference-in-Difference

The following tables show the difference-in-difference estimates for the Sutter and Post Street treatment corridors and the 17th Street treatment corridor, respectively. Both Sutter and Post streets had 2010 listed as the year of their lane construction and we kept together while 17th street's consstruction was one year later.

Table 3: Difference-in-Difference for Sutter and Post Streets

	Dependent variable:	
	Retail	Accomodation
	(1)	(2)
ConstructionBefore	61.410	−12.814
	(51.551)	(25.394)
Treatment	−53.926	30.218
	(50.205)	(24.731)
ConstructionBefore:Treatment	−45.679	6.086
	(74.351)	(36.624)
Constant	133.486***	108.884***
	(34.756)	(17.120)
Observations	487	487
R^2	0.011	0.007
Adjusted R^2	0.005	0.001
Residual Std. Error (df = 483)	408.288	201.118
F Statistic (df = 3; 483)	1.856	1.195

Note: *p<0.1; **p<0.05; ***p<0.01

Both DiD estimates show a non-significant effect of treatment on both retail and accomodation employment for our respective corridors. The construction date dummy variable for the 17th Street model is significant showing that there may be some kind of time effect at play.

Interrupted Time Series

Similar to the DiD the simple interrupted time series results were all non-significant. Given this evidence, it seems unlikely that the installation of bike lanes affected the economic growth tracjectories of our selected corridors.

Appendix

Table 4: Difference-in-Difference for 17th Street

	Dependent variable:	
	Retail	Accomodation
	(1)	(2)
ConstructionBefore	−4.972	−12.873**
	(4.647)	(6.119)
Treatment	−0.322	7.844
	(4.722)	(6.217)
ConstructionBefore:Treatment	5.833	6.539
	(6.418)	(8.450)
Constant	16.891***	21.018***
	(3.383)	(4.454)
Observations	247	247
R^2	0.008	0.049
Adjusted R^2	−0.004	0.038
Residual Std. Error (df = 243)	25.089	33.032
F Statistic (df = 3; 243)	0.648	4.211***

Note: *p<0.1; **p<0.05; ***p<0.01

Table 5: Interrupted Time Series Estimates for the Post and Sutter St. Corridors

	Dependent variable:	
	Retail	Accomodation
	(1)	(2)
TimeElapsed	−1.544	−0.310
	(7.648)	(12.800)
ConstructionBefore	11.667	−4.045
	(63.989)	(107.089)
TimeElapsed:ConstructionBefore	−2.211	−2.185
	(12.656)	(21.180)
Constant	91.168	141.432
	(58.990)	(98.723)
Observations	234	234
R^2	0.004	0.0003
Adjusted R^2	−0.009	−0.013
Residual Std. Error (df = 230)	147.851	247.436
F Statistic (df = 3; 230)	0.279	0.022

Note: *p<0.1; **p<0.05; ***p<0.01
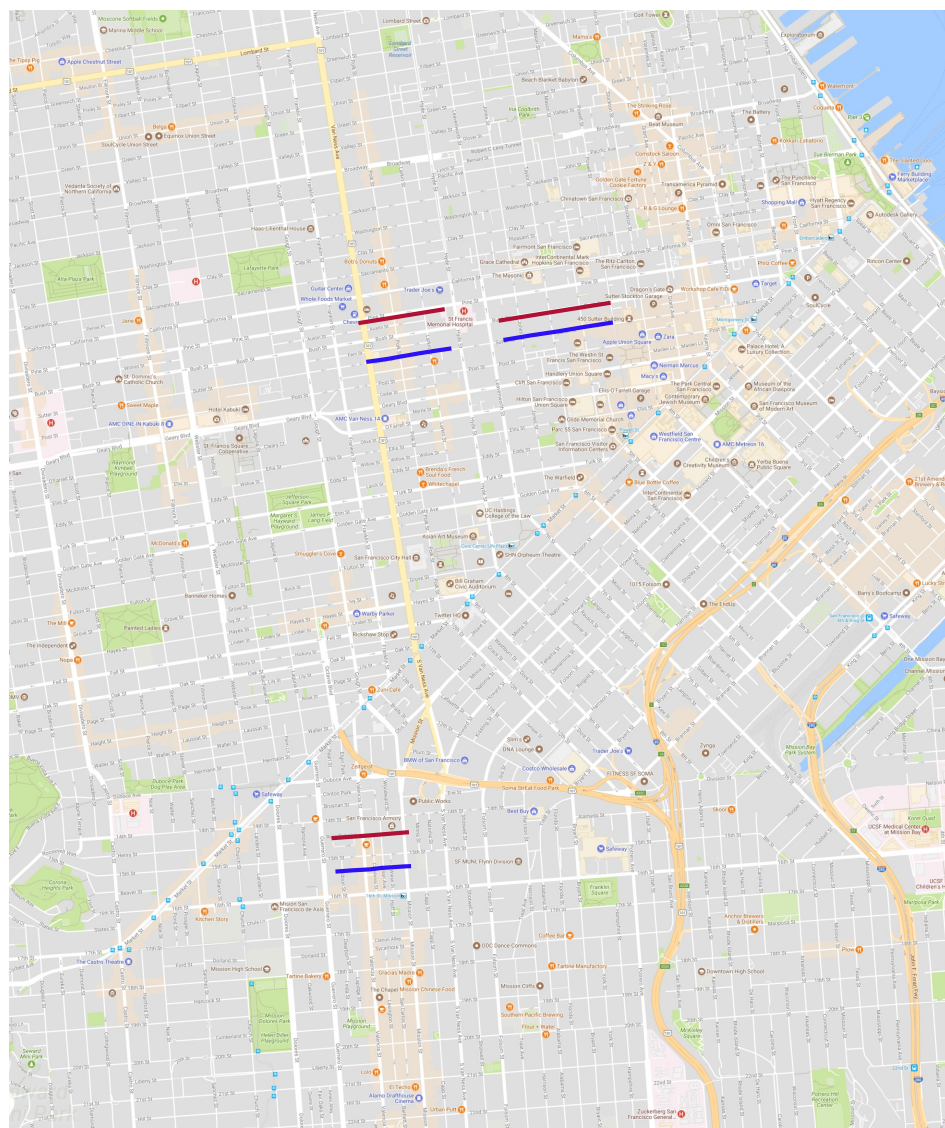
Figure 1: Figure 1: Treatment and Control Corridors

Table 6: Interrupted Time Series Estimates for 17th Street

	Dependent variable:	
	Retail	Accomodation
	(1)	(2)
TimeElapsed	0.967	1.524
	(1.922)	(3.941)
ConstructionBefore	11.370	6.249
	(16.137)	(33.089)
TimeElapsed:ConstructionBefore	−2.089	−1.701
	(2.394)	(4.909)
Constant	8.864	16.720
	(15.547)	(31.879)
Observations	130	130
R^2	0.007	0.007
Adjusted R^2	−0.016	−0.017
Residual Std. Error (df = 126)	20.692	42.429
F Statistic (df = 3; 126)	0.309	0.290
Note:	*p<0.1; **p<0.05; ***p<0.01	