

## **Online Appendix**

### **A: NOAA Hazard and FEMA Disaster Matching Strategy**

The identification of tornadoes that were declared as disasters proceeded as follows. I first include only the Presidential Disaster Declarations that included the word “tornado” or “severe storm.” I then stratify both datasets by year and match tornadoes to the disaster declarations if the SPC date was either an exact match to the FEMA incident date or was included within the range of dates provided by FEMA. Before 1984, there was no incident date and only the declaration date, so for 1980-1983 tornadoes, I matched the presidential disaster declarations to tornadoes that occurred within a 2 week prior to the declaration date. Given the nature of tornadoes’ timing, none were declared an EM.

## B: Placebo Test

In the placebo test, I model a difference-in-differences estimator on the first decade, the demographic change from 1980 to 1990, using a false treatment group: all the block groups that experience a severe tornado during the last decade 2000 to 2009. I should therefore detect no treatment effect. I use the same coarsened exact matching preprocessing, and then model a standard two period, difference in difference equation on the matched sample:

$$y_{jt} = b_1 D_t + b_2 X_j + b_3 D_t X_j + b_3 \mathbf{Z}_{jt} + e_{jt}$$

where  $b_3$  is the difference in difference estimator, the interaction between the time and treatment, such that  $D_t$  is a dummy for the time, coded 1 for 1990 and 0 for 1980.  $X_j$  is a treatment variable coded 1 if the block group is treated and 0 otherwise.  $\mathbf{Z}_{jt}$  are controls for the log of land area and the log of the number of housing units. I estimate all models using a matched sample. Table A presents the results. As expected, none of the placebo treatment effects are statistically significant at  $p < .05$ .

Table OA1: DID estimator for the effects of a placebo severe tornado on net demographic change, CEM matched sample (1980-1990)

	Total Pop	Young Adult	White	Black	Hispanic	Family Poverty	Median Fam Inc
DID	0.001 (0.003)	-0.001 (0.009)	0.029+ (0.017)	-0.110 (0.107)	-0.163 (0.139)	0.075 (0.054)	0.001 (0.006)
Time	-0.059*** (0.002)	-0.136*** (0.003)	-0.121*** (0.008)	-1.19*** (0.038)	-2.34*** (0.052)	-0.444** (0.010)	-0.030*** (0.002)
Treatment	0.023*** (0.004)	0.025** (0.008)	0.011 (0.011)	0.376+ (0.203)	0.189** (0.066)	-0.035 (0.022)	0.027*** (0.007)
BG x Decade	130,586	130,586	130,586	130,586	130,586	130,586	130,586

All models weighted using coarsened exact matching. Clustered robust standard errors in parentheses. Two-tailed tests: + $p < .10$  \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$ . All models include controls for the log of land area and log of housing units.

## C: Supplemental Analyses at Tract-Level

In the first supplemental analysis, I repeat the main model specification at the census tract level. Table OA1 provides the descriptive statistics in a balance table, and Table OA2 provides the time series fixed effects estimator. For socioeconomic status and race, the results show substantively similar but less precisely estimated effects. For total population, the result suggests a decrease in the percent change in total population of affected tracts, but the 95% confidence interval includes the null effect.

Table OA2: Unmatched and Matched Descriptive Statistics, Census Tract Level

1980 Variable	Unmatched			Matched		
	Control	Treatment	Difference	Control	Treatment	Difference
Total Population	3215 (1618)	3412 (1453)	197*** (28)	3012 (1255)	3024 (1256)	12 (28)
Young Adult	830 (489)	800 (411)	-29*** (8)	711 (313)	705 (313)	-6 (7)
White	2604 (1552)	2918 (1359)	315*** (27)	2760 (1261)	2764 (1257)	4 (28)
Black	439 (1012)	402 (819)	-37** (17)	188 (439)	198 (446)	9 (10)
Hispanic	131 (462)	52 (188)	-80*** (8)	36 (69)	33 (60)	-3** (2)
Median Income	20300 (6761)	17745 (5125)	-2555*** (116)	18671 (5011)	18659 (4959)	-12 (112)
Family Poverty	83 (94)	109 (89)	26*** (2)	80 (60)	82 (60)	2* (1)
Rural Population	943 (1385)	2088 (1646)	1146*** (25)	1892 (1541)	1905 (1542)	13 (34)
Housing Units	1237 (622)	1325 (561)	88*** (11)	1167 (482)	1169 (482)	2 (11)
Rented Units	367 (338)	301 (227)	-66*** (6)	247 (164)	246 (163)	-2 (4)
Land Area	33 (120)	113 (178)	80*** (2)	64 (113)	85 (122)	21** (3)
1970s Pop Change	0 (0)	0 (0)	-0 (0)	0 (0)	0 (0)	-0 (0)
N (Census Tract)	36,315	3,567	39,882	12,647	2,384	15,031

Two sample t-test: +p<.10 \*p<.05 \*\*p<.01 \*\*\*p<.001

Table OA2: FE estimates of tornadoes on net demographic change, CEM matched sample (1980-2010)

	Total Pop	Young Adult	White	Black	Hispanic	Family Poverty	Median Fam Inc
Treatment	-0.010 (0.016)	-0.010 (0.014)	0.019 (0.014)	-0.071 (0.058)	0.129** (0.049)	-0.042 (0.032)	0.012** (0.004)
Census Tract FE	Y	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y	Y
Adj. R-Sq.	0.559	0.572	0.688	0.682	0.4502	0.403	0.666
N (Tract x Dec.)	59,541	59,541	59,541	59,541	59,541	59,541	59,409

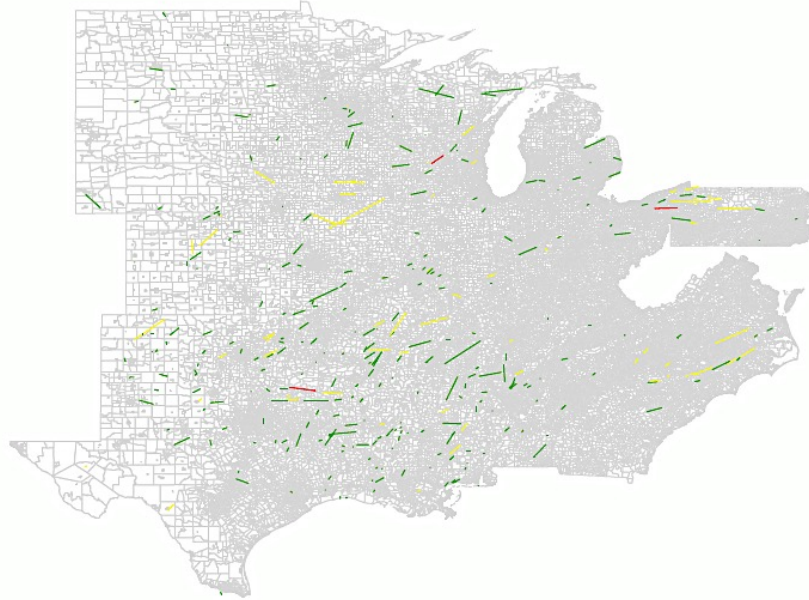
All models weighted using coarsened exact matching. Huber-White robust standard errors in parentheses.

Two-tailed tests: +p<.10 \*p<.05 \*\*p<.01 \*\*\*p<.001.

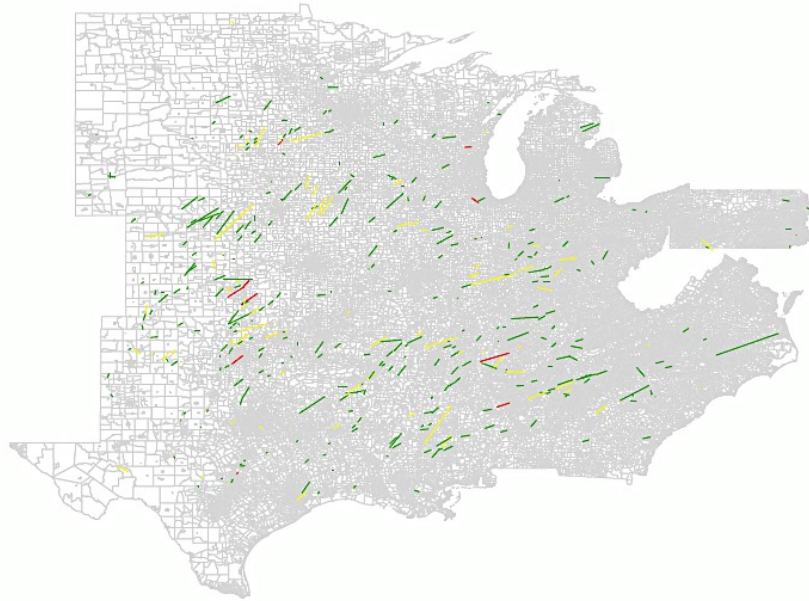
**D: Figure 1 Color Coded by Magnitude (F-Scale)**

Figure 1 with Color Coded Tornado Tracks (Red = F5, Yellow = F4, Green = F3)

Panel 1: Severe Tornado Activity in the United States, 1980-1989



Panel 2: Severe Tornado Activity in the United States, 1990-1999



Panel 3: Severe Tornadic Activity in the United States, 2000-2009

