The Effect of Natural Disasters on Economic Activity in US Counties: A Century of Data

Web Appendix

Table 1: Effect of Disasters on Migration - Weighting each county by population

	Migration rate
Super-severe disaster	-0.00794
	(0.0131)
Severe disaster	-0.00914
	(0.00918)
Disaster count	0.0000306
	(0.00345)
Disaster count >=1	0.00875
	(0.00803)
Exp. employment growth rate, 1930 weights	0.242^{***}
	(0.0288)
Observations	24408
R^2	0.564

This table reports our main estimates of equation (1), weighting each county by its population. We study the migration of the entire population. Regressions include decade and county fixed effects, as well as state-specific time trends. All disaster variables are computed as shown in equation (3). Standard errors clustered at the SEA level.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 2: Effect of Disasters on Migration - Without spatially weighted disasters

	Migration rate
Super-severe disaster =1	-0.0170**
	(0.00679)
Severe disaster =1	0.00246
	(0.00440)
Disaster count	-0.00351**
	(0.00136)
Disaster count >=1	0.0117**
	(0.00492)
Exp. employment growth rate, 1930 weights	0.275***
	(0.0228)
Observations	24408
R^2	0.524

This table reports our main estimates of equation (1). We study the migration of the entire population. Regressions include decade and county fixed effects, as well as state-specific time trends. Here, disaster variables are county-specific and not computed as in equation (3). Standard errors clustered at the SEA level.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Effect of Disasters on Migration – SEA level

	Migration rate
Super-severe disaster	-0.0288***
	(0.00908)
Severe disaster	-0.00364
	(0.00820)
Disaster count	-0.000647
	(0.00223)
Disaster count >=1	0.0233***
	(0.00826)
(mean) bartik_1930	0.357***
	(0.0323)
Observations	3992
R^2	0.565

This table reports our main estimates of equation (1), with data collapsed at the SEA-decade level (each county given the same weight). We study the migration of the entire population. Regressions include decade and SEA fixed effects, as well as state-specific time trends. All disaster variables are computed as shown in equation (3). Standard errors clustered at the SEA level.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Effect of Disasters on Migration - Male & young male

	(1) Migration rate	(2) Migration rate (male)	(3) Migration rate (young male)
Super-severe disaster	-0.0228**	-0.0239**	-0.0509***
	(0.00889)	(0.00948)	(0.0142)
Severe disaster	0.00416	0.00551	0.0105
	(0.00594)	(0.00634)	(0.0101)
Disaster count	-0.00434***	-0.00451***	-0.00226
	(0.00165)	(0.00170)	(0.00240)
Disaster count >=1	0.0104**	0.0123**	0.0247***
	(0.00525)	(0.00551)	(0.00845)
Exp. employment growth rate, 1930 weights	0.276***	0.279***	0.424***
	(0.0229)	(0.0240)	(0.0360)
Observations	24408	24408	24408
R^2	0.523	0.495	0.495

This table reports our main estimates of equation (1). In column (1) we study the migration of the entire population, in column (2) we focus on migration of males and in (3) we focus on young males (age 25 to 45). Regressions include decade and county fixed effects, as well as state-specific time trends. All disaster variables are computed as shown in equation (3). Standard errors clustered at the SEA level.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Effect of Disasters on Migration - Controlling for DAMS

	Migration rate
Disaster count	-0.00313**
	(0.00140)
Severe disaster	0.00569
	(0.00569)
Super-severe disaster	-0.0198**
	(0.00797)
Exp. employment growth rate, 1930 weights	0.282***
	(0.0240)
Dam count	0.0000420**
	(0.0000198)
Observations	23384
R^2	0.539

This table reports our main estimates of equation (1). We study the migration of the entire population. Regressions include decade and county fixed effects, as well as state-specific time trends and a control for the number of dams built. All disaster variables are computed as shown in equation (3). Standard errors clustered at the SEA level.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Effect of Disasters on Migration - Urban vs. rural areas (def. 2)

	Urban Migration rate	Rural Migration rate
Super-severe disaster	-0.0117	-0.0311*
	(0.00749)	(0.0161)
Severe disaster	-0.00120	0.00450
	(0.00546)	(0.00980)
Disaster count	-0.00359***	-0.00684**
	(0.00129)	(0.00310)
Disaster count >=1	0.0142***	0.00986
	(0.00505)	(0.00804)
Exp. employment growth rate, 1930 weights	0.281***	0.161***
	(0.0237)	(0.0409)
Observations	12216	12192
R^2	0.576	0.517

Column (1) focuses on urban counties, while column (2) focuses on rural counties. Rural areas defined as counties with below-median population in 1930. Regressions include decade and county fixed effects, as well as state-specific time trends. All disaster variables are computed as shown in equation (3). Standard errors clustered at the SEA level.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Propensity Score for Severe Disaster [First Stage]

	(1) Severe disaster (EMDAT and/or ARC)
Latitude	0.0220
	(0.137)
Latitude squared	-0.000682
	(0.00358)
Latitude cubed	0.00000456
	(0.0000310)
Longitude	-0.0711
	(0.0834)
Longitude squared	0.000468
	(0.000865)
Longitude cubed	-0.000000715
	(0.00000295)
Land area (sq. miles)	-0.0000244***
	(0.00000503)
BAY	-0.000322
	(0.000335)
BEACH	0.00498***
	(0.00164)
LAKE	-0.0000244
	(0.0000662)
STREAM	0.000244***
	(0.0000549)
SUMMIT	0.0000280
	(0.000113)
SWAMP	0.000457
	(0.000522)
VALLEY	-0.0000717
	(0.0000819)
ELEVMAX	-0.0000213***
	(0.00000265)
COASTAT	0.0886***
	(0.0277)
COASTPC	-0.00825
	(0.0388)
COASTGL	-0.103***
	(0.0235)
COASTGU	0.179***
	(0.0281)
RIV1120	0.0126
	(0.00815)
RIV2150	0.0220**
	(0.0109)
RIV51UP	0.0532***
	(0.0119)
RIV0510	-0.00201
	(0.00401)
AWC	0.242
	(0.230)
CLAY	0.000634
	(0.000770)
PERM	-0.00681*
	(0.00385)
THICK	-0.00221***
	(0.000640)
DRAIN	0.000610
	(0.00856)
SLOPE	0.000119
	(0.000789)
Observations	24016
R^2	0.388

This Regression includes county fixed effects. Standard errors clustered at the SEA level.
* p < 0.1, ** p < 0.05, *** p < 0.01

Table 8: Effect of Disasters on Migration - Good versus bad weather areas
(Controlling by disaster type)

	(1) All	(2) Good weather	(3) Bad weather
Super-severe disaster	-0.0173**	-0.0127	-0.0171
	(0.00864)	(0.0115)	(0.0121)
Severe disaster	0.00227	-0.00552	0.00738
	(0.00651)	(0.00993)	(0.00667)
Disaster count >=1	0.000282	0.00114	-0.00149
	(0.00532)	(0.00840)	(0.00595)
Flood count	0.00349	-0.00154	0.00559**
	(0.00253)	(0.00443)	(0.00239)
Storm count	-0.00286**	-0.00479**	-0.00222
	(0.00120)	(0.00190)	(0.00157)
Tornado count	0.00111	0.00870	-0.00360
	(0.00372)	(0.00669)	(0.00390)
Hurricane count	-0.0133**	-0.0133*	-0.0136**
	(0.00601)	(0.00701)	(0.00560)
Drought count	0.0148*	0.0337***	-0.00121
	(0.00815)	(0.0105)	(0.0101)
Volcano count	-0.0347**	-0.0435**	
	(0.0171)	(0.0193)	
Earthquake count	-0.0115	-0.00448	-0.0493
	(0.0282)	(0.0305)	(0.0443)
Other disasters (count)	-0.0137***	-0.0148***	-0.00633
	(0.00458)	(0.00527)	(0.00969)
Exp. employment growth rate, 1930 weights	0.267***	0.255***	0.283***
	(0.0244)	(0.0309)	(0.0377)
Observations	20976	10488	10488
R2	0.514	0.488	0.523

Column (1) focuses on all counties that have weather information. Column (2) focuses on counties that experience good weather, while column (3) focuses on counties that experience bad weather. Good weather areas are defined as counties with above median score in their good weather index, computed as: county-specific average daily temperature in the winter of year 2000 divided by its

cross-county standard deviation, minus county-specific average daily temperature in the summer of year 2000 divided by its cross-county standard deviation. Regressions include decade and county fixed effects, as well as state-specific time trends. The first three disaster variables are computed as shown in equation (3), the specific categories of disaster counts are specific to county of occurrence. Standard errors clustered at the SEA level.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$