Appendix

Table A1. Modeling County-Level Flooding Impact/Frequency Using the Rainfall Anomaly Measure

	ln(NFIP payments,$)	ln(# of claims)	ln(NFIP payment per claim, $)	ln(NFIP payment per policy holder, $)	ln(# Claims per policy holder, $)	ln(damage, $)	# of Storm Events	# of flood and hurricane PDDs
Rain, t	0.6242***	0.3425***	1.0978***	0.8217***	0.0145***	1.5253***	0.5879***	0.1560***
	(0.0116)	(0.0067)	(0.0192)	(0.0140)	(0.0004)	(0.0252)	(0.0139)	(0.0034)
lncome	-0.4678***	-0.2840***	-0.8783***	-0.6310***	-0.0203***	-0.2323	1.8879***	0.1076**
	(0.11)	(0.0603)	(0.2257)	(0.1550)	(0.0054)	(0.3038)	(0.1578)	(0.0466)
Population	1.1748***	0.6978***	2.0977***	1.0425***	0.0187***	1.2575***	0.1355	-0.2359***
	(0.1338)	(0.0774)	(0.2757)	(0.1858)	(0.0061)	(0.3553)	(0.1753)	(0.0386)
constant	-4.8800***	-2.8043***	-7.4361***	-0.9009	0.1005**	-7.1520*	-5.8154***	2.2668***
	(1.1598)	(0.6306)	(2.2924)	(1.5408)	(0.0408)	(3.9238)	(1.9581)	(0.4211)
R^2	0.13	0.14	0.11	0.12	0.07	0.11	0.32	0.24
N	59,646	59,646	59,646	59,646	59,646	60,328	60,328	52,115
Mean of dep. var	1.329	0.7928	2.9815	1.6264	0.0194	3.8348	2.6934	0.3861

Notes: All specifications include both the year and county fixed effects. In parenthesis are standard errors clustered by county. NFIP payments, claims and PDD for flood, hurricane, coastal storm and surge disasters (columns 1, 2, 3, 4, 5, 8) were obtained from FEMA. Damage (in column 6) corresponds to total flood, hurricane, coastal storm and surge related damage at the county level. The data come from the Spatial Hazard Events and Losses Database (SHELDUS) available at http://hvri.geog.sc.edu/SHELDUS/. Storm Events (column 7)correspond to the number of storms and significant weather events that cause loss of life, injuries property damages and disruption of commerce, with the data obtained from the Storm Events database of NOAA Centers for Environmental Information (https://www.ncdc.noaa.gov/stormevents/). Across all specifications, we show that the rainfall anomaly variable consistently has a significant and positive effect on the contemporaneous flood-related impact, suggesting its validity as a magnitude measure of the exogenous flooding condition.
* $p<0.1$; ** $p<0.05$; *** $p<0.01$;

Table A2. Instrumental Variable Model of Household Flood Insurance Purchases, with Additional Year Lags of Rainfall Anomalies

	ln_policy	ln_coverage	ln_premium	ln_take-up
ln_PA, t-1	-0.1373***	-0.1283***	-0.1156***	-0.1390***
	(0.0323)	(0.0334)	(0.0308)	(0.0326)
ln_IA, t-1	0.1013**	0.0789*	0.0464	0.1026**
	(0.0422)	(0.0422)	(0.0388)	(0.0427)
Rain, t	0.0138**	0.0181***	0.0201***	0.0139**
	(0.0067)	(0.0069)	(0.0063)	(0.0068)
Rain, t-1	0.0996***	0.1129***	0.1272***	0.1010***
	(0.0296)	(0.0311)	(0.0286)	(0.0298)
Rain, t-2	0.0475***	0.0507***	0.0523***	0.0477***
	(0.0104)	(0.0110)	(0.0102)	(0.0105)
Rain, t-3	-0.0060	-0.0015	-0.0012	-0.0062
	(0.0055)	(0.0056)	(0.0052)	(0.0055)
Rain, t-4	-0.0054	-0.0067	-0.0088	-0.0051
	(0.0064)	(0.0067)	(0.0061)	(0.0065)
Rain, t-5	-0.0135	-0.0080	-0.0030	-0.0132
	(0.0085)	(0.0084)	(0.0077)	(0.0086)
Income, t-1	0.5593***	0.8326***	0.5268***	0.5227***
	(0.1090)	(0.1199)	(0.1089)	(0.1100)
Loan, t-1	0.0071	0.0113*	0.0075	0.0067
	(0.0060)	(0.0061)	(0.0055)	(0.0060)
Population, t-1	0.6375***	0.8545***	0.7032***	-0.3053**
	(0.1467)	(0.1536)	(0.1403)	(0.1489)
N	34,361	34,361	34,361	34,361
First stage F-statistics for PA	18.36	18.36	18.36	18.36
First stage F-statistics for IA	11.46	11.46	11.46	11.46
Hansen J	0.00	1.03	1.22	0.00
Hansen J P-value	0.99	0.31	0.27	0.99

Notes: In parenthesis are standard errors clustered by congressional district. All the specifications include both the year and county fixed effects. In this table we show that the rainfall anomaly variable generally has little effect on flood insurance purchase beyond the two-year lag.
* $p<0.1$; ** $p<0.05$; *** $p<0.01$.

Table A3. FE IV Model: Similar to Stafford, Non-Stafford committee is also specified as the total number of state seats in these committees.

	ln_policy	ln_coverage	ln_premium	ln_take_up
ln_PA, t-1	-0.0913***	-0.0758***	-0.0705***	-0.0928***
	(0.0262)	(0.0255)	(0.0228)	(0.0264)
ln_IA, t-1	0.1117***	0.0907**	0.0565*	0.1129***
	(0.0370)	(0.0356)	(0.0317)	(0.0374)
Rain, t	0.0042	0.0066	0.0103**	0.0043
	(0.0054)	(0.0054)	(0.0048)	(0.0054)
Rain, t-1	0.0283	0.0307	0.0561***	0.0296
	(0.0195)	(0.0196)	(0.0177)	(0.0196)
Rain, t-2	0.0225***	0.0221***	0.0278***	0.0225***
	(0.0073)	(0.0075)	(0.0067)	(0.0074)
Rain, t-3	-0.0026	0.0018	0.0014	-0.0028
	(0.0042)	(0.0042)	(0.0037)	(0.0042)
Income, t-1	0.5333***	0.8028***	0.5026***	0.4963***
	(0.0946)	(0.1072)	(0.0943)	(0.0951)
Loan, t-1	0.0047	0.0084*	0.0049	0.0043
	(0.0050)	(0.0049)	(0.0043)	(0.0050)
Population, t-1	0.7211***	0.9450***	0.7798***	-0.2214*
	(0.1278)	(0.1339)	(0.1195)	(0.1289)
N	34,361	34,361	34,361	34,361
J	2.82	0.74	0.37	2.83
Jp	0.09	0.39	0.54	0.09
1st stage F-statistics PA	30.74	30.74	30.74	30.74
1st stage F-statistics IA	15.72	15.72	15.72	15.72

Notes: In parenthesis are standard errors clustered at the congressional district level. All the specifications include both the year and county fixed effects. * $p<0.1$; ** $p<0.05$; *** $p<0.01$. Instrumental Variables used are total number of state seats in Stafford and Non-Stafford committees, respectively and the interaction between the indicator variable for a swing county at t and the dummy variable if t-1 was a presidential election year.

Table A4. FE IV mode: Effect of the PA grant on subsequent flood damage

	Ln(flood damage)
ln_PA, t-1	-1.1334***
	(0.3866)
ln_IA, t-1	1.5425***
	(0.5317)
Rain, t	1.6398***
	(0.0854)
Rain, t-1	0.1854
	(0.3358)
Rain, t-2	0.2022*
	(0.1215)
Rain, t-3	-0.3222***
	(0.0591)
Income, t-1	1.9643*
	(1.0177)
Loan, t-1	0.0055
	(0.0497)
Population, t-1	-3.8471**
	(1.6661)
N	34,361
Hansen J	1.37
Hansen J P-value	0.24
Mean of dep. Var	3.4702

Notes: The Dependent variable measures the total flood, hurricane and storm surge related damages, using the data collected from SHELDUS (available at http://hvri.geog.sc.edu/SHELDUS/). In parenthesis are standard errors clustered by congressional district. All the specifications include both the year and county fixed effects. We instrument for the PA and IA grants using the same set of instrument variables we used in our empirical analysis. We find that the IA grant has a negative and significant effect on the flooding damage that occurred in the next year, after controlling for the exogenous flooding condition (rainfall anomaly), and other county-level socio-economic variables. The PA coefficient suggests that one percent increase in the PA grant a county receives is associated with 1.13 percent decrease in the flooding damage in the following years, all else being equal. When setting all other variables at their sample means, we estimate that one-dollar increase in the PA could would decrease a county's flooding damage in the next year by 1.2 dollars.
* $p<0.1$; ** $p<0.05$; *** $p<0.01$.

Table A5. FE IV model: Effect of the PA grant on average household flood coverage per policy (intensive margin)

	ln (coverage_policy)
ln_PA, t-1	0.0106
	(0.0150)
ln_IA, t-1	-0.0232
	(0.0152)
Rain, t	0.0039
	(0.0027)
Rain, t-1	0.0113
	(0.0136)
Rain, t-2	0.0026
	(0.0052)
Rain, t-3	0.0042**
	(0.0020)
Income, t-1	0.2720***
	(0.0692)
Loan, t-1	0.0041*
	(0.0022)
Population, t-1	0.2174***
	(0.0731)
N	34,361
Mean of Dep. Var	11.7310

Notes: Dependent variable measures the average insurance coverage (US$) per policy holder and is log transformed. In parenthesis are standard errors clustered by congressional district. All the specifications include both the year and county fixed effects.
* $p<0.1$; ** $p<0.05$; *** $p<0.01$.

Table A6. FE IV model (weighted by population)

	ln_policy	ln_coverage	ln_premium	ln_take_up
ln_PA, t-1	-0.1310***	-0.1190***	-0.1068***	-0.1321***
	(0.0271)	(0.0264)	(0.0244)	(0.0273)
ln_IA, t-1	0.0874***	0.0641**	0.0371	0.0881***
	(0.0329)	(0.0316)	(0.0293)	(0.0332)
Rain, t	0.0163***	0.0197***	0.0207***	0.0164***
	(0.0057)	(0.0055)	(0.0051)	(0.0057)
Rain, t-1	0.1053***	0.1157***	0.1248***	0.1063***
	(0.0250)	(0.0243)	(0.0227)	(0.0252)
Rain, t-2	0.0473***	0.0496***	0.0501***	0.0473***
	(0.0093)	(0.0090)	(0.0084)	(0.0093)
Rain, t-3	-0.0055	-0.0011	-0.0016	-0.0057
	(0.0046)	(0.0045)	(0.0042)	(0.0047)
Income, t-1	0.6427***	0.9093***	0.6010***	0.6042***
	(0.0872)	(0.0900)	(0.0827)	(0.0879)
Loan, t-1	0.0074	0.0109**	0.0073*	0.0071
	(0.0046)	(0.0045)	(0.0041)	(0.0046)
Population, t-1	0.7352***	0.9347***	0.7698***	-0.2077**
	(0.1022)	(0.1001)	(0.0919)	(0.1032)
N	34,361	34,361	34,361	34,361
Hansen J-statistics	0.2	2.32	2.37	0.19
First stage F-statistics, PA	17.53	17.53	17.53	17.53
First stage F-statistics, IA	15.56	15.56	15.56	15.56

Notes: In parenthesis are standard errors clustered at the congressional district level. All the specifications include both the year and county fixed effects. * $p<0.1$; ** $p<0.05$; *** $p<0.01$.