

Online Resource 1 for “Flood Exposure, Assessed Losses, and Resale Prices: Evidence from Florida”

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Anonymized supplementary material

A One parcel identity across tax rolls

The problem. The rolls and sale files of the Florida Department of Revenue identify a parcel by a county number and a parcel identifier. The identifier is a character string that each county writes in its own format, and the format is not constant over time. In 35 counties the identifier of the same parcel is written with hyphens or blanks on some rolls and without them on others, and in Orange and Pasco counties the section and range digits at the head of the identifier changed places. A key formed from the string as it stands on each roll treats the two spellings as two parcels. Sales of one home before and after the respelling are then never paired, the change in assessed value between the two rolls around the respelling is missing, and in the population at risk the home appears not to have been resold. Among the parcels of the study that link to the statewide cadastral layer, 16.5 percent carried two such keys.

The rule. The identity of a parcel is its county number, read as an integer, and its identifier reduced to letters and digits in upper case. For a county and roll year in which the share of residential identifiers that match an identifier of the cadastral layer is at least 20 percent after the first and third pairs of characters are exchanged, and at least 10 percentage points higher than before the exchange, the exchange is applied to every identifier of that county and year. This holds in 38 county-years: Orange County on the rolls of 2002 to 2023 and Pasco County on the rolls of 2002 to 2017 (Table A1, panel A). An identifier in a sale file is treated like the identifiers of the roll of its assessment year. The key is a hash of the county number and the reduced identifier. The rule is applied when the rolls and sale files are first read (`code/windows_build/parcel_key.py`), so every later file inherits it: the compact rolls, the sales and pairs, the roll-to-roll changes in improvement value, the flood events and their parcel counts, the population at risk, and the link to the cadastral layer.

What the rule does and does not join. Panel B of Table A1 counts, for every county and pair of consecutive rolls, the residential parcels whose key is found on the next roll. With the key of each roll, 4,595,515 parcel-years (2.78 percent) do not keep their key; with one identity per parcel 1,945,042 (1.17 percent) do not, a number that includes demolitions,

splits and mergers of parcels. No parcel linked to the cadastral layer carries two keys any longer. Panel C lists the counties joined by the rule and the counties in which a roll replaced the identifiers by numbers with no relation to the earlier ones. The rule cannot join those: the earlier number of such a parcel is not in the cadastral layer, and the parcel keeps two identities. As before, a flood in a county and year in which fewer than 70 percent of parcels can be followed to the roll that fixes the geography has no parcel count dated before it and classes no home (Section B).

Effect on the files and the estimates. Every file of the study was rebuilt from the rolls with the rule. Every estimate in the paper and in this Online Resource uses the rebuilt files, and no estimate of an earlier build is carried over. Table A2 sets the main counts and estimates of the paper beside those obtained with the key of each roll. The pair file grows from 2,681,503 to 2,992,632 pairs and the population at risk after a heavy flood from 145,249 to 148,606 homes. The share of homes at risk that are resold after the flood rises from 19.4 to 20.2 percent, because a resale after a respelling is now attached to the home. The comparison of the flag with depth is unchanged to the first decimal. The discount on homes with 1 ft of water or more moves from -5.63 to -5.34 log points in all sales and from -4.40 to -3.70 in sales dated in $S + 2$ or later. No estimate of the table moves by more than 0.43 of its standard error, and two intervals change sides. The interval for sales in $S + 2$ or later, -8.30 to -0.49 under the earlier key, is now -7.73 to 0.33 and includes zero; the paper reports it as such. The interval within block group and flood for all sales, -8.15 to 0.10 before, is now -7.55 to -0.48 and excludes zero. The selection bounds, the area comparison and the estimates for the assessment flag keep their sign, size and precision. Panel A of the table gives two counts of pairs: those that meet the sample conditions of Section 2.1 of the paper, and the regression sample, the pairs among them that share a tract, purchase-year and resale-year cell with another pair. The measures of water and damage are properties of a location; they were not recomputed and are attached to the cadastral parcel, so a difference between the two columns comes from the identity of the parcel alone.

Table A1: Parcel identifiers across rolls: the exchange of section and range digits, and parcels that keep their key

<i>A. County and roll years in which the section and range digits are exchanged</i>			
County	Rolls	Identifiers matching the layer (%)	
		as they stand	after the exchange
Orange	2002–2023	3.1	97.4
Pasco	2002–2017	2.6	99.0
All other county-years (1,570)	2002–2025	90.2	2.1
<i>B. Residential parcels that keep their key into the next roll, 2002 to 2024</i>			
	Number	Key of each roll	One identity
County-years	1,541		
fewer than 90 percent of parcels keep their key		58	16
fewer than 70 percent of parcels keep their key		51	10
fewer than 50 percent of parcels keep their key		49	10
Parcel-years	165,565,054		
not keeping their key		4,595,515	1,945,042
share (%)		2.78	1.17
<i>C. Counties with a respelled identifier (first roll in the new spelling)</i>			
Joined by the rule: Alachua (2015); Baker (2014, 2019); Bay (2025); Bradford (2021); Brevard (2015); Calhoun (2022); Columbia (2021); DeSoto (2020); Flagler (2005); Franklin (2022); Gilchrist (2021); Glades (2020); Gulf (2022); Hamilton (2021); Hardee (2007, 2021); Holmes (2024); Jackson (2023); Lake (2008, 2022); Liberty (2023); Madison (2021); Martin (2021); Nassau (2023); Okaloosa (2024); Okeechobee (2020); Orange (2024); Osceola (2012); Pasco (2018); Pinellas (2008); Putnam (2009); St. Johns (2005, 2007); Sarasota (2013); Union (2022); Wakulla (2024); Walton (2022); Washington (2022).			
Not joined, identifier replaced by an unrelated number: Charlotte (2008); Collier (2004); Duval (2007); Escambia (2008); Highlands (2008); Levy (2009); Martin (2003); Taylor (2015); Volusia (2008, 2018).			

Notes: Panel A: residential parcels of the county and rolls named; an identifier is reduced to its letters and digits and compared with the identifiers of the statewide cadastral layer of the same county, as it stands and after the first and third pairs of characters are exchanged; shares are weighted by parcels. The exchange is applied where the share after the exchange is at least 20 percent and at least 10 points above the share before it. Panel B: residential parcels (land uses 001 to 009) on the rolls of 2002 to 2024 whose key is found on the next roll, by county and year. Key of each roll: a hash of the county number and the identifier as spelled on the roll. One identity: the rule of Section A. Panel C: counties with a pair of rolls on which fewer than half of the parcels keep the key of each roll; a county is joined if at least 90 percent keep their identity under the rule.

Table A2: Main counts and estimates with the key of each roll and with one identity per parcel

	Key of each roll	One identity	Change
<i>A. Files</i>			
Pairs of sales	2,681,503	2,992,632	+11.6%
meeting the sample conditions	2,614,189	2,919,043	+11.7%
in the regression sample	2,338,214	2,616,077	+11.9%
flagged in a heavy flood	2,664	2,786	+4.6%
Homes at risk after a heavy flood	145,249	148,606	+2.3%
flagged	18,330	18,687	+1.9%
resold after the flood	28,240	29,967	+6.1%
Linked parcels with two keys (%)	16.5	0.0	-16.5
<i>B. The flag against depth</i>			
Homes at risk with depth known	109,944	112,301	+2.1%
Homes with 1 ft or more and no flag (%)	78.5	78.5	-0.0
Flagged homes with no modeled water (%)	17.5	17.5	+0.1
Flag at 3 ft or more, within block group and flood (points)	16.4 (5.1)	16.1 (4.9)	-0.3
<i>C. Resale prices, 1 ft of water or more (log points)</i>			
Tract peers, all sales	-5.63 (1.80) [-9.23, -2.02]	-5.34 (1.83) [-8.99, -1.69]	+0.29
Tract peers, sales in $S + 2$ or later	-4.40 (1.96) [-8.30, -0.49]	-3.70 (2.02) [-7.73, 0.33]	+0.70 includes zero
Within block group and flood, all sales	-4.02 (2.07) [-8.15, 0.10]	-4.02 (1.77) [-7.55, -0.48]	+0.00 excludes zero
Within block group and flood, $S + 2$ or later	-3.78 (1.91) [-7.59, 0.03]	-3.09 (1.59) [-6.26, 0.08]	+0.69
Leaving one storm out, range	[-6.34, -5.11]	[-6.37, -4.73]	
Pairs with 1 ft or more	5,476	5,719	+4.4%
<i>D. Selection bounds, cells 10–90 percent inundated (log points)</i>			
Difference in means	-3.72 (1.70)	-3.82 (1.51)	-0.10
Bounds, higher resale	[-9.34, 2.26]	[-9.27, 1.86]	
Interval of the bounds	[-14.45, 5.13]	[-13.83, 4.63]	
<i>E. Homes with no water in inundated block groups (log points)</i>			
Threshold 10 percent	-1.98 (1.03)	-2.01 (1.02)	-0.03
wild-bootstrap p	0.11	0.092	
leaving one storm out, range	[-2.28, -1.45]	[-2.27, -1.64]	
Threshold 25 percent	-3.82 (1.27)	-3.73 (1.24)	+0.09
wild-bootstrap p	0.011	0.007	
leaving one storm out, range	[-4.00, -3.67]	[-4.11, -3.56]	
<i>F. Assessment flag and mortgage aggregates</i>			
Flagged homes, all sales (log points)	-9.15 (2.20)	-9.08 (2.18)	+0.07
Flagged homes, sales in $S + 2$ or later	-4.55 (1.57)	-4.33 (1.60)	+0.22
Origination-to-sales gap index (points)	3.02 (1.48)	3.26 (1.41)	+0.24

Notes: Key of each roll: the files and estimates of the build of 6 October 2026, in which the parcel key was a hash of the identifier as spelled on each roll; stored with the replication files and not re-estimated. One identity per parcel: this build, on which every table of the paper and of this Online Resource rests. Estimates are followed by standard errors in parentheses and 95 percent intervals in brackets, as defined in the tables of the paper; “range” is the smallest and largest estimate when one storm is left out. Change: the difference of the estimates, the percent change of a count, or a note where an interval changes whether it includes zero.

B Data construction

The extraction reads, from each county file in the Department of Revenue’s yearly archives, only the parcel identifier, county, assessment year, land use, just value, land value, construction fields, actual and effective year built, living area, unit counts, new-construction value, census block, physical ZIP code and the sale fields. Owner, mailing-address, physical-address and legal-description fields are never read, and the parcel identifier is replaced by the hashed key of Section A before any merge. Rolls are restricted to residential land uses 001 to 009.

The sale files for roll years 2009 to 2025 give 23,451,635 records of improved single-family homes and condominiums and 14,777,056 unique sales. The qualification code is missing for all sales in the 2009 file; sales dated 2009 reappear in the 2010 file with codes. The roll sale fields for 2002 to 2009 carry prices, dates and flags but no qualification codes; together with the 2008-dated sales of the 2009 file they give 7,051,430 sales dated 2001 to 2008, of which 4,509,623 pass a screen: an improved single-parcel sale without a change code and with a price between 0.5 and 3 times just value. On coded sales of 2010 to 2016 the screen retains 97.2 percent of qualified sales, and 68.5 percent of the sales it retains are qualified. There are 4,790,587 consecutive pairs of qualified or screened sales, 4,407,240 after the holding-period, land-use and price-change filters, and 4,339,597 with a block group.

The block groups of the claims file match the block groups on the rolls best on the roll of 2022, and I use that roll’s block group for every parcel and every year, including the block-group medians of the write-down measure. Residential parcels per block group, for the 1 and 5 percent thresholds, are counted on the roll of 1 January of the year before the flood, for floods of 2003 and later (2002 is the first roll): parcels of that roll are placed in the block groups of the reference roll through the parcel key. In a county and roll year in which fewer than 70 percent of parcels link to the reference rolls, because the county renumbered its parcels, and in a block group whose count on the earlier roll exceeds 1.5 times its count on the reference roll, no pre-flood count is available; 39 of 1,608 county-years are in the first case. Floods without a pre-flood count, and floods before 2003, count as flood history, and a pair with such a flood between its sales is dropped (15,123 pairs), so that every flood that can class a home has a parcel count dated before it. Claims with a date of loss before 2000 come from the OpenFEMA claims data retrieved in September 2026. Named storms are keyed by name and year, because some storm names recur.

Table A3 reconciles the population at risk of resale with the pairs of the price sample. The population file has one row for every single-family parcel in a block group with a heavy flood, by flood year: 472,738 rows for 381,837 parcels. It carries two classifications. An earlier one has a row for every heavy flood year of the block group and flags a home relative to the

block-group median over single-family homes and condominiums. The common definition, used in the paper, classes a home once in each holding period, at the first qualifying flood of its block group after its last eligible sale, and flags it relative to the block-group median over all parcels, the rule under which pairs of sales are classed. Panel B gives a reason code for every home that the two classifications class differently. Table A4 gives the flagged homes and pairs by flood year; the floods of 2022 and 2024 supply 81 percent of the flagged homes at risk.

Table A3: Reconciliation of the population at risk with the price and selection samples

	Earlier parcel-event classification	Common definition
<i>A. From flagged homes at risk to the price and selection samples</i>		
Flagged homes at risk of resale	32,765	18,687
resold after the flood	4,118	2,849
resale passes the pair filters	4,049	2,809
pair in the single-family pair file	3,918	2,786
write-down dated after the year of the first sale	3,892	2,786
in a cell with at least two pairs	3,030	2,261
with an unflagged peer in the cell (selection sample)	2,782	2,042
of which a heavy-event flag in the pair file	1,891	2,042
Unflagged homes at risk of resale	206,206	129,919
with an unflagged peer in the cell (selection sample)	28,785	21,596
<i>B. Reason codes of the 891 selected homes classed differently by the pair file</i>		
R1 An earlier, smaller flood opens the holding period; flagged there	47	smaller-flood flag
R2 An earlier heavy flood opens the holding period; not flagged there	289	unflagged, earlier flood
R3 An earlier, smaller flood opens the holding period; not flagged there	489	not in the population
R4 Same flood; decline under 0.2 against the all-parcel median	66	unflagged
Without a reason code	0	
<i>C. The 2,918 heavy-event flagged pairs of the pair file</i>		
Written down and in the population at risk (common flag)		2,786
Disaster change code without a write-down; home unflagged and at risk		107
Disaster change code without a write-down; home not in the population		5
Written down; not single-family on the roll of the flood year or the next		20
<i>D. Pairs with the common flag in each analysis</i>		
In a cell with at least two pairs		2,261
Aligned regression sample (claims-rate measure defined)		2,240
With an unflagged peer in the cell (selection sample)		2,042

Notes: Unit: a single-family parcel in a block group with a heavy flood, by flood year. At risk of resale: an eligible sale before 1 January of the flood year and none between that date and the flood. Earlier parcel-event classification: a row for every heavy flood year of the block group; flag by the change in log improvement value relative to the block-group median over single-family homes and condominiums. Common definition: the first qualifying flood of the block group after the home's last eligible sale; flag relative to the block-group median of all parcels. Pair filters: holding period, price and price-change screens of Section 2.1 of the paper. A cell is a tract, a first-sale year and a second-sale year; a peer is a pair of a home not written down in the same cell. Panel C: the pairs classed as flagged in a heavy flood by the pair file, including pairs that carry a disaster change code without a write-down; those keep an indicator of their own in the regressions and are not part of the flag.

Table A4: Flagged homes at risk and flagged pairs by flood year

Flood year	Flagged homes at risk	Share (percent)	Resold with an unflagged peer	Flagged pairs, aligned regression sample
2003	4	0.0	3	3
2004	506	2.7	242	267
2005	619	3.3	292	321
2008	5	0.0	2	2
2009	30	0.2	10	8
2011	38	0.2	9	12
2012	8	0.0	3	3
2014	4	0.0	2	2
2016	419	2.2	155	173
2017	592	3.2	178	182
2018	883	4.7	260	285
2019	4	0.0	1	1
2020	138	0.7	37	37
2022	8,055	43.1	537	594
2023	361	1.9	57	61
2024	7,021	37.6	254	289
All years	18,687	100.0	2,042	2,240

Notes: Common definition of Section 2.2 of the paper. Resold with an unflagged peer: the home is resold in a pair of the price sample whose cell holds a pair of a home not written down. Last column: flagged pairs of the regression sample.

C Independent measures: sources, linkage and checks

Sources. Table A5 gives the coverage of the independent measures by flood, and Table A7 lists every file retrieved for them: 59 files, retrieved on 6 and 7 October 2026, with the host, the number of records and the first twelve characters of the SHA-256 hash; the replication files hold the full addresses and hashes. Not found: a modeled depth grid for Hurricane Michael, for which the high-water-mark surface is the substitute; depth grids of FEMA for Hurricanes Ian, Idalia, Helene and Milton, for which the RIFT and ICEYE products are used; a state damage survey for Hurricane Helene, whose public layer is empty; and permit histories for unincorporated Lee County, for Collier, Sarasota and Pinellas counties outside the City of St. Petersburg, for the cities of Tampa, Fort Myers and Naples, and for Manatee, Broward, Palm Beach and Bay counties. No parcel-level damage layer produced by a property appraiser was found, so every field record comes from emergency-management, building or search-and-rescue staff. Several retrieved files are listed and not used: the storm-surge polygons of the National Hurricane Center for Idalia, the substantial-damage estimates of Lee County, whose inspections date from late 2024, the FEMA geospatial damage assessments, which are

modeled for Irma and record wind for Michael, the RIFT raster for Debby, which reaches no home at risk, and the permit layer of Charlotte County, which holds new construction only.

Linkage. The reduced parcel identifier of Section A is matched to the identifier of the statewide cadastral layer within the county. Table A6 gives the linkage and the coverage of the depth sources for the thirty largest groups of homes at risk by flood and county. For the homes at risk in heavy floods the share linked is 99.6 percent. Measures joined by location are attached to the cadastral parcel.

Checks of the depth sources. Table A8 compares each depth source with the height of water above ground at the surveyed high-water marks of the U.S. Geological Survey. The RIFT hindcast for Ian is ordered like the surveyed heights and too deep in level. The FEMA grids for Irma show no water at more than half of the marks inside their extent and have no correlation with the surveyed heights overall; at coastal marks the correlation is 0.26. The surface for Michael is evaluated by leaving out each mark in turn; the median absolute error is 0.73 ft. Table A9 compares, across ZIP codes, the share of parcels with 1 ft of water or more with the share of owner-occupied houses registered for individual assistance that report flood damage. The correlations lie between 0.51 and 0.91. Table A10 describes the permit sources. Table A11 records a second search for permit histories on 7 October 2026: 9 county and city sources, two attempts each, of which the City of St. Petersburg alone held dated repair permits that could be linked to a parcel; the search by geographic extent also returned the building permits of the City of Miami. The City of St. Petersburg publishes its residential renovation applications with a location; the year of an application is read from its link to the city’s permit system and the month from the application number. The City of Miami publishes building permits with a folio, but its linked records are sparse before mid-2018, so they begin after Irma, and no home at risk in a later flood with a depth source lies in the block groups that the source covers.

Table A7: Files retrieved for the independent measures

Source	Host	Retrieved	Records	SHA-256
City of Port Orange, Hurricane Ian damage addresses, layer 0 (Hurricane_Ian_Damage_Addresses)	services1.arcgis.com	2026-10-06	27,912	d001e8b66de2
FEMA Historical Geospatial Damage Assessment Database (FL)	services.arcgis.com	2026-10-06	98,021	e482bfd7c04a
Fort Myers Beach initial damage assessments, layer 0 (Commercial)	services.arcgis.com	2026-10-06	234	99de785423d3
Fort Myers Beach initial damage assessments, layer 1 (Residential)	services.arcgis.com	2026-10-06	2,964	8fa6e746a98d
HydroShare Irma: DR4337_FL_-_Observed_Flood_Extent.shp.zip	www.hydroshare.org	2026-10-06	–	bd23d714c2e5

Source	Host	Retrieved	Records	SHA-256
HydroShare Irma: FEMA_Damage_Assessments_Irma_Public.20170914.zip	www.hydroshare.org	2026-10-06	–	67c041953b42
HydroShare Irma: FEMA_Modeled_Preliminary_Observed.20170911.zip	www.hydroshare.org	2026-10-06	–	f5138ecc1220
HydroShare Irma: FEMA_Modeled_Preliminary_Observed.20170912.zip	www.hydroshare.org	2026-10-06	–	5ea1680ebe0d
HydroShare Irma: FEMA_Modeled_Preliminary_Observed.20170913.zip	www.hydroshare.org	2026-10-06	–	be7f1f2821d4
HydroShare Irma: FEMA_Modeled_Preliminary_Observed.20170913.2.zip	www.hydroshare.org	2026-10-06	–	8ba175faf40a
ICEYE building flood-depth statistics iceye_helene_bldg	services5.arcgis.com	2026-10-06	177,215	63b38a9b4fdb
ICEYE building flood-depth statistics iceye_milton_bldg	services5.arcgis.com	2026-10-06	185,037	624152bd890a
Lee County building footprints, layer 0 (Building Footprints)	services2.arcgis.com	2026-10-06	360,217	02c5cf02e095
Lee County damage inventory, layer 0 (DamageInventory)	services2.arcgis.com	2026-10-06	341	584cf2cc8d7e
Lee County substantial-damage estimates, layer 0 (Substantial_Damage_Estimate)	services2.arcgis.com	2026-10-06	2,974	8a48ef531dff
NHC storm surge inundation estimate, Idalia (FEMA)	services.arcgis.com	2026-10-06	18	b037d606a461
OpenFEMA HousingAssistanceOwners (FL)	www.fema.gov	2026-10-06	22,626	78b9abe7ed88
OpenFEMA HousingAssistanceRenters (FL)	www.fema.gov	2026-10-06	25,629	edb114ed755c
Peace River inundation parcels, layer 10 (Peace_River_Parcels_SpatialJ)	services.arcgis.com	2026-10-06	5,806	fb59897d87dc
Search-and-rescue (SARCOP) damage observations, Hurricane Debby, layer 1 (20240807_SARCOP_Export_Damage_Observ	services.arcgis.com	2026-10-06	11,728	cd3bf03ce291
USGS STN high-water marks (FL)	stn.wim.usgs.gov	2026-10-06	1,526	93eeaa6cade4
Cape Coral residential building permits (Lee County GIS item, March 2025)	services2.arcgis.com	2026-10-07	2,192	a528b5f2775d
Charlotte County building permits	agis3.charlottecountyfl.gov	2026-10-07	106,967	2d0ea0a2f219
City of Cape Coral permits, layer 1 Building Permits	capeims.capecoral.gov	2026-10-07	65,387	b43e17b58a19
City of Miami building permits since 2014	services1.arcgis.com	2026-10-07	233,906	8897648cb450
City of Orlando permit applications (Socrata ryhf-m453)	data.cityoforlando.net	2026-10-07	1,111,255	d139162d9699
City of St. Petersburg residential permits, layer 2 (new single-family homes)	egis.stpete.org	2026-10-07	46,401	a9f7ef494669
City of St. Petersburg residential permits, layer 3 (renovation and alteration)	egis.stpete.org	2026-10-07	86,918	b6186b7f6fb6
FDEM Broward.2023.Flooding_IA_Survey_view layer 0 (Broward_Flooding_IA_Survey)	services.arcgis.com	2026-10-07	1,092	9c439002e8a5
FDEM Helene and Milton damaged homes by block group	services.arcgis.com	2026-10-07	5,044	d958e44303d6
FDEM High_Water_Marks_Ian layer 0 (HWMs_Ian_USGS)	services.arcgis.com	2026-10-07	177	f53d25b3770f
FDEM Hurricane_Debby_-_IA.Initial.Damage_Assessment_view layer 0 (Individual Assistance Survey (V4.0))	services.arcgis.com	2026-10-07	257	12f4dc6b3bfc
FDEM Hurricane_Idalia_IA_QuickCapture_View layer 0 (Local IA Windshield Template)	services.arcgis.com	2026-10-07	1,431	517a409685dc

Source	Host	Retrieved	Records	SHA-256
FDEM Hurricane.Idalia.IA.Survey.view layer 0 (Hurricane.Idalia.IA.Survey)	services.arcgis.com	2026-10-07	225	1f978b744d13
FDEM Hurricane.Idalia.QuickCapture.IA.Windshield.1 layer 0 (October 2023 Tornadoes IA/SBA Assessments)	services.arcgis.com	2026-10-07	1,632	f70dede97059
FDEM IA.IDA.Fix layer 0 (Individual Assistance Surve.0)	services.arcgis.com	2026-10-07	186	8fffc2035f35
FDEM IA.In.person.Assessments.5.20.24.WFL1 layer 0 (Lee Schedule)	services.arcgis.com	2026-10-07	33	49a85ad4319e
FDEM IA.In.person.Assessments.5.20.24.WFL1 layer 1 (Dillon Schedule)	services.arcgis.com	2026-10-07	24	2aa0500e2f1c
FDEM IA.PA.Windshield.Assessment.Milton.view layer 0 (PA.Windshield.Assessment.FDEM)	services.arcgis.com	2026-10-07	1	85bec49947b2
FDEM Milton.IA.Initial.Damage.Assessments.view layer 0 (Individual Assistance Survey (V4.0))	services.arcgis.com	2026-10-07	23	acc5ce75c1c9
FDEM October.2023.Tornadoes.IA.and.SBA.Assessments.view layer 0 (October 2023 Tornadoes IA/SBA Assessments)	services.arcgis.com	2026-10-07	1,632	d36a1777fae4
FDEM State.IA.PDAs.-.Ian.view layer 0 (State.IA.PDAs...Ian)	services.arcgis.com	2026-10-07	186	d4121fdd5361
Florida Department of Revenue statewide cadastral layer: object ids, parcel identifiers and centroids	services9.arcgis.com	2026-10-07	10,950,718	87beb5e6035c
Hillsborough County Accela permits, layer 0 GIS.Dashboard.Issued.CO.Merged	services.arcgis.com	2026-10-07	111,850	1f61551bb6eb
Hillsborough County Accela permits, layer 3 GIS.Dashboard.CO.20211028	services.arcgis.com	2026-10-07	36,059	0b77dfccea8d
Hillsborough County Accela permits, layer 4 GIS.Dashboard.Issued.20211028	services.arcgis.com	2026-10-07	75,791	0d595928f1bf
Hillsborough County Accela permits, layer 6 Subdivisions	services.arcgis.com	2026-10-07	10,907	7d2e47bc0821
Miami-Dade building permits (item detail)	services5.arcgis.com	2026-10-07	262,965	4da906fd7694
Miami-Dade permit data (MDPublisher)	services.arcgis.com	2026-10-07	139,386	4352a16f6c7f
New permits after 2021, Lee, Manatee, Sarasota, Charlotte (Auburn University user)	services.arcgis.com	2026-10-07	13,543	10ca87639568
OpenFEMA DisasterDeclarationsSummaries (FL)	www.fema.gov	2026-10-07	188	69d9c9b349f2
OpenFEMA IHP valid registrations v2, Florida rows (API, by disaster)	www.fema.gov	2026-10-07	7,222,635	631b6a516fe4
PNNL RIFT maximum flood depth, debby (RIFT20240807.12z.imagery)	tiledimageservices3.arcgis.com	2026-10-07	297	64a11159ac3c
PNNL RIFT maximum flood depth, helene (RIFT20241002.hindcast.imagery)	tiledimageservices3.arcgis.com	2026-10-07	912	2139c5c95700
PNNL RIFT maximum flood depth, ian (RIFT.hindcast.Ian.imagery)	tiledimageservices3.arcgis.com	2026-10-07	903	bea60aa96feb
PNNL RIFT maximum flood depth, idalia (RIFT20230831.hindcast.imagery)	tiledimageservices3.arcgis.com	2026-10-07	1,968	ab413645cbe4
PNNL RIFT maximum flood depth, milton (RIFT20241009.12z.imagery)	tiledimageservices3.arcgis.com	2026-10-07	1,764	08ba7bb2e75a
USGS 3DEP elevation samples (michael.hwm)	elevation.nationalmap.gov	2026-10-07	503	34d052eaf1d6
USGS 3DEP elevation samples (michael.parcels)	elevation.nationalmap.gov	2026-10-07	21,127	0d73d54b137c

Table A5: Independent measures of water and damage: coverage and linkage

Flood	Independent measure	Homes at risk	Linked to a centroid (%)	Depth known (%)	Assessment flag	Field assessment
Irma 2017	FEMA modeled depth grids (coastal), 7.6 m	12,442	99.8	91.9	583	–
Michael 2018	USGS high-water marks less 3DEP ground	4,701	99.7	75.5	883	–
Ian 2022	PNNL RIFT hindcast, 60 m	44,728	99.9	99.9	8,049	543
Idalia 2023	PNNL RIFT hindcast, 60 m	4,960	99.9	99.9	273	160
Helene 2024	ICEYE building depth; RIFT elsewhere	42,083	100.0	100.0	6,732	–
Milton 2024	ICEYE building depth; RIFT elsewhere	5,601	100.0	100.0	219	–
Debby 2024	field assessments only	1,250	100.0	–	65	415
April 2023 flood	field assessments only	3,939	100.0	–	88	95
Other heavy floods, 2003–2024	none	28,902	98.3	–	1,795	–
All heavy floods		148,606	99.6	75.6	18,687	1,213
Floods with a depth source		114,515	99.9	98.1	16,739	703
<i>Pairs meeting the sample conditions, with a heavy flood between the sales</i>						
All heavy floods		29,541	99.5	46.7	2,783	
Floods with a depth source		14,700		93.8	1,745	

Notes: Homes at risk: single-family homes at risk of resale after a heavy flood under the common definition, by the flood that classes the home. Linked: the parcel identifier matches a parcel of the statewide cadastral layer, whose centroid locates the home. Depth known: the home is linked and lies inside the extent of the storm’s depth source (Irma: the eleven counties of the FEMA grids; Michael: within 5 km of a surveyed high-water mark; Helene and Milton: the ICEYE building depth where ICEYE mapped the county, the RIFT class elsewhere). Field assessment: an inspection record within 40 m of the parcel centroid. Lower panel: pairs that meet the sample conditions of Section 2.1 of the paper, before the pairs that are alone in their cell are set aside.

Notes: Source: the name of the layer or file as published. Host: the server of the request; the full address of every request is in the retrieval log of the replication files and in `SOURCES.txt`. Retrieved: date of the request (UTC). Records: features, rows or raster tiles received; a dash where the file is an archive. SHA-256: the first twelve characters of the hash of the file as stored.

Table A6: Linkage and coverage by flood and county: the thirty largest groups of homes at risk

Flood	County	Homes at risk	Linked (%)	Depth known (%)	Flagged	Field assessment	Resold
Ian 2022	Lee	30,833	99.9	99.9	6,732	543	3,611
Helene 2024	Pinellas	20,044	100.0	100.0	4,687	–	961
Helene 2024	Hillsborough	10,698	100.0	100.0	692	–	502
Irma 2017	Monroe	7,133	99.9	99.9	439	–	2,646
Ian 2022	Volusia	4,078	100.0	100.0	131	–	620
April Florida Flooding 2023	Broward	3,939	100.0	–	88	95	550
Helene 2024	Manatee	3,918	99.9	99.9	298	–	215
Ian 2022	Collier	3,510	100.0	100.0	658	–	420
Helene 2024	Sarasota	3,446	100.0	100.0	431	–	168
Ian 2022	Charlotte	2,996	100.0	100.0	355	–	375
Helene 2024	Pasco	2,878	100.0	100.0	424	–	179
Michael 2018	Bay	2,572	99.5	56.0	486	–	1,017
Milton 2024	Hillsborough	2,546	100.0	100.0	38	–	88
Irma 2017	Miami-Dade	1,910	99.9	99.9	72	–	764
Milton 2024	Pinellas	1,774	100.0	100.0	140	–	77
Michael 2018	Gulf	1,664	99.9	98.9	361	–	633
Idalia 2023	Pinellas	1,648	99.9	99.9	195	89	173
Ian 2022	Orange	1,398	99.7	99.7	1	–	141
Idalia 2023	Pasco	1,340	100.0	100.0	11	62	230
Debby 2024	Sarasota	1,250	100.0	–	65	415	55
Irma 2017	Collier	1,177	99.8	99.7	32	–	387
Irma 2017	Duval	920	99.3	99.3	12	–	411
Idalia 2023	Citrus	902	99.8	99.8	53	–	127
Helene 2024	Charlotte	629	100.0	100.0	77	–	26
Milton 2024	Volusia	561	100.0	100.0	19	–	18
Idalia 2023	Hernando	558	100.0	100.0	0	2	96
Ian 2022	St. Johns	515	100.0	100.0	121	–	92
Milton 2024	Hernando	405	100.0	100.0	0	–	13
Ian 2022	Monroe	404	100.0	100.0	1	–	61
Helene 2024	Lee	389	100.0	100.0	118	–	10

Notes: Homes at risk under the common definition, by the flood that classes the home and the county. Linked: the parcel is matched to a centroid of the statewide cadastral layer. Depth known: linked and inside the extent of the storm’s depth source. Field assessment: homes with an inspection record. Resold: homes resold after the flood.

Table A8: Depth sources against surveyed high-water marks

Storm and depth source	Marks	Height above ground (ft)	Depth of the source (ft)	Source shows no water (%)	Correlation
Irma 2017, FEMA grids	320	2.24	1.39	54	−0.06
coastal	138	1.89	1.87	36	0.26
riverine	182	2.51	1.02	68	−0.19
Ian 2022, RIFT hindcast	343	3.07	8.02	4	0.57
coastal	275	3.46	8.90	4	0.53
riverine	68	1.48	4.47	6	0.46
Helene 2024, RIFT hindcast	5	1.15	4.00	20	0.87
coastal	5	1.15	4.00	20	0.87
Michael 2018, mark surface less ground (leave one out)	467	2.53	3.31	10	0.59

Notes: High-water marks of the U.S. Geological Survey Short-Term Network in Florida with a surveyed height above ground, inside the extent of the depth source. Height above ground: mean over the marks. Depth of the source: mean depth of the source at the marks (class midpoints for RIFT). Coastal and riverine: the environment recorded for the mark. Last row: for each mark, the water surface interpolated from the other marks less the ground elevation of the 3D Elevation Program at the mark.

Table A9: Depth at the parcel and registrations for federal individual assistance, by ZIP code

Storm (disaster)	ZIP codes	Owner-house registrations	With flood damage	Correlation with the share reporting flood damage		Correlation of the flag share with the share reporting damage
				Share with 1 ft or more	(rank)	
Irma 2017 (4337)	270	370,516	9,319	0.73	0.26	0.18 [35]
Michael 2018 (4399)	14	21,781	1,171	0.91	0.75	−0.19 [8]
Ian 2022 (4673)	621	357,787	26,235	0.66	0.56	0.29 [59]
Idalia 2023 (4734)	248	20,344	3,279	0.59	0.52	0.46 [19]
Helene 2024 (4828)	361	113,084	31,331	0.73	0.57	0.41 [77]
Milton 2024 (4834)	787	409,007	14,430	0.51	0.26	−0.06 [26]

Notes: ZIP codes with parcels of the study covered by the storm’s depth source and with registrations of owner-occupied houses in FEMA’s Individuals and Households Program for the disaster. Columns 5 and 6: correlation and rank correlation, across ZIP codes, between the share of covered parcels with 1 ft of water or more and the share of registrations that report flood damage. Last column: correlation between the share of homes at risk that are flagged and the share of registrations that report flood damage, with the number of ZIP codes that hold homes at risk in brackets.

Table A10: Building-permit sources

Source	Link to the parcel	Months covered	Records 2015–2026	Linked (%)	Block groups covered	Declared value
Charlotte County (new residential construction)	identifier, then location	not used	36,409	65	–	no
Hillsborough County (unincorporated; issued permits)	location	2020-05 to 2025-11	75,369	71	397	yes
Miami-Dade County, building permits	identifier, then location	2022-07 to 2025-11	178,441	63	550	yes
Miami-Dade County, permit data	identifier	2024-05 to 2025-11	139,386	48	615	yes
City of Cape Coral	identifier	2024-08 to 2025-11	65,384	68	119	yes
City of Orlando	identifier	2014-08 to 2025-11	426,822	36	140	yes
City of St. Petersburg (renovation and new homes; applications)	location	2014-08 to 2025-11	23,145	97	202	yes
City of Miami, building permits since 2014	identifier, then location	2018-06 to 2025-11	232,249	38	211	yes

Notes: Link: by the parcel identifier where the source carries it, otherwise by the nearest parcel centroid within 30 m of the permit’s location. Months covered: first and last month of the permits linked to parcels of the study. Linked: share of the records dated 2015 to 2026 that match a parcel of the study. Block groups covered: block groups in which at least 5 percent of the linked single-family parcels, and at least 20 parcels, carry a permit of the source. The Charlotte County layer holds new residential construction only and is not used.

Table A11: Search for building-permit histories, 7 October 2026

Source	First attempt	Second attempt	Result
Sarasota County	County open-data site (data-sarco.opendata.arcgis.com) and ArcGIS Online, by keyword: no building-permit layer; a user-compiled layer of new-construction permits after 2021	County map server (ags3.scgov.net), City of North Port server, ArcGIS Online within the county's extent: Gulf-beach setback permits (1,485 records) and state coastal permits only	Not obtained
Charlotte County	County map server and ArcGIS Online: the building-permit layer (106,993 records, 1964 to 2026)	Record types of that layer from 2015 on: new residential and commercial construction, site plans and code enforcement; ArcGIS Online within the county's extent: nothing further	No repair permits; not used, as before
City of St. Petersburg	The city's open-data address (stat.stpete.org) redirects to an information page; ArcGIS Online by keyword: none	City map server (egis.stpete.org): residential permit layers for renovation and alteration (86,918 rows) and new single-family homes (46,401 rows), with a location and the year and month of the application	Obtained: 23,145 applications of 2015 to 2026 linked to a parcel by location
City of Tampa	City open-data site: single-family permits (1,027 records) and construction inspections	City map server (arcgis.tampagov.net): the same layer and current commercial projects (2,589 records); a user-compiled table of permit records without dates	Not obtained: no dated history of residential permits
City of Fort Myers	ArcGIS Online by keyword and the city's open-data address: no permit layer	ArcGIS Online within the city's extent; the city's server addresses tried did not resolve	Not obtained
City of Naples	ArcGIS Online by keyword and the city's open-data address: no permit layer	ArcGIS Online within the city's extent; the city's server addresses tried did not resolve	Not obtained
Collier County	ArcGIS Online by keyword: no county permit layer	The county's ArcGIS Online organization (32 services: utilities, stormwater, planned developments), its hub site, and ArcGIS Online within the county's extent: no permit layer	Not obtained
Pinellas County	County map server (egis.pinellas.gov), Accela folder: address, parcel and inspector-area layers; no permit records	ArcGIS Online within the county's extent: Accela reference services; a layer of substantial-damage estimates after Helene (20,033 points), which records damage and not repair and was not retrieved	Not obtained for the county; the City of St. Petersburg lies in it
Lee County	County open-data hub and the property appraiser's server: no building-permit layer	County map server (gismapservr.leegov.com) and the county's ArcGIS Online organization: a permit layer of 2013 to 2015 (9,034 records) and a snapshot of March 2025 with new residences (9,386 records)	Not obtained: no repair permits after 2015
City of Miami (found in the search by extent)	Found in the ArcGIS Online search by extent: building permits since 2014 (233,906 records) with folio, issue date and scope of work	–	Obtained: 86,995 permits linked; most are dated 2018 or later, after Irma, so the source covers no heavy flood with a depth source

Notes: Each source was tried twice: first through its open-data site and a keyword search of ArcGIS Online, then through the listing of the agency's own map services and a search of ArcGIS Online restricted to the geographic extent of the county or city. Record counts are those returned by the services on the day of the search. The scripts and their logs are in the replication files.

D The assessment flag against the independent measures

Table A12 is the full version of Table 1 of the paper, with every storm and every field source. Table A13 relates the flag to the timing of the home's first resale after the flood, for the floods observed for at least 24 months. Within block group and flood, homes first resold in the flood year or the next differ from homes resold later by -5.6 percentage points (s.e. 3.0) in the share flagged; for Ian the difference is -9.2 points and for the other storms 0.0 (s.e. 1.4).

Table A12: The assessment flag against depth at the parcel and field damage class, by storm

	Homes at risk	Flagged (%), by depth at the parcel				Flagged homes with no water (%)	Homes with 1 ft or more, not flagged (%)
		No water	Under 1 ft	1 to 3 ft	3 ft or more		
<i>A. Share of homes with an assessment flag</i>							
All floods with a depth source	112,301	6.1	16.9	19.2	22.4	17.5	78.5
Ian 2022	44,689	5.5	6.2	9.1	22.7	4.9	79.0
Helene 2024	42,077	6.8	32.1	32.4	26.5	25.9	70.2
Irma 2017	11,433	3.5	7.1	7.0	7.3	43.4	93.0
Michael 2018	3,547	16.5	11.1	18.1	25.6	45.2	77.1
Idalia 2023	4,955	2.9	6.2	6.7	5.7	11.7	93.7
Milton 2024	5,600	3.5	3.9	9.1	6.5	78.5	91.3
Without the floods of 2024	64,624	5.7	6.8	8.6	21.8	10.2	81.0
Without Ian	67,612	6.2	20.3	22.7	21.6	29.5	77.7
<i>B. Flag on depth within the block group and flood (percentage points, relative to homes with no water)</i>							
All floods with a depth source	112,284		10.4 (6.1)	13.3 (6.8)	16.1 (4.9)		
Without the floods of 2024	64,617		2.1 (0.7)	3.5 (1.1)	9.5 (3.6)		
Ian 2022	44,685		2.1 (0.7)	4.5 (1.3)	13.0 (4.6)		
Helene 2024	42,070		20.4 (8.5)	22.6 (9.8)	20.7 (7.2)		
<i>C. Share flagged by field damage class (homes assessed in the field)</i>							
	Homes	Unaffected	Affected	Minor	Major	Destroyed	
Ian 2022 (Fort Myers Beach; state teams)	543	–	50 [10]	45 [141]	65 [342]	76 [50]	
Idalia 2023 (state and local teams)	160	–	–	– [4]	24 [153]	– [3]	
Debby 2024 (search-and-rescue teams)	415	2 [243]	0 [54]	5 [60]	42 [12]	76 [46]	
April 2023 flood, Broward (state teams)	95	–	–	0 [32]	5 [63]	–	
All field assessments	1,213	2 [243]	8 [64]	28 [237]	47 [570]	75 [99]	

Notes: Homes at risk of Table A5 with depth known (panels A and B) or with a field assessment (panel C). Panel B: linear probability regressions of the flag on indicators for the depth bins with an effect for every block group and flood; standard errors clustered by county. Panel C: share flagged, in percent, with the number of homes of the class in brackets; a dash marks a class with fewer than ten homes. Field classes follow the FEMA individual-assistance scale.

Table A13: The assessment flag and the timing of the first resale after the flood

	All floods	Ian 2022	Other floods
<i>A. Share with an assessment flag (%)</i>			
First resale in the flood year or the next	8.1	8.6	7.2
First resale later	12.0	18.0	8.2
Not resold	15.7	18.5	7.4
<i>B. Share with 1 ft of water or more (%)</i>			
First resale in the flood year or the next	65.7	80.6	40.4
First resale later	50.4	78.9	32.6
Not resold	70.3	80.5	41.0
<i>C. Flag on resale timing within the block group and flood (percentage points, relative to homes not resold)</i>			
Early resale	−5.9 (3.1)	−9.2 (2.7)	−0.1 (1.0)
Later resale	−0.3 (0.4)	0.0 (0.6)	−0.1 (0.6)
Early minus later	−5.6 (3.0)	−9.2 (2.4)	0.0 (1.4)
Early minus later, depth bins added	−5.6 (2.9)	−9.1 (2.3)	−0.1 (1.3)
Early minus later, homes with 1 ft or more	−7.4 (3.1)	−10.6 (1.7)	2.3 (1.9)
Early minus later, homes with less water	−1.9 (1.2)	−2.7 (2.8)	−1.6 (1.3)
Homes at risk	64,624	44,689	19,935
first resale early	3,699	2,332	1,367
first resale later	8,060	3,092	4,968

Notes: Homes at risk with depth known, floods observed for at least 24 months. Early: the first resale after the flood is dated in the flood year or the next; later: after that. Panel C: linear probability regressions of the flag on indicators for an early and a later first resale, with an effect for every block group and flood; standard errors clustered by county. Less water: no water or under 1 ft.

E Resale prices by depth: further results

As in the paper, under 1 ft as a depth bin means some water and less than 1 ft, and homes with less water are the homes with no water or under 1 ft. Table A14 is the full version of Table 2 of the paper, with the coded-sale sample and the sample without the floods of 2024. Table A15 gives the depth coefficients by storm and the pooled coefficient when one storm is left out, which stays between -4.73 and -6.37 log points. Table A16 varies the depth source and the threshold. Table A17 applies the depth regression to pairs whose second sale precedes the storm. The coefficient for 1 ft or more is -0.20 log points (s.e. 0.12). For Hurricane Michael it is -5.42 (s.e. 1.45): the homes later inundated by Michael were already appreciating less, and the estimate for that storm in Table A15 should be read with that in mind. Without Michael the pooled coefficient is -4.77 (s.e. 1.96). Table A18 reports the price regressions by field damage class for the few pairs with a field assessment.

Table A19 estimates the flag and the indicator for 1 ft of water or more on the pairs with a known depth, each alone, both together, and in four classes, and Table 3 of the paper interacts both with the timing of the second sale. In later sales the flag alone has a coefficient

of -1.12 log points (s.e. 1.80) and water alone -2.75 (s.e. 1.43). Flagged homes with 1 ft or more sell 7.27 log points below unflagged homes with 1 ft or more (s.e. 3.01). The slope per foot of depth is -1.38 log points in early sales and -0.58 in later ones.

Table A21 concerns resales dated two calendar years or more after the flood. The estimand is that of Table 2 of the paper; the table changes the functional form and the inference. Each foot of depth goes with a price lower by 0.60 log points in sales dated in $S + 2$ or later (s.e. 0.19) and by 0.61 in sales dated in $S + 3$ or later (s.e. 0.24); the wild-bootstrap p -values with county clusters are 0.029 and 0.11. With the square of depth added, neither term is estimated precisely. The coefficient of the indicator for 1 ft or more has a wild-bootstrap p -value of 0.076 in $S + 2$ or later. With storms as clusters, pairs whose flood is one of the storms form one cluster per storm and the other pairs keep their county; inundated homes then lie in 4 clusters in $S + 2$ or later and 3 in $S + 3$ or later, and a bootstrap with so few treated clusters has little power and can also reject too often, so I read these p -values as a check and not as a second test. Table A22 gives the estimates by storm with the pairs behind them. Ian supplies 58 percent of the inundated pairs in $S + 2$ or later; Helene and Milton supply none, because the sale files end in 2025.

Table A23 compares the same homes with homes outside the flooded area. The treated homes are those of block groups with a heavy flood in the storm, and the comparison homes are those of never-inundated block groups of the same county, matched exactly on the tract, the county, the years of the two sales and the decade of construction. Because flooded and never-inundated block groups can differ in price growth, the comparison is the event study of equation (4) of the paper, which measures the price after the storm against the year before it. Homes with 1 ft or more sell 23.87 log points lower in the first 24 months (s.e. 5.71) and 9.71 lower 24 to 59 months after the storm (s.e. 2.75; wild-bootstrap $p = 0.004$), on 2,500 pairs in 14 counties; the coefficient for the years before the storm is 2.03 (s.e. 1.08). Homes with no water in the same block groups sell 4.63 log points lower 24 to 59 months after the storm (s.e. 2.45), so the difference between the two groups is -5.07 (interval -12.13 to 1.98), of the same sign as the estimate against tract peers and less precise. The slope per foot of depth above 1 ft changes sign across the columns of the table and is not informative in this comparison. These estimates are larger than those against tract peers. The tract peers of an inundated home share any loss of the flooded area, and a pair is classed in the paper at the first qualifying flood between its sales, where this comparison follows every home with 1 ft or more in the storm; either difference can account for the larger estimates.

Table A20 gives the incidence of repair permits after the flood. Of the 18,752 homes at risk in block groups covered by a permit source, 8,262 are in unincorporated Hillsborough County and 10,309 in the City of St. Petersburg, and the mean follow-up after the flood is

16 months. A repair permit is issued after the flood for 3.5 percent of homes with no water and 10.4 percent of homes with 3 ft or more, and for 11.5 percent of flagged homes against 4.2 percent of unflagged ones.

Table A24 sets the discount in later resales against three records of repair. The permit comparison has too few pairs for an estimate: 19 inundated pairs with a repair permit before the resale in all sales and 12 in sales dated in $S + 2$ or later; the table gives the counts and shows a coefficient only where a group has 30 pairs or more. The second record is an improvement on the tax roll, which the ledger of the population at risk carries for every home: the first roll from $S + 1$ on with new-construction value, a living area more than 1 percent larger or a later effective year built. A home counts as improved before its resale if that roll is dated 1 January of the resale year or earlier. This is the appraiser's record of work done and not of damage, and it is recorded for 48 percent of the inundated homes and 47 percent of the homes with less water that are resold in $S + 2$ or later. Improved homes sell for more in both groups, by 4.05 log points among inundated homes and by 8.63 among homes with less water; the difference of the two is -4.59 (interval -9.57 to 0.40). An improvement adds value of its own, so these differences are not a return to repair. The third record is the sum of NFIP building payments of the flood in the block group over the block group's single-family parcels with 1 ft or more, with a median of 20,635 dollars per inundated home. Inundated homes of block groups at or above the median sell 1.14 log points higher in later resales than those below it (interval -4.39 to 6.66), and each additional \$10,000 per inundated home goes with a later price higher by 0.27 log points (s.e. 0.13); in all sales that slope is -0.09 (s.e. 0.17). Payments rise with damage as well as with coverage, so their sign is not informative about repair without a measure of the damage itself.

Table A14: Resale prices by depth of water at the parcel: all samples (log points)

	All sales	Later sales	Coded sales	No floods of 2024	No Ian
<i>A. Relative to tract peers, by depth at the parcel in a heavy flood</i>					
No water	-0.41 (1.16)	-0.47 (1.23)	-0.38 (1.22)	-0.29 (1.49)	-0.99 (1.40)
Under 1 ft	-2.19 (1.52)	-1.91 (1.62)	-2.58 (1.88)	-1.80 (1.54)	-3.25 (1.78)
1 to under 3 ft	-3.49 (2.15)	-2.80 (2.10)	-3.19 (1.98)	-2.57 (1.91)	-4.76 (2.85)
3 ft or more	-6.90 (1.56)	-4.58 (2.13)	-5.35 (1.69)	-6.42 (1.64)	-8.67 (2.23)
1 ft or more (one indicator)	-5.34 (1.83)	-3.70 (2.02)	-4.36 (1.82)	-4.76 (1.97)	-6.37 (2.46)
Per foot of depth	-0.98 (0.21)	-0.60 (0.19)	-0.79 (0.16)	-0.94 (0.22)	-1.69 (0.47)
<i>B. Contrasts within heavily exposed block groups</i>					
1 ft or more minus no water	-4.72 (1.79)	-3.12 (1.44)	-3.84 (1.71)	-4.16 (1.94)	-5.33 (2.39)
	[-8.29, -1.15]	[-5.99, -0.25]	[-7.26, -0.42]	[-8.03, -0.30]	[-10.10, -0.56]
3 ft or more minus no water	-6.49 (1.56)	-4.11 (1.42)	-4.97 (1.60)	-6.13 (1.82)	-7.68 (2.26)
	[-9.61, -3.38]	[-6.95, -1.27]	[-8.16, -1.77]	[-9.76, -2.49]	[-12.20, -3.16]
3 ft or more minus 1 to under 3 ft	-3.41 (1.69)	-1.78 (1.68)	-2.15 (1.54)	-3.85 (1.59)	-3.91 (2.19)
	[-6.79, -0.03]	[-5.13, 1.57]	[-5.22, 0.91]	[-7.02, -0.69]	[-8.29, 0.47]
<i>C. Within the block group and flood, with decade of construction (relative to homes with no water)</i>					
Under 1 ft	-2.61 (0.90)	-1.78 (0.85)	-3.15 (1.39)	-1.79 (0.64)	-2.59 (1.10)
1 ft or more	-4.02 (1.77)	-3.09 (1.59)	-2.68 (1.37)	-3.09 (1.97)	-4.69 (2.19)
1 to under 3 ft	-3.21 (1.76)	-2.83 (1.45)	-2.53 (1.55)	-2.22 (1.66)	-3.60 (2.16)
3 ft or more	-5.39 (2.03)	-3.59 (2.19)	-2.93 (1.45)	-4.65 (2.51)	-6.55 (2.39)
Per foot of depth	-0.90 (0.31)	-0.59 (0.34)	-0.48 (0.18)	-0.83 (0.34)	-1.43 (0.48)
Pairs with 1 ft or more	5,719	3,222	4,998	5,209	2,346
counties	24	23	24	24	17
storms	6	4	6	4	5
Pairs with no water	4,402	2,517	3,577	3,360	3,646
Pairs	2,616,077	2,543,118	1,147,180	2,611,457	2,602,775

Notes: Dependent variable, cells and effects as in Table 2 of the paper. Panel A: rows 1 to 4 are one regression; the row for 1 ft or more and the row per foot are separate regressions, the latter with an indicator for a heavy flood with depth known. Panel B: differences between coefficients of the regressions of panel A, with 95 percent intervals in brackets. Panel C adds an effect for every block group and heavy flood with depth known and indicators for the decade of construction. Later sales: pairs with a flood or a write-down in year S are kept only if the second sale is dated in $S + 2$ or later. Coded sales: first sale in 2009 or later. Standard errors clustered by county; intervals use t_{66} .

Table A15: Resale prices by depth and storm, and leaving one storm out (log points)

Storm	No water	Under 1 ft	1 ft or more	1 ft or more minus no water	Pairs with 1 ft or more	Estimate without the storm
Irma 2017	-2.40 (1.28)	-3.81 (1.72)	-3.59 (2.67)	-1.19 (1.94)	783	-5.85 (2.02)
Michael 2018	2.96 (2.51)	2.33 (4.07)	-9.51 (2.97)	-12.47 (3.16)	615	-4.77 (1.96)
Ian 2022	-0.42 (1.71)	-1.12 (2.06)	-4.39 (2.84)	-3.97 (2.10)	3,372	-6.37 (2.46)
Idalia 2023	-4.46 (2.13)	-8.96 (2.79)	-6.28 (4.35)	-1.82 (5.27)	442	-5.69 (1.95)
Helene 2024	-1.19 (1.04)	-0.62 (4.04)	-8.45 (4.06)	-7.25 (3.95)	489	-4.73 (1.93)
Milton 2024	2.58 (1.30)	-8.32 (8.33)	-2.02 (1.98)	-4.60 (2.61)	18	-5.38 (1.86)
<i>Later sales</i>						
Irma 2017	-1.31 (1.74)	-2.92 (1.94)	-3.02 (2.71)	-1.70 (1.81)	653	
Michael 2018	-2.36 (2.48)	1.16 (3.70)	-10.70 (2.96)	-8.34 (2.70)	495	
Ian 2022	2.45 (2.24)	-2.05 (3.53)	-1.51 (2.60)	-3.96 (1.61)	1,855	
Idalia 2023	-9.07 (4.75)	-1.13 (13.59)	-5.67 (12.33)	3.40 (9.05)	219	

Notes: One regression with the depth indicators by storm (upper panel: all sales; lower panel: later sales, for the storms with later sales). Columns 2 to 4 are relative to tract peers. Pairs: pairs with 1 ft or more in cells with at least two pairs. Last column: the pooled coefficient for 1 ft or more of Table 2 of the paper when the pairs classed at the storm are left out. Standard errors clustered by county.

Table A16: Resale prices by depth: depth sources and thresholds (log points)

Depth definition	All sales		Later sales	
	At or above the threshold	Minus no water	At or above the threshold	Minus no water
Main definition, 1 ft	-5.34 (1.83)	-4.72 (1.79)	-3.70 (2.02)	-3.12 (1.44)
RIFT only for Helene and Milton, 1 ft	-4.81 (1.87)	-4.22 (1.90)	-3.71 (2.02)	-3.12 (1.44)
ICEYE only for Helene and Milton, 1 ft	-5.35 (1.83)	-4.72 (1.79)	-3.71 (2.02)	-3.12 (1.44)
Irma at the centroid cell, 1 ft	-5.60 (1.79)	-5.06 (1.73)	-3.90 (2.00)	-3.38 (1.42)
Any water	-4.79 (1.76)	-4.03 (1.63)	-3.27 (1.86)	-2.62 (1.18)
2 ft or more	-5.90 (1.79)	-5.37 (1.80)	-3.74 (2.11)	-3.17 (1.55)
Without Irma, 1 ft	-5.84 (2.02)	-6.32 (1.85)		
Without Lee County, 1 ft	-4.33 (2.12)	-4.01 (1.90)		
Second sales through 2024, 1 ft	-5.28 (1.78)	-4.13 (1.98)		

Notes: The regression of Table 2 of the paper, panel A, with the indicator for depth at or above the threshold, and its difference from homes with no water. Main definition: Section 2.3 of the paper. Irma at the centroid cell: the value of the grid cell at the centroid in place of the largest of the nine cells around it. The last three rows drop the pairs classed at Hurricane Irma, the pairs of Lee County with a flood, and the pairs with a second sale in 2025.

Table A17: Pairs sold before the storm, by the depth the parcel later records (log points)

	Coefficient	Pairs
<i>Second sale before the storm; depth the parcel records in the later storm</i>		
1 ft or more, any storm	−0.20 (0.12)	291,917
Under 1 ft, any storm	−0.10 (0.10)	
Per foot of later depth	−0.07 (0.04)	
1 ft or more, second sale within five years before the storm	−0.59 (0.17)	121,712
1 ft or more, second sale within three years before the storm	−0.41 (0.20)	80,035
<i>By storm, 1 ft or more</i>		
Irma 2017	0.31 (0.60)	9,140
Michael 2018	−5.42 (1.45)	1,682
Ian 2022	−0.21 (0.14)	205,573
Idalia 2023	−0.34 (0.29)	56,621
Helene 2024	0.98 (0.51)	44,699
Milton 2024	0.04 (0.23)	82,646

Notes: Pairs of the regression sample whose second sale is dated before the storm; cells, effects and the indicators of equation (1) of the paper. The added indicators give the depth that the parcel records in the later storm. Pairs: pairs with a later depth of 1 ft or more. Standard errors clustered by county.

Table A18: Resale prices by field damage class (log points)

	All sales	Later sales	Coded sales	No floods of 2024
Assessed major or destroyed	−11.23 (7.82)	−23.08 (4.78)	−10.42 (8.45)	−10.75 (7.88)
Assessed affected or minor	2.76 (9.34)	−	3.63 (9.67)	8.20 (8.28)
Assessed unaffected	−	−	−	−
Major or destroyed minus affected or minor	−13.99 (6.41)	−	−14.05 (6.15)	−18.96 (5.83)
Major or destroyed minus unassessed, unflagged homes of heavy floods	−9.21 (7.81)	−20.74 (4.62)	−9.17 (7.83)	−8.63 (7.82)
Pairs assessed major or destroyed	59	27	59	58
Pairs assessed affected or minor	13	5	13	11

Notes: Dependent variable, cells and effects as in Table 2 of the paper. Indicators for the field damage class of pairs with a heavy flood between the sales and an inspection record for that flood; the other pairs keep the indicators of equation (1). A dash marks a class with fewer than ten pairs. Standard errors clustered by county.

Table A19: The assessment flag and depth at the parcel on the same pairs (log points)

	All sales	Later sales	Coded sales	No floods of 2024
<i>A. Each measure alone, relative to the other homes of heavy floods with depth known</i>				
Assessment flag	-6.73 (2.80)	-1.12 (1.80)	-6.43 (2.97)	-3.66 (1.34)
1 ft of water or more	-4.32 (1.71)	-2.75 (1.43)	-3.36 (1.55)	-3.77 (1.88)
Water minus flag	2.40 (2.60)	-1.63 (2.00)	3.07 (2.92)	-0.11 (1.37)
	[-2.80, 7.60]	[-5.63, 2.37]	[-2.75, 8.89]	[-2.85, 2.63]
<i>B. Both measures in one regression</i>				
Assessment flag	-6.30 (2.66)	-0.91 (1.77)	-6.11 (2.88)	-3.38 (1.28)
1 ft of water or more	-3.89 (1.57)	-2.70 (1.41)	-2.94 (1.44)	-3.61 (1.82)
<i>C. Four classes, relative to tract peers</i>				
Flagged, 1 ft or more	-11.41 (3.01)	-6.43 (2.26)	-10.20 (3.05)	-9.09 (2.06)
Flagged, less water	-4.86 (2.82)	3.12 (2.36)	-4.68 (3.55)	-0.11 (1.99)
Not flagged, 1 ft or more	-4.14 (1.78)	-3.18 (2.01)	-3.20 (1.74)	-4.07 (1.94)
Not flagged, less water	-0.53 (1.30)	-1.11 (1.27)	-0.52 (1.28)	-0.91 (1.60)
Water among unflagged homes (row 3 minus row 4)	-3.61 (1.61)	-2.07 (1.39)	-2.68 (1.50)	-3.15 (1.79)
Flag among homes with less water (row 2 minus row 4)	-4.33 (2.96)	4.23 (2.23)	-4.15 (3.48)	0.80 (2.38)
Flag among homes with 1 ft or more (row 1 minus row 3)	-7.27 (3.01)	-3.24 (1.61)	-7.00 (3.04)	-5.03 (1.33)
Pairs: flagged, 1 ft or more	910	541	781	747
flagged, less water	394	221	314	269
not flagged, 1 ft or more	4,809	2,681	4,217	4,462
not flagged, less water	4,882	2,890	3,989	3,877

Notes: Dependent variable, cells and effects as in Table 2 of the paper. Panels A and B include an indicator for a heavy flood with depth known, so the coefficients are relative to the other homes of those floods. Panel A: two regressions; the difference uses the county-level influence scores of both, with the 95 percent interval in brackets. Panel C: one regression with four classes; less water: no water or under 1 ft. Later sales: second sale in $S+2$ or later. Standard errors clustered by county.

Table A20: Repair permits after the flood, by depth and by the assessment flag

	All covered homes		Helene 2024		Milton 2024	
	Homes	Permit (%)	Homes	Permit (%)	Homes	Permit (%)
<i>A. Homes with a repair permit after the flood</i>						
No water	9,950	3.5	7,631	3.9	2,153	1.4
Under 1 ft	1,776	4.6	1,618	4.5	105	1.9
1 to under 3 ft	3,221	7.5	2,721	6.1	203	6.9
3 ft or more	2,220	10.4	1,945	8.5	19	15.8
Assessment flag	2,474	11.5	2,203	11.0	124	6.5
No flag	14,693	4.2	11,712	3.9	2,356	1.7
<i>B. The same homes in the 36 months before the flood</i>						
Less water (none or under 1 ft)	11,726	6.5	9,249	6.9	2,258	3.6
1 ft or more	5,441	9.4	4,666	8.2	222	2.3
Assessment flag	2,474	8.6	2,203	8.4	124	4.0
No flag	14,693	7.2	11,712	7.1	2,356	3.5
<i>C. Permit after the flood within the block group and flood (percentage points)</i>						
	All covered homes		Helene 2024		Milton 2024	
1 ft of water or more	3.7 (0.6)		3.3 (0.7)		5.7 (2.2)	
Assessment flag	6.2 (1.0)		6.1 (1.1)		5.2 (2.6)	
Both: water	2.7 (0.6)		2.2 (0.6)		5.2 (2.2)	
Both: flag	5.5 (1.0)		5.5 (1.1)		4.2 (2.4)	
1 ft or more, after minus before	3.0 (1.4)		3.0 (1.5)		5.6 (2.4)	
Flag, after minus before	6.6 (1.3)		6.4 (1.5)		5.5 (3.6)	
Homes	17,167		13,915		2,480	
Clusters	tracts (58)		tracts (46)		tracts (11)	

Notes: Homes at risk with depth known, in block groups covered by a permit source that begins before the flood (Table A10). Repair permit: a permit whose type or description names roofing, a storm or damage, demolition, elevation, rebuilding, repair, remodelling or alteration; permits for mechanical, electrical or plumbing work alone are not counted. Panel A: a permit dated from the month of the flood to 36 months after it or to the end of the source. Panel B: the 36 months before the flood. Panel C: linear probability regressions with an effect for every block group and flood; standard errors clustered by census tract, because the covered homes lie in few counties.

Table A21: Resales dated two years or more after the flood: depth in feet, depth bins and inference (log points)

	$S + 2$ or later	$S + 3$ or later	All sales
<i>A. Depth as a continuous measure</i>			
Per foot of depth	−0.60 (0.19) [−0.99, −0.22]	−0.61 (0.24) [−1.09, −0.13]	−0.98 (0.21) [−1.39, −0.57]
wild-bootstrap p , county clusters	0.029	0.11	0.004
wild-bootstrap p , storm clusters	0.11	0.028	0.046
Per unit of $\log(1 + \text{feet})$	−2.20 (0.79) [−3.77, −0.64]	−1.94 (1.02) [−3.96, 0.09]	−3.50 (0.87) [−5.24, −1.76]
wild-bootstrap p , county clusters	0.034	0.084	0.002
wild-bootstrap p , storm clusters	0.096	0.027	0.029
Per foot, with the square: linear	−0.93 (0.50)	−0.75 (0.53)	−1.46 (0.49)
squared	0.04 (0.04)	0.02 (0.04)	0.05 (0.04)
<i>B. Depth bins, relative to tract peers</i>			
No water	−0.47 (1.23)	−1.22 (1.66)	−0.41 (1.16)
Under 1 ft	−1.91 (1.62)	−3.02 (2.27)	−2.19 (1.52)
1 to under 3 ft	−2.80 (2.10)	−2.21 (2.01)	−3.49 (2.15)
3 ft or more	−4.58 (2.13)	−5.73 (2.36)	−6.90 (1.56)
3 ft or more: wild-bootstrap p , county clusters	0.062	0.043	0.002
<i>C. One indicator for 1 ft of water or more</i>			
1 ft or more	−3.70 (2.02) [−7.73, 0.33]	−3.86 (2.27) [−8.38, 0.67]	−5.34 (1.83) [−8.99, −1.69]
wild-bootstrap p , county clusters	0.076	0.10	0.017
wild-bootstrap p , storm clusters	0.016	0.029	0.004
1 ft or more minus no water	−3.12 (1.44) [−5.99, −0.25]	−2.46 (1.60) [−5.66, 0.73]	−4.72 (1.79) [−8.29, −1.15]
Pairs with 1 ft or more	3,222	1,684	5,719
counties; storms	23; 4	16; 3	24; 6
Pairs of heavy floods with depth known	6,333	3,888	10,995
Pairs	2,543,118	2,495,530	2,616,077

Notes: Sample and regressions of Table 2 of the paper. $S + 2$ ($S + 3$) or later: pairs with a flood or a write-down in year S are kept only if the second sale is dated in $S + 2$ ($S + 3$) or later. Panel A: depth at the parcel in feet, or $\log(1 + \text{feet})$, for pairs of heavy floods with depth known, beside an indicator for those pairs; separate regressions. Panel B: one regression. Panel C: one indicator; the contrast with homes with no water is from the regression with indicators for no water, under 1 ft and 1 ft or more. Standard errors clustered by county in parentheses; 95 percent intervals in brackets use t_{66} . Wild-bootstrap p : wild cluster bootstrap with the null imposed, 9,999 draws, six-point weights; with storm clusters, pairs whose flood is one of the storms form one cluster per storm and the other pairs keep their county.

Table A22: Later resales by storm (log points)

Storm	No water	Under 1 ft	1 ft or more	1 ft or more minus no water	Per foot of depth	Pairs with 1 ft or more	Counties
<i>A. Second sale dated in $S + 2$ or later</i>							
Irma 2017	-1.31 (1.74)	-2.92 (1.94)	-3.02 (2.71)	-1.70 (1.81)	-0.70 (0.50)	653	5
Michael 2018	-2.36 (2.48)	1.16 (3.70)	-10.70 (2.96)	-8.34 (2.70)	-1.81 (0.49)	495	4
Ian 2022	2.45 (2.24)	-2.05 (3.53)	-1.51 (2.60)	-3.96 (1.61)	-0.51 (0.14)	1,855	10
Idalia 2023	-9.07 (4.75)	-1.13 (13.59)	-5.67 (12.33)	3.40 (9.05)	1.34 (0.82)	219	6
All storms						3,222	23
<i>B. Second sale dated in $S + 3$ or later</i>							
Irma 2017	-2.29 (2.03)	-4.15 (2.40)	-2.94 (2.72)	-0.64 (1.47)	-0.37 (0.28)	524	5
Michael 2018	-1.92 (2.68)	7.30 (3.37)	-7.47 (2.63)	-5.55 (2.48)	-1.27 (0.27)	331	4
Ian 2022	3.51 (3.34)	-3.70 (5.16)	-2.63 (4.23)	-6.13 (2.09)	-0.72 (0.24)	829	9
All storms						1,684	16

Notes: As Table A21, with the depth indicators, and in a separate regression the slope per foot, specific to the storm. Coefficients relative to tract peers; standard errors clustered by county. Pairs and counties: pairs with 1 ft of water or more in the sample of the panel.

Table A23: Homes of heavily flooded block groups against homes of never-inundated block groups of the county, by time from the storm (log points)

	Decade matched	No decade	No Lee County	No Ian
<i>A. Homes with 1 ft of water or more</i>				
Years -6 to -2	2.03 (1.08)	0.49 (1.42)	1.73 (1.19)	2.06 (1.21)
0 to 23 months after the storm	-23.87 (5.71)	-22.05 (5.18)	-24.53 (5.84)	-25.72 (5.62)
24 to 59 months after the storm	-9.71 (2.75)	-7.05 (2.19)	-9.08 (2.73)	-9.14 (3.10)
	[-15.49, -3.93]	[-11.65, -2.46]	[-14.84, -3.32]	[-15.75, -2.52]
wild-bootstrap p	0.004	0.007	0.012	0.036
60 months or more	-9.04 (2.48)	-6.11 (3.11)	-8.54 (2.47)	-9.14 (2.63)
<i>B. Homes with no water, same block groups</i>				
Years -6 to -2	1.58 (0.77)	0.16 (1.67)	1.38 (0.82)	2.12 (0.82)
0 to 23 months after the storm	-6.92 (1.50)	-5.83 (1.39)	-6.65 (1.41)	-6.58 (1.36)
24 to 59 months after the storm	-4.63 (2.45)	-2.25 (3.72)	-4.81 (2.58)	-4.97 (2.64)
<i>C. Homes with 1 ft or more minus homes with no water</i>				
0 to 23 months after the storm	-16.95 (4.96)	-16.22 (4.95)	-17.89 (5.17)	-19.14 (4.97)
	[-27.36, -6.53]	[-26.62, -5.82]	[-28.80, -6.97]	[-29.73, -8.55]
24 to 59 months after the storm	-5.07 (3.36)	-4.81 (3.59)	-4.27 (3.34)	-4.17 (3.68)
	[-12.13, 1.98]	[-12.36, 2.74]	[-11.32, 2.78]	[-12.02, 3.68]
24 to 59 months, per foot of depth above 1 ft	-0.92 (0.56)	-0.90 (0.47)	1.04 (1.18)	2.20 (0.86)
Pairs with 1 ft or more sold 24 to 59 months after counties	2,500	2,655	1,000	609
	14	14	13	9
Comparison pairs	350,270	356,259	344,731	309,565
Counties (clusters)	19	19	18	16

Notes: Stacked repeat-sales event study of equation (4) of the paper, one stack per storm. Treated: pairs of homes with depth known in block groups with a heavy NFIP flood in the storm, by depth at the parcel (homes with under 1 ft are left out). Comparison: pairs of homes in block groups of the same county with no parcel at 1 ft or more in any of the storms, under 2 percent of parcels with any water in the storm, and no qualifying NFIP flood. Cells: stack $\times$ county $\times$ first-sale year $\times$ second-sale year $\times$ decade of construction (first column), without the decade (second column). Event time is measured in years from the month of the storm, and the year before the storm is omitted. Standard errors clustered by county in parentheses; 95 percent intervals in brackets; wild cluster bootstrap with the null imposed.

Table A24: The discount on inundated homes by three records of repair (log points)

	$S + 2$ or later	All sales
<i>A. A repair permit dated between the flood and the resale (block groups covered by a permit source)</i>		
1 ft or more, with a permit	– [12]	– [19]
1 ft or more, no permit	8.11 (5.84) [42]	–3.80 (5.01) [218]
Less water, with a permit	– [1]	– [5]
Less water, no permit	– [12]	0.84 (0.96) [355]
With a permit minus none, 1 ft or more	–	–
<i>B. An improvement recorded on the tax roll before the resale</i>		
1 ft or more, improvement recorded	–0.68 (2.68) [1,523]	–0.59 (2.72) [1,927]
1 ft or more, none recorded	–4.72 (1.83) [1,648]	–6.57 (1.56) [3,734]
Less water, improvement recorded	4.27 (1.96) [1,454]	4.42 (1.81) [1,976]
Less water, none recorded	–4.36 (1.27) [1,622]	–2.88 (1.42) [3,253]
Recorded minus none, 1 ft or more	4.05 (2.03)	5.98 (1.92)
Recorded minus none, less water	8.63 (1.76)	7.30 (1.73)
Difference of the two	–4.59 (2.50)	–1.32 (1.92)
<i>C. NFIP building payments of the flood per inundated home of the block group</i>		
1 ft or more, payments at or above the median	–2.80 (3.03) [1,419]	–5.94 (2.72) [2,690]
1 ft or more, payments below the median	–3.93 (2.04) [1,803]	–4.65 (1.49) [3,029]
Above minus below, 1 ft or more	1.14 (2.77)	–1.28 (2.32)
Per \$10,000 of payments per inundated home, 1 ft or more	0.27 (0.13)	–0.09 (0.17)
with depth in feet	0.27 (0.14)	–0.08 (0.18)

Notes: Regressions of Table 2 of the paper with the indicators for 1 ft or more and for less water (no water or under 1 ft) split by the record of repair; coefficients relative to tract peers, standard errors clustered by county in parentheses, pairs in brackets; no coefficient is shown for a group of fewer than 30 pairs. Panel A: pairs of block groups covered by a permit source that begins before the flood; a repair permit dated from the month of the flood to the month of the second sale. Panel B: the first roll from $S + 1$ on with new-construction value, a larger living area or a later effective year built is dated 1 January of the resale year or earlier. Panel C: NFIP building payments of the flood in the block group over its single-family parcels with 1 ft or more in the storm, split at the median over inundated pairs; the last two rows are the slope on that amount, in \$10,000 and capped at the 99th percentile, for inundated homes.

F The assessment flag as the measure of exposure

This section reports equation (1) of the paper, in which exposure is measured by the assessment flag. Its sample covers every heavy flood from 2003 to 2024, where the depth regressions cover the six storms with a depth source.

Flagged homes resell 9.08 log points below tract peers (s.e. 2.18; Table A25), on 2,240 flagged pairs in 32 counties. Homes written down in a year with no flood between the sales sell 5.93 log points below their peers, and the difference between the two coefficients is -3.15 log points (interval -7.48 to 1.19). The flag’s coefficient is -17.99 for second sales in the flood year or the next and -4.49 for later sales, a difference of -13.50 (interval -20.65 to -6.34). When exposed homes are kept only if the second sale is dated in $S + 2$ or later, the coefficient is -4.33 (s.e. 1.60). Table A26 gives the coefficient by storm group and with each group left out; it lies between -10.22 and -7.65 log points.

Table A27 sets the flag beside a proxy that uses neither assessed values nor sale prices: for a home in block group b built in year v , the number of single-family NFIP claims with a positive building payment in (b, v) in the flood year over the single-family parcels of (b, v) on the roll of 1 January of that year, capped at one. A move of this rate from zero to one goes with a price lower by 4.30 log points (s.e. 2.25). The rate is not a probability that the particular home was damaged: claims are not linked to homes, and it depends on insurance take-up.

Tables A28 and A29 follow flagged and unflagged homes at risk on common windows, so that floods with short follow-up do not mix with floods observed for five years. Within 24 and 36 months of the flood, flagged homes are resold somewhat less often than unflagged homes of the same tract and flood year, and within 60 months as often. The flag’s coefficient is largest for second sales in the first 24 months after the flood.

Table A25: Discounts on assessment-flagged homes and on homes written down without a flood (log points, relative to tract peers)

	Flagged	Written down, no flood	Difference [95 percent interval]	Flagged pairs	Counties	Events
<i>A. All pairs of the aligned sample</i>						
Floods of 2003 to 2024	-9.08 (2.18)	-5.93 (0.61)	-3.15 (2.17) [-7.48, 1.19]	2,240	32	32
without Hurricane Michael (2018)	-8.35 (2.31)	-5.92 (0.61)	-2.43 (2.32) [-7.06, 2.20]	1,955	29	31
without the floods of 2024	-7.65 (1.86)	-5.93 (0.61)	-1.72 (1.91) [-5.53, 2.09]	1,951	31	29
without both	-6.53 (1.68)	-5.92 (0.61)	-0.61 (1.80) [-4.21, 3.00]	1,666	28	28
without Hurricane Ian (2022)	-10.22 (2.80)	-5.94 (0.61)	-4.28 (2.80) [-9.87, 1.30]	1,646	32	30
second sales through 2024	-8.19 (2.07)	-5.99 (0.61)	-2.20 (2.04) [-6.28, 1.88]	1,737	32	31
first sale in 2009 or later	-7.55 (2.67)	-6.18 (0.98)	-1.37 (2.94) [-7.24, 4.51]	1,302	28	17
<i>B. By the year of the second sale relative to the year S of the flood or write-down (one regression)</i>						
Second sale in S or $S + 1$	-17.99 (3.26)	-7.93 (0.85)	-10.07 (2.85) [-15.75, -4.38]	724		
Second sale in $S + 2$ or later	-4.49 (1.61)	-5.48 (0.62)	0.98 (1.77) [-2.55, 4.52]	1,516		
Early minus later	-13.50 (3.58)		[-20.65, -6.34]			
<i>C. Exposed and written-down homes kept only if the second sale is dated in $S + 2$ or later</i>						
Floods of 2003 to 2023	-4.33 (1.60)	-5.50 (0.62)	1.18 (1.76) [-2.34, 4.69]	1,513	30	26
first sale in 2009 or later	-1.04 (2.33)	-6.16 (1.00)	5.12 (2.75) [-0.38, 10.62]	792	24	13
<i>D. Unchanged homes with no later improvement on the roll</i>						
Floods of 2003 to 2024	-16.05 (5.02)	-7.62 (0.69)	-8.44 (4.83) [-18.07, 1.20]	540	26	25
without Hurricane Michael	-12.17 (2.77)	-7.60 (0.68)	-4.57 (2.67) [-9.90, 0.77]	501	24	24
second sale in $S + 2$ or later	-10.08 (3.79)	-7.32 (0.62)	-2.76 (3.64) [-10.02, 4.50]	265	21	19

Notes: Dependent variable: the change in log price between two consecutive eligible sales of the same single-family home, times 100. Cells are tract $\times$ first-sale year $\times$ second-sale year, with county $\times$ month effects entered as differences (equation 1 of the paper). Aligned sample: the regression sample of Section 2.1 of the paper, on which the flag and the claims-rate proxy are both defined. Flagged: Section 2.2 of the paper. No flood: written down in a year of the holding period with no qualifying flood between the sales. A written-down home enters only if the write-down is dated after the year of the first sale. Each row is one regression, except panel B, which is one regression. Panel C drops pairs with a flood or a write-down whose second sale is dated in S or $S + 1$. Panel D: pairs of homes unchanged between the sales and, if written down, with no improvement on a later roll. An event is a named storm in a year or a month of unnamed claims. Standard errors clustered by county; intervals use t_{66} .

Table A26: The assessment flag by storm group and leaving one group out (log points, relative to tract peers)

Flood year or storm	Flag of the storm group (one regression)				Leaving the group out	
	Flagged	Difference from no-flood write-downs	[95 percent interval]	Pairs	Flagged	Difference
2004	-8.99 (1.75)	-3.06 (1.81)	[-6.67, 0.55]	267	-9.11 (2.43)	-3.17 (2.42)
2005	-10.53 (4.15)	-4.61 (4.18)	[-12.95, 3.74]	321	-8.83 (2.30)	-2.89 (2.31)
Irma 2017	-3.61 (2.83)	2.32 (2.89)	[-3.46, 8.10]	182	-9.67 (2.24)	-3.72 (2.21)
Michael 2018	-12.60 (3.92)	-6.67 (3.95)	[-14.55, 1.21]	285	-8.35 (2.31)	-2.43 (2.32)
Ian 2022	-5.63 (1.60)	0.30 (1.84)	[-3.37, 3.97]	594	-10.22 (2.80)	-4.28 (2.80)
Idalia 2023	-16.27 (5.57)	-10.34 (5.57)	[-21.45, 0.77]	61	-9.05 (2.22)	-3.12 (2.21)
Helene/Milton 2024	-19.78 (1.23)	-13.85 (1.29)	[-16.43, -11.27]	289	-7.65 (1.86)	-1.72 (1.91)
Other years	-1.43 (3.88)	4.50 (3.96)	[-3.41, 12.41]	241	-9.96 (2.28)	-4.02 (2.24)

Notes: Columns 2 to 5: one regression on the sample of Table A25 with the flag by storm group; the difference is from homes written down without a flood. Columns 6 and 7: the regression of Table A25, first row, without the pairs classed at the storm group. Standard errors clustered by county; intervals use t_{66} .

Table A27: The cohort claims rate and the assessment flag on the same pairs (log points)

	All pairs	Without Michael	Without Michael and 2024	First sale in 2009 or later	Second sale in $S + 2$ or later
<i>A. Tract cells and county-month effects</i>					
Cohort claims rate (0 to 1)	-4.30 (2.25)	-4.51 (2.35)	-3.35 (2.10)	-6.38 (2.68)	-2.27 (2.16)
Assessment flag, against unflagged exposed homes	-7.06 (2.22)	-6.49 (2.36)	-4.58 (1.60)	-6.31 (2.75)	-1.98 (1.56)
Claims rate minus flag	2.77 (1.87)	1.98 (1.84)	1.23 (1.86)	-0.07 (2.26)	-0.29 (2.12)
95 percent interval	[-0.97, 6.51]	[-1.69, 5.65]	[-2.47, 4.94]	[-4.58, 4.44]	[-4.52, 3.94]
<i>B. Adding indicators for the decade of construction</i>					
Cohort claims rate (0 to 1)	-6.41 (2.02)	-6.77 (2.09)	-5.76 (1.87)	-9.35 (2.17)	-4.71 (1.79)
Assessment flag, against unflagged exposed homes	-7.88 (2.17)	-7.23 (2.26)	-5.35 (1.42)	-7.64 (2.63)	-2.85 (1.43)
Claims rate minus flag	1.47 (1.91)	0.46 (1.85)	-0.42 (1.78)	-1.71 (2.18)	-1.86 (1.88)
95 percent interval	[-2.33, 5.27]	[-3.24, 4.15]	[-3.97, 3.14]	[-6.07, 2.66]	[-5.61, 1.89]
<i>C. Adding an effect for every heavy block-group event</i>					
Cohort claims rate (0 to 1)	-5.64 (1.79)	-5.86 (1.86)	-5.30 (1.76)	-7.84 (2.57)	-5.56 (2.09)
Assessment flag, against unflagged homes of the event	-6.57 (2.08)	-5.74 (2.11)	-3.91 (1.38)	-6.37 (2.52)	-1.42 (1.60)
Claims rate minus flag	0.93 (1.71)	-0.12 (1.81)	-1.39 (2.09)	-1.47 (2.40)	-4.14 (2.65)
95 percent interval	[-2.49, 4.35]	[-3.74, 3.50]	[-5.56, 2.77]	[-6.26, 3.31]	[-9.42, 1.15]
<i>D. Claims rate and flag in one regression (specification of panel C)</i>					
Cohort claims rate (0 to 1)	-4.90 (1.60)	-5.21 (1.67)	-4.98 (1.77)	-7.03 (2.29)	-5.40 (2.12)
Assessment flag	-6.40 (2.03)	-5.53 (2.05)	-3.76 (1.40)	-6.08 (2.42)	-1.27 (1.63)
Pairs with a heavy flood between the sales	24,509	22,808	21,122	13,806	16,469
with a positive cohort claims rate	15,823	14,861	13,685	8,872	10,626
flagged	2,240	1,955	1,666	1,302	1,513
Heavy block-group events with an effect (panel C)	943	914	710	720	600

Notes: Dependent variable, cells and effects as in Table A25. Cohort claims rate: single-family NFIP claims with a positive building payment for losses in the flood year in the home's block group and with the home's year built, over the single-family parcels of the block group with that year built on the roll of 1 January of the flood year, capped at one; zero for homes with no heavy flood between the sales. In each panel the claims rate and the flag come from two regressions on the same pairs, and the flag row reports the flag minus the coefficient of unflagged homes in heavily exposed block groups. Panel B adds indicators for the decade of construction. Panel C adds an effect for every block group and heavy flood. "Claims rate minus flag": the difference of the two rows above, with a standard error from the county-level influence scores of the two regressions. Panel D: both measures in the regression of panel C. Standard errors clustered by county; intervals use t_{66} .

Table A28: Resale and recorded improvement of flagged and unflagged homes at risk, on common windows

	Resold (percent)		Difference	Flagged	Not yet	Largest cohorts
	flagged	unflagged	(points)	homes	observed	(share of flagged homes)
	(1)	(2)	(3)	(4)	(5)	(6)
<i>A. Floods observed for the whole window</i>						
Within 12 months	4.6	5.3	−0.66 (1.23)	18,627	0.0	2022: 43, 2024: 38
Within 24 months	7.9	10.6	−2.71 (1.61)	11,616	37.6	2022: 69, 2018: 8
Within 36 months	12.1	14.9	−2.80 (1.18)	11,255	39.5	2022: 71, 2018: 8
Within 60 months	29.4	29.3	0.06 (1.24)	3,238	82.6	2018: 27, 2005: 19
<i>B. The floods observed for 60 months, at every horizon</i>						
Within 12 months	7.3	7.0	0.33 (0.98)	3,238	82.6	2018: 27, 2005: 19
Within 24 months	13.2	13.5	−0.29 (0.88)	3,238	82.6	2018: 27, 2005: 19
Within 36 months	18.8	19.8	−1.01 (1.03)	3,238	82.6	2018: 27, 2005: 19
Within 60 months	29.4	29.3	0.06 (1.24)	3,238	82.6	2018: 27, 2005: 19
<i>C. By the end of the sale files</i>						
Floods through 2023	20.7	23.0	−2.33 (1.48)	11,616		2022: 69, 2018: 8
Floods of 2024	6.1	4.5	1.66 (0.51)	7,011		2024: 100
<i>D. Improvement recorded on one of the three rolls after the flood year, floods through 2022</i>						
Homes at risk	64.3	46.2	18.16 (6.48)	11,255		2022: 71, 2018: 8
resold	52.2	43.7	8.58 (3.89)	2,337		2022: 32, 2005: 16
not resold	67.5	46.9	20.60 (6.63)	8,915		2022: 81, 2018: 6

Notes: Population at risk under the common definition. Columns 1 and 2: the share with an eligible resale within the window, in percent; unflagged homes are weighted so that each tract and flood year has the weight of its flagged homes. Column 3: the difference, with a standard error from 999 samples of counties drawn with replacement. Column 5: the share of all flagged homes at risk whose flood is not observed for the whole window. Column 6: the two flood years with the largest shares of the flagged homes of the row, in percent. Panel A: for each window, the floods observed for that many months before the end of the sale files. Panel B: the floods observed for 60 months, at every window. Panel D: new-construction value, a living area more than 1 percent larger or a later effective year built on one of the three rolls after the flood year.

Table A29: The assessment flag and the cohort claims rate by time from the flood to the resale (log points)

	Assessment flag	[95 percent interval]	Cohort claims rate (0 to 1)	Flagged pairs	Counties
<i>A. Second sale within the window, floods observed for the whole window (one regression per row)</i>					
Within 24 months	-11.35 (3.70)	[-18.74, -3.97]	-5.29 (2.74)	790	28
Within 36 months	-9.39 (2.43)	[-14.24, -4.54]	-4.97 (2.19)	1,131	29
Within 60 months	-8.55 (3.10)	[-14.74, -2.36]	-1.95 (2.39)	831	28
<i>B. The floods observed for 60 months, by months from the flood to the second sale (one regression)</i>					
Months 1 to 24	-16.28 (5.22)	[-26.70, -5.86]	-3.00 (3.60)	377	25
Months 25 to 36	-4.48 (1.80)	[-8.08, -0.89]	-3.11 (4.39)	160	20
Months 37 to 60	-0.23 (2.14)	[-4.51, 4.04]	0.36 (3.27)	294	21
Later than 60 months	-6.97 (3.52)	[-14.00, 0.07]	0.07 (3.41)	465	22
Months 1 to 24 minus months 37 to 60	-16.05 (5.92)	[-27.87, -4.23]	-3.36 (5.19)		
<i>C. By flood year and by the year of the second sale (one regression)</i>					
Floods through 2023, second sale through 2024	-7.63 (2.04)	[-11.69, -3.57]	-1.75 (1.98)	1,685	31
Floods through 2023, second sale in 2025	-8.32 (3.45)	[-15.20, -1.44]	-18.12 (8.96)	266	21
Floods of 2024, second sale in 2024	-24.94 (3.20)	[-31.33, -18.55]	-18.28 (8.89)	52	6
Floods of 2024, second sale in 2025	-15.81 (2.83)	[-21.46, -10.16]	-10.09 (4.85)	237	10

Notes: Equation (1) of the paper and the claims-rate regression of Table A27, panel A, with the flag, the indicator for unflagged exposed homes and the claims rate split by group; the groups partition the pairs with a heavy flood between the sales. Panel A: one pair of regressions per row. Panel B: one pair of regressions; floods observed for 60 months before the end of the sale files. Panel C: one pair of regressions. Counties: counties with a flagged pair of the group. Standard errors clustered by county; intervals use t_{66} .

G Selection bounds: further rows and the assessment flag

Table A30 is the full version of panel A of Table 4 of the paper: the test of the direction in which inundation moves resale. Homes with 1 ft of water or more are resold more often than homes with less water in the same tract and flood at every horizon; the difference is distinguishable from zero at the 5 percent level at 3 of the five horizons for any eligible resale, and the hazard ratio lies between 1.10 and 1.15 with a p -value of at most 0.021. Years since purchase do not change the difference. For the resales that enter the price sample, which are the selection of the bounds, the difference by the end of the sale files is 0.71 percentage points (s.e. 0.32; $p = 0.038$). Table A31 gives the bounds under higher resale and the difference weighted by the inverse probability of resale, row by row. Table A32 gives the bounds under the other direction and under either direction for the same rows; the bounds under lower resale are the ones that the test rejects. Table A33 applies the routine to the assessment flag on the full population at risk, 2003 to 2024. There 11.0 percent of flagged and 11.7 percent of unflagged homes at risk are resold in a pair with an unflagged peer, a difference of -0.74 percentage points (s.e. 0.86). If a flag weakly lowers resale, the bounds are -11.44 and -3.00 log points, with a 95 percent interval from -16.34 to 4.04 ; allowing either direction gives an interval from -16.32 to 2.67 . The outcome is built county by county, from that county's pairs only, so refitting it on a resample of counties returns the same values; the code verifies this on resamples of all pairs.

Table A30: Resale of homes with 1 ft of water or more against homes with less water in the same tract and flood

	12 months	24 months	36 months	60 months	End of sale files
<i>A. Any eligible resale: 1 ft of water or more against less water, none or under 1 ft (percentage points)</i>					
Resold (%): 1 ft or more	4.8	9.1	12.9	32.9	12.5
Resold (%): less water	4.7	10.3	15.2	30.9	12.5
Difference within tract and flood	0.49 (0.20)	0.80 (0.56)	1.78 (0.69)	2.16 (1.65)	1.15 (0.33)
<i>p</i>	0.020	0.17	0.020	0.22	0.002
with years since purchase	0.49 (0.20)	0.78 (0.56)	1.75 (0.70)	2.01 (1.69)	1.16 (0.33)
Against homes with no water	0.55 (0.21)	1.02 (0.63)	2.04 (0.94)	1.97 (1.89)	1.24 (0.34)
Cells 10 to 90 percent inundated	0.46 (0.17)	0.99 (0.54)	2.15 (0.70)	2.49 (1.72)	1.26 (0.37)
Per foot of depth	−0.05 (0.04)	−0.13 (0.10)	0.07 (0.12)	0.92 (0.22)	0.04 (0.07)
<i>B. Resale that enters the price sample (percentage points)</i>					
Difference within tract and flood	0.26 (0.12)	0.87 (0.43)	1.73 (0.60)	2.19 (1.25)	0.71 (0.32)
<i>p</i>	0.032	0.052	0.011	0.11	0.038
Against homes with no water	0.30 (0.13)	1.13 (0.45)	1.89 (0.72)	2.02 (1.38)	0.80 (0.33)
Cells 10 to 90 percent inundated	0.25 (0.14)	0.99 (0.42)	1.99 (0.58)	2.65 (1.30)	0.79 (0.37)
<i>p</i>	0.084	0.031	0.004	0.080	0.044
<i>C. Hazard of the first resale, stratified by tract and flood (hazard ratio of 1 ft or more)</i>					
Against less water	1.108	1.108	1.146	1.117	1.105
	[1.023, 1.201]	[1.017, 1.207]	[1.068, 1.230]	[1.031, 1.211]	[1.019, 1.197]
<i>p</i>	0.014	0.021	<0.001	0.009	0.017
Against no water	1.122	1.127	1.163	1.131	1.113
	[1.029, 1.223]	[1.032, 1.231]	[1.061, 1.275]	[1.027, 1.245]	[1.016, 1.219]
<i>p</i>	0.011	0.010	0.002	0.014	0.023
Homes at risk (panel A)	112,294	64,623	59,669	14,980	112,294
Homes in the hazard strata; resales	77,685; 3,805	78,063; 5,803	78,119; 7,411	78,119; 9,202	78,119; 10,052

Notes: Population: single-family homes at risk of resale after a heavy flood with depth known. Less water: no water or under 1 ft. Columns: resale within the horizon, for floods observed that long, and by the end of the sale files. Panels A and B: linear probability regressions on an indicator for 1 ft of water or more (the row per foot: on depth in feet) with an effect for every tract and flood, in percentage points; standard errors clustered by county in parentheses. *p*: two-sided *p*-value from the *t* distribution with degrees of freedom equal to the number of counties of the regression minus one; the regressions against less water have 25, 24, 18, 11 and 25 counties in the five columns, and the hazard models 25 in every column. Panel B counts a resale only if it forms a kept pair of the price sample with a peer not written down. Cells 10 to 90 percent inundated: tract × flood-year cells in which that share of homes has 1 ft or more. Panel C: proportional-hazard model of the first eligible resale, stratified by tract and flood, with the spell censored at the horizon or at the end of the sale files; Breslow method for ties; county-clustered robust covariance; 95 percent intervals in brackets.

Table A31: Selection bounds under higher resale of the treated homes, and weighting by the inverse probability of resale (log points)

	Treated resold	Resold (%)		Difference in means	Bounds if the treatment raises resale		95 percent interval	Weighted by the inverse probability of resale
		Treated	Comparison					
1 ft or more against less water, cells 10 to 90 percent inundated	2,447	10.2	9.3	-3.82 (1.51)	[-9.27, 1.86]	[-13.83, 4.63]		-6.46 (1.78) [-9.95, -2.98]
without Ian	1,879	10.1	9.2	-3.90 (1.78)	[-9.70, 2.06]	[-15.51, 5.59]		-6.87 (1.96) [-10.70, -3.03]
first resale in $S + 2$ or later	1,411	12.5	11.5	-1.79 (1.17)	[-7.02, 3.42]	[-11.53, 6.61]		-1.24 (1.78) [-4.72, 2.24]
1 ft or more against less water, all cells	3,206	10.0	10.9	2.10 (2.59)	[2.10, 2.10]	[-7.54, 6.25]		-3.11 (2.10) [-7.23, 1.00]
3 ft or more against less water, cells 10 to 90 percent	976	9.8	8.4	-6.06 (2.21)	[-13.98, 2.62]	[-19.94, 6.64]		-8.02 (2.10) [-12.12, -3.91]
1 ft or more against no water, cells 10 to 90 percent (weighting only)	2,178			-3.60 (1.36)				-6.00 (1.70) [-9.32, -2.67]

Notes: Population, cells, weights and outcome as in panel B of Table 4 of the paper. Bounds: the treated homes that resell are trimmed by one minus the ratio of the comparison to the treated resale rate; where the treated rate is the lower one, no trimming is called for and the bounds equal the difference in means. Less water: no water or under 1 ft. Interval: the lower bound minus, and the upper bound plus, the critical value of Imbens and Manski (2004) times the bootstrap standard error of that bound. In the all-cells row the treated rate is the lower one in the sample and the higher one in 33 percent of the bootstrap draws, which are then trimmed; the standard errors of the two bounds are 4.91 and 2.12, so the interval is not centered on the difference in means. Weighted: each resold home is weighted by the inverse of its estimated probability of resale, from a logit on years since purchase (four classes), the period of purchase (four classes), the assessment flag, the claims share of the block group and the storm, fitted separately for treated and comparison homes, with probabilities bounded below at 0.01; standard error in parentheses and 95 percent interval in brackets, from 999 county bootstrap draws of the whole procedure.

Table A32: Resale and selection bounds with depth at the parcel as the treatment, under lower resale and under either direction (log points)

	Treated resold	Resold (%)		Difference in means	Bounds if the treatment lowers resale		95 percent interval	95 percent interval, either direction
		Treated	Comparison					
<i>A. 1 ft of water or more against less water (none or under 1 ft)</i>								
All cells with both groups	3,206	10.0	10.9	2.10 (2.59)	[-3.24, 7.45]	[-8.78, 18.63]		[-8.96, 16.08]
Cells with 10 to 90 percent of homes inundated	2,447	10.2	9.3	-3.82 (1.51)	[-3.82, -3.82]	[-6.78, -0.85]		[-13.82, 4.63]
without the floods of 2024	2,021	18.0	16.2	-2.97 (1.76)	[-2.97, -2.97]	[-6.41, 0.49]		[-13.91, 6.24]
without Ian	1,879	10.1	9.2	-3.90 (1.78)	[-3.90, -3.90]	[-7.34, -0.21]		[-15.38, 5.55]
first resale in the flood year plus two or later	1,411	12.5	11.5	-1.79 (1.17)	[-1.79, -1.79]	[-4.08, 0.61]		[-11.44, 6.56]
resale within 36 months, floods observed that long	1,283	13.6	11.5	-4.09 (2.29)	[-4.09, -4.09]	[-8.58, 0.39]		[-17.82, 8.05]
unchanged homes with no later improvement	635	2.6	2.7	-4.07 (2.54)	[-6.77, -1.72]	[-11.41, 4.61]		[-11.86, 3.56]
<i>B. 3 ft or more against less water (none or under 1 ft)</i>								
Cells with 10 to 90 percent of homes at 3 ft or more	976	9.8	8.4	-6.06 (2.21)	[-6.06, -6.06]	[-10.40, -1.71]		[-19.92, 6.62]
first resale in the flood year plus two or later	533	11.8	9.9	-2.38 (2.08)	[-2.38, -2.38]	[-6.35, 1.91]		[-16.63, 9.52]
<i>C. The assessment flag on the same homes</i>								
All cells with both groups	1,181	7.2	7.9	-7.45 (3.03)	[-12.83, -1.93]	[-18.04, 8.55]		[-19.16, 5.67]
first resale in the flood year plus two or later	697	7.3	7.0	-2.02 (1.65)	[-2.02, -2.02]	[-6.02, 2.85]		[-10.60, 7.21]

Notes: Population, cells, weights and outcome as in panel B of Table 4 of the paper. Treated resold: treated homes resold in a pair of the price sample with a peer not written down. Resold: percent of the homes at risk so resold, treated and comparison. Bounds if the treatment lowers resale: comparison homes are trimmed by one minus the ratio of the resale rates, which applies when the treated rate is the lower one; otherwise the bounds equal the difference in means. The resale test of Table A30 rejects this direction for 1 ft of water or more. Either direction: the union of the bounds under the two directions. Intervals are 95 percent intervals with the critical value of Imbens and Manski (2004) from 999 county bootstrap draws of the whole procedure. Rows: without the floods of 2024, for resale within 36 months of floods observed that long, and for unchanged homes with no later improvement on the roll.

Table A33: Bounds for selection into resale with the assessment flag as the treatment (log points)

	Resold (percent)		Difference in resale (points)	Difference in means	Flag lowers resale		Flag raises resale, 95 percent interval	Either direction, 95 percent	Flagged resold
	flagged	unflagged	(3)	(4)	bounds	95 percent interval	(7)	(8)	(9)
<i>A. Selection: the home is resold in a pair of the price sample with an unflagged peer</i>									
Floods of 2003 to 2024	11.0	11.7	-0.74 (0.86)	-7.21 (2.21)	[-11.44, -3.00]	[-16.34, 4.04]	[-13.63, -2.70]	[-16.32, 2.67]	2,042
without Hurricane Michael	10.0	10.6	-0.59 (0.92)	-6.33 (2.35)	[-10.02, -2.62]	[-15.18, 4.80]	[-14.20, -1.32]	[-15.54, 2.82]	1,782
without the floods of 2024	15.4	17.1	-1.71 (0.94)	-5.52 (1.82)	[-11.47, 0.37]	[-17.11, 5.85]	[-9.21, -1.46]	[-16.66, 5.48]	1,788
without both	14.2	15.8	-1.54 (1.15)	-4.21 (1.50)	[-9.88, 1.43]	[-16.14, 7.00]	[-7.68, 0.05]	[-15.26, 6.22]	1,528
resold within 24 months	6.4	8.1	-1.75 (1.03)	-9.99 (4.54)	[-20.38, 0.24]	[-27.70, 14.28]	[-20.67, -1.69]	[-27.56, 12.75]	741
resold within 36 months	9.2	11.2	-1.97 (0.68)	-7.88 (3.38)	[-16.82, 1.06]	[-21.71, 10.24]	[-14.63, -1.35]	[-21.69, 10.07]	1,040
resold within 60 months	24.0	24.8	-0.79 (1.13)	-7.28 (3.46)	[-9.98, -4.60]	[-17.33, 1.74]	[-14.08, 0.32]	[-16.85, 1.68]	777
<i>B. Selection: resold, and the home did not change between the sales</i>									
Floods of 2003 to 2024	5.0	6.7	-1.66 (0.80)	-9.81 (2.24)	[-21.42, 1.40]	[-27.37, 9.55]	[-14.28, -5.48]	[-27.32, 9.46]	939
without the floods of 2024	7.1	10.0	-2.85 (0.54)	-8.71 (1.99)	[-21.60, 3.78]	[-27.56, 10.18]	[-12.62, -4.80]	[-27.56, 10.18]	825
<i>C. Selection: resold, unchanged, and no later improvement on the roll</i>									
Floods of 2003 to 2024	3.0	3.9	-0.86 (0.69)	-12.00 (3.61)	[-22.42, -2.34]	[-32.17, 9.64]	[-21.16, -4.54]	[-31.12, 7.81]	564
without the floods of 2024	4.0	5.6	-1.61 (0.76)	-10.47 (3.73)	[-22.93, 1.25]	[-33.27, 12.72]	[-18.29, -2.97]	[-32.70, 12.08]	468

Notes: Population at risk under the common definition, heavy floods of 2003 to 2024; weights, outcome and trimming as in Table 4 of the paper. Columns 1 and 2: the share of homes at risk that are selected under the definition of the panel. Column 3: their difference in percentage points. Column 4: the difference in mean excess price change between selected flagged and unflagged homes. Columns 5 and 6: bounds and their 95 percent interval under the assumption that a flag weakly lowers resale. Column 7: the interval under the assumption that a flag weakly raises resale. Column 8: the interval for the union of the two sets of bounds. Standard errors and intervals from 999 samples of counties drawn with replacement, with the critical value of Imbens and Manski (2004). The rows for 24, 36 and 60 months use floods observed for that long and count a home as resold if its second sale falls within the window.

H Area comparisons: by storm, and tracts defined by claims

Table A34 is the full version of panel A of Table 5 of the paper: the area comparison with the inundated share of the block group as a continuous dose, the specification fixed as primary before estimation. The stack holds, for each storm, the homes with no water at the parcel in block groups with at least one parcel at 1 ft or more, with the share as their dose, and the homes of never-inundated block groups of the same county at a dose of zero. Most block groups with some inundation have small shares; the share is 10 percent or more for 18 percent of the treated pairs of Ian and 21 percent of those of Helene. By storm the slope is negative for each of the six storms and distinguishable from zero for Ian, Idalia and Helene; the slope before the storm differs from zero for five of the six storms, with both signs. For Ian and Idalia it is as large as the slope after the storm, so the estimates for single storms do not date the difference to the storm, and the pooled slope before the storm is near zero because the signs offset. With the square of the share the linear term is -7.60 (s.e. 4.15) and the squared term 5.31 (s.e. 7.29) per unit of the share, and the implied difference at a share of 25 percent, -1.57 log points (s.e. 0.71), is close to that of the linear specification, -1.35 . In bins of the share, the coefficient after the storm is -1.17 log points below 10 percent, -1.44 from 10 to 25 percent, -3.32 from 25 to 50 percent and -2.75 at 50 percent or more, and the coefficients for the years before the storm are positive in every bin: against the never-inundated comparison, block groups with any inundation were priced higher in the earlier years than in the year before the storm. That difference before the storm is common to the bins and does not rise with the share, which is why the slope before the storm in panel A is not distinguishable from zero. Table A35 gives the binned comparisons at the thresholds of 10 and 25 percent, with the estimates by storm. Table A36 reports a comparison that does not use the depth sources and covers every flood year from 2003: census tracts whose first qualifying flood since 1978 put claims on at least 5 percent of parcels, against the five tracts of the same county with no qualifying flood that are nearest in earlier claims, assessed value per home, improvement share and building age. Pooled over the flood-year cohorts, homes in those tracts sell 5.98 log points lower in years 0 to 4 (s.e. 1.91; wild-bootstrap $p = 0.058$). Within the cohort of 2022 the estimate comes from Lee County: it is -8.26 log points there (s.e. 1.71) and 1.83 (s.e. 1.78) in the other counties flooded in 2022. Without the cohorts of 2022 and 2024 the pooled estimate is -3.85 (s.e. 1.97).

Table A34: Homes with no water at the parcel and the inundated share of the block group (log points)

	Before (years -6 to -2)	Years 0 to 4 after	Wild-bootstrap <i>p</i>	Block groups	Pairs sold after	Counties
<i>A. Slope on the inundated share, per 10 percentage points (homes with no water at the parcel)</i>						
All storms	-0.17 (0.18)	-0.54 (0.23)	0.041	8,051	488,318	46
without Lee County	-0.23 (0.19)	-0.50 (0.26)	0.085	7,598	449,491	45
without the storms of 2024	-0.38 (0.17)	-0.64 (0.28)	0.047	7,706	431,939	45
block groups with some inundation only	-0.48 (0.17)	-0.38 (0.21)	0.11	8,050	488,168	45
<i>B. Leaving one storm out</i>						
Without Irma 2017	-0.27 (0.18)	-0.50 (0.25)	0.057	7,966	404,789	46
Without Michael 2018	-0.18 (0.18)	-0.52 (0.23)	0.047	8,030	486,723	46
Without Ian 2022	0.17 (0.30)	-0.51 (0.31)	0.14	5,360	245,300	46
Without Idalia 2023	-0.10 (0.17)	-0.54 (0.23)	0.045	7,883	384,521	46
Without Helene 2024	-0.29 (0.17)	-0.56 (0.22)	0.030	7,973	475,679	45
Without Milton 2024	-0.22 (0.17)	-0.60 (0.28)	0.056	7,841	445,545	46
<i>C. By storm (standard errors clustered by census tract)</i>						
Irma 2017	0.98 (0.43)	-0.13 (0.34)	—	1,030	83,529	10
Michael 2018	2.46 (0.88)	-1.22 (1.91)	—	22	1,595	1
Ian 2022	-0.56 (0.15)	-0.58 (0.13)	—	6,782	243,018	33
Idalia 2023	-0.57 (0.26)	-0.58 (0.28)	—	3,470	103,797	38
Helene 2024	0.60 (0.24)	-0.81 (0.35)	—	1,115	12,639	24
Milton 2024	0.06 (0.22)	-0.22 (0.27)	—	3,222	42,773	37
Ian, Lee County	-1.63 (0.38)	-1.01 (0.37)	—	255	6,891	1
Ian, other counties	-0.43 (0.17)	-0.52 (0.14)	—	6,527	236,127	32
<i>D. With the square of the share (coefficients per unit of the share and of its square)</i>						
Share	-2.17 (3.63)	-7.60 (4.15)	0.098			
Share squared	1.09 (5.25)	5.31 (7.29)	0.49			
Implied at a share of 10 percent		-0.71 (0.36)				
Implied at a share of 25 percent		-1.57 (0.71)				
Implied at a share of 50 percent		-2.47 (1.15)				
<i>E. Bins of the share, one regression (log points)</i>						
Under 10 percent	2.51 (0.41)	-1.17 (0.53)	0.067			
10 to under 25 percent	1.45 (0.57)	-1.44 (0.77)	0.098			
25 to under 50 percent	1.00 (0.87)	-3.32 (1.00)	0.010			
50 percent or more	1.86 (0.88)	-2.75 (1.72)	0.15			
<i>F. Placebo: never-inundated block groups with a randomly assigned share (per 10 percentage points)</i>						
Mean and standard deviation of the slope over 499 draws		0.01 (0.11)		6,683	1,182,435	
2.5th and 97.5th percentiles		[-0.20, 0.23]				
share of draws with a slope as large as the estimate		0.000				
share of draws with a <i>t</i> ratio as large as the estimate's		0.076				
share of draws with $ t > 1.96$		0.124				

Notes: Stacked repeat-sales event study of equation (4) of the paper, one stack per storm, with the event-time terms multiplied by the inundated share of the block group (the share of linked single-family parcels with 1 ft of water or more in the storm). Treated: pairs of homes with no water at the parcel in block groups with at least one parcel at 1 ft or more. Comparison: pairs of homes in block groups of the same county with no parcel at 1 ft or more in any of the storms, under 2 percent of parcels with any water in the storm, and no qualifying NFIP flood; their share is zero. Panels A to C: coefficients per 10 percentage points of the share. Panel A, last row: treated pairs only. Panel D: per unit of the share and of its square, and the implied difference at three shares. Panel E: indicators for bins of the share in place of the share. Before: years -6 to -2; after: years 0 to 4; the year before the storm is omitted. Standard errors clustered by county in parentheses, by census tract in panel C; *p*: wild cluster bootstrap with the null imposed. Panel F: the comparison pairs only; every never-inundated block group receives the share of a block group drawn at random, with replacement, from the block groups with some inundation in the same storm, and the slope of panel A is re-estimated.

Table A35: Homes in inundated block groups against never-inundated block groups of the same county: thresholds of the inundated share, by storm (log points)

	Before (years −6 to −2)	Years 0 to 4 after	Wild-bootstrap <i>p</i>	Tracts	Pairs sold after	Counties
<i>A. Homes with no water at the parcel, in block groups where 10 percent of homes or more had 1 ft</i>						
All storms	1.46 (0.70)	−2.01 (1.02)	0.092	1,687	72,938	42
without Lee County	1.38 (0.72)	−2.03 (1.04)	0.094	1,557	67,556	41
without the storms of 2024	1.14 (0.60)	−2.25 (1.15)	0.10	1,474	62,685	37
and no assessment flag	1.44 (0.71)	−1.72 (0.94)	0.11	1,687	71,540	42
<i>B. By storm (standard errors clustered by census tract)</i>						
Irma 2017	1.23 (1.31)	−1.12 (1.26)	–	174	9,473	10
Michael 2018	8.40 (4.33)	−6.80 (7.50)	–	4	143	1
Ian 2022	1.06 (0.55)	−2.40 (0.56)	–	1,259	44,435	32
Idalia 2023	1.21 (0.79)	−2.92 (0.81)	–	412	8,634	20
Helene 2024	3.14 (1.43)	−1.89 (1.18)	–	243	2,406	16
Milton 2024	1.93 (0.65)	−1.36 (0.70)	–	584	7,833	31
Ian, Lee County	−0.12 (4.11)	−20.42 (4.60)	–	77	2,007	1
Ian, other counties	1.07 (0.55)	−2.34 (0.56)	–	1,182	42,428	31
<i>C. Leaving one storm out</i>						
Without Irma 2017	1.48 (0.70)	−2.27 (0.95)	0.022	1,639	63,465	42
Without Michael 2018	1.45 (0.70)	−1.96 (1.02)	0.099	1,683	72,795	41
Without Ian 2022	1.83 (1.13)	−1.64 (1.27)	0.23	900	28,503	41
Without Idalia 2023	1.50 (0.68)	−1.86 (1.05)	0.12	1,649	64,304	42
Without Helene 2024	1.32 (0.60)	−2.07 (1.02)	0.076	1,640	70,532	38
Without Milton 2024	1.34 (0.73)	−2.15 (1.12)	0.098	1,534	65,105	41
<i>D. Other groups of homes of the same block groups</i>						
Homes with 1 ft of water or more	1.49 (0.95)	−7.37 (3.13)	0.024	1,592	39,370	39
without Lee County	1.28 (0.97)	−7.61 (3.20)	0.023	1,436	27,746	38
All homes	1.27 (0.72)	−3.95 (1.75)	0.053	1,737	124,584	42
<i>E. Block groups where 25 percent of homes or more had 1 ft</i>						
Homes with no water, all storms	1.23 (1.24)	−3.73 (1.24)	0.007	662	14,708	35
without Lee County	0.89 (1.28)	−3.83 (1.28)	0.011	577	13,078	34
Homes with 1 ft or more, all storms	1.10 (1.16)	−10.84 (4.06)	0.017	718	27,907	35

Notes: Stacked repeat-sales comparison of equation (4) of the paper, one stack per storm with a depth source. Treated: pairs of homes with depth known in block groups where at least 10 percent (panels A to D) or 25 percent (panel E) of linked single-family parcels had 1 ft of water or more in the storm. Comparison: as in Table A34. Before: average coefficient for years −6 to −2; after: years 0 to 4; the year before the storm is omitted. A positive coefficient before the storm means that the treated homes were priced higher in those years than in the year before the storm, relative to the comparison. Standard errors clustered by county in parentheses; *p*: wild cluster bootstrap with the null imposed. Panel B: one stack per row, standard errors clustered by census tract. Panel D: other groups of homes of the treated block groups at the 10 percent threshold. Tracts, pairs and counties: treated units with a sale on each side of the storm.

Table A36: Heavily flooded tracts defined by claims, by flood-year cohort, leaving one cohort out, and on common horizons (log points)

	Flooded tracts	Counties	Pairs sold after the flood	Before, all homes	After, all homes	After, homes not written down
<i>A. One flood-year cohort at a time (census tracts as clusters)</i>						
2004 (Charley, Frances, Ivan, Jeanne)	9	5	444	-3.51 (1.63)	-4.44 (2.21)	-4.32 (2.19)
2005 (Dennis, Katrina, Wilma)	2	1	0	—	—	—
2016 (Hermine, Matthew)	5	4	99	-6.49 (4.18)	-1.77 (3.82)	-1.69 (3.73)
2017 (Irma)	1	1	0	—	—	—
2018 (Michael)	1	1	74	-2.63 (6.94)	-1.13 (4.68)	-3.10 (3.97)
2020 (Sally, Eta)	2	2	88	7.12 (2.99)	-0.87 (2.67)	-0.78 (2.73)
2022 (Ian, Nicole)	31	4	1,584	-1.52 (1.64)	-7.41 (1.60)	-7.15 (1.59)
2023 (Idalia)	4	2	94	-6.11 (4.70)	-1.12 (1.31)	-0.60 (1.31)
2024 (Debby, Helene, Milton)	26	4	218	1.09 (1.72)	-5.21 (3.32)	-1.35 (2.69)
2022, Lee County	26	1	1,427	-1.38 (1.83)	-8.26 (1.71)	-7.94 (1.70)
2022, other counties	5	3	157	-2.62 (0.88)	1.83 (1.78)	1.21 (1.83)
<i>B. All cohorts but one (counties as clusters; wild cluster bootstrap p in brackets)</i>						
Every cohort	81	21	2,601	-1.49 (0.46)	-5.98 (1.91) [0.058]	-5.52 (1.99) [0.067]
without 2004	72	17	2,157	-1.41 (0.49)	-6.47 (1.48) [0.095]	-5.85 (1.72) [0.10]
without 2005	79	20	2,601	-1.48 (0.46)	-5.89 (1.94) [0.081]	-5.44 (2.02) [0.099]
without 2016	76	17	2,502	-1.23 (0.35)	-6.05 (1.93) [0.090]	-5.59 (2.02) [0.11]
without 2017	80	20	2,601	-1.51 (0.46)	-6.04 (1.86) [0.052]	-5.58 (1.94) [0.052]
without 2018	80	20	2,527	-1.50 (0.46)	-6.04 (1.88) [0.056]	-5.58 (1.96) [0.056]
without 2020	79	20	2,513	-1.66 (0.54)	-6.02 (1.94) [0.084]	-5.55 (2.04) [0.12]
without 2022	50	18	1,017	-1.73 (1.43)	-3.67 (1.55) [0.039]	-2.65 (1.45) [0.048]
without 2023	77	21	2,507	-1.29 (0.51)	-6.18 (1.86) [0.063]	-5.74 (1.92) [0.065]
without 2024	55	18	2,383	-1.91 (0.57)	-6.16 (1.98) [0.092]	-5.98 (1.85) [0.086]
without 2022 and 2024	24	15	799	-3.81 (1.58)	-3.85 (1.97) [0.073]	-3.65 (1.92) [0.068]
cohorts before 2022	20	14	705	-3.12 (2.41)	-4.18 (2.28) [0.090]	-4.08 (2.25) [0.080]
<i>C. Common horizons: cohorts observed for every year of the horizon (average of the yearly coefficients)</i>						
Floods through 2020, years 0 to 4	20	14	705	-3.18 (2.07)	-4.72 (2.81)	-5.06 (3.05)
without Lee County	19	13	643	-3.17 (2.25)	-2.63 (1.49)	-2.81 (1.59)
Floods through 2022, years 0 to 2	51	17	2,289	-1.92 (0.38)	-6.95 (1.41)	-6.79 (1.30)
without Lee County	24	16	800	-2.65 (1.62)	-3.01 (1.86)	-2.95 (1.94)
Floods through 2023, years 0 and 1	55	18	2,383	-2.16 (0.40)	-5.85 (1.83)	-5.42 (1.65)
without Lee County	28	17	894	-3.28 (1.09)	-1.70 (1.22)	-1.62 (1.15)
<i>D. Tracts with claims on under 5 percent of parcels, common horizons, all homes</i>						
Floods through 2020, years 0 to 4	452	48	49,987	-0.54 (0.49)	-0.13 (0.41)	
Floods through 2022, years 0 to 2	572	51	56,610	-0.65 (0.44)	-0.10 (0.30)	
Floods through 2023, years 0 and 1	596	51	57,067	-0.71 (0.42)	0.10 (0.29)	

Notes: Stacked repeat-sales event studies around the tract’s first qualifying flood since 1978, with the estimator of equation (4) of the paper; tracts with claims on 5 percent of parcels or more in the year of the flood (panels A to C) or under 5 percent (panel D). Controls: the five tracts of the county with no qualifying flood since 1978 nearest to each flooded tract in claims per 100 parcels through the year before the flood, just value per home, the improvement share of just value and the median year built on the roll of the year before the flood. “Before”: years -6 to -2 ; “After”: years 0 to 4 . Panel A: one regression per cohort, standard errors clustered by census tract; no estimate is shown where fewer than 30 pairs of sales span the flood. Panel B: all cohorts but the one named, standard errors clustered by county, wild cluster bootstrap p -value in brackets. Panels C and D: averages of year-by-year coefficients on the cohorts observed for every year of the horizon.

I Mortgage aggregates

Table A37 compares Home Mortgage Disclosure Act (HMDA) records and recorded sales by census tract and year. A treated tract-event has a block group with a heavy flood in year g and no qualifying flood in the three years before. Controls are the five tracts of the same county with no qualifying flood since 1978 that are nearest in earlier claims, assessed value, improvement share and mortgage decisions. Stacks span the years $g - 3$ to $g + 3$, with tract and county-by-year effects, weights equal to the tract's mean number of lending decisions before the flood, and year -1 omitted. The sample is the 1,389 tracts whose identifier is the same in the 2000, 2010 and 2020 census vintages and whose land area maps to itself by at least 99 percent, because the mortgage files and the rolls report different vintages in different years.

The first outcome is $100(1 - O/S)$, where O counts home-purchase originations and S recorded sales, bounded at 0 and 100 for tract-years with at least ten recorded sales. Originations and sales are not linked loan by loan, and the two sources need not cover the same purchases, so the index is not an observed share of cash purchases. It rises by 3.26 points after a heavy flood (s.e. 1.41), by 2.69 (s.e. 1.26) when the incomplete sale year 2025 is left out, by 8.38 in Lee County and by 2.10 (s.e. 1.21) elsewhere. The estimates for the denial rate, the loan amount, the combined loan-to-value ratio and the rate spread are small and imprecise.

Table A37: Recorded sales, mortgage originations and loan terms in tracts with a heavy flood, against matched never-flooded tracts of the county

	Before (years $-3, -2$)	After (years 0 to 3)	Flooded tract-events
<i>A. Origination-to-sales gap index (points), floods of 2013 to 2024</i>			
All heavy floods	−0.06 (1.12)	3.26 (1.41)	163
floods of 2013 to 2021	−0.21 (1.77)	2.66 (1.87)	47
floods of 2022 to 2024	0.00 (1.48)	3.44 (2.24)	116
Lee County	2.96 (1.96)	8.38 (1.56)	23
other counties	−0.47 (1.23)	2.10 (1.21)	140
sale years through 2024	−0.14 (1.15)	2.69 (1.26)	163
controls: all never-flooded tracts of the county	−0.42 (1.06)	4.16 (1.73)	163
<i>B. Volumes, floods of 2013 to 2024 ($\log \times 100$)</i>			
Applications per recorded sale	−0.20 (2.33)	−5.09 (2.73)	163
Originations per recorded sale	0.51 (2.38)	−6.07 (3.29)	163
Home-purchase applications	2.21 (2.14)	−1.03 (4.15)	163
Recorded sales	2.42 (2.17)	4.06 (2.37)	163
<i>C. Terms of the loans</i>			
Denial rate (percentage points), floods of 2010 to 2024	−0.15 (0.48)	0.42 (0.42)	170
Loan amount ($\log \times 100$), floods of 2010 to 2024	−0.53 (1.26)	−1.50 (1.16)	170
Combined loan-to-value ratio (points), floods of 2021 to 2024	−0.68 (0.38)	−0.63 (0.76)	117
Rate spread (percentage points), floods of 2021 to 2024	−0.03 (0.03)	0.05 (0.03)	117

Notes: Stacked event studies by census tract and year, on tracts unchanged across the 2000, 2010 and 2020 vintages. “Before”: mean of the coefficients for years -3 and -2 ; “After”: mean for years 0 to 3; year -1 is the reference. Panel A: $100 \times (1 - \text{home-purchase originations} / \text{recorded sales})$, tract-years with at least ten recorded sales, bounded at 0 and 100; tracts with at least five recorded sales in every year of the stack. Recorded sales begin in 2010, the mortgage files in 2007 and the loan-to-value ratio and rate spread in 2018, and each row uses the floods observed from $g - 3$. Standard errors clustered by county; for Lee County alone, by census tract.

J Replication

The replication files hold the analytic extracts with anonymous parcel keys: the pair file, the population at risk by flood year, the stacked rows of the tract comparison, the parcel-level extract of the independent measures, the permits, and the tract panels of the mortgage aggregates. One command, `bash code/jrefe/jrefe_master.sh`, re-estimates from them every table of the paper and of this Online Resource, writes the file from which the text reads every number, and builds the documents. Tables A39 and A40 list the script behind each table. The scripts that build the extracts from the public files, including the parcel identity of Section A, are included; they need the downloads listed in `SOURCES.txt` and are

not run by the build.

Table A38 compares the estimates of a clean build with those of the same scripts on the machine that holds the rolls, and the estimates from the extracts with estimates obtained there from the parcel-level files. Over 20,575 statistics the largest scaled difference between the two machines is below 10^{-6} . The scripts for the independent measures were run on the extracts only.

Table A38: Agreement of the estimates across machines and with the parcel-level files

Estimate file	Statistics compared	Largest scaled difference
<i>A. The same scripts on the extracts: clean build against the author's machine</i>		
Reconciliation counts (rep_a_ledger.py)	533	0
Flag and claims rate, aligned samples (main)	2,631	$1.7\text{e}-13$
By the year of the second sale (timing)	1,086	$1.3\text{e}-13$
Decade of construction; block-group-event effects (bge)	4,838	$9.6\text{e}-12$
Storm groups, later improvement, size of the write-down (extra, status2)	2,309	$3.9\text{e}-12$
Follow-up on common windows (rep_c_followup.py)	2,479	$2.6\text{e}-12$
Selection bounds, 999 county draws (rep_d_bounds.py)	2,020	$1.1\text{e}-15$
Tract comparison by cohort and horizon (rep_e_area.py)	4,679	$8.8\text{e}-14$
<i>B. Estimates from the extracts against estimates from the parcel-level files</i>		
Reconciliation counts (jrefe_j37a_extract.py)	330	0
Tract comparison, three-period coefficients, 46 regressions (jrefe_j37e_area.py)	802	$7.6\text{e}-07$
Tract comparison, yearly paths, 20 regressions	3,260	$3.3\text{e}-07$

Notes: Panel A: every numerical entry of the estimate files written by the scripts named, from a clean build on the extracts and from the same scripts and extracts on the machine that holds the rolls; the scaled difference is the absolute difference over the larger of one and the two absolute values. Panel B: the reconciliation counts and the tract regressions computed from the extracts against the same quantities computed from the parcel-level files before the extracts were cut.

Table A39: Tables on parcel identity, the assessment flag, the tract comparison and the mortgage aggregates: scripts and sources

Table	Script	Source of the estimates	Status
Table A1	make_keys.py	computed in the build from reports of the machine that holds the rolls (work/keys)	A
Table A2	make_keys.py	this build; column for the key of each roll from the stored estimates of the earlier build (work/keys)	E/S
Table A3	rep_a_ledger.py	re-estimated from the extracts in every build	E
Table A4	rep_a_ledger.py	re-estimated from the extracts in every build	E
Table A25	rep_b_main.py (main, timing, extra)	re-estimated from the extracts in every build	E
Table A26	rep_b_main.py (extra)	re-estimated from the extracts in every build	E
Table A27	rep_b_main.py (main, bge)	re-estimated from the extracts in every build	E
Table A28	rep_c_followup.py	re-estimated from the extracts in every build	E
Table A29	rep_c_followup.py	re-estimated from the extracts in every build	E
Table A33	rep_d_bounds.py	re-estimated from the extracts in every build	E
Table A36	rep_e_area.py	re-estimated from the extracts in every build	E
Table A37	jrefe_tract_panel.py, jrefe_hmda_r12.py, make_lending.py	re-estimated in every build from the tract panels in data/extracts	E
Table A38	verify_repair.py	estimate files of the two machines	E
Table A39	make_repair.py	this list	–

Notes: E: re-estimated from the extracts in every build. A: computed in the build from reports written on the machine that holds the rolls. S: stored estimates of the earlier build, used only in the first column of Table A2.

Table A40: Tables on the independent measures: scripts and sources

Table	Script	Source of the estimates	Status
Table A5	nd_b_validate.py	re-estimated from the extracts in every build	E
Table A6	nd_b_validate.py	re-estimated from the extracts in every build	E
Table A8	make_newdata.py	computed in the build from the high-water-mark checks of the machine that holds the downloads (work/newdata/reports)	A
Table A12	nd_b_validate.py	re-estimated from the extracts in every build	E
Table A9	nd_b_validate.py	re-estimated from the extracts in every build	E
Table A13	nd_b_validate.py	re-estimated from the extracts in every build	E
Table A14	nd_a_depth.py (main, bge)	re-estimated from the extracts in every build	E
Table A19	nd_a_depth.py (race)	re-estimated from the extracts in every build	E
Table A21	nd_a_depth.py (later)	re-estimated from the extracts in every build	E
Table A22	nd_a_depth.py (laterstorm)	re-estimated from the extracts in every build	E
Table A23	nd_f_match.py	re-estimated from the extracts in every build	E
Table A32	nd_c_bounds.py	re-estimated from the extracts in every build	E
Table A30	nd_g_select.py	re-estimated from the extracts in every build	E
Table A31	nd_g_select.py; nd_c_bounds.py	re-estimated from the extracts in every build	E
Table A20	nd_d_repair.py; nd_a_depth.py (repair)	re-estimated from the extracts in every build	E
Table A24	nd_a_depth.py (repair, repair2)	re-estimated from the extracts in every build	E
Table A10	make_newdata.py; nd_d_repair.py	source summaries of the machine that holds the downloads; coverage re-estimated from the extracts	A
Table A11	make_newdata.py; code/permit_search	the search log of 7 October 2026, in work/newdata/reports	–
Table A35	nd_e_area.py	re-estimated from the extracts in every build	E
Table A34	nd_h_dose.py	re-estimated from the extracts in every build	E
Table A16	nd_a_depth.py (main, robust)	re-estimated from the extracts in every build	E
Table A15	nd_a_depth.py (storm)	re-estimated from the extracts in every build	E
Table A17	nd_a_depth.py (placebo)	re-estimated from the extracts in every build	E
Table A18	nd_a_depth.py (field)	re-estimated from the extracts in every build	E
Table A7	make_newdata.py	the retrieval logs of the machine that holds the downloads (work/newdata/reports/manifest_r17.jsonl, manifest_r18.jsonl)	–
Table 1	nd_b_validate.py	re-estimated from the extracts in every build	E
Table 2	nd_a_depth.py (main, bge, later)	re-estimated from the extracts in every build	E
Table 3	nd_a_depth.py (timing, race)	re-estimated from the extracts in every build	E
Table 4	nd_g_select.py; nd_c_bounds.py	re-estimated from the extracts in every build	E
Table 5	nd_h_dose.py; nd_e_area.py	re-estimated from the extracts in every build	E
Table A40	make_newdata.py	written in the build	–

Notes: E: re-estimated from the extracts in every build. A: computed in the build from reports written on the machine that holds the downloads. Labels beginning with M refer to tables of the paper.

References

Imbens, G. W., & Manski, C. F. (2004). Confidence intervals for partially identified parameters. *Econometrica*, 72(6), 1845–1857. <https://doi.org/10.1111/j.1468-0262.2004.00555.x>