At War with the Weather
Managing Large-Scale Risks in a New Era of Catastrophes

Howard C. Kunreuther and Erwann O. Michel-Kerjan
with Neil A. Doherty, Martin F. Grace, Robert W. Klein, and Mark V. Pauly

The MIT Press
Cambridge, Massachusetts
London, England
Index

Actuarially fair premiums, 121, 136–138
Actuarial rates and, 84–85, 96, 258–259
Actuaries
  decision making and, 129, 132–135
  financial soundness and, 112, 347–348
  insurers’ decision making and, 129–150 (see also Insurers)
  rate increases and, 35, 46
  risk ambiguity and, 129, 132–135
Adjustable-premium contracts (APCs), 341–342
Adverse selection, 84, 131, 135, 147
Affordability, xiv, 379n17
  adjustable-premium contracts (APCs) and, 341–342
  all-hazards insurance and, 343–346
American Housing Survey (AHS)
  affordability issues and, 235–236, 238–239, 242, 246
  policy analysis and, 276, 278
  status quo analysis and, 276, 278
American International Group (AIG), 182, 354, 373n26
Anxiety reduction, 124–126
Army Corps of Engineers, 262
Auctioned reinsurance contracts, 333
Auto insurance, 100
Average annual loss (AAL), 156–158, 228–229, 274, 286, 303

Banks
  homeowners and, 124
  innovation and, 339–340
  insurance-linked securities (ILS) and, 184, 188
  catastrophes and, 4, 13, 16–17, 23
Base Flood Elevations, 113–115
homeowners’ insurance and, 208, 210, 215–216, 218, 222, 231
market concentration and, 65–66, 275–276
Mission Task Force and, 46
Personal Lines Account (PLA) policies and, 48–49
policy analysis and, 271, 275–276
reinsurance market and, 167
residual market regulation and, 44–50
status quo analysis and, 280, 288, 291
unit elastic demand and, 203
Clearing prices, 198–201
Climate change, 3, 11–13, 85, 357
Coastal hurricane zones, 333, 347–348
Coastal residents, 8–9, 27, 132, 153, 369n8
all-hazards insurance and, 343–346
catastrophe models and, 155–159
Citizens Property Insurance Corporation and, 44–45
coastal hurricane zones and, 333, 347–348
correlated risks and, 136
increased insurance rates and, 59
information-sharing equity and, 346
nonrenewing policies and, 39–40
Omnibus Coastal Property Insurance Reform Act and, 264
special flood hazard areas (SFHAs) and, 86
Texas Windstorm Insurance Association and, 271, 276, 284–288
undiversifiable catastrophe risk and, 199–200
Coinsurance
moral hazard and, 135–136
pro rata, 152, 174
quota-share, 152, 174, 182
Collateralized debt obligation (CDO), 184
Commissioners
fines and, 28–29
homeowners’ insurance and, 206
nonrenewal notices and, 39–40
National Association of Insurance Commissioners (NAIC), 28, 31, 78, 206, 372n13
regulation and, 28–30 (see also Regulation)
Committee on Financial Markets, 359
Community rating system (CRS), 92, 95–96, 252–253
Competitive market analysis, 271
assumptions for, 295–299
corporate bonds, 186
cost functions, 60–61
Coverage
“acts of God,” 42
affordability and, 336–338 (see also Affordability)
all-hazards insurance and, 343–346
availability of, 74–76, 161–171
catastrophe bonds and, 176–181
competitive market analysis and, 271, 295–303
deductibles and, 76–77 (see also Deductibles)
determining whether to provide, 130–131, 153–154
distribution of provisions, 76–77
Florida flood insurance, 96–101
homeowners’ insurance and, 217–218, 221–231
industry loss warranties and, 174–176
insurability concept and, 130–131
insurance-linked securities (ILS) and, 173–191
insurers’ decision making and, 129–150
limitation by reinsurers and, 161–165
long-term insurance (LTI) contracts and, 338–343
loss capacity and, 165–166, 317–329
market performance/conduct issues and, 70–74
maxima limits of, 97–99
moral hazard and, 135–136
National Flood Insurance Program (NFIP) statistics, 87–91
recent reinsurance market trends and, 161–171
reinsurers’ decision making and, 151–171
sidecars and, 174, 181–183
state differences in, 269
status quo analysis and, 276–295
structural damage and, 248–249
survival constraint and, 130–131, 153–154
Temporary Emergency Additional Coverage Options (TEACO) and, 275, 282, 284
building codes and, 17, 247, 251–255, 261–265
C-4 Basin Project and, 266–267
costs damage and, 98, 248–249
flood insurance rate maps (FIRMs) and, 84–85
floodplain resettlement and, 260, 262
grandfathered structures and, 254
homeowners and, 247 (see also Homeowners)
levee effect and, 259
Miami Children’s Hospital (MCH) and, 267–268
mitigation grants and, 247, 250–251, 253, 267
National Institute of Building Science and, 250
natural disaster syndrome and, 262–263
panel systems and, 267–268
risk reduction measures and, 247–268
seawalls and, 260
special flood hazard areas and, 86, 103–105
structural damage and, 248–249
wind damage and, 248–249 (see also Wind)
Contents damage, 98, 248–249
Cooling degree days (CDDs), 377n17
Construction and real estate, 13, 16
better zoning ordinances and, 264–265
Five-pillar strategy
behavioral biases and, 355
bonus systems and, 356
catastrophe risk management and, 355–356
choice heuristics and, 355
exceedance probability (EP) curves and, 353–354
interdependencies and, 354, 356
problem characterization and, 352–353
risk assessment and, 353–354
scenario construction and, 353–354, 356
Fixed-price contracts (FPCs), 341–342
Flex rating systems, 32
Flood Disaster Protection Act, 86
Flood insurance
buyer characteristics, 93–96
choice changes in, 83
claim payment factors and, 102–104
competitive market analysis and, 295–299
cost evolution of, 104–108
decision making theory and, 124–125
deductible choice and, 99–101
flood zone definitions and, 94–96, 102, 105, 113–115
Florida and, 92–108
historical perspective on, 84–86
impact of extreme events and, 101–102, 111–112
individual behavioral bias and, 85–86
National Flood Insurance Program (NFIP) and, 87–108 (see also National Flood Insurance Program (NFIP))
premises and, 84
special flood hazard areas (SFHAs) and, 86, 103–105
take-up rates for, 85
Write-Your-Own program and, 83–85, 108
Flood insurance rate maps (FIRMs), 84–85, 113
Floods, xv, 13
“acts of God” and, 42
adverse selection and, 135
all-hazards insurance and, 343–346
C-4 Basin Project and, 266–267
economic effects of, 4–7, 373n18
emotional response and, 124–125
five-pillar strategy for, 352–356
floodplain resettlement and, 260, 262
homeowners’ insurance and, 236
levee effect and, 259
mitigation grants and, 247, 250
natural disaster syndrome and, 262–263
property drainage and, 248–249
risk ambiguity and, 132–135
risk reduction measures and, 266–268
seawalls and, 260
taxpayer costs and, 84
wind-water controversy and, 25–26, 41–43
FloodSmart campaign, 87
Florida, xiii, xv, 3, 13, 57–58, 61, 81, 151
affordability issues and, 238–239, 246
American Housing Survey and, 235
building codes and, 253–255
C-4 Basin Project and, 266–267
catastrophe models and, 144–146, 155–159
Citizens Property Insurance Corporation and, 18, 62
(see also Citizens Property Insurance Corporation)
competitive market analysis and, 295–303
coverage amounts in, 96–101
deductible choices in, 99–101
exceedance probability curves and, 143–144
exposure patterns in, 67, 70, 260
financial regulation and, 43–44
flood insurance and, 92–108
food stamp program and, 337
grandfathered structures and, 254
hazard-prone areas and, 9
homeowners’ insurance and, 203–217, 220–232
hurricane potential of, 269–270 (see also Hurricanes)
impact of catastrophes on consumer choice, 101–102
income elasticity and, 204
industry loss warranties and, 176
innovations for, 333–349
insurance rates in, 34–38, 59, 72, 74
insurers’ decision making and, 129–130
loss comparison data for, 307–311
market analysis of, 60–67, 77–81
market analysis of, 60–67, 77–81
metropolitan areas and, 295
Miami-Dade County, 17, 64, 67, 105, 130, 136, 143–148, 155, 267, 271, 295
National Flood Insurance Program (NFIP) and, 88, 92–108
policy analysis and, 271 (see also Policy analysis)
policy analysis and, 271 (see also Policy analysis)
political pressure in, 27
population growth in, 8–9
residual market mechanisms and, 26, 46–51
restructuring of property insurance markets and, 59
risk reduction measures and, 250–251, 253–255, 266–268
special flood hazard areas (SFHAs) and, 86, 103–105
State Board of Adminstration (SBA) and, 282–284
state funds and, 275–276
status quo analysis and, 280–284, 288–293
underwriting regulation and, 39
undiversifiable catastrophe risk and, 201
unit elastic demand and, 203
wind loss cost and, 41, 46, 317–318
Write-Your-Own program and, 85
Florida Building Code (FBC), 253–255
Florida Commission on Hurricane Loss Projection Methodology, 22
Florida Department of Community Affairs, 267
Florida Department of Financial Services, 253
Florida Hurricane Catastrophe Fund (FHCF), 19, 26, 36, 54–56
average annual loss (AAL) and, 156–158
catastrophe models and, 144–145, 147, 155–159
competitive market analysis and, 297
funding arrangements and, 282, 284
homeowners’ insurance and, 214
hurricane scenarios and, 269
Insurance Capital Build-Up Incentive Program and, 284
payout calculation and, 281–282
policy analysis and, 271, 274–275
reinsurance market and, 166–167
status quo analysis and, 279–284, 288, 291, 293
U.S. Hurricane Model and, 156
Florida Insurance Guaranty Association (FIGA), 19, 56
Florida Office of Insurance Regulation (FLOIR), 35, 39, 49
Allstate and, 371n15
homeowners’ insurance and, 206
hurricane risk analysis and, 67
policy analysis and, 275
Quality Supplemental Report (QUASR) system and, 67, 74
status quo analysis and, 281
Florida Residential Property and Casualty Joint Underwriting Association, 46
Florida Windstorm Underwriting Association, 46
FONDEN, 179
Food stamp program, 336–337
Forest fires, 5
French Caisse Centrale de Reassurance, 343
French minimum efficient scale (MES), 60–61
Geographic information systems (GIS), 141
Global Agenda Councils (GACs), 358–359
Globalization, 354–359
Global Risk Network, 357–359
Global Risks Report, 358
Global warming, 12
Grandfathered structures, 254
Green Tree Mutual Assurance Company, 339
Gron-Winter model, 194
Guaranty associations, 56–57
Gulf Coast, 9, 12, 41–43, 161. (see also Coastal residents
Guy Carpenter, 160–161, 163, 167, 169–171, 188
Hazard-prone areas, 74, 270
affordability issues and, 122
Base Flood Elevations and, 113–115
building codes and, 17, 247, 251–255, 261, 263–265
catastrophe models and, 141–148, 155–159
coastal hurricane zones and, 333, 347–348
disaster relief and, 122–124
five-pillar strategy and, 352–356
flood zone mapping and, 84–85, 94–95, 113–115
homeowners’ insurance and, 204 (see also Homeowners’ insurance)
increased development in, 8–11
innovations for, 333–349
land use regulations and, 17
levee effect and, 259
Hazard-prone areas (cont.)
NFIP flood zone definitions and, 94–96, 102, 105, 113–115
profit measurement and, 77–79
property values and, 3
reinsurers and, 20–21
restructuring of property insurance markets and, 59
risk management and, 20–21 (see also Risk management)
special flood hazard areas (SFHAs) and, 86, 103–105, 112, 124, 126
toxins and, 121
Hedge funds, 377n17
catastrophe funds and, 187 (see also Catastrophe funds)
insurance-linked securities and, 173–176, 181, 183, 187, 189
sidecars and, 174, 181–183, 188, 191
Herfindahl-Hirschman Index (HHI), 65–67
Homeowners, xv
all-hazards insurance and, 343–346
American Housing Survey (AHS) and, 235–239, 242, 246, 272, 276
budget heuristics and, 256–257
building codes and, 17, 247, 251–255, 261, 263–265
cost-benefit analysis and, 119
decision making theory and, 119–127
emotional consolation and, 124–126
expected utility theory and, 120
factors influencing insurance purchases, 121–124
federal poverty line and, 236, 238–241, 246
financial protection and, 125
flood insurance and, 84–85 (see also Flood insurance)
floodplain resettlement and, 260, 262
grandfathered structures and, 254
household income and, 237–246
impact of insurance status on welfare of, 235–246
information-sharing equity and, 346
interdependencies and, 261
learning failures and, 259–261
levee effect and, 259
long-term mortgages and, 339
Louisiana, 18, 42, 51, 88, 91
low-income energy assistance program and, 337
misperception of risk and, 121
mitigation grants and, 247, 250–251, 253, 267
moral hazard problems and, 120
natural disaster syndrome and, 262–263
nonrenewing policies and, 39–40
normative model of choice and, 120
Omnibus Coastal Property Insurance Reform Act and, 264
policy prices and, 71–74
property values and, 3, 83, 97, 99, 112, 119, 220, 261
relationship with insurance agent and, 124
residential exposure data and, 271, 274
risk reduction measures and, 247–268
risk underestimation by, 258–259
role of disaster relief and, 122–124
role of goals and, 124–126
Safe Drinking Water Act and, 242–243
social/cognitive norms and, 126, 261
status quo analysis and, 276–295
superstitions and, 260–261
temporal planning biases and, 257
underweighting the future and, 257–258
uninsured, 16, 235–241, 276–278
uninsured home value (UHV) and, 277–278
wind-water controversy and, 25–26, 41–43
Homeowners’ insurance
affordability issues and, 122, 235–246
average annual loss (AAL) and, 228–229
commissioners and, 206
company characteristics and, 211–216
competitive market analysis and, 295–303
costs and, 248–249
county-level analysis of, 206–217
coverage and, 217–218, 221–231
cross-price elasticity and, 210, 212–213
cross-state analysis of, 217–231
cross-subsidies and, 205–206
deductibles and, 120, 204–205, 217–221, 225–232, 246
demand equation estimation and, 208–209
direct premiums written (DPW) and, 295, 297
distribution systems and, 217–218
Florida and, 203–217, 220–232
housing characteristics and, 210–211
impact of premiums reflecting risk, 303–306
income elasticity and, 203–204
indicated loss cost (ILC) and, 218, 227, 229–230
innovations for, 333–349
insured home value (IHV) and, 278
lack of, 16, 235–241, 276–278
long run perspective and, 372n12
long-term insurance (LTI) contracts and, 338–343
Louisiana, 18, 42, 51, 88, 91
mortgages and, 208, 220–225, 235, 380n2
policy analysis and, 269–299 (see also Policy analysis)
postal-zone data and, 204, 206, 220
premiums and, 208–218, 221–231
price definition and, 217–218
price elasticity in, 221–231
quantity demanded, 218–220
rating agencies and, 205–206, 214
South Carolina and, 203–204, 220–221, 223, 225–226, 230–232
structural damage and, 248–249
supply and demand model for, 204–232
Texas and, 203–204, 216, 219–221, 232
total insured value (TIV) and, 274, 295, 303
unit elastic demand and, 203
Hood, Jim, Attorney General 42
HO-3 policies, 72, 76–77
Hurricane Andrew, 5–6, 17, 21, 170
correlated risks and, 136
disaster relief and, 123
Florida and, 18–19
market effects of, 77–80
reinsurance contract auctions and, 347
residual market regulation and, 48
Hurricane Camille, 17
Hurricane Celia, 284
Hurricane Charley, 5, 23, 102, 247, 253, 266
Hurricane Dennis, 102
Hurricane Dolly, 287
Hurricane Frances, 5, 23, 102, 268
Hurricane Hugo, 5
Hurricane Ike, 5, 80, 194, 260, 284–285, 287
Hurricane Ivan, 5, 23, 102
Hurricane Jeanne, 5, 23, 102, 268
Hurricane Katrina, xiii, 50, 80, 167, 194
all-hazards insurance and, 344–345
correlated risks and, 136
cost of, 102, 124, 132, 161
disaster relief and, 123–124
impact of extreme events and, 111–112
industry loss warranties (ILWs) and, 175–176
learning failures and, 260
Miami Children’s Hospital (MCH) and, 268
National Flood Insurance Program (NFIP) and, 87, 97, 108
new era of catastrophes and, 5, 9, 19, 21–23
policy claims and, 102, 108–111
prediction of, 356
reinsurers and, 20–21
risk ambiguity and, 132
risk reduction measures and, 253
sidecars and, 181–183
undiversifiable catastrophe risk and, 200
war against weather and, 351, 356
wind-water controversy and, 25–26, 41–43
Hurricane Rita, xiii, 50, 110, 136, 175
Hurricane Wilma, xiii, 102, 110, 175, 260, 268
Hurricanes, xv, 3, 20
all-hazards insurance and, 343–346
annual average of, 12
building codes and, 17, 247, 251–255, 261, 263–265
catastrophe bonds and, 177, 179
catastrophe models and, 141–148, 155–159
Category system of, 12
C-4 Basin Project and, 266–267
claim payment factors and, 102–104
climate change and, 11–13
coastal hurricane zones and, 333, 347–348
coverage lawsuits and, 25–26
disaster relief and, 123–124
disproportionate risk of metropolitan areas and, 269
economic impact of, 23, 102, 124, 132, 161, 173–174, 271
five-pillar strategy for, 352–356
Galveston, Texas, 260
increased reinsurance costs and, 173
increase of, xiii, 4–7, 351
Index of potential destructiveness for, 12
innovations for, 333–349, 335
insurer exposure patterns and, 67, 70
likelihood vs. intensity, 11–13
long-term intensity analysis of, 12–13
market analysis of risk of, 59–81
natural disaster syndrome and, 262–263
ocean temperatures and, 11–12
recent changes in impact of, 4–7
risk ambiguity and, 132–135
risk reduction measures and, 248–250, 265–268, 311–312
sidecars and, 181–183
status quo analysis and, 271, 276–295
Texas Windstorm Insurance Association and, 271, 276, 284–288
total dissipation power of, 12
undiversifiable catastrophe risk and, 199–200
wind damage and, 249–250 (see also Wind)
wind-water controversy and, 25–26, 41–43
Index–based derivatives, 173, 188
Indicated lost cost (ILC), 218, 227, 229–230, 379n21
Industry loss warranties (ILWs), 174–176, 191
Inflation, 6, 9, 97, 369n13
Innovations
adjustable-premium contracts (APCs) and, 341–342
affordability issues and, 333–338
all-hazards insurance and, 343–346
alternative risk transfer instruments (ARTs) and, 333
auctioned reinsurance contracts and, 333
coastal hurricane zones and, 333, 347–348
equity and, 333–336, 346
federal reinsurance contract auctions and, 347
fixed-price contracts (FPCs) and, 341–342
food stamp program and, 336–337
Global Risk Network and, 357–359
guiding principles for, 334–335
information-sharing platform and, 334, 346
insurance-linked securities (ILS) and, 346
long-term insurance (LTI) contracts and, 338–343
Low-Income Home Energy Assistance Program and, 337–338
national catastrophe fund and, 348–349
need for bold initiatives in, 357–359
 premiums reflecting risk and, 333–336
RECAP method and, 342
Universal Service Fund (USF) and, 337
vouchers and, 338
Institute for Business and Home Safety, 266, 277
Insurability, 130

Insurance. *See also specific type*

- contents damage and, 98, 248–249
- cost-benefit analysis and, 119
- cycle of, 194
- excess-of-loss, 175, 181
- factors affecting decision to buy, 119–127
- financial protection goals and, 125
- five-pillar strategy for, 352–356
- Global Risk Network and, 357–359
- innovations for, 333–349
- lack of, 16, 235–241, 276–278
- long-run perspective and, 70, 77, 80, 120, 231, 248, 335, 356, 372n12
- long-term insurance (LTI) contracts and, 338–343
- policy analysis and, 273–299 (*see also Policy analysis*)
- positive role of, 248
- pro rata, 152, 174
- quota-share, 152, 174, 182
- regulation and, 185 (*see also Regulation*)
- risk reduction measures and, 247–268
- structural damage and, 248–249
- supply and demand framework for, 193–201
- Insurance and Private Pensions Committee, 359
- Insurance Capital Build-Up Incentive Program, 284
- Insurance-linked securities (ILS)
  - catastrophe bonds and, 174–181, 186–188, 191
  - credit risk and, 186
  - derivatives and, 173, 183–184, 187–191
  - historical perspective on, 174–183
  - increase of, 190–191
  - industry loss warranties and, 174–176, 191
  - investors’ concerns and, 186–187
  - issuers’ concerns and, 185–186
  - market liquidity and, 346
  - new product innovation and, 188
  - pricing challenges of, 186
  - pro rata insurance and, 174
  - rating agencies and, 187
  - regulation and, 185–187
  - sidecars and, 174, 181–183, 188, 191
  - Solvency II and, 185–186
  - terrorism and, 179, 189
  - tipping point for, 187–191
  - tranching and, 177, 187–188
  - volatility dispersion and, 189, 191
  - weather derivatives and, 173, 184–185
- Insurance Services Office (ISO), 378n25, 379n21
- Building Code Effectiveness Grading Schedule (BCEGS) and, 251–253
- homeowners’ insurance and, 218, 221
- insurance-linked securities (ILS) and, 175
- market analysis and, 71, 77
- Insured home value (IHV), 278
- Insurers, xvi, 20–21. *See also Reinsurers*
  - actuarially fair premiums and, 136–138
  - adverse selection and, 84, 131, 135, 147
  - catastrophe models and, 141–148, 155–159
- commissioners and, 28–30
- competitive market analysis and, 295–303, 313–316
- correlated risks and, 136
- cost conditions and, 60–61
- cost of capital and, 136–138
- decision making for coverage and, 129–150
- exceedance probability curves and, 143–144, 146
- exclusion of terrorism and, 355
- exposure patterns and, 67, 70 (*see also Exposure*)
- fair rate of return and, 77, 136–138, 147, 303, 372n12
- five-pillar strategy for, 352–356
- guaranty associations and, 56–57
- homeowners’ insurance and, 203–232
- increased capital allocation and, 129–130
- insurability concept and, 130–131
- insurance-linked securities (ILS) and, 173–191
- investors and, 22
- lawsuits against, 25–26
- loading factor and, 138
- market concentration and, 60–67
- market performance/conduct issues and, 70–74
- minimum efficient scale and, 60–61
- moral hazard and, 44, 120, 131, 135–136, 147, 198
- negative profits and, 59
- price trends and, 71–74
- professional relationships of, 124
- profitability and, 77–79
- Property Insurers Association of America (PCIAA)
  - and, 72
- rate regulatory systems of, 32–33
- rating agencies and, 139–141, 149–150
- recent impact changes on, 4–7
- risk ambiguity and, 132–135 (*see also Risk management*)
- setting premiums and, 131–136
- single-state companies and, 40
- standard deviation and, 130, 145–146
- supply and demand framework for, 193–201
- survival constraint and, 130–131
- undiversifiable catastrophe risk and, 199–201
- wind-water controversy and, 25–26, 41–43
- Write-Your-Own program and, 83–85, 108–110, 374n43

Interdependencies

- five-pillar strategy and, 354–359
- need for bold initiatives, 357–359
- risk reduction and, 261, 266
- Interested parties, 23
- brokers, 21
- capital markets, 21
- construction and real estate, 13, 16
- federal government, 19–20
- financial institutions, 16–17
- homeowners, 16
- insurers, 20
- investors, 22
- modeling firms, 21–22
rating agencies, 22
reinsurers, 20–21
state government, 17–19
Internal Revenue Service (IRS), 334, 346
International Building Code, 251
International Code Council (ICC), 251
International Residential Code, 251
Investors
catastrophe bonds and, 176–181
derivatives and, 173, 183–184, 187–191
enhanced market capital solutions and, 186–187
executive officers and, 353
fair rate of return and, 77, 136–138, 147, 303, 372n12
five-pillar strategy for, 352–356
Global Risk Network and, 357–359
innovations for, 333–349
insurance-linked securities (ILS) and, 173–191
return on equity (ROE) and, 22, 78, 129, 136–138, 153–154, 167, 170, 304
risk reduction measures and, 247–268 (see also Risk management)
Sharpe ratio and, 186, 378n23
supply and demand framework and, 193–201
survival constraint and, 130–131, 153–154
tipping points and, 187–191
tranching and, 177, 187–188
volatility dispersion and, 173, 188–191
weather derivatives and, 184–185
Joint underwriting associations, 18
Kamp Re, 182
Katrina Canal Breaches Consolidated Litigation, 42
Layered pricing, 154–155
loss on line (LOL), 164–165
rate on line (ROL), 161–165
recent reinsurance market trends and, 161–171
Learning failures, 259–261
Lee County, 93
Legal issues
Allstate and, 39, 41–42, 371n15
Safe Drinking Water Act and, 242–243
State Farm and, 39, 42
wind-water controversy and, 25–26, 41–43
Lenders. See Financial institutions
Levee effect, 259
Levees, 262
Licensing, 17, 28, 31, 39, 44, 181, 253, 385, 370n6
Likelihood. See also Probability; Risk management
catastrophe models and, 141–148
expected loss and, 151–159
insurability concept and, 130
insurers’ decision making and, 129–150
reinsurers’ decision making and, 151–171
risk ambiguity and, 132–135
survival constraint and, 130–131, 153–154
Loading factor, 138, 303–304
Long-term insurance (LTI) contracts, 382n14
fixed-price contracts (FPCs) and, 341–342
institutional details and, 342–343
nature of program, 338–341
open issues in, 341
protection against catastrophic losses and, 341–342
risk reduction measures and, 339–341
understanding, 342
Losses. See Exposure; Risk management
Loss on line (LOL), 164–165, 167
Louisiana, 18, 80, 263
catastrophe bonds and, 179
Hurricane Katrina and, 87, 108 (see also Hurricane Katrina)
National Flood Insurance Program (NFIP) and, 88, 91
property insurance and, 25–26, 34, 42
wind-water coverage controversy and, 25–26, 42
Louisiana Citizens Property Insurance Corporation, 18
Low-Income Home Energy Assistance Program, 337–338
McCarran-Ferguson Act, 370n2
Man-made disasters
building codes and, 17, 247, 251–255, 261, 263–265
increased development in hazard-prone areas, 8–11
losses from, 7
Market regulation, 199
Citizens Property Insurance Corporation and, 26
financial regulation and, 43–44
government intervention framework, 27–31
policy terms/provisions, 40–41
rates and, 32–38
residual market mechanisms and, 44–56
state differences in, 25
stringency and, 33–34, 37–38
underwriting, 38–40
wind-water controversy, 41–43
Markets
actuarially fair premiums and, 136–138
alternative risk transfer (ART) instruments and, 174
bubbles and, 196
capital constraint model and, 194–197
catastrophe bonds and, 186
competitive market analysis and, 271, 295–303
concentration and, 61–67, 80
conduct and, 70–79
cyclical nature of, 194
derivatives and, 173, 183–184, 187–191
distribution systems and, 76–77, 217–218
electric power grid failure and, 351, 354
entry and, 61–67
exits and, 61–67
firm distribution factors and, 59
Markets (cont.)
food crisis and, 354
globalization effects and, 354, 356–359
hardening of, 155, 170–171, 194, 196
Herfindahl-Hirschman Index (HHI) and, 65–67
homeowners’ insurance and, 203–232
housing prices and, 356
hurricane risk analysis and, 59–81
increased liquidity for, 346
insurance-linked securities (ILS) and, 173–191, 346
insurer cost conditions and, 60–61
insurer exposure patterns and, 67–70
insurers’ decision making and, 129–150
investors’ concerns and, 186–187
issuers’ concerns and, 185–186
minimum efficient scale and, 60–61
National Flood Insurance Program (NFIP) and, 9, 16, 19, 23, 373n26, 374n39
over-the-counter (OTC), 184–185
performance and, 70–79
price and, 71–74
profitability and, 77–79 (see also Profitability)
recent trends in reinsurance, 161–171
restructuring of property insurance, 59
retrocession, 173–174
softening of, 194, 196
status quo analysis and, 276–295
sticker-shock effect and, 371n12
supply and demand framework for, 193–201
surplus assumption and, 298–299
tipping points and, 187–191
tranching and, 177, 187–188
weather derivatives and, 184–185
Miami Children’s Hospital (MCH), 267–268
Miami-Dade County, 17, 155, 271, 295
catastrophe models and, 148, 155
C-4 Basin Project and, 266–267
correlated risks and, 136
exceedence probability curves and, 143–144
flood risk and, 105
hurricane risk and, 64, 67
insurers’ decision making and, 130, 136, 143–148
National Flood Insurance Program (NFIP) and, 93
standard deviation and, 145–146
Mississippi, 17, 111
catastrophe risk and, 25–26
hurricane risk and, 80
National Flood Insurance Program (NFIP) and, 88
wind-water controversy and, 26, 41–42
Mitigation. See Risk reduction measures
Modeling firms, 21–22, 138, 141–148, 155–159, 163, 186
Monroe County, 74
Moody’s, 22, 139
Moral hazard, 44, 120, 131, 135–136, 147, 198
Mortgages
affordability and, 235, 237–246
coverage limits and, 97
decision making and, 119, 123–127, 134
federally insured, 16
homeowners’ insurance and, 208, 220–225, 235, 380n2
innovations and, 333, 339–343
required flood insurance and, 86
subprime crisis and, 183, 356
wind exclusions and, 41
Multihazard Mitigation Council (MMC), 250
Mutual funds, 186–187
Myanmar, 7, 352

National Association of Insurance Commissioners (NAIC), 28, 31, 78, 206, 372n13
National catastrophe fund, 348–349
National Flood Insurance Program (NFIP), xv, 9, 16, 19, 23, 373n26, 374n39
adverse selection and, 135
all-hazards insurance and, 343–345
average premium per policy, 91
buyer demographics, 93–96
claim payment factors and, 102–104
community rating system (CRS) and, 95–96
coverage statistics for, 87–91
creation of, 369n10
current deficit of, 111
exposure rates and, 87–88
financial performance of, 108–111
flood insurance rate maps (FIRMs) and, 84–85
floodplain management regulation and, 84
flood zone definitions of, 94–96, 102, 105, 113–115
flood zone mapping of, 94–96, 113–115
Florida and, 88, 92–108
growth of, 83, 87–88
Hurricane Katrina and, 87
impact of catastrophes on consumer choice and, 101–102
impact of extreme events and, 111–112
long-term insurance (LTI) contracts and, 339
low participation rates in, 85–86
national-level statistics for, 87–88
number of policies in place, 91
operating expenses and, 110
operational changes in, 83
policy analysis and, 274
premiums and, 95–96
price adjustment and, 105, 108
private insurance limitations and, 84
quantity of insurance in place and, 91
risk pooling of, 84
state-level statistics and, 88–91
total premiums collection and, 91
U.S. Congress and, 84
wind-water coverage controversy and, 25, 41–43
Write-Your-Own program and, 83–85, 108–110

National Geographic, 356
National Homebuilders Association, 265
Nationwide, 35–36, 218
Index

Natural disasters, 360
“acts of God” and, 42
catastrophe models and, 141–148, 155–159
choice heuristics and, 355
catastrophe models and, 141–148, 155–159
climate change and, 11–13
death tolls from, 352
developing countries and, 352
economic issues of, 4–7 (see also Economic issues)
federal disaster relief and, xiii, 19, 84, 119–124, 127, 262–265, 340, 348, 375n12
five-pillar strategy for, 352–356
food crisis and, 354
Global Risk Network and, 357–359
historical perspective on, 261
increase of, xiii–xv, 3–4, 351
measuring exposure to, 141–146
new era of, xiii–xv
presidential declarations and, 19, 122–124, 375n12
risk ambiguity and, 132–135
New Orleans. See Louisiana
New Orleans Times Picayune, 356
New York, xv, 13, 58, 81, 155
affordability issues and, 238–240, 246
competitive market analysis and, 295–303
FAIR Plans and, 54
food stamp program and, 337
homeowners’ insurance and, 203–204, 220–221, 224–226, 229–232
hurricane potential of, 269–270
industry loss warranties and, 175
innovations for, 333–349
insurance rates in, 37
loss comparison data for, 307–311
market concentration and, 66
metropolitan areas and, 295
National Flood Insurance Program (NFIP) and, 91
nonrenewing policies and, 39–40
policy analysis and, 271 (see also Policy analysis)
price trends in, 72
residual market mechanisms and, 26, 54
restructuring of property insurance markets and, 59
status quo analysis and, 288–293
undiversifiable catastrophe risk and, 201
wind loss cost and, 319–320
New York Insurance Department, 40
New York Mercantile Exchange, 173, 188
No file systems, 33
Noncompetitive rating (NCR), 32–34
Nonrenewal notices, 39–40
Northridge earthquake, 5–6, 21, 347

Ordinary-least-squares (OLS) regression, 103
Organization for Economic Cooperation and Development (OECD), 359
Organization of Petroleum Exporting Countries (OPEC), 337
Over-the-counter (OTC) market, 184–185
Palm Beach, 50, 64, 93, 105
Pan Am 103 crash, 356
Panel systems, 267–268
Paragon, 275
Parametric index, 177
Pennsylvania, 16, 85, 339, 382n10
Pennypack Creek Watershed, 16, 85
Penusco Wetlands, 267
Philadelphia Contributionship for the Insuring of Houses from Fire, 339, 382n10
Poe Financial Group, 19, 56, 62, 64
Policies, insurance
“acts of God” and, 42
ambiguous language and, 42
coverage, 74–76 (see also Coverage)
deductibles and, 197–198 (see also Deductibles)
homeowners’ insurance and, 203–232
insurability concept and, 130
insurers’ decision making and, 129–150
price trends in, 71–74 (see also Premiums)
regulation of, 38–41
survival constraint and, 130–131
undiversifiable catastrophe risk and, 199–201
vouchers and, 338
wind-water controversy and, 25–26, 41–43
Policy. See also Federal government; State government
affordability issues and, 244–246
Alquist-Priolo Act and, 13
conventional wisdom and, 352
coastal hurricane zones and, 347–348
disaster relief and, xiii, 19, 84, 119–124, 127, 262–265, 340, 348, 375n12
electric power grid failure and, 351
FAIR Plans and, 44
federal poverty line and, 236, 238–241, 243–246, 336–337, 379n1
five-pillar strategy for, 352–356
Flood Disaster Protection Act and, 86
government intervention framework and, 27–31
information-sharing platform and, 334
innovations for, 333–349
local/international dimension of, 13
McCarran-Ferguson Act and, 370n2
mitigation grants and, 247, 250–251, 267
National Flood Insurance Program (NFIP) and, 84
need for bold initiatives and, 357–359
Omnibus Coastal Property Insurance Reform Act and, 264
presidential declarations and, 19, 122–124, 375n12
regulation and, 17–19, 25–28 (see also Regulation)
residual market mechanisms and, 44–56
Safe Drinking Water Act and, 242–243
Solvency II and, 185–186
supply and demand framework and, 193–201
Telecommunications Act and, 337
wind-water coverage controversy and, 25–26, 41–43
Write-Your-Own program and, 83–85, 108–110
Policy analysis, 269–270
American Housing Survey (AHS) and, 276
average annual loss (AAL) and, 274
competitive market analysis and, 271, 295–303, 313–316
data sources for, 271–276
(Florida Office of Insurance Regulation (FLOIR) and, 275
impact of premiums reflecting risk, 303–306
insurance company data, 274–275
objectives of, 271
rating agencies and, 271, 274–275
standard deviation and, 274
state exposure data, 271, 274
state funds and, 275–276
status quo analysis and, 271, 276–295
Politician’s dilemma, 263–264
Politics
commissioners and, 28–30
electric power grid failure and, 351
regulation and, 25–27 (see also Regulation)
risk reduction measures and, 263–264
Pollution, 242–243
Population, 8–11
Poverty
absolute, 354
affordability and, 235–246, 336–337
federal poverty line and, 236, 238–241, 243–246, 336–337, 379n1
food crisis and, 354
Power dissipation, 12
Premiums
actuarially fair, 136–138
adjustable-premium contracts (APCs) and, 341–342
adverse selection and, 135
affordability and, 122, 235–246, 336–338 (see also Affordability)
all-hazards insurance and, 343–346
building code discounts and, 254–255
community rating system (CRS) and, 95–96
contract analysis of, 160–161
correlated risks and, 136
cross-price elasticity and, 210, 212–213
deductibles and, 76–77 (see also Deductibles)
direct premiums written (DPW), 62, 295, 297
evergy and, 235–237, 243–244
fair rate of return and, 137–138
Fast Track Monitoring System and, 71
federal poverty line and, 236, 238–241
fixed-price contracts (FPCs) and, 341–342
flood insurance and, 84
flood zone mapping and, 94–95, 113–115
Froot-O’Connell studies and, 160–161
full price, 71
homeowners’ insurance and, 208–218, 221–231
innovations for, 333–336
insurability concept and, 130
layered pricing and, 154–155, 161–165
loading factor and, 138, 303–304
long-term insurance (LTI) contracts and, 338–343
loss cost and, 303–304, 317–329
loss on line (LOL), 164–165, 167
moral hazard and, 135–136
national catastrophe fund and, 348–349
National Flood Insurance Program (NFIP) and, 83, 95–96, 108–111
policy prices and, 71–74 (see also Rates)
profit measurement and, 77–79
pure, 71
rate on line (ROL), 161–165, 169
RECAP method and, 342
recent reinsurance market trends and, 161–171
reflecting risk, xiv, 303–306, 333–336, 349
reinsurers’ decision making and, 152–155
risk ambiguity and, 132–135
setting, 131–136
status quo analysis and, 293
subsidy, xiv, 84–85, 235, 244–246, 334–338
survival constraint and, 130–131
trend analysis of, 71–74
unfair increases in, 235–236
use of future, 293
Presidential declarations, 19, 122–124, 375n12
Private insurance. See also specific insurer
adverse selection issues and, 84
inability to cover floods, 84
national catastrophe fund and, 348–349
public insurance rates and, 105, 108
status quo analysis and, 276–295
Write-Your-Own program and, 83–85
Probability, 129
bonus systems and, 356
catastrophe models and, 141–148
conventional wisdom and, 352
insurers’ decision making and, 129–150
rating agencies and, 139–141, 149–150
risk ambiguity and, 132–135
survival constraint and, 130–131, 153–154
Probable maximum loss (PML), 139, 278, 274–275, 278–279
Profitability, 79, 372n13
expected utility and, 119–121, 124, 127, 197, 217
fair rate of return and, 77, 136–138, 147, 303, 372n12
impact of reinsurers’ losses and, 161–165
insurers’ decision making and, 129–150
recent reinsurance market trends and, 161–171
Profits on insurance transactions (PTT), 78
Property and Casualty (P&C) lines, 186
Property Casualty Insurers Association of America (PCIAA), 71–72
Property insurance
affordability and, 18
availability of coverage and, 74–76
Citizens Property Insurance Corporation, 18, 26 (see also Citizens Property Insurance Corporation)
coverage amounts and, 20
federal government and, 19–20
Florida and, 9, 18–19
homeowners’ insurance and, 203–232 (see also Homeowners’ insurance)
hurricane risk analysis and, 59–81
impact of premiums reflecting risk, 303–306
innovations for, 333–349
insurer exposure patterns and, 67–70
international dimension of, 13
investors and, 22
joint underwriting associations and, 18
lack of, 235–241
market performance/conduct and, 70–79
market structure of, 59–70
modeling firms and, 21–22
National Flood Insurance Program (NFIP) and, 9, 16
penetration rates and, 7
policy analysis and, 269–299 (see also Policy analysis)
prices and, 71–74
profitability and, 77–79
rate and policy form regulation and, 17
rating agencies and, 22
regulation of, 17–20, 25–58
solvency regulation and, 17
state government and, 17–19
tax policy and, 19–20
wind-water controversy and, 25–26, 41–43
Property values, 3, 83, 97, 99, 112, 119, 220, 261
Pro rata insurance, 152, 174
Protected tranche, 177
Public insurance
National Flood Insurance Program (NFIP) and, 108–111 (see also National Flood Insurance Program (NFIP))
private insurance rates and, 105, 108
Write-Your-Own program and, 83–85, 108–110
Quality Neighborhood Improvement Program, 267
Quarterly Supplemental Report (QUASR), 67, 74, 275, 281
Quota-share insurance, 152, 174, 182
Rate and policy form regulation, 17
Rate on line (ROL), 161–165, 169
Rates, 151
affordability and, 122, 235–246, 336–338
all-hazards insurance and, 343–346
catastrophe bonds and, 178–181
competitive rating (CR) and, 32–34
compression and, 33, 35
equilibrium and, 194–201
flood insurance and, 84–85, 104–108
Florida and, 34–35, 37–38
increase of, 59
insurance-linked securities (ILS) and, 186
layered pricing and, 154–155
loss variance and, 193
market clearing prices and, 198–201
National Flood Insurance Program (NFIP) and, 91
negative profit effects and, 59
New York and, 37
noncompetitive rating (NCR) and, 32–34
private vs. public insurance, 105, 108
regulation of, 32–38
South Carolina and, 37
stabilization instruments for, 178–181
sticker-shock effect and, 371n12
stringency and, 33–34, 37–38
supply and demand framework for, 193–201
suppression and, 33
Texas and, 36–37
types of systems for, 32–33
unit elastic demand and, 203
Rating agencies, 22, 149–150, 379n15, 381n15
competitive market analysis and, 295, 297–299
decision making and, 129, 139–141
homeowners’ insurance and, 206, 214
insurance-linked securities (ILS) and, 187
policy analysis data and, 271, 274–275
probability distribution and, 129
reinsurers’ decision making and, 161
role of, 139–141
status quo analysis and, 278–279, 306
Supplemental Rating Questionnaires and, 275
RECAP (record, evaluate and compare alternative prices), 342
Recoupment process, 293
Regression analysis, 103
Regulation, 64, 81, 248, 379n13
availability/affordability issues and, 43
better zoning ordinances and, 264–265
building codes and, 17, 247, 251–255, 261, 263–264
catastrophe bonds and, 178–181
Citizens Property Insurance Corporation and, 26
domiciliary state and, 31
Europe and, 185–186
financial, 43–44
fines and, 28–29
floodplain management and, 84
government intervention framework and, 27–31
guaranty associations and, 56–57
innovations for, 336
insurance-linked securities (ILS) and, 185–187
insurance policy terms/provisions and, 38–41
insurance rates and, 32–38
insurer cost conditions and, 60–61
interdependencies and, 356
licensing and, 28, 31, 44
McCarran-Ferguson Act and, 370n2
market, 25–56, 199
Regulation (cont.)
maximum deductibles and, 40–41
National Association of Insurance Commissioners
and, 28
nonrenewal notices and, 39–40
politics and, 25–27
premiums and, 32–38, 243–244
price constraints and, 25
property insurance, 25–58
residual market mechanisms and, 44–56
responsibilities of, 30–31
Solvency II and, 185–186
solvency requirements and, 43
state insurance mechanisms and, 25–27, 44–57
stringency and, 33–34, 37–38, 271n8
supply and demand framework and, 199
underwriting and, 38–40
unfair business practices and, 25
wind-water controversy and, 25–26, 41–43
Reinsurers, xvi, 20–21
auctioned contracts and, 333
average annual loss (AAL) and, 156–158
capacity of handling losses by, 165–166
capital allocation and, 129–130, 152–153
catastrophe models and, 155–159
competitive market analysis and, 295–303
decision making and, 151–171
empirical contract data and, 160–161
excess-of-loss and, 174
Europe and, 166
expected loss and, 151–171
five-pillar strategy for, 352–356
Florida and, 166–167
Froot-O’Connell studies and, 160–161
catastrophe models and, 155–159
Florida and, 46–51
New York and, 54
regulation of, 44–56
self-reinforcement and, 45–46
South Carolina and, 54
Texas and, 51, 54
Residual market mechanisms
artificial depressing effect and, 45
available coverage and, 45
Citizens Property Insurance Corporation and, 44–50
eligibility requirements and, 45
exposure growth and, 45
FAIR Plans and, 44, 51
Florida and, 46–51
New York and, 54
regulation of, 44–56
Return on equity (ROE), 137, 153–154, 167
Risk management, 4
adverse selection and, 84, 131, 135, 147
ambiguity and, 129, 132–135
building codes and, 247, 251–255, 261, 263–264
catastrophe models and, 141–148, 155–159
choice heuristics and, 355
financial institutions and, 16–17
five-pillar strategy for, 352–356
flood insurance and, 83–115
Global Risk Network and, 357–359
government intervention framework and, 27–31
insurers’ decision making and, 129–150
loading factor and, 138
misperceptions of risk and, 121
natural disaster syndrome and, 262–263
need for bold initiatives and, 357–359
policy analysis and, 269–329 (see also Policy
analysis)
reinsurers’ decision making and, 151–171
residual markets and, 44–54
risk ambiguity and, 132–135
standard deviation and, 130, 145–146
stringency and, 33–34, 37–38
supply and demand framework and, 193–201
survival constraint and, 130–131, 153–154
tranching and, 177, 187–188
underwriting regulation and, 38–40
undiversifiable catastrophe risk and, 199–201
volatility dispersion and, 173, 188–191

Risk Management Solutions (RMS), 352
decision making and, 141, 144, 155–156
U.S. Hurricane Industry Exposure Database and, 271
U.S. Hurricane Model and, 156, 274, 277

Risk reduction measures
adoption factors of, 255–261
affordability and, 265–266
behavioral considerations and, 256, 262–264
budgeting heuristics and, 256–257
building codes and, 17, 247, 251–255, 261, 264–265
California and, 263–264
C-4 Basin Project and, 266–267
contents damage and, 248–249
cost-effectiveness of, 250–251, 255–256
encouraging adoption of, 339–341
excessive optimism and, 258–259
floods and, 266–268
Florida and, 250–251, 253–255, 266–268
future challenges for, 265, 269–270
hurricanes and, 248–250, 260, 265–266, 311–312
Institute for Business and Home Safety and, 266, 277
interdependencies and, 261
learning failures and, 259–261
levee effect and, 259
long-term insurance (LTI) contracts and, 339–341
Miami Children’s Hospital (MCH) and, 267–268
mitigation grants and, 247, 250–251, 253, 267
natural disaster syndrome and, 262–263
Omnibus Coastal Property Insurance Reform Act and, 264
open windows during tornado and, 260–261
politician’s dilemma and, 263–264
public/private collaboration and, 247, 262–265
reduced claims from, 247, 253
role of insurance and, 248
savings from, 269–270, 311–312
seawalls and, 260
social norms and, 261
South Carolina and, 264
status quo analysis and, 277, 293
structural damage and, 248–249
superstitions and, 260–261
tax incentives and, 264
temporal planning biases and, 257
Texas and, 260, 271, 276, 284–288
triggering effect and, 261
underweighting the future and, 257–258
water damage and, 249–250
wind and, 249–250, 255–256
zoning ordinances and, 264–265

Safe Drinking Water Act, 242–243
Safer Living program, 277
Samaritan’s dilemma, 122
Santa Rosa County, 102–103, 105
SARS epidemic, 357
Seawalls, 260
Senter, Judge L. T., Jr., 41–42
September 11 terrorist attacks, xiii, 6, 189, 195–196, 351, 355
Sharpe ratio, 186, 378n23
Sidecars, 174, 181–183, 188, 191
Small Business Administration (SBA), 19, 123
Social norms, 126, 261
Solvency II, 185–186
Solvency regulation, 17–18
South Carolina, xv, 13, 58, 80–81
competitive market analysis and, 295–303
FAIR Plans and, 54
homeowners’ insurance and, 203–204, 220–221, 223, 225–226, 230–232
hurricane potential of, 269–270
innovations for, 333–349
insurance rates in, 37
loss comparison data for, 307–311
market concentration and, 66–67
metropolitan areas and, 295
National Flood Insurance Program (NFIP) and, 91
Omnibus Coastal Property Insurance Reform Act and, 264
policy analysis and, 271 (see also Policy analysis)
price trends in, 72
residual market mechanisms and, 26, 54
restructuring of property insurance markets and, 59
risk reduction measures and, 264
status quo analysis and, 288–293
undiversifiable catastrophe risk and, 201
wind loss cost and, 321–322
South Carolina Department of Insurance, 37, 54
South Florida Sun-Sentinel, 275
Special flood hazard areas (SFHAs), 86, 103–105, 112, 124, 126
Standard and Poor’s (S&P), 22, 187, 189
Standard deviation, 130, 145–146, 274
State Board of Administration (SBA), 282, 284
State Farm, 35–36
catastrophe bonds and, 178
correlated risks and, 136
discount premiums and, 254
homeowners’ insurance and, 218
Hurricane Andrew and, 136
legal issues of, 39, 42
market concentration and, 62
subpoenas of, 39
underwriting regulation and, 39
wind-water controversy and, 42

State government, 19
building codes and, 17
commissioners and, 28–30
fines and, 28–29
guaranty associations and, 56–57
impact of premiums reflecting risk, 303–306
insurance funds and, 54–56, 275–276
insurance rates and, 32–38
intervention framework of, 27–31
land use regulation and, 17
licensing and, 28, 31
nonrenewal notices and, 39–40
residential exposure data and, 271, 274
residual market mechanisms and, 44–56
risk reduction measures and, 264–265
solvency regulation and, 17–18
underwriting and, 38–40
vouchers and, 338
wind-water controversy and, 25–26, 41–43
Status quo analysis, 271
alternative risk transfer (ART) instruments and, 278–280
American Home Survey and, 276, 278
assumptions for, 276–295
ex post assessment and, 293
Florida and, 280–284, 288–293
losses and, 276, 288–293
metropolitan areas and, 295
New York and, 288–293
probable maximum losses (PMLs) and, 275, 278–279
rating agencies and, 278–279, 306
recoupment process and, 293
reinsurance calculations and, 278–280
risk reduction measures and, 277, 293
South Carolina and, 288–293
state comparison of, 288–293
state funds and, 291, 293
take-up rate and, 277
Temporary Emergency Additional Coverage Options (TEACO) and, 282, 284
Temporary Increase in Coverage Limit (TICL) and, 282, 284
Texas and, 284–293
total insured value (TIV) and, 295
uninsured losses projection and, 277–278
use of future premiums and, 293
Storms
catastrophe models and, 141–146, 155–159
capacity constraint model and, 194
cardinal constraint model and, 194–197
clearing prices and, 198–201
credit quality and, 196
deductibles and, 197–198, 200
demand equation estimation and, 208–209
demand side and, 197–198, 208–211, 217–221
equilibrium and, 194–201
equity and, 193
homeowners' insurance and, 204–232
loss variance and, 193
natural disaster syndrome and, 262–263
policy design and, 199–201
regulation and, 199
supply side and, 194–197, 212–215
transaction costs and, 197
undiversifiable catastrophe risk and, 199–201
unlimited free risk transfer and, 197
Surplus (insurers'), 20, 217, 379n13, 14
A.M. Best and, 381n15
comparative state analysis of, 31, 43, 49, 55
decision making and, 131, 153–154, 160, 165–166
innovations and, 333, 336, 340, 344–345
licensing and, 370n6
market analysis of hurricane risk and, 61, 78
policy analysis and, 270, 274–275, 281, 285–286,
291, 298–299, 306
Survival constraint, 130–131, 153–154
Take-up rate (TUR), 277
Taxes, 261, 381n10
insurance and, 19–20
loading factor and, 138
politician's dilemma and, 263–264
risk reduction measures and, 263–264
vouchers and, 338
Telecommunications Act, 337
Temporal planning, 257
Temporary Emergency Additional Coverage Options (TEACO), 275, 282, 284
Temporary Increase in Coverage Limit (TICL), 275
Terrorism, 20, 352–354
anthrax and, 357
catastrophe bonds and, 179
choice heuristics and, 355
insurer exclusion of, 355
Pan Am 103 crash and, 356
September 11 attacks and, xiii, 6, 189, 195–196, 351, 355
weather derivatives and, 184–185
wind-water coverage controversy and, 25–26, 41–43
Stringency, 33–34, 37–38, 271n8
Structural damage, 248–249
Subprime mortgage crisis, 183, 356
Subsidies, 29–30, 261, 379n13
Super-cats, 6
Superstitions, 260–261
Supplemental Rating Questionnaires, 275
Supply and demand framework
capacity constraint model and, 194
capital constraint model and, 194–197
clearing prices and, 198–201
credit quality and, 196
deductibles and, 197–198, 200
demand equation estimation and, 208–209
demand side and, 197–198, 208–211, 217–221
equilibrium and, 194–201
homeowners' insurance and, 204–232
loss variance and, 193
natural disaster syndrome and, 262–263
policy design and, 199–201
regulation and, 199
supply side and, 194–197, 212–215
transaction costs and, 197
undiversifiable catastrophe risk and, 199–201
unlimited free risk transfer and, 197

Texas, xiii, xv, 13, 58, 80–81, 152
affordability issues and, 238–240, 244–246
American Housing Survey and, 235
catastrophe bonds and, 179
coastal hurricane zones and, 347–348
competitive market analysis and, 295–303
FAIR Plans and, 51
food stamp program and, 337
homeowners’ insurance and, 203–204, 216, 219–221, 232
hurricane potential of, 269–270
indicated loss cost determination and, 379n21
innovations for, 333–349
insurance rates in, 36–37
insurance regulation and, 25–58
loss comparison data for, 307–311
market concentration and, 66–67
metropolitan areas and, 295
National Flood Insurance Program (NFIP) and, 88, 91
policy analysis and, 271 (see also Policy analysis)
price trends in, 72
residual market mechanisms and, 26, 51, 54
restructuring of property insurance markets and, 59
risk reduction measures and, 260
state funds and, 275–276
status quo analysis and, 284–293
undiversifiable catastrophe risk and, 201
wind loss cost and, 323–329
Texas Catastrophe Property Insurance Association, 284
Texas General Reserve Fund, 287
Texas Lloyds, 51
Texas Windstorm Insurance Association (TWIA), 271, 276
average annual losses (AAL) of, 286
Catastrophe Reserve Trust Fund (CRTF) and, 286–288
funding arrangements of, 286–288
insured property and, 284–285
market share of, 286
operations of, 285–286
risk reduction measures and, 286–288
status quo analysis and, 284–288, 291
Tipping points, 187–191
Tornadoes
all-hazards insurance and, 343–346
open windows and, 260–261
Total insured value (TIV), 144, 274, 295, 303
Tower Hill, 62
Tranching, 177, 187–188
Triggers, 177, 261
Tropical Cyclone Nargis, 7
Tropical Storm Agnes, 85–86, 123
Tropical Storm Allison, 111
Tsunamis, 352
Two-state least-squares analysis, 220, 228–229
Typhoons, 6–7, 166, 179
Underwriting
actuarially fair premiums and, 136–138
catastrophe models and, 141–148
decision making and, 129–150
insurers’ decision making and, 129–150
premiums and, 160–161 (see also Premiums)
regulation of, 38–40
risk ambiguity and, 129, 132–135
survival constraint and, 130–131
Uninsured home value (UHV), 277–278
United Nations, 8
Unit elastic demand, 203
Universal Service Fund (USF), 337
Unprotected tranche, 177
Urbanization, 8–11
USAA, 35–36
U.S. Census Bureau, 9
American Housing Survey (AHS) and, 235–239, 242, 246, 272, 276
county demographics and, 92–93
flood risk and, 113
homeowners and, 97, 99, 206, 208, 220
property values and, 97, 99
U.S. Congress, xiv, 84, 122–123
U.S. Congressional Budget Office, 85
U.S. Department of Housing and Urban Development (HUD), 16, 242, 276
Use and file systems, 33
U.S. Environmental Protection Agency (EPA), 242–243
U.S. Government Accountability Office (GAO), 110, 252, 265, 344
U.S. Hurricane Industry Exposure Database, 271
U.S. Hurricane Model, 156, 274, 277
U.S. National Institute of Building Science, 250
Volatility dispersion, 173, 188–191
Vouchers, 338
Water. See also Floods
C-4 Basin Project and, 266–267
damage from, 19, 42, 92, 111, 120, 249–250, 344–345
wind-water coverage controversy and, 25–26, 41–43
Weather, xvi
climate change and, 11–13, 85, 357, 369n15
cooling degree days (CDDs) and, 377n17
global warming and, 12
winning the war against, 351–360
Weather derivatives, 173, 184–185
Weather Risk Management Association (WRMA), 184
Wind, 7, 9. See also Hurricanes
all-hazards insurance and, 343–346
anemometer and, 141
building codes and, 247
catastrophe models and, 141–148, 155–159
Wind (cont.)
Citizens Property Insurance Corporation and, 26, 44–45
costal hurricane zones and, 347–348
deductibles and, 204
five-pillar strategy for, 352–356
Florida Windstorm Underwriting Association and, 46
homeowners’ insurance and, 204
industry loss warranties and, 175–176
innovations for, 335
loss cost data and, 317–329
Miami Children’s Hospital (MCH) and, 267–268
mitigation grants and, 247, 250
open windows and, 260–261
policy analysis and, 271, 274, 276
policy exclusions of, 41
risk ambiguity and, 132–135
risk reduction measures and, 249, 255–256
Texas Windstorm Insurance Association and, 76, 271, 284–288
weather derivatives and, 184–185
wind-water coverage controversy and, 25–26, 41–43
Wind-water coverage controversy, 25–26, 41–43
World Economic Forum (WEF), 357–359
World Trade Center, xiii, 355
Write-Your-Own (WYO) program, 83–85, 108–110, 374n43

Zoning, 264–265