Index

9/11  11–12, 183
Abadie, Alberto  12, 29
Abt, Clark C.  5, 126, 229
access bridges, ports  265, 269–79, 281, 283–4
action-based substitutions  26–8
active defense  121–3
adaptive resilience  203, 206
agent-based simulations  92–3
aggregate price indexes  157–8, 161–2
air
cargo  238
defense  121–2
travel  30
airline baggage screening  see baggage screening
airport
screening  264
security  129
al-Qaida  16, 25, 26, 31, 121, 126, 196
Alameda Corridor  265, 280, 281, 282
Alexander, Yonah  18
all-hazards warning systems  139
Allen, Kenneth  138, 139
Alston, Julian M.  181
Amin, Massoud  75
An, D.  203, 299
anthrax  18, 125, 126, 127, 129
antibiotics  122, 123, 128, 129
Apt, Jay  4
Arce, M.  15, 23, 25, 31
Arthur Anderson  37, 53
assassinations  16, 28
asymmetric targets  25–6
Atkinson, Scott E.  16, 20
attack
costs  229
perceived risk  152–4, 156, 157–8
predictability  2
probability  20–21, 155–6, 224–5, 230, 232, 237–8

protection strategies  41–2
Automatic Targeting System (CPB)  238, 257
Azam, Jean-Paul  12
Badger Rail Bridge  281
Bae, Chang-Hee Christine  9
baggage screening, airports  29–30, 38–41, 44–5, 46–7, 48–51
ballistic missile defense  119, 121, 124
Baran, P.  196
Barings Bank  37, 53
Barnett, A.I.  238
Bassok, Alon  9
Baton, Jonathan  52
Becker, G.  171
Beenstock, M.  207
behavioral
considerations, investment in security  52
responses to terrorism  152–4
benefit transfer  181–2
Bental, B.  207
Bernknopf, R.L.  5–6, 140
Bernoulli random process  227
Bertekas, D.  228
bin Laden, Osama  196
biodefense  119–20
active vs. passive  121–3
benefits  127–8
cost-benefit assessment  123–4, 125
effectiveness vs. efficiency  120–21
public health benefits  130–31
resource allocation  124–5
short-term strategies  128–9
bivariate probit model  144–6
blackouts, electricity system  58–9, 66–7
barriers to prevention  61–3
costs of  207–8
public reactions to  59–60
Blain, Larry  9
Boisvert, R.  198
bombings 16, 17
Bonner, Robert C. 249
Booz-Allen-Hamilton 218, 229
borders, expansion of 249–52
Bostrom, A. 70
bounded rationality 200
Bowser, G.F. 221, 226
Boyle, Kevin J. 178
Bradford, D. 171
bridges 265, 269–79, 283–4
Lake Washington 288–9
reconstruction 281, 295, 298–9
Brookshire, D.S. 5–6, 140
Brophy-Baermann, Brian 25
Brown, Thomas C. 178
Bruneau, N. 204
building-support infrastructure 85–6
bulk power delivery systems 93–5
Bureau of Public Roads (BPR) 284
Burke, P.J. 228
Bush, George W. 133, 135, 244
business
interruption 269, 299–300
membership of C-TPAT 251–2
Business Roundtable 136

Cameron, T.A. 180
Capitol Hill, anthrax clean-up
operations 126
car-pools 300
cargo delays, costs 225, 228–9, 230, 232–3, 257
Carnegie Mellon University 66
Carroll, Thomas M. 156
Carsell, Kim 141
casualties 19
catastrophe models 183
Caves, D. 207
Center for Risk and Economic
Analysis of Terrorism Events (CREATE) 1
Center for Strategic and International
Studies 249
central business districts (CBDs) 159, 166–7
Chalk, Peter 18
Champ, Patricia 178
Chang, S.E. 4, 75, 198, 212, 213, 229, 269, 279, 289–90
Chao, H.P. 205
Cho, S. 75, 203, 229, 269, 279, 299
choice under uncertainty 139–49
choke points 60, 241
city shapes 153
Clark, Lee B. 137
Clauretia, Terrence M. 156
Clemen, Robert T. 80, 81
climate change damages 198
Clinton, Bill 75, 220, 245
coalition building 24–6
Coast Guard and Maritime
Coastal Barrier Resource Act (1982) 185
Cobb-Douglas production functions 198
Cochrane, H. 198, 209, 212, 213
Cohen, Linda 50
Cold War 129
Comfort, L. 204, 205
command-and-control
communications 123, 128
Commerce Clause, US Constitution 91
Commission on Critical Infrastructure
Protection (PCCIP) 75
Complex Interactive
Networks/Systems Initiative (CIN/SI) 75
compliance, port security programs 256
computable general equilibrium (CGE)
modelling 181, 197–203, 208–10, 212, 213–14
resilience 205–6
computer security 45, 47–8
conceptual frameworks, infrastructure
interdependencies 76–9
conjoint surveys 179–80
constant elasticity of substitution
(CESS) production function 205–6
consumer behavior 152–4, 156
consumer-choice model 26–7
contagion 38–41, 42–3, 44–6, 52–3
societal effects 46–8
solutions 48–51
container
design 255
discrete regions of proximity 160, 161–7
disequilibria 208–9
distributed generation (DG) 67–8
distribution hubs 280
domestic facility/vessel security plans 248
Dominion Virginia Power 60
Douglas, J. 207, 210
Drakos, Kostas 29
Duchin, F. 200
dynamic models 51–2
earthquakes
  analysis of 76, 289–91
damage 270, 279, 281
engineering 72
mitigation 124
simulations 156, 168, 199, 210, 212
eco-terrorism 60
economic
disequilibria 201
effects of ‘dirty bomb’ attacks 269–75
impacts, spatial diffusion 201
losses 197, 207–8
methodology 12
resilience 200, 203
economy-wide responses, terrorist threats 208–9
economy, Los Angeles/Long Beach ports 263
effectiveness vs. efficiency, biodefense 120–21
Eguchi, R. 213
Ehrlich, I. 171
Electric Power Research Institute (EPRI) 65, 75
electrical dependencies 71
electricity systems 57
blackouts 58–63, 71–9, 80–88, 209–10
distributed generation 67–8
new vulnerabilities 64–5
primer 93–5
system survivability 66–7
electromagnetic pulse (EMP) 64–5
electronic scanning, containers 220, 225
elevated risk condition 133, 134
Elysian Park Fault 229, 279, 299
emergency warning systems 136
empirical insights, terrorist threats 209–13
specifications of resilience 206
strategy, impact of spatial externalities 157–9
Enders, Walter 3, 12, 15, 16, 18, 19, 25, 26, 27, 28, 31
environmental variables 155
equilibrium
  displacement model 181
  schedule of prices 176
equipment
  container inspections 236
  failure, electricity system 58, 60
ETA (Euskadi ta Askatasuna) 29
expected pay-offs, hostage taking 20–23
expected utility theory 79–80, 147–8, 174–6
exports 263
externalities models 154–9
externally transmitted shocks, modelling effects of 107
extreme events 1–2
  mitigation of 70–89
facility plans, ports 247–8, 256
Faria, Joao 18
Farrell, Alex 4
fatalities 13, 30
Federal Bureau of Investigation (FBI) 63, 245
Federal Emergency Management Agency (FEMA) 73, 83, 185, 198
Federal Energy Regulatory Commission (FERC) 63, 91, 96–7
federal port security grants 252
financial damages, averted 225
First American Real Estate Solutions 185
Fischbeck, P.S. 80
Fischhoff, B. 80, 152
Fisher, R. 75
Florida ports, identity cards 248–9
Florida Power and Light Co. 115
Florig, H. Keith 80
Flynn, Stephen E. 219, 220, 242
Force Protection Condition 136
Index

foreign governments/interests 13, 17
foreign ports
  membership of CSI 249–51
  security 246, 248, 256
Fortune 100 228
fossil fuels 68
Fourier series theory 19
Frankle, R.S. 226
freeway access to ports 262, 275–9
freight delays 299–300
French, S. 200
full information maximum likelihood method 146
function transfer 182
funding, port security programs 257–8
Galbraith, J.K. 196
Gallagher, R. 228
game theory, hostage taking 20–23
government responses 23–4
gamma-ray scanning 221, 222, 226
Ganderton, P.T. 5–6, 140
Gardeazabal, Javier 12, 29
Garin-Lowry style model 266, 267, 269
gas transmission system 65
Gellerson, M. 207
general equilibrium effects 207–8, 210, 212
Gerenscer, M. 218
German war machine 196
Gilmore Commission 138–9
Goldin, E. 207
Gonzalez, D.A. 152
Gordon, Peter 8–9, 75, 203, 229, 267, 269, 279, 299
government
  regulations 49–50
  responses, hostage taking 23–4
  safety regulators 63
Graham, Bob 245
Great Northeastern Blackout (1965) 59
Greenberg, M. 154
Gruntfest, Eve 141
Guha, G. 199, 200, 205, 209, 210
Haimes, Y.Y. 75
Haitobsky, Y. 207
Hallstrom, Daniel G. 6–7, 171
hand inspection, containers 221, 225, 226–7, 228, 229–30, 232, 234, 257
hand-held radiation detectors 264
Harriages, J. 207
Hartwig, Robert 183
Haveman, Jon D. 8
hazard events 83
hazard loss estimation model (HAZUS) 83, 198
Heal, Geoffrey 3–4, 29, 37, 43, 49, 51, 53
healthcare
  benefits 125, 128, 130–31
  expenditures 121
  issues 86
Heckman, J.J. 180
hedonic
  models 176, 187
  pricing 154–5
  regression 157, 162–3
Henrion, Max 80
Hensher, David A. 179
Hershey, John 52
Hewings, G. 203
high-hazard facilities 67
high-profile citizens 173
high-risk
  areas 184, 188
  containers 257
  high-traffic ports 234, 237–8
  high-value targets 123
  highjackings 26, 27, 30
  highway network, implications of attack 287–8
  issues 296–300
  precursor to research 289–91
  research objectives 288–9
  trip diversion and costs by route 291–7
hoaxes 17, 19
Hoffman, Bruce 16
Holling, C. 203
Hollings, Ernest F. 245
Homeland Security Advisory System (HSAS) 5, 133–50
homeland security policies 170–71
  benefit transfer 181–2
  cost–benefit analysis 171–5
  information/methods of evaluation 175–81
natural hazards as natural experiments 183–90
Homestead Air Force Base 184
Hoover Dam 60
hostage-taking 16, 17, 19–20, 27
housing markets see land markets
housing sales data 185
Hughes, J. 154
Hurricane Andrew 229
study of 183–90
Hurricane Ivan 229
Husemann, R.C. 221, 226
Hydro-Quebec 110
Hyogoken-Nanbu earthquake (1995) 72–3, 76
I–O modelling 199–203, 208, 210, 213
ice storms 58–9
identification cards, port workers 248–9
Im, Eric I. 28
impact analysis 180–81
CGE models 199–203
IMPLAN input–output model 266
imports 263
incentives, investment in security 35–54
Independent System Operators (ISO) 91, 92, 96, 98, 102, 110, 115–16, 117
indirect economic loss module (IELM) 198
individual
behavior 200
decision-making under uncertainty 171–2, 174–6
resilience 204–5, 212
influence diagrams 81
information for policy choice 175–81
infrastructure
container inspections 236
electricity system 60
failures 71–2, 84–8
impacts 200
interdependencies 65, 72–5
restoration 298–9
targets 57, 137
infrastructure failure 70–71
conceptual frameworks 72, 76–9
electrical interdependencies 71
issues 72–5
mitigation ranking exercises 79–84
recent disasters 84–8
structure and specific objectives 71–2
infrastructure failure interactions (IFIs) 72, 76–9, 83, 84, 85–6, 87–8
inherent resilience 203, 205–6
institutional structure, power industry 96–7
insurance 30, 48, 50, 54, 167, 173–5, 185
Insurance Information Institute 183
intelligence information 24, 137
inter-industry models 266, 270
interdependent security (IDS) 29–30, 35–54
International Air Transport Association (IATA) 50
international legislation, maritime shipping 243, 246
International Maritime Organization (IMO) 219, 243
International Port Security Program, USCG 248
International Ship and Port Facilities Security Code (ISPS) 219, 246
international shipping systems, security models 254
International Terrorism: Attributes of Terrorist Events (ITERATE) 15–16, 17
international trade 218
contribution of US ports 243–5
impact of port closures 271–5, 283
maintenance 242–3
international vessel security plans 248
Internet security threats 66
Internet-based systems 64
investment in security 35–7
extension of analysis 51–2
multi-agent case 43–8
research on risk management strategies 52–4
risk management solutions 48–51
two-agent problem 38–43
Islam, Muhammad Q. 20
INDEX

Jang, S. 203
Jenni, K.E. 80
Jensen, Jeff 156
Jerry Desmond Bridge 282
Jiang, P. 75
Johnson, E. 221, 226
journey-to-services matrix 266
Jun, Myung-Jin 267
Kahn, H. 121
Kahn, Matthew E. 154
Kahneman, Daniel 52
Kamedo, Hiroyuki 76, 82
Kauffman, S. 103, 108
Kearns, Michael 37, 45
Keeney, R.L. 79, 80, 84
Kelly, T.K. 72, 76
Khrushchev, Nikita 196
Kim, Moon-Hyun 267
Kim, T.J. 203
Kobe earthquake 76
Koloski, M. 198
Krikorian, G. 221
Kunreuther, Howard 3–4, 29, 30, 37, 43, 49, 50, 51, 52, 70
Kupperman, Richard N. 24
Kutan, Ali M. 29
La Cienega Boulevard bridge 270
labor relations, ports 258
Lakdawalls, D. 172, 173, 183
Lake Washington, bridges 288–9
land markets 152–4
data 159–60
results 160–67
terrorism and models of externalities 154–9
Landes, William M. 26, 27
Lange, G. 200
Lapan, Harvey E. 15, 23
Larson, R.C. 228
Lave, Lester B. 4
LED traffic lights 66–7
Lee County, Florida 184–5, 188
Lee, Dwight R. 25
Lee, J.S. 203
legislation, maritime shipping 243, 244–55
Lerner, J.S. 152
Lerner-Lam, A. 70
Levitan, B. 103, 107
liability 48–9
Liao, S. 199, 202, 205, 210, 212
Libya 28
lifecycle interactions 72, 76
Likert scales 179
Lim, D. 199, 209, 210, 212, 213
Lobo, J. 103, 107
local electricity distribution system 58
local impacts, port closure 271–5
locational advantage of terrorists 25
logistic support, biodefense 124, 128
logistically complex attacks 19–20
Loma Prieta earthquake (1989) 156
Long Beach see Los Angeles
Looney, R. 229
Los Angeles International Airport 262
Los Angeles/Long Beach
electricity blackouts 199
housing market 153–4, 159–60, 163–7
Los Angeles/Long Beach ports 262
effects of ‘dirty bomb’ attack 264–5, 269–79
identification cards 248–9
local economy 263
port disruption studies 265
strikes 126
Louviere, Jordan J. 179
low risk condition 133
macroeconomic repercussions 201
resilience 204
Malta Airlines 39
manifest screening 221
manufacturing supply chains 228
marginal analysis, container inspections 236–7
maritime
domain awareness 255
security plans 247–8, 255–6
shipping, legislation 243
Maritime Administration 228
Maritime Transportation Security Act (2002) 8, 219, 243, 244, 245–9, 252, 254–5, 256, 257, 258
market
behavior 200
failures theory 12
resilience 212–13
Martonosi, S.E. 7–8, 224, 238
McDaniel, B. 226
McDaniels, Timothy L. 4
McFadden, Daniel 178
media 15, 17, 87–8, 174
Memphis, Texas 199, 210
mesoeconomic resilience 204
meta-analysis 182
metal detectors 26, 27
Metropolitan Planning Organization (MPO), Seattle 287
microeconomic resilience 204
Mileti, D. 203
military defense 121
Military Traffic Management Command (MTMC) 252
Minnesota Planning Group 266
mitigation
‘dirty bomb’ attacks 283
literature 184
port closures 275
ranking exercises 79–84
terrorist activity 202, 203, 204
monopoly franchise system 61
Monte Carlo simulation model 290
Moore II, J.E. 8–9, 75, 203, 269, 299
Morgan, K.M. 80
Morgan, M. Granger 4
motivations of terrorism 11, 16–17
multi-agent IDS case 43–4
characterization of solutions 44–5
multi-period models 51–2
multi-sector modelling approaches 199–203
Munasinghe, M. 207
Murdock, James C. 156
Murrah Federal Building 229
Nash equilibrium 3, 46, 49, 175
nation-specific benefits of retaliation 25–6
National Electric Reliability Council (NERC) 96–7
National Flood Insurance Program 185
National Interstate Economic Model (NIEMO) 267, 283
National Laboratories 75
National Opinion Research Center 59
National Science Foundation 70
National Transportation Safety Board 65
natural
epidesms 129
experiments 178
natural disasters
costs 229
economics 1–2
infrastructure failure
interdependencies 84–8
natural hazards
CGE modelling 198–9
electricity system 58–9
as natural experiments 183–90
as parallel events 183
Navarro-Lozana, S. 180
Navrud, Stale 182
‘near-miss’ natural hazards 183, 184, 188
negative externalities 154, 173
negotiations, hostage takers 20–23
Neil, Roger 50
Netherlands, distributed generation 68
networking advantage of terrorists 24
New York Power Authority 110
New York, electricity system 94–5
Nojima, Nobuoto 72, 76
non-market
goods/services 175–6
impacts 200
non-terrorist actions 28
North American Electricity Reliability Council (NERC) 58, 59, 63, 75
Northridge earthquake (1994) 199, 270, 281
Norton, George W. 181
nuclear
materials, container inspection
policies 220
power stations 60–61, 67, 249
reactor meltdown 42–3
Nuclear Regulatory Commission (NRC) 61
numerical simulations, power industry 103–14
potential inferences 114–17
Odoni, A.R. 228
Office of Critical Infrastructure
Index

Protection and Emergency Preparedness, Canada 73
Office of Domestic Preparedness (ODP) 252
port security grants 254
Office of Technology Assessment 60
Onculer, Ayse 52
Operation Safe Commerce (OSC) 246, 253–4
operational control, power systems 97–100
costs, container inspections 236
operator error, electricity system 58
organizational performance model 104–7
Ortiz, D. 7–8, 218, 219
Overgaard, Per B. 23
Pacific Northwest case study 80–89
effects of storms 72, 73
Pacific Northwest Economic Region (PNWER) 73
Pan Am 39, 49
Pan, Qisheng 8–9
Panama Canal 281–2
Pardey, Philip G. 181
Pareto improvements 171
Parise, Gerald F. 15, 19, 29
partial equilibrium 207
Partnership for Public Warning (PPW) 138
Partridge, M. 197
passenger car equivalent (PCE) 294, 301
passive defense 121–3
peacetime defense 121
peak commuting periods 291–3
Peerenboom, J.P. 72, 73, 75, 76
Pelosi, Nancy 220
Pena, Charles V. 134, 138
performance, container inspection 226–7
perishable cargo 228
Perrings, C. 203, 204
Persian Gulf 26
personnel requirements, containing inspections 236
Petak, W. 204
Pizam, Abraham 156
Plamondon, Marie-Eve P. 76
Plchinsky, Dennis 18
pneumonic plague 125, 129
Poisson process 227, 235
policy initiatives 245–6
container inspection 221–2, 225, 229–30
disruption 264–5, 269–75
diversion of trade 281–2
lock-outs 218
political objectives of terrorism 11
port attacks
research needs 282
strategic questions 279
port security 242–3
evaluation of policies 255–8
focus of 219
issues 243–5
measures 245–55
Port Security: A National Planning Guide 245
Porter, M. 206
Portland, Oregon 199, 210, 212
positive externalities 154
power systems, connectivity 91–3
electrical systems primer 93–5
numerical simulation insights 103–14
operation control/reliability 97–100
principles for improvements 114–17
regulatory and institutional structure 96–7
terrorist assaults 100–102
primary inspection, containers 220, 221
prisoners' dilemma paradigm 15, 25, 36, 41–2, 47–8
private protection 172–4
private sector infrastructure 137
production interruption 196–7, 199, 200
property damage 196, 199, 200
values 183–90
protection policies 172–3
provision points 179
public education 123, 124
pressure 18
protection 172–3
reactions, electricity blackouts 59–60
transport 300
utility commissions 62
warning systems 174
public-private risk management partnerships 54
Puget Sound Region Transportation Model 289
Puget Sound Regional Council 287
Purdum, Todd S. 136
pure information effect 184–5, 188
queuing models 225, 235–6
radiological dispersal devices (RDDs) see ‘dirty bombs’
rail network, California 280–81
random utility models 142–3, 177–8
rational choice representations of terrorists 26–30
rational model of behavior 12, 52, 147–8
Reagan, Ronald 26
recovery processes 201
recreation demand model 177
Red Cross 133, 140, 144, 149
Redfearn, Christian L. 6
Reed, Dorothy 4
regional economic impacts analysis 197–8
measurement of 266–9
Regional Transmission Organizations (RTO) 91, 92, 96, 98, 102, 115–16, 117
regulatory structure, electricity industry 96–7
reliability institutions 61–2, 63
philosophy, power systems 97–100
religious-based fundamentalist groups 16–17
repeat sales model 187–90

research and development (R&D) biodefense 123, 124
electricity industry 63
grants 254–5
research directions, container inspections 237–8
resilience 203–6, 209–10, 212–13
resources biodefense 120–21, 124–5
misallocation of 139
port security 255–6
terrorists 27–8
revealed preference methods 176–8
joint estimation of 180
Revolutionary Organization 17
November, Greece 13, 17
Richardson, Harry W. 8–9, 75, 203, 229, 267, 269, 279, 299
Rickman, D. 197
Ridge, Tom, 133, 138
Rinaldi, S.M. 72, 73, 76
risk assessment 137, 156
aversion 20–21
information 139–42
perception 184
reduction 170–71
risk management, IDS problem 48–51
future research 52–4
risk-taking culture 37
Riverside distribution hub 280–81
road congestion index 287–8
Robert, Benoit 76
Rose, A. 7, 198, 199, 200, 202, 205, 209, 210, 212, 213
route changes, costs 291–6
Sabourin, Jean-Pierre 76
San Bernardino County distribution hub 280–81
San Francisco, housing market 156
Sandler, Todd 3, 12, 15, 16, 18, 19, 20, 23, 25, 26, 27, 28, 31
scanning, containers 221, 222, 226, 227–8
cost–benefit analysis 229–30, 230–34
research directions 237–8
scenario-building 2–3
Schelling, Thomas C. 37, 121
Schiesel, S. 221, 226
Schuler, R. 4–5, 103, 107
Scott, John L. 20
screening, airports 264
<table>
<thead>
<tr>
<th>Term</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seattle Fault</td>
<td>83</td>
</tr>
<tr>
<td>Seattle highway network</td>
<td>see highway network</td>
</tr>
<tr>
<td>secondary inspection, containers</td>
<td>220, 222</td>
</tr>
<tr>
<td>security</td>
<td>electricity system 62</td>
</tr>
<tr>
<td></td>
<td>failures 38–9</td>
</tr>
<tr>
<td></td>
<td>grants 252–4</td>
</tr>
<tr>
<td></td>
<td>perceptions 170</td>
</tr>
<tr>
<td></td>
<td>planning 247–8</td>
</tr>
<tr>
<td></td>
<td>vulnerabilities 242–3</td>
</tr>
<tr>
<td>security policies</td>
<td>see homeland security policies</td>
</tr>
<tr>
<td>Seligson, H.</td>
<td>213</td>
</tr>
<tr>
<td>Senay, Marie-Helene</td>
<td>76</td>
</tr>
<tr>
<td>service flows</td>
<td>155–6</td>
</tr>
<tr>
<td>severe risk condition</td>
<td>133, 134</td>
</tr>
<tr>
<td>Shahin, Wassim N.</td>
<td>20</td>
</tr>
<tr>
<td>Shatz, Howard J.</td>
<td>8</td>
</tr>
<tr>
<td>Shefi, Y.</td>
<td>284</td>
</tr>
<tr>
<td>Shinozuka, Masanbou</td>
<td>75, 203, 229, 279, 299</td>
</tr>
<tr>
<td>Shoven, J.</td>
<td>197</td>
</tr>
<tr>
<td>simulated randomness</td>
<td>12</td>
</tr>
<tr>
<td>simulation exercises</td>
<td>124</td>
</tr>
<tr>
<td>Singh, Harinder</td>
<td>156</td>
</tr>
<tr>
<td>single-occupant vehicles (SOVs)</td>
<td>293</td>
</tr>
<tr>
<td>Siqueira, Kevin</td>
<td>15, 23</td>
</tr>
<tr>
<td>Sloboda, Brian W.</td>
<td>156</td>
</tr>
<tr>
<td>Slovic, Paul</td>
<td>52</td>
</tr>
<tr>
<td>Small, D.A.</td>
<td>152</td>
</tr>
<tr>
<td>smallpox</td>
<td>125, 126–7, 129</td>
</tr>
<tr>
<td>Smart and Secure Tradelanes consortium</td>
<td>219</td>
</tr>
<tr>
<td>Smith, Ginger</td>
<td>156</td>
</tr>
<tr>
<td>Smith, Vernon</td>
<td>6–7, 171, 177</td>
</tr>
<tr>
<td>social insurance programs</td>
<td>48</td>
</tr>
<tr>
<td>societal effects of contagion</td>
<td>46–8</td>
</tr>
<tr>
<td>socio-economic groups, distribution of impacts</td>
<td>201</td>
</tr>
<tr>
<td>Software Engineering Institute, Carnegie Mellon University</td>
<td>66</td>
</tr>
<tr>
<td>Sohn, J.</td>
<td>203</td>
</tr>
<tr>
<td>solar-electric technologies</td>
<td>67–8</td>
</tr>
<tr>
<td>Southern California Association of Governments (SCAG)</td>
<td>266</td>
</tr>
<tr>
<td>Southern California Planning Model (SCPM)</td>
<td>266–9, 283</td>
</tr>
<tr>
<td>Soviet Union</td>
<td>196</td>
</tr>
<tr>
<td>Spain, tourist industry</td>
<td>29</td>
</tr>
<tr>
<td>spatial</td>
<td>economic impact models 270</td>
</tr>
<tr>
<td></td>
<td>externalities 154–9</td>
</tr>
<tr>
<td>Special Flood Hazard Area (SFHA)</td>
<td>185, 187, 188</td>
</tr>
<tr>
<td>specific targets/threats</td>
<td>136, 137, 138–9, 149, 152, 199–200</td>
</tr>
<tr>
<td>Spencer, C.</td>
<td>228–9</td>
</tr>
<tr>
<td>spillover effects, natural disasters</td>
<td>72–3, 83</td>
</tr>
<tr>
<td>Stana, R.M.</td>
<td>218, 238</td>
</tr>
<tr>
<td>Standard Market Design, electricity industry</td>
<td>96–7</td>
</tr>
<tr>
<td>State of the Union address (2004)</td>
<td>220</td>
</tr>
<tr>
<td>stated preference methods</td>
<td>178–80</td>
</tr>
<tr>
<td></td>
<td>joint estimation of 180</td>
</tr>
<tr>
<td>Stewart, T.R.</td>
<td>70</td>
</tr>
<tr>
<td>strategic ports</td>
<td>252–3</td>
</tr>
<tr>
<td>strikes, ports</td>
<td>126, 265</td>
</tr>
<tr>
<td>subsidized insurance</td>
<td>173–4, 185</td>
</tr>
<tr>
<td>substitution, terrorist attacks</td>
<td>26–9</td>
</tr>
<tr>
<td>Suez Canal</td>
<td>281–2</td>
</tr>
<tr>
<td>supervisory control and data acquisition (SCADA) systems</td>
<td>64, 65, 68</td>
</tr>
<tr>
<td>supply and demand</td>
<td>209</td>
</tr>
<tr>
<td>supply chain security</td>
<td>251–2, 253–4, 258–9</td>
</tr>
<tr>
<td>survivability of systems</td>
<td>66–7</td>
</tr>
<tr>
<td>Sveklar, W.D.</td>
<td>75</td>
</tr>
<tr>
<td>symbolic targets</td>
<td>57, 200</td>
</tr>
<tr>
<td>system planners, electricity supply</td>
<td>64–5</td>
</tr>
<tr>
<td></td>
<td>resilience 203</td>
</tr>
<tr>
<td></td>
<td>survivability, electricity supply 66–7</td>
</tr>
<tr>
<td>Taliban</td>
<td>25, 31</td>
</tr>
<tr>
<td>taxation</td>
<td>49</td>
</tr>
<tr>
<td>technology barriers</td>
<td>28</td>
</tr>
<tr>
<td>container scanning</td>
<td>221–2, 230, 233–4, 237–8</td>
</tr>
<tr>
<td>development</td>
<td>254–5</td>
</tr>
<tr>
<td>testing</td>
<td>246, 253–4</td>
</tr>
<tr>
<td>wish-lists</td>
<td>249</td>
</tr>
<tr>
<td>Terminal Island</td>
<td>265, 281, 282</td>
</tr>
<tr>
<td>terrorism motivations</td>
<td>11, 16–17</td>
</tr>
<tr>
<td>networks</td>
<td>24</td>
</tr>
</tbody>
</table>
terrorist threats 196–7
computable general equilibrium modelling 197–203
economy-wide
responses/disequilibria 208–9
empirical insights 209–13
general equilibrium effects 207–8
resilience to 203–6
terrorist-related screening 219–20
terrorists, rational choice representations 26–30
Texas Transportation Institute 287–8
Thatcher, Margaret 174
Thayer, Mark 156
third-party inspections 49–50, 54
Thorp, J. 102
threat communication analysis 133–5
background 135–9
data, analysis and results 141–9
experiments 139–41
threats
levels 133–7, 138–9
perceptions 139–49
responses to 147
trends/cycles 17, 19
Tierney, Kathleen 137, 204, 205, 210
time-to-failure model 16, 31
‘tipping’ phenomenon 30, 37, 44, 45–6, 51
Top Officials Exercise of Response to
Terrorist Attack (TOPOFF) 124
tourism 29, 156
trade diversion 281–2
trade-offs 175–6
traffic
congestion 86, 289–91
flows 267–9, 288–9
mitigation measures 300
signals 66–7, 73, 84, 92
traffic analysis zones (TAZs) 290
training, system operators 67
transference externality 23–4
transmission system, electricity 62
transnational terrorism 11–13
cost-benefit analysis of terrorist-thwarting policies 30–31
data 13–20
game theory/government responses 23–4
game theory/hostage taking 20–23
rational choice representations of
terrorists 26–30
transportation
access, ports 269–75, 284–5
infrastructure 287–8
network models 280
security initiatives, goal of 219
transportation impacts of ‘dirty bomb’
attacks 275–9, 283
qualifications to 280–82
Transportation Security Administration (TSA) 248
port security grants 252–3
Transportation Worker Identification Credential (TWIC) 248–9
travel
costs 284–5
risks 29, 30
times 289–96
Treonster, J.B. 229
trends, transnational terrorism 17–20
trip
deterrence 298
diversion 291–7
truckways 280–81
Tschirhart, John T. 16, 20
Tversky, Amos 52
two-agent problem 38–43
unbounded systems 66
uncertainly
choice under 139–49
container inspection model 224
unilateral action 25
unit value transfer 182
Urban Areas Security Initiative (UASI) 254
urban population centres 125
US Bank Tower 262
US Census 159, 167, 293
US Coast Guard (USCG) 243, 246,
247–8, 249, 256, 257
International Port Security Program 248
US Constitution 91
US Customs and Border Protection (CBP) 8, 219, 221, 224, 238, 243,
249, 256–7
US Embassies 13, 16, 17, 27, 28, 30
<table>
<thead>
<tr>
<th>Term</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Maritime Administration (MARAD)</td>
<td>252</td>
</tr>
<tr>
<td>US Senate Bill 1214</td>
<td>245</td>
</tr>
<tr>
<td>utility</td>
<td></td>
</tr>
<tr>
<td>monopolies, regulation</td>
<td>62</td>
</tr>
<tr>
<td>service disruption, CGE modelling</td>
<td>198, 199, 209, 210–12</td>
</tr>
<tr>
<td>vaccines</td>
<td>122, 123, 124, 125, 128, 129</td>
</tr>
<tr>
<td>van der Linde, C.</td>
<td>206</td>
</tr>
<tr>
<td>vector autoregression (VAR) analysis</td>
<td>27–8, 29</td>
</tr>
<tr>
<td>Vehicle and Cargo Inspection System (VACIS)</td>
<td>227</td>
</tr>
<tr>
<td>vessel plans</td>
<td>247–8, 256</td>
</tr>
<tr>
<td>video surveillance</td>
<td>283</td>
</tr>
<tr>
<td>Vilchis, Ernesto</td>
<td>8</td>
</tr>
<tr>
<td>Vincent Thomas Bridge</td>
<td>265, 281, 282</td>
</tr>
<tr>
<td>Vincent, D.</td>
<td>218</td>
</tr>
<tr>
<td>von Winterfeldt, D.</td>
<td>80</td>
</tr>
<tr>
<td>vulnerabilities</td>
<td>242–3</td>
</tr>
<tr>
<td>assessments</td>
<td>249</td>
</tr>
<tr>
<td>electricity system</td>
<td>60, 64–5</td>
</tr>
<tr>
<td>Waddington, Margaret</td>
<td>156</td>
</tr>
<tr>
<td>Wang, H.</td>
<td>102</td>
</tr>
<tr>
<td>Wardrop, J.G.</td>
<td>284</td>
</tr>
<tr>
<td>warnings, responses</td>
<td>134, 136, 139, 149</td>
</tr>
<tr>
<td>Washington Heights, electricity blackout</td>
<td>101–2</td>
</tr>
<tr>
<td>water</td>
<td></td>
</tr>
<tr>
<td>supply</td>
<td>92</td>
</tr>
<tr>
<td>systems</td>
<td>75, 86</td>
</tr>
<tr>
<td>weakest-link countries</td>
<td>24</td>
</tr>
<tr>
<td>wealth</td>
<td>146, 148</td>
</tr>
<tr>
<td>weapons arsenals, use of ports</td>
<td>244</td>
</tr>
<tr>
<td>web-based experiments</td>
<td>149–50</td>
</tr>
<tr>
<td>Weinberg, J.</td>
<td>218</td>
</tr>
<tr>
<td>welfare economics</td>
<td>79–80</td>
</tr>
<tr>
<td>Whalley, J.</td>
<td>197</td>
</tr>
<tr>
<td>Whitfield, R.</td>
<td>75</td>
</tr>
<tr>
<td>Wilhelmsson, Mats</td>
<td>154</td>
</tr>
<tr>
<td>Wilkinson, Paul</td>
<td>15, 16</td>
</tr>
<tr>
<td>willingness-to-pay/willingness-to-sell</td>
<td>79–80</td>
</tr>
<tr>
<td>Willis, H.</td>
<td>218, 219</td>
</tr>
<tr>
<td>Willis, Henry H.</td>
<td>7–8</td>
</tr>
<tr>
<td>Wilson, R.</td>
<td>205</td>
</tr>
<tr>
<td>Windle, R.</td>
<td>207</td>
</tr>
<tr>
<td>Woo, Gordon</td>
<td>174, 185</td>
</tr>
<tr>
<td>World Trade Centre</td>
<td>11, 92, 183, 229</td>
</tr>
<tr>
<td>x-ray scanning</td>
<td>221, 222, 226, 264</td>
</tr>
<tr>
<td>Y2K</td>
<td>64</td>
</tr>
<tr>
<td>Yezer, A.M.J.</td>
<td>184</td>
</tr>
<tr>
<td>Zanjani, G.H.</td>
<td>172, 173, 183</td>
</tr>
</tbody>
</table>