Index

accident, 29
advanced measurement approaches (AMA), for calculating operational risks, 127–130
airline terrorist risk model, 39
AIRMIC, 28
ALARM, 28
Bachelier, Louis, 75–76
banking risks, 23
Barings Bank, 73
Basel II agreement, 120, see also Basel II framework, for operational risk
Basel II Consultative paper, 123
Basel II framework, for operational risk, see also loss exposures, quantification of advanced measurement approaches for calculating operational risks, 127–130
Basel II reporting matrix, 132
definition of, 124
essentials for branch operations, 132
indicator approach for calculating operational risks, 124
management principles of operational risks, 125
pillars of, 123–124
risk mitigation, 130
standardized approach for calculating operational risks, 125–127
Basel II regulations, 123
Basel I regulations, 123
Bayes, Thomas, 119
Bayesian networks, 29, 70, 134, 149, 243
for analysis of vaccination policy, 87–90
calculation of road transport fleet risk using
extension of influence diagrams, 87–90
inference, 83–85
introduction to Bayesian network, 78–83
introduction to case, 77
knowledge acquisition in, 85–86
dependencies, 81–83
nodes and variables in, 79
probabilities, 79–81
Bayes’ theorem, 50–54, 57
belief revision process, 50–51
binomial distribution, 62–63
bonus, 165
British Airways, 26
British Petroleum, 26
capital adequacy equation, 123
capital charges, 126
cargo road accident model, 39
catastrophic events, 1, 170
central limit theorem, 68, 188
chief risk officer, 26–27
cindynic potential, 172
cindynics, basic concepts, 170–172
axioms in, 174–175
dysfunctions, 172–174
general principles, 174
perspectives, 174–176
cindynic situation, 170
claims management, 21
Cluedo game, 51–54
Committee for Banking Supervision, 128
conditional probability, see probability basics
contractual risk transfer, 164–165
credit cards, 32
cumulative distribution function (CDF), 59, 61
decision nodes, 30
diversifiable risk, 4
duplication, 167
economic efficiency, 8
Efficient Market Hypothesis (EMH), 76
enterprise social responsibility, 9
environmental risks, 119
European wheel roulette game, 43, 55
exposure, definition of, 7, 32
exposure, measurement of, 135
external auditors, 128
Exxon Valdez, 26
family systematic therapy, 173
“fat finger” error, 135
“fat finger” scenario, 150–157
“fault tree analysis” technique, 141
Fayol, Henri, 27
FERMA, 28
Firestone, 26
Fisher – Tippett distribution, 66
foreign exchange risk, 24
foreign war, see military risk
frequency risks, 166
frequency × severity matrix, 20–22
Gaussian distribution, 63
GESTRISK, 5
global attack rate, 187
globalization, 25
gross income, 124, 126
Gumbel distribution, 66
hazardous situation, 170
hazards, 6
health risk, 24
Heisenberg’s uncertainty principle, 29
histogram distribution, 66
impact, measurement of, 135
equations and variables for different scenarios, 146
influence diagram, 31
influenza pandemic risk model
Bayesian network, 180
exposure, 177
impact, 178–179
occurrence, 177
insurable risks, 4–7
insurance premium, 21
intangible assets, 5
interest rate risks, 24
internal fraud” risk, 136, 138
intrinsic cost, 162
investment risk, 24
IRM, 28
ISO 73 document, 3
Katrina, 119
knowledge management, 120
KPMG, 26
liquidity risk, 23
Lisbon earthquake, 169
loss control
category of drivers in, 163
loss prevention
contractual risk transfer, 164–165
elimination of exposure, 164
reducing frequency of occurrence, 166
risk avoidance or suppression, 164
loss reduction
active reduction, 167–168
duplication, 167
passive reduction, 166
post-event redeployment planning, 168–169
separation, 166–167
Loss Distribution Approach (LDA), 121, 134, 157
loss exposures, quantification of, see also Basel II
framework, for operational risk
candidate scenarios for quantitative risk
assessment, 134
conditioning of exposure, 137
measurements for exposure to different types
of risk, 136
modelling and conditioning exposure at peril, 135–136
modelling and conditioning impact
distribution variables involved, 146–147
impact drivers, 147–148
impact equation, 145
modelling and conditioning occurrence
conditioning the probability of occurrence, 143–144
consistency of exposure and occurrence, 137–140
evaluating the probability of occurrence, 140–143
modelling the global distribution of losses, 158
quantifying scenarios, 148–150
example of, 150–157
variable quantification method, 147
XOI model, 135, 149
machine complexity, 29
management, definition of, 7
Maquet, Yves, 13
Meltzer’s original paper, 181, 185
military risk, 24
mixed risks, 4
Monte Carlo simulation, 134, 149
for analysis of potential earthquake in cement
industry
computation model, development of, 106–107
context, 104–106
Monte Carlo simulation of net present value, 107–109
application of control variable technique in, 113–114
background of, 109–110
definition of, 110–111
estimation according to, 111–112
hedging of weather risk
computational model, development of, 99–100
data collection, 98–99
introduction to case, 96–97
manual analysis of scenario using model, 101
Monte Carlo simulation of potential losses, 101–104
random variable generation in, 112–113
software tools used in, 117
for structured funds, 90–92
application of sampling random numbers, 92–94
building structured fund simulation, 94–96
use of antithetic variable sampling in, 114
use of Latin hypercube sampling, 115–117
use of stratified sampling, 115
variance reduction in, 113

natural disasters, 2
Neumann, John von, 109
nondiversifiable risk, 4
none strategy, 183

object of risk
categories in, 5
caption of, 5
occurrence, measurement of, 135
temporal evaluation, 140
subjective evaluation, 141
temporal evaluation, 140
organization
definition of, 3
resources of, 3

perceptual salience, theory of, 74
peril, 5, 32–33, 140
classification of, 5–6
financial loss by, 7
vs hazards, 6
Perrier, 26
physical assets, 1
Pillar One rules, 124
Poisson distribution, 65
probability basics
axioms in, 43–45
Bayes’ theorem, 50–54
conditional probabilities, 45–49, 56
empirical estimation of probabilities, 68–71
expert estimation of probabilities, 71–75
independence, 49–50
maximum likelihood estimation, of
probabilities, 69
probability density function, 61
probability distributions, 62–67
random variables, 54–57
moments of, 57–61
theorems in, 43–45, 67–68
unconditional probability, 56
procurement management, 2
project risk, 24
PTAII strategy, 183
PTHiRisk strategy, 183, 187
pure risk, 4
quality management, 2
quantitative risk assessment, see also Basel II
framework, for operational risk
features of risk assessment, 119–120
issues in risk quantification, 121
objectives of risk assessment, 120–121
random variables, 54–57
correlation of, 58
covariance of, 58
expected value of, 57–58
moments of, 57–62
standard deviation of, 58
2000 readiness crisis management team, 2
reputation, concept of, 25–26
residual risk, 165
resilience planning process, 168
risk centres, 11, 131
method, 13–14
risk control, quantitative modelling of
economic impact of pandemic influenza
context, 176
influenza pandemic risk model, 177–181
risk analysis, 188–189
risk control strategies, 181–187
enterprise-wide risk management
application to the risk management of an
industrial plant, 203–210
context and objectives, 195
representation using Bayesian networks,
196–201
risk analysis and complex systems,
195–196
usage of the model for loss control,
201–202
“fat fingers” operational risk model
analyses of potential severe losses, 189
analysing the cumulated impact of loss
control actions, 190–191
identifying the loss control actions, 189–190
risk analysis, 192–193
index

risk financing, see also risk financing, with quantitative models
alternative risk transfer (ART) tools, 260–261
building blocks in, 254–257
captive insurer, 259–260
combination of risk model and financing model in, 261–264
excess insurance, 258
financing tools in, 257
first line insurance, 258
informal retention, 258
instruments
capital markets products for risk financing, 225–230
choice of retention levels, 222–223
financial reinsurance and finite risks, 223–225
hybrid techniques, 220–222
retention techniques, 214–219
risk financing and risk quantifying, 230
transfer techniques, 219–220
retro-tariff insurance, 259
self-insurance, 258
risk financing, with quantitative models
case example of property insurance programme calculation of perils, 243–244
computation of losses, 250
context and objectives, 243
financial programme in, 248–249
quantification of impacts, 245–248
risk analysis, 250–252
case example of satellite launcher context and objectives, 231
development of risk model, 231
financing programme, 231–232
implementation of Monte Carlo simulation, 235–243
probabilistic analysis of failures, 232–233
set up and operating conditions, quantitative analysis of, 233–235
risk management, see also Basel II framework, for operational risk
Australian standards, 28
British standards, 28
causal graph for, 38–39
circle of, 18
classification of perils, 5
concepts in, 3–8
decision process in audit and corrective actions, 19–20
diagnosis of exposures, 11–16
risk treatment, 16–19
financial risks, 23–24
identification tools for expert analyses, 13
financial and accounting records, 12
historical data and scenario analysis, 12–13
marketing, purchasing and other documents, 12
production and flow charts, 12
site inspection, 13
standards questionnaires, 12
information system for, 5
of insurance company, 4
loss control techniques, 17
marketing techniques in, 1
model for, 39–40
nonfinancial risk, 24
objectives
economic efficiency, 8
environmental issues, 8–9
ethics and good citizenship, 9
functional objectives, 9
at operational level, 9–10
at organizational level, 8
other objectives, 10
permanent objective of manager, 14
risk financing techniques, 17
risk quantification
changes in frequency due to exposure and probability, 33–34
cost of decisions, 36–37
drivers of risk exposure variables, 35–36
impact drivers in, 34–35
quantitative causal model of risk, 31–33
risk financing, 37
trends in physical asset management, 25–26
risk financing and strategic financing, 23
in risk management professional skills, 26–28
risk management vs strategic management, 23–25
risk matrix, 20–22
risk mapping, 22
risk mitigation, 130
risk premium, 4
risk quantification, 122
changes in frequency due to exposure and probability, 33–34
cost of decisions, 36–37
drivers of risk exposure variables, 35–36
impact drivers in, 34–35
quantitative causal model of risk, 31–33
risk financing, 37, see also risk financing
separation, 166
Shell, 26
social environment, 172
speculative risk, 4
stakeholders, 165
stochastic process, 62
<table>
<thead>
<tr>
<th>Suppression, 164</th>
<th>VAI strategy, 183, 185, 187</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systematic risk, 4</td>
<td>Venn diagrams, 44–45</td>
</tr>
<tr>
<td>Tangible assets, 5</td>
<td>VHiRisk strategy, 183</td>
</tr>
<tr>
<td>9/11 terrorist attacks, 119</td>
<td>Weak law, of large numbers, 67</td>
</tr>
<tr>
<td>Transferee, 165</td>
<td>Weather conditions risk, 24</td>
</tr>
<tr>
<td>Transferor, 165</td>
<td>Weibull distribution, 64</td>
</tr>
<tr>
<td>Triangular distribution, 67, 74</td>
<td>World Health Organization, 170</td>
</tr>
<tr>
<td>Truffle Fund, 90–96</td>
<td>XOI model, see loss exposures, quantification of</td>
</tr>
<tr>
<td>Ulam, Stanislaw, 109</td>
<td>Year 2000 bug, 1, 25</td>
</tr>
<tr>
<td>Uncertain event, 48, 63</td>
<td>Zero cover, 168</td>
</tr>
<tr>
<td>Unsystematic risk, 4</td>
<td>Zero defects, 2</td>
</tr>
<tr>
<td>User experience, 29</td>
<td>Zero inventories, 2</td>
</tr>
<tr>
<td>US stock returns distribution, 60</td>
<td></td>
</tr>
<tr>
<td>Utility graph, 162</td>
<td></td>
</tr>
<tr>
<td>Utility nodes, 30</td>
<td></td>
</tr>
</tbody>
</table>