Index

accumulation rule 63
active investing 113–14
affective trust 161–2
agent-based theory 73–4
agnostic probability 93, 94, 97, 106–8
algorithmic collusion 209
algorithmic decision-making 157, 160, 168
algorithmic trading 54, 137–8, 141, 143, 206
allocative efficiency 61
antifragility 89, 91–3, 96, 97, 103–5
a priori probability 5
Arrow, Kenneth 80
artificial general intelligence (AGI) 111, 130
artificial intelligence (AI)
  associated human elements 241
  characteristics 240
  consumer effects 210–12
  European Commission 243
  evolution of 242
  financial institutions 206–10
    challenges 208–9
    processes 207–8
    protection 208
    selling proposition 207
  general type 206
  narrow type 205–6
  principles
    competition 213–14
    ethics 212–13
    explainability 213
    privacy 213
  risk management
    banks’ AI applications 243–4
    future tasks 248
  reputational key risk indicators
    246–7
  reputational risk 245–6
  social-media reputational risk component 247–8
  super 206
  technological elements 241
see also finance-related specific headings
artificial marketers 130
artificial neural networks (ANNs) 77, 126
artificial risk managers 130
augmented decision-making 156, 160, 168
automated decision-making 156
automated trader (JATB) 128–30
automated trading 126, 130, 137
Background knowledge 9, 18, 21
Becker, Gary 63, 78, 81
behavioral life cycle (BLC) theory 32
behavioral policy interventions 69–84
  agent-based theory 73–4
  comparative advantages 81–3
  expert systems 70
  individual knowledge 69–70
  intelligent machines 70–72
  interaction-based theory 73–4
  machine learning 74–5
  networks of nodes and links 76–8
  paternalistic policymaking 83
  policymakers 78–9
  topology 75–6
bias 140–41
  confirmation 165
Big Data 1–5, 116
binding contract rule 62
Blueprint 37–43
Boglehead 203–4
Bogle, John C. 203
Borrow Less Tomorrow (BLT) program 42
bounded rationality 11, 116–17
Buchanan, James 79
explainability 213
explainable artificial intelligence (XAI) 147
exponential technologies 91, 99–104
extra-marginal traders 60–64
Extraordinary Popular Delusions and the Madness of Crowds (Mackay) 200
extreme gradient boosting (XGB) 149–52
fast-and-frugal heuristics 118–19
fear of missing out (FOMO) 199–201
financial consciousness 89, 91, 95, 102, 104–6, 108
financial consumers 174–89
  behavioural experiments 174, 176–8, 188–9
  decision aids 176, 189
  digital interfaces 176–8, 180–81, 183, 187
  experimenter demand 177
  nudge vs. boost 183–7
  online consumption 174, 177
  personal loans 178–83
  products 175–6
financial heuristics toolbox 118–24
  fast-and-frugal heuristics 118–19
  fundamental analysis 120–21, 123
  micro-heuristics 120
  price action 120
  statistical arbitrage strategies 119
  technical analysis 120–22
Financial Markets Standards Board (FMSB) 137, 142–3
financial market transparency (FMT) 89–108
  agnostic probabilities 93, 94, 97, 106–8
  antifragility 89, 91–3, 96, 97, 103–5
  axiology 106–8
  biological micro-foundations 89–93, 97, 101, 104, 107, 108
  Conscious Banking platforms 91, 95, 96, 104
  cost-benefit analysis 91, 95, 106–8
  exponential technologies 91, 99–104
  financial consciousness 89, 91, 95, 102, 104–6, 108
  fundamental uncertainty 91–7, 100, 103–7
  homo economicus 89–91, 93–5, 101–3
  homo sapiens 89–93, 95, 97, 101–3
  irreversible time 90–91, 93, 96, 104, 107
  macro-level value generation 97–9
  micro-level value generation 104–6
  open mainstream reference systems 94–7
  rationality vs. irrationality 89, 92
  risk-neutral simulation 93, 94, 106–8
Fodor, Jerry 8
fundamental analysis heuristics 120–21, 123–4
  content analysis 123, 124
  current news 123
  macro-economic indicators 123
  market indices 123
  network analysis 123, 124
  sentiment analysis 123, 124
  fundamental uncertainty 91–7, 100, 103–7
game theory 62, 65, 71, 150
Gell-Mann, Murray 66, 95
general artificial intelligence 206
Global Financial Crisis 91, 108
Goals-Based Investing (GBI) holistic framework 93, 108
Gopnik, Alison 10
Graham, Benjamin 202
Greenspan, Allan 91
Gricean maxims 9
grid trading 119
grounded cognition 11
Grundfest, Joseph 33
guaranteed of losing extreme sums (GOLES) 200
Heckmann, Peter 35
hedge-fund managers 202
heuristics 111–32
  decision-making 15–16
  financial toolbox 118–24
  fast-and-frugal heuristics 118–19
fundamental analysis 120–21, 123
micro-heuristics 120
price action 120
statistical arbitrage strategies 119
technical analysis 120–22
hill-climbing 15
integrated architecture 126–30
automated trader (JATB) 128–30
core (central module) 128
data service 128
neural networks 126–7
neuro-evolutionary algorithms 127
order taker service 128
strategies provider service 128
system architecture 129
validation service 128
less-is-more principle 16
machine learning 116–18, 124–6
means-ends analysis 15
overview of 111–12
rules of thumb 14
trading and investing 112–15
active investing 113–14
efficient market hypothesis 113, 114
exchange-traded fund 113
passive investing 113
hill-climbing technique 15
Hobbes, Thomas 7
holism 91, 96, 104
homo economicus 89–91, 93–5, 101–3
homo sapiens 89–93, 95, 97, 101–3
human consciousness 96–7
human decision-making 156–60, 167–9
human intelligence 2, 3, 7, 9, 14, 17, 22, 54, 65, 70, 92, 241
human traders 55, 56, 58, 65, 66
Hume, David 1
information completeness 220–22
information complexity 222–8
The Intelligent Investor (Graham) 202
intelligent machines 70–72
learning 71
machine-Human pair 72
intentional arc 19
intentionality 17–18
interaction-based theory 73–4
interpretability metrics 150
intra-marginal traders 61–2
irrationality 89, 92
predictable 79
irreversible time 90–91, 93, 96, 104, 107
Joy, Bill 23
Just Another Trading Bot (JATB) 128–30
Kaplan, Steven Jon 20
Key Information Documents see PRIIPs
KIDs
Keynes, John Maynard 80
Klarman, Seth 202
Knight, Frank 5
knowledge of equilibrium 51
know sure thing (KST) indicators 122
Kurzweil, Ray 23
learnability 73, 77
LearnVest 43–6
less-is-more principle 16
lifestyle information 145
logistic regression 149, 151
Lopes, Lola 34
Lucas, Robert 81
Lynn, Laurence 78
machine intelligence 3, 70
machine learning (ML) 1–3
behavioral policy interventions 74–5
consumer effects 210–12
finance 124–6
financial institutions 206–10
heuristics 116–18
non-supervised learning 242
reactive behavior 241
reinforced learning 242
risk management
banks’ AI applications 243–4
future tasks 248
reputational key risk indicators 246–7
reputational risk 245–6
social-media reputational risk component 247–8
supervised learning 241
systems based on 241
wholesale financial markets
bias 140–41
market concentration and correlation 141
model drift 140
resources 141–2
trade pricing and execution 139
Mackay, Charles 200, 203
macro-economic indicators 123
macro-level financial value generation 97–9
Margin of Safety (Klarman) 202
market concentration and correlation 141
market indices 123
market institutions
accumulation rule 63
allocative efficiency 61
binding contract rule 62
competitive equilibrium 53, 55, 59, 66
demand and supply functions 55–62, 64
double auction market 53–5, 57, 60–65
extra-marginal traders 60–64
human traders 55, 56, 58, 65, 66
inefficiency 61, 62
intra-marginal traders 61–2
knowledge of equilibrium 51
price priority rule 62, 63
pursuit of self-interest 63, 66
student algorithm traders 56
Walrasian tatonnement 51–3, 61, 65
zero-intelligence traders 57–8, 60, 61, 64–6
Marr, David 8
means-ends analysis 15
measure of textual lexical diversity (MTLD) 224, 225
Meltzoff, Andrew 10
micro-heuristics 120
micro-level financial value generation 104–6
model drift 140
momentum trading 202
Mullainathan, Sendhil 3
Musk, Elon 113
narrow artificial intelligence 205–6
natural language processing techniques 220–28
information completeness 220–22
information complexity 222–8
n-body relations 77
neural networks 149–52
artificial 77, 126
neuro-evolutionary algorithms 127
NeuroEvolution of Augmenting Topologies (NEAT) algorithms 126–7
methodology 126
optimization 127
Newell, Allen 14
non-supervised learning 242
no trend indicators 122
ontic uncertainty 6
open banking 145
open mainstream reference systems 94–7
Consscious Banking platforms 95, 96
double-blind method 94
entelechy/anti-entelechy 97
expected utility theory/prospect theory 95
hierarchical systems 96
human consciousness 96–7
randomisation 94
overfitting 150

Packaged Retail Investment and Insurance Products see PRIIPs KIDs
Pareto efficiency 83
passive investing 113
paternalistic policymaking 79, 83
personal loans 178–83
Peters, Ole 95
Plott, Charles 53, 55
Ponty, Merleau 19
Popper, Karl 1
predictable irrationality 79
price action heuristics 120
price priority rule 62, 63
PRIIPs KIDs 215–36
data sets 215–20
evidence-based policymaking 229–31
measure of textual lexical diversity 224, 225
natural language processing techniques 220–28
information completeness 220–22
information complexity 222–8
RegTech 216–17
risk assessments 232–4
summary risk indicator 218, 221, 227, 229, 232, 235
SupTech 216–17
privacy 213
privacy enhancing techniques (PETs) 213
property dualism 7, 8
psychology AI 2
pursuit of self-interest 63, 66
Putnam, Hilary 8

The Quark and the Jaguar (Gell-Mann) 66

radical rationality 89–108
random forest (RF) 149–51
range indicators 122
rationality–reality gap 82
registered investment advisors (RIAs) 37
regret and responsibility 35
RegTech 216–17
reinforced learning 242
reputational risk
characteristics of 245
definition of 245–6
key risk indicators 246–7
social-media component 247–8
reversal patterns 122
risk assessment methods 144
risk management 240–48
banks’ AI applications 243–4
future tasks 248
reputational key risk indicators 246–7
reputational risk 245–6
social-media reputational risk component 247–8
risk-neutral simulation 93, 94, 106–8
robo-advisors 163–7
robo/human-advising financial service firms
behavioral life cycle (BLC) theory 32
Chase Card Services 37–43
Edelman Financial Engines 33–7
LearnVest 43–6
Rosch, Eleanor 12
rules-based algorithmic trading 137–41

Santayana, George 204
Savage, Jimmy 6
Schlifske, John 45
Searle, John 9, 17
security/potential/aspiration (SP/A) concept 34
Sharpe, William 33
Simon, Herbert 6, 11, 13, 14, 83, 116
simplicity 16
simulative AI 2, 7–12
Smith, Adam 52, 53, 59, 63, 105
Smith, Gordon 37
Smith, Vernon 61
social-media reputational risk component 247–8
stability 150
statistical arbitrage strategies 119
statistical probability 5
Stiglitz, Joe 7
stock markets 193–4, 198–9, 201
structural rationality 51–66
student algorithm traders 56
subjective expected utility (SEU) 14
summary risk indicator (SRI) 218, 221, 227, 229, 232, 235
super artificial intelligence 206
supervised learning 241
SupTech 216–17
systemic risk 209
technical analysis heuristics 120–22
categories of patterns 121–2
continuation patterns 122
cycle indicators 122
neuro-evolutionary algorithms 127
no trend indicators 122
reversal patterns 122
Index

- trend indicators 122
- volatility/range indicators 122
- volume indicators 122
- Thaler, Richard 32
- Thompson, Evan 12
- topological data analysis (TDA) 76
- topological data field theory (TDFT) 76
- topological studies 75–6
- trade pricing and execution 139
- transparency 213
- transparent markets 99–104
- trend indicators 122
- trustworthiness 35
- Turing, Alan 17

- universal constructor 77
- van Gelder, Timothy 19
- Varela, Francisco 12
- Vinge, Vernor 22
- volatility/range indicators 122
- volume indicators 122
- von Tobel, Alexa 43

- Walrasian tatonnement 51–3, 61, 65
- wealth management 36
- wholesale financial markets 137–43
  - algorithmic trading 137–8, 141, 143
  - automated trading 137
  - challenges 142–3
  - machine learning 138–42
    - bias 140–41
    - market concentration and correlation 141
    - model drift 140
    - resources 141–2
    - trade pricing and execution 139
  - rules-based algorithmic trading 137–41
- Winter, Sidney 81
- World Economic Forum 209–10

- Zeckhauser, Richard 81
- zero-intelligence traders 57–8, 60, 61, 64–6