

Index

- abandonment of children (Roman Egypt),
 197–9, 203–16, 224, 227
 - financial effectiveness of, 214
 - rate of, 214–15
 - social attitudes to, 211–12
 - trigger for, 208–10, 212, 214
 - wet-nurse contracts (Tebtunis), 215
- agriculture (Roman Egypt)
 - crops, 218–22
 - labour, 217–18, 222–4
 - Nile flood, 201–4, 213, 219–23, 225–6
 - plot size, 203, 205, 212, 217–19, 223
 - seed, 202–3, 209, 214, 217–19, 222, 225
 - share-cropping, 219
 - storage/spoilage, 222–3
 - wheat prices, 201, 203, 220–2, 226
 - wheat yield, 201–3, 212–13, 217–22
- Akriagg, Ben, 61–2
- aleatory uncertainty. *See* uncertainty, aleatory
- Allen, Robert, 112
- Allison, Penelope, 100
- AMCP (adult male citizen population). *See*
 demography, Classical Greece
- anchoring effect, 23–4
- Andermahr, Anna Maria, 121
- andrapodismos*. *See* mass enslavement
- Arcenas, Scott, 65–7, 71, 83
- archaeological assemblages, uncertainty in
 dating of, 2, 12
- Archebios of Byzantium, 69
- Arsinoite nome, 200, 215, 217
- Bagnall, Roger, 215, 226
- Bairoch, Paul, 273–4, 283
- battleship curve, 156
- Bayesian inference, 12, 13 n.26
- Bayesian interpretation of probability. *See*
 probability, frequentist v subjective
 interpretations of
- belief, degree of. *See* degree of belief
- beliefs, defined, 13
- Beloch, Julius, 1, 289
- Bennet's Law, 255
- Berger, Shlomo, 64, 66
- binomial distribution, 138
- Bodel, John, 122
- Bonneau, Danielle, 220
- bootstrap method, 104, 280
- Bresson, Alain, 53, 59
- Brittius Balbus, Q., 108
- Broughton, Thomas, 258
- Camodeca, Giuseppe, 93
- Capehart, Kevin, 96
- carbon-14 dating, absolute, 2, 12
- Carter method, 164
- Cébeillac-Gervasoni, Mireille, 121
- census qualification (Roman)
 - curial, 109–11
 - equestrian, 94
 - senatorial, 94, 122
- cities
 - inhabited area, 275–6, 279, 284–5
 - population density, 275–6
- citizens, adult male. *See* demography,
 Classical Greece
- cleruchies, Classical Greek, 80–1
- Clodius Flaccus, Aulus, 110
- cognitive biases, 22–4
- coherence, axiom of, 25
- coinage of the Roman empire
 - coinage supply
 - defined, 135
 - dominated by silver not gold, 161
 - total value ca 160 CE
 - bronze, 159–60
 - centrally produced precious metal,
 156–7
 - Eastern silver, 157–9
 - decay of coinage in circulation, 180–2,
 183–9
 - finds, biases in
 - hoards, stray finds and site finds,
 140–3
 - military regions, 141–3, 180
 - Pompeii, 143–51

- coinage of the Roman empire (cont.)
 - production
 - coin type, concept of, 162–3
 - die productivity, 139–40, 173–8
 - dies per coin type, 163–73
 - value of under Hadrian, 152–5
 - reform of 54 CE, 147–51
- confidence in estimation, 28, 36
- confidence intervals, 29 n.56
- correlation of input values in Monte Carlo simulation, 33
- credible intervals, defined, 28–9
- data
 - missing, 41–2, 271–2, 281–3, 292–3, 298
 - representativeness of, 280–1
- de Callatay, François, 136
- De Finetti, Bruno, 10, 21
- De Ligt, Luuk, 120
- degree of belief, 10, 13, 21, 54–5
- Della Corte, Matteo, 108
- demographic microsimulation, 2
- demography
 - Classical Greece, 57–63
 - adult male citizen population (AMCP), 58, 60–2, 70–2, 75–7, 81
 - Athens, 57–8, 60–2
 - household size, 59–60
 - landless poor, 61–2
 - metics, 60, 62
 - population growth, 57–8
 - population, total, 57
 - slaves, 58–60, 62
 - Roman Egypt
 - fertility and mortality, 202, 205, 209–12, 226–7
 - model family, 201, 204–5, 208, 210–11, 217–27
 - population growth, 205–6
 - Roman Empire
 - demographic insults, 290
 - household size, 277
 - population, growth rate, 289–90, 292
 - population, total, 289
 - urban population, density, 276–7
 - urban population, growth rate, 287, 292
 - urban population, total, 285–7, 291
 - urbanization rate, 291
- Demosthenes of Oenoanda, 252
- Demougin, Ségolène, 94
- Dioskourides of Abdera, 68–70
- doubling time, 287, 292
- Duncan-Jones, Richard, 110–11, 122, 137, 151–2
 - estimate of the Roman money supply, 135–40, 151–2, 155–60
- economic growth, Greek, 53–4, 63, 75, 85
- economic rationality, 252
- epistemic uncertainty. *See* uncertainty, epistemic
- Erdkamp, Paul, 232
- Eschebach, Liselotte, 100
- estates, Greek
 - estate lifetimes, 57, 62–3
 - total number, 60–3
- estimates
 - interval, 4, 7
 - point, 2, 4, 21
 - probabilistic, 25–30
- Esty method, 164
- events v quantities as objects of uncertainty, 14
- expected value, 28, 95
- expert opinion, elicitation of, 16, 19
- exposure (Roman Egypt), 199
- family finances (Roman Egypt)
 - children, impact on. *See* abandonment
 - income, 223–4
 - outgo, 224–5
 - rents. *See* tenancy
 - ruin, 200–8, 212–3, 227
 - defined, 203
 - subsistence, 201–3, 209, 212
 - surpluses, deficits, debt and credit, 200–9, 212–6, 223–6
 - model of, 201
- Flohr, Miko, 94, 98, 106, 115
- forecasting, 11, 16
- Freyberg, Hans-Ulrich von, 135
- Frier, Bruce, 198–9, 202, 215, 226, 288–90
- Friesen, Steven, 2, 95, 117, 135, 242, 258
- Garnsey, Peter, 5–8, 36, 110, 120, 122, 232, 252
- GDP of the Roman empire, 135–6, 161
- Gehrke, Hans-Joachim, 64–6
- geometric method for inferring original
 - number of dies. *See* Esty method
- Goldsmith, Raymond, 135–6
- Gompertz curve, 202
- grain dole, 236
- grain fund (Roman Greece and Asia Minor)
 - benefactions to, 241–2, 258–61
 - civic contributions to, 243–4, 261–3

- dynamics of, 238–9
- failure of, 245
- funding of, 235–6
- lending from, 235–6
- Median Fund Life, 246
- probability of failure, 247
- reselling of grain, 236–7
- sitōnai* (grain fund officials), 232, 234, 237–8
- survival rate, 246–7
- sustainability of, 250–2
- withdrawals from, 240–1

- Hammond, Mason, 117
- Hansen, Mogens, 57, 59, 70, 72, 75, 78, 273,
 See also Inventory of Archaic and Classical Poleis
- hard-easy effect, 23
- Harris, William, 197, 199
- harvest failure, 231, 240–1, 252–3
- Herakleides of Byzantium, 69
- highest probability density (HPD) interval,
 30, 82, 95
- hoards, coin, 140–1
- Hopkins, Keith, 1, 113, 135, 261
- Howego, Christopher, 136
- HPD interval. *See* highest probability density (HPD) interval

- ignorance, total, problem of, 17
- input variables, defined, 6
- interdependence
 - epistemic, defined, 30–1
 - of input variables, 30–5, 290–1
- Inventory of Archaic and Classical Poleis*,
 56–7, 64–6, 70, 72, 80

- Jongman, Wim, 107, 135, 232, 254

- Kahnemann, Daniel, 23
- Kaplan, Stan, 21
- Kirbihler, François, 253
- Kobes, Jörn, 252
- Kron, Geoffrey, 94, 111, 115

- land carrying capacity, defined, 3
- Langellotti, Micaela, 215
- Lavan, Myles, 290
- law of small numbers, 24
- Lo Cascio, Elio, 136, 272
- Lopez Barja de Quiroga, Pedro, 120
- Łoś, Andrzej, 120
- Lysander, 70

- Maddison, Angus, 135
- mass enslavement, Greek (*andrapodismos*),
 77–80
- Metcalf, William, 136
- Migeotte, Léopold, 238, 251
- missing data. *See* data, missing
- Mitchell, Stephen, 255
- models
 - best-estimate/deterministic, 2, 4
 - historical, use of, 300–4
 - probabilistic, 2, 296, 297
 - probabilistic v deterministic, 95, 113
- monetization ratios, 135
- money supply, defined, 135
- Monte Carlo simulation
 - explained, 25–30
 - interpretation of results, 27–8, 95–6, 178
 - number of iterations required for, 25 n.54
- Morris, Ian, 4
- most likely value, 9, 15–20, 298–9
- Mouritsen, Henrik, 108, 120
- Mueller, Eva, 204

- Naevius Memor, 119
- negative binomial distribution, 138
- New Institutional Economics, 54, 85
- Nielsen, Thomas. *See Inventory of Archaic and Classical Poleis*
- nominal range sensitivity test. *See* sensitivity analysis, nominal range sensitivity test
- normal distribution. *See* probability density functions (PDFs), normal distribution

- Osborne, Robin, 53
- overconfidence, 22–3
- Oxyrhynchite nome, 200, 215, 217–20, 226–7

- parameters of a mathematical distribution,
 16–19
- Pareto, Vilfredo, 96
- Patterson, Cynthia, 216
- Patterson, John, 122
- PDFs. *See* probability density functions (PDFs)
- personalist interpretation of probability. *See* probability, frequentist v subjective interpretations of
- PERT distribution. *See* probability density functions (PDFs), PERT distribution
- Philip II, 68, 175

- Pobjoy, Mark, 110
 point estimates. *See* estimates, point
 Pomeroy, Sarah, 59
 Pompeii
 coin finds, 143–51
 elite
 equestrians, 94
 freedmen in, 120
 minors (male) in, 119
 senators, 93–4
 women in, 118–19
 housing, 97–106
 wealth inequality, 97–106
 population, Classical Greek. *See*
 demography
 Postumius, Q., 93–4
 power law. *See* probability density functions
 (PDFs), power-law
 precision in estimation, 28
 prediction. *See* forecasting
 prediction intervals, 28–30
 probability
 frequentist v subjectivist interpretations
 of, 9–14
 objective v subjective, 10–11
 probability density functions (PDFs), 14–19,
 55, 95
 defined, 14
 lognormal, 280
 normal, 18–19
 PERT, 19, 27
 power-law, 96–7
 inflexion point, 104
 mean-excess plot, 104
 Zenga plot, 104
 Zipf plot, 102–3
 triangle, 17–18, 27, 55
 uniform, 16–17, 55
 probability distributions, 14–19
 discrete, 14
 joint, 33
 representing uncertainty v variability.
 See uncertainty distributions v
 variability distributions
 probability mass, 27–9
 property, Greek. *See* also cleruchies; estates;
 mass enslavement; *stasis*
 confiscation, 55, 63–84
 defined, 54
 invisible, 85
 landed v movable, 55–6
 rights of citizens, 53–4, 63, 74
 quantities
 continuous v discrete, 14
 v events as objects of uncertainty, 14
 quantity of interest, defined, 6
 R (statistical software), 42
 randomness, 11
 rank-size rule, 280
 Rathbone, Dominic, 219
 representativeness, judgement by, 24
 Riddle, John, 198
 Rowlandson, Jane, 227
 Rubinstein, Lene, 70
 rule 70, 287
 Sabina, Poppaea, 121
 Saller, Richard, 122
 Salomon, Nicoletta, 81
 sampling error, 259–60, 266
 scenario analysis, 2, 72
 Scheidel, Walter, 2, 58, 95, 117, 135, 210, 224,
 242, 258
 sensitivity analysis, 6, 37–9, 83–4, 116,
 212–14, 247–50
 nominal range sensitivity test, 37, 116
 Shipley, Graham, 70–1
 Silver, Morris, 232
 site finds, 141
 Sosin, Joshua, 251
 stasis, 64–73, 83–4
 state of knowledge, 10, 13, 21, 54
 stray finds, 141
 Strubbe, Johan, 232, 235–7, 250, 260–1
 subjectivity in historical analysis, 13, 54
 summae/honoraria, 110–11
 supply-and-demand model, 241, 256
 Temin, Peter, 135
 tenancy (Roman Egypt), 200, 215–16, 218–19
 three-point estimation, 19, 22
 tornado plot, 37
 triangle distribution. *See* probability
 density functions (PDFs), triangle
 distribution
 Tversky, Amos, 23
 uncertainty
 about mean v variability, 19–21
 aggregation of/combining, 25–30, 55
 aleatory v epistemic, 9, 11
 epistemic, 54–5, 95, 153, 200, 217
 defined, 3

events v quantities as objects of, 14	in Roman Egypt, 200–3, 212–13, 216–17, 219–22
in relation to past, present and future, 12	
uncertainty distributions v variability	variability distributions
distributions, 20, 40–1, 239, 299–300	uncertainty about parameters of, 20 n.43
uniform distribution. <i>See</i> probability	v uncertainty distributions, 20, 40–1, 299–300
density functions (PDFs), uniform	
distribution	Wallace-Hadrill, Andrew, 100
urbanism. <i>See also</i> cities	wigwam argument, 113
definition of, 274	Willems, Joseph, 117
urbanization rate, 292	Wilson, Andrew, 275, 284
	Wrigley, Edward Anthony, 274, 287, 290–1
Valerius Macedon, Q., 122	
variability, 18–21, 233	Zuiderhoek, Arjan, 232, 235, 258–60, 262