

Index

- Abandonment options, 739–748, 763–767
- Absolute returns, 89
- Accrual(s):
 on basket of assets, 178–179
 instruments, 405–406
 range, 226–227
- Acquisitions, 801–809, 821. *See also* Buy decisions
- AIC (Akaike Information Criterion), 277
- Allocation, portfolio:
 banking and, 313–314
 continuous, 356–361
 investment, 372
 stochastic, 400–404
- ALM (asset liability management), 349–354
- Alpha errors, 624
- American closed-form approximations, 225, 424, 697–699, 753, 761–762
- American options:
 abandonment, 739–740, 742–743
 call options, 180–187, 424–425, 697–699, 726, 733–735, 737, 738
 chooser options and, 764, 770–771
 contraction, 750–751
 on debt, 422–423
 dividends and, 186–187, 734–738
 double and exotic barrier, 731–733
 dual variable rainbow options and, 767–769
 employee stock options and, 715–717
 exchange asset options and, 203
 exotic options and, 178, 731–733
 expansion, 756–758
 on foreign exchange, 182–183
 futures contracts and, 212
 on index futures, 184–185
 jump-diffusion options and, 774
 lower barrier, 725–727
 mean-reversion options and, 777, 779
 multiple assets competing options and, 781
 perpetual options and, 225
 plain vanilla options and, 424–431
 put options, 422, 424, 697, 733, 736–738, 748
 range accruals and, 226
 in Real Options SLS, 697–699, 715–717
 with sensitivities, 180–181
 simultaneous compound options and, 791
 upper barrier, 728–730
- Amortizations, 141–144, 534–537
- Analytics:
 Central Limit Theorem, 79–88
 Flaw of Averages, 88–93
 lottery numbers, winning, 84–88
 Mathematical Integration Approximation Model, 93–96
 projectile motion, 96–99
 regression diagnostics, 100–109
 Ships in the Night, 109–111
 statistical analysis, 111–122
 weighting of ratios, 123–124
- ANOVA (analysis of variance), 610–611, 618–623
- Approximation models, 93–96, 180
- Approximations, 93–96, 186, 225. *See also* American closed-form approximations
- ARIMA (autoregressive integrated moving average), 74–75, 276–282
- Arithmetic averages, 188–189
- Asian lookback options, 188–190
- Assets:
 accruals on basket of, 178–179
 allocation optimization model, 356–361
 asset-equity parity model, 137–138
 asset liability management (ALM), 349–354
 asset or nothing options, 190–191
 benchmark, 235–236
 debt analysis and, 147–148
 exchange assets options, 203
 market value of, 137–138
 multiple, 779–781
 reference, 236
 two-asset options, 212, 222–223, 233–236
 volatility of, 137–138, 222
- Assumptions:
 defining, 9–12
 management, 666, 681
 optimization and, 62
 violations of, 46, 101, 240
- Audit worksheets, 700, 702
- Auto-ARIMA, 75, 278–281
- Autocorrelations. *See also* Correlations
 diagnostic tools and, 47–49, 51–52
 forecasting and, 241, 243, 244, 277
 regression diagnostics and, 103–105
 statistical analysis and, 113, 120–121
- Autoregressive integrated moving average (ARIMA), 75, 276–282
- Average options, 188–189

- Averages:
 analytics and, 88–93
 arithmetic, 188–189
 autoregressive integrated moving, 75, 276–282
 exponentially weighted moving, 664–665
 geometric, 88–90, 189–190
 harmonic, 90–91
 skewed, 91–93
- Backcasting, 133
- Backward induction, 153, 156, 158
- Bandwidth requirements, 329
- Banking, 293–320, 634–643
 break-even inventory and, 637–639
 classified loan borrowing base and, 634–636
 default probabilities in, 294–301
 economic capital and value at risk and, 303–312
 firm in financial distress and, 640–641
 hurdle and discount rates and, 318–320
 loss given default and, 301–303
 optimization and, 315–319
 portfolio allocation and, 313–315
 pricing loan fees model and, 642–643
 queuing models and, 354–356
- Barrier options:
 binary digital instruments and, 405
 double, 200–201, 230, 731–733
 exotic, 191–192, 732
 gap options and, 212
 graduated, 213–214
 lower, 725–727, 818
 two-asset, 233–234
 upper, 728–730
- Basel II Accord, 293, 301, 652, 653, 657
- Baseline growth, 283
- Basic Econometrics, 75
- Basic simulation model, 510–516
- Bayesian analysis (Bayes' Theorem), 166–168
- Bearish spread positions, 417
- Benchmark assets, 235–236
- Benchmarks, 697–700
- Benyovszky, Mark A., 329
- Bermudan options:
 abandonment, 744–746
 chooser options and, 765
 contraction, 751–754
 dividends and, 186, 734–738
 employee stock options and, 716–718
 exotic options and, 178
 expansion, 760
 plain vanilla options and, 429–431
 with sensitivities, 180–181
- Bernoulli distributions, 97
- Beta distributions, 83, 446, 518
- Beta errors, 624
- BIM (Bliss interpolation model), 674–675
- Binary decision variables, 62
- Binary digital instruments, 405–406
- Binary digital options, 193–194
- Binomial distributions, 54–56, 81–84, 548–552, 571–573
- Binomial lattices:
 closed-form model *versus*, 821–826
 employee stock options and, 719
 exotic options and, 180–182, 186, 217
 modified, 407–413, 420–423
 multinomial lattices *versus*, 705, 708, 709, 768, 795–798
 plain vanilla options and, 424–431
- Biotech, 287–292
- Bivariate linear regression, 395–400
- Black-Derman-Toy methodology, 407
- Blackout Steps, 428–429, 701–703, 717, 723–724
- Black-Scholes closed-form model, 697–699, 719, 821–823
- Black-Scholes option pricing model. *See also* Generalized Black-Scholes-Merton model
 exotic options and, 180, 217, 237, 737–738
 plain vanilla options and, 424
 tornado and sensitivity charts and, 27–28
- Bliss interpolation model (BIM), 674–675
- Bond(s):
 call options, 149–150
 debt analysis and, 138–140
 inverse floater, 407–413
 value of, 129–130, 151–152
 yields and spreads, 432–434
- Bootstrap simulations, 35–40, 522–525, 587–589
- Borrowing base loans, 634–636
- Box-Jenkins ARIMA, 75, 277–278
- Break-even inventory, 637–639
- Brownian motion, 49, 51, 106, 216, 245
- Bull spread positions, 417
- Buy decisions. *See also* Acquisitions
 build *versus*, 801–809
 lease *versus*, 631–633
- Calendar-days ratios, 232
- Call and put collar strategy, 224–225
- Call options. *See also* American options;
 Bermudan options; European options
 bonds, 149–150
 definition of, 211
 dividends and, 734–735
 mean-reversion and, 777–779
 plain vanilla, 424–431
 simple, 795–797
- Capability measures (Cpk), 627–631
- Capital:
 asset liability management and, 349–354
 economic, 303–315
 value at risk and, 653–661
- CAPM (capital asset pricing model), 320
- Case studies. *See* Real Options Strategic Case Studies
- Cash flow. *See also* Discounted cash flow model
 matching, 350
 model, 481–486, 667
 returns, 664–668, 681

- Cash or nothing options, 195
- Causation *versus* correlation, 19, 52, 247
- CDF (cumulative distribution function), 54–56, 81
- Central Limit Theorem, 40, 79–88, 624
- Changing volatility, 709, 712
- Chi-square tests, 608–611
- Chooser options, 196–197, 228, 763–767, 770–773
- CIR (Cox-Ingersoll-Ross) model, 138–140, 673–674
- Classified loan borrowing base, 634–636
- Closed-form models. *See* American closed-form approximations; Black-Scholes closed-form model
- Coefficient of variation, 327, 374, 482
- Combinatorics, 625–626
- Commercial real estate, 456–459
- Commodity options, 198
- Complex chooser options, 197, 228, 771–773
- Complex combinatorial nested options, 781–782, 823
- Compound options, 223–224. *See also* Sequential compound options; Simultaneous compound options
- Confidence intervals, 16–18, 87, 580–583
- Constraints, 61–64, 368, 382, 470–472
- Continuous decision variables, 62, 64–70, 400–404
- Continuous portfolio allocation, 356–361
- Contraction options, 748–755, 763–767, 803–804, 806, 808
- Control charts, quality, 628–631
- Convertible warrants, 821–826
- Convexity, 145–146, 472–473
- Correlations. *See also* Autocorrelations
- causation *versus*, 19, 52, 247
 - correlated simulations, 525–529
 - decision analysis and, 158, 168
 - effects model, 528–530
 - forecasting and, 246–253
 - pairwise, 525–531
 - parametric, 19
 - precision control and, 18–22
 - rainbow options and, 768–769
 - regression diagnostics and, 108
 - sensitivity analysis and, 29–33, 505, 508–509
 - serial, 276–277
 - value at risk and, 304–305, 309–312, 657–663
 - volatility and, 682–684
- Cost estimation model, 443–446
- Covariance, 474–475, 661–663
- Covered call positions, 416–417
- Cox-Ingersoll-Ross (CIR) model, 138–140, 673–674
- Cpk (Process Capability Index), 627
- CPM (critical path method), 446–453
- Credit analysis. *See also* Debt analysis; Loans
- credit default swaps and credit spread options, 127–128
 - credit premium, 125–126
 - credit risk analysis, 129–130, 133–134, 295, 437, 653–656
 - external debt ratings and spread, 131–132
 - internal credit risk rating model, 133–134
 - profit cost analysis of new credit, 135–136
- Credit default swaps, 131–132
- Credit premiums, 125–126
- Credit risk analysis, 129–130, 133–134, 295, 437, 653–656
- Credit Risk Plus method, 434
- Credit scoring models, 295, 299–301, 432–436
- Credit spreads, 125–132, 434
- Credit Suisse Financial Products, 434
- Critical path analysis (CPM PERT GANTT), 446–453
- Cubic spline extrapolation, 258, 262–263, 684–689
- Cumulative distribution function (CDF), 54–56, 81
- Cuneo Hervieux, Elio, 321
- Currency options, 199–200, 205–207, 487–488. *See also* Foreign exchange: options
- Custom distributions, 76
- Customized options:
- abandonment, 745–747
 - chooser options and, 764, 766, 767
 - contraction, 752, 755
 - expansion, 760–761
- Custom variables, 703
- Data. *See also* Historical data
- extraction, 42, 515
 - fitting, 531–534
- Debt:
- options on, 422–423
 - repayment of, 141–144, 534–537
 - value of, 129–132, 147–148, 151–152
- Debt analysis. *See also* Credit analysis
- asset-equity parity model, 137–138
 - Cox model, 138–140
 - debt repayment and amortization, 141–144
 - debt sensitivity models, 145–146
 - Merton model, 147–148
 - Vasicek models, 149–152
- Debt sensitivity models, 145–146
- Decision analysis:
- Bayes' Theorem and, 166–168
 - buy *versus* build, 801–809
 - buy *versus* lease, 631–633
 - decision trees, 153–168
 - economic order quantity and, 169–172
 - expected utility analysis and, 172–173
 - expected value of perfect information and, 164
 - inventory and, 169–172, 174–175
 - Minimax and, 165, 168
 - optimization models and, 56–70
 - queuing models and, 176–178
- Decision trees, 153–168

- Decision variables. *See also* Variables
 continuous, 62, 64–70, 400–404
 integers, 62
 mixed, 62
 optimization and, 60–63
- Default probabilities:
 banking and, 294–301
 bond yield and spreads and, 432–434
 credit analysis and, 125–126, 133, 135
 empirical models of, 294, 299–301, 432–436
 external options model (public company),
 437–440
 loss given default, 301–303
 Merton models and, 441–442
 structural models of, 294–300, 432–434, 441
- Defective proportion units (DPU), 627
- Deferment options, 810–813
- Delphi method, 33, 334, 339, 342, 380
- Delta, call, 492–493
- Delta-gamma hedges, 474–478
- Delta hedges, 214, 478
- Delta options portfolio, 651–652
- Delta precision, 624
- Demand curves, 538–541
- Descriptive statistics, 112–114
- Design of experiments, 625–626
- Deterministic, 59, 62, 274, 373–374, 642
- Diagnostic tools, forecasting and regression, 42,
 44–52, 100–109, 239–247, 270
- Digital instruments, 405–406
- Discounted cash flow model:
 abandonment options and, 739
 contraction options and, 748
 expansion options and, 756
 net present value and, 344–346
 sensitivity analysis and, 496–497
 simulations and, 23–24, 542–545
 valuations and, 640
 volatility and, 664
- Discount rates, 318–320
- Discrete integer variable, 70–73, 364–368
- Discrete project selection, 362–366
- Discrete uniform distribution, 79–81, 86
- Distributional analysis, 54–56, 58–61,
 521–523
- Distributional fitting:
 data and, 531–534
 multiple variable, 682–686
 simulations and, 33–35, 36
 statistical analysis and, 113–116
 value at risk and, 304, 306, 653–655
- Distributions:
 Bernoulli, 97
 Beta, 83, 446, 518
 binomial, 54–56, 81–84, 548–552, 571–573
 custom, 76
 discrete uniform, 79–81, 86
 exponential, 354–356
 Gumbel maximum, 337
 hypergeometric, 83
 normal, 79–86, 574–577
 outcomes, 79–81
 Poisson, 83, 176–177, 342, 354–356, 573–576
 skewed, 217
 skewness, 36–38
 triangular, 446
- Distributive lag analysis, 47–48, 104–105,
 243–244
- Dividends:
 call options and, 734–735
 exotic options and, 186–187, 201–202
 expansion options and, 756–757, 759
 put options and, 736–738
 uneven payment options, 237
- Domestic currency, 205–206, 207
- Double barrier options, 200–201, 230, 731–733
- DPU (defective proportion units), 627
- Dual variable rainbow options, 767–769
- Duration, 145–146, 349–351, 470–471
- Dynamic optimization:
 continuous portfolio allocation and, 359–360
 discrete project selection and, 364
 industry applications and, 316
 military portfolio and, 377, 380
 simulations and, 63–64
 stochastic portfolio allocation and, 403–404
- Dynamic *versus* static perturbations, 25–26,
 29–33
- Econometrics, 75, 248–253
- Economic capital, 303–314
- Economic order quantity, 169–172
- Efficient frontier:
 of generation, 322–328
 integrated risk analysis and, 470–472
 military portfolio and, 380–385
 optimization procedure, 63–64, 71, 360, 365
- Elasticity, 386–390, 538–541
- Electric/utility, 321–329
- Embedded options, 350–351, 420
- Employee stock options, 715–724
 American call options and, 715–716
 Bermudan call options with vesting and,
 716–718
 blackouts and, 723–724
 European call options and, 719–720
 forfeiture and, 723–724
 suboptimal exercise and, 720–722, 723–724
 valuation toolkit, 717–718, 721–722
 vesting and, 716–718, 723–724
- Epidemics, 546–548
- Equity, 137–138
- Errors. *See also* Normality of errors
 alpha/beta, 624
 estimates of, 284, 286
 mean absolute percent, 284, 286
 mean-squared, 284
 sphericity of, 104, 243, 286
- ESO (Employee Stock Options) Valuation
 Toolkit, 717–718, 721–722

- European options:
 abandonment, 743–745
 chooser options and, 764, 770–773
 contraction, 751–753
 on debt, 422–423
 dividends and, 186, 201–202, 734–738
 double and exotic barrier, 731–733
 dual variable rainbow options and, 767–769
 employee stock options and, 719–720
 exchange asset options and, 203
 exotic options and, 178, 198, 217, 236
 expansion, 756–760
 futures contracts and, 212
 inverse gamma options and, 215
 jump-diffusion options and, 774
 lower barrier, 725–727
 mean-reversion options and, 777
 multiple assets competing options and, 781
 plain vanilla options and, 424–431
 range accruals and, 226
 in Real Options SLS, 697–699
 with sensitivities, 180–181
 upper barrier, 728–730
- EVII (expected value of imperfect information), 161, 163–164
- EVPI (expected value of perfect information), 164
- EWMA (exponentially weighted moving average) models, 664, 665, 668
- Excel, 1–2, 4, 6, 8, 19, 24, 42, 63, 67, 71, 74, 90, 93, 96, 163, 315, 344, 358, 364, 382, 402, 410, 414, 424, 426–427, 450, 455, 463, 465, 515, 526, 558, 562, 625, 695–697, 700, 709–714
- Exchange assets options, 203
- Exchange rates. *See* Foreign exchange
- Exotic options:
 accruals on basket of assets, 178–179
 Asian lookback options, 188–190
 asset or nothing options, 190–191
 barrier options, 191–192, 200, 201, 213–214, 725–733
 basic call options, 734–735
 basic put options, 736–738
 binary digital options, 193–194
 cash or nothing options, 195
 chooser options, 196–197, 228, 763–767, 770–773
 commodity options, 198
 currency options, 199–200
 with dividends, 186–187, 201–202, 237
 exchange assets options, 203
 foreign equity options, 207–208
 foreign exchange options, 182–183, 199–200, 205–206
 foreign takeover options, 209
 forward start options, 210
 futures options, 184–185, 211–212, 229
 gap options, 212–213
 index options, 184–185, 214–215
 inverse gamma options, 215–216
 jump-diffusion options, 216–217
 leptokurtic and skewed options, 217–218
 lookback options, 188–190, 218–222
 option collar, 224–225
 options on options, 223–224
 perpetual options, 225
 range accruals, 226–227
 with sensitivities, 180–181
 supershare options, 230
 time switch options, 231
 trading-day corrections, 232
 two asset options, 222–223, 233–236
 writer extendible options, 238
- Expansion options, 756–767, 804–806
- Expected utility analysis, 172–173
- Expected values, 156, 161, 163–164
- Experiments, design of, 625–626
- Exponential distribution, 354–356
- Exponential growth, 254–256, 264–266
- Exponentially weighted moving average (EWMA) models, 664–665
- External debt ratings, 127–132
- External options model (public company), 437–440
- Extrapolation, 77, 118, 258–263, 271–272, 684–685
- Extreme spreads options, 204–205
- Fairway options, 226–227, 405–406
- Farm-outs, 810–813
- Federal Reserve Bank, 139
- Financial distress, 640–641
- Financial instruments, embedded options in, 350–351
- Financial statements, valuation and, 637–639, 644
- Fixed income investments, 472–473
- Fixed strike options, 218–220
- Fixed *versus* floating rates, 479–480
- Flaw of Averages, 88–93
- Floating exchange rate, 487
- Floating strike options, 220–222
- Floating *versus* fixed rates, 479–480
- Forecast(s):
 charts, 14–18, 511–513
 correlations and, 246–253
 defining, 12–13
 diagnostic tools, 42, 44–52, 100–109, 239–247, 270
 econometric, 248–253
 exponential J-growth curves and, 254–256
 integrated risk analysis and, 460–462
 interpretation of results, 13–16
 linear interpolation and, 258–263
 logistic S-growth curves and, 264–266
 manual computations, 257–258
 market share and, 267–268
 Markov chains and, 267–268
 module, functions of, 3
 multiple regression, 248–253, 269–270

- Forecast(s) (*Continued*)
 nonlinear extrapolation and, 258–263, 271–272
 optimization and, 62
 statistics, 14
 stochastic processes and, 77–78, 245–246, 273–275
 techniques, 73–78
 time-series analysis and, 257–258, 283–286
 time-series ARIMA and, 276–282
- Foreign equity options, 205–208
- Foreign exchange:
 cash flow model, 481–486
 hedging exposure, 487–491
 options, 182–183, 199–200, 205–206
- Foreign takeover options, 209
- Forfeiture, 719–720
- Forward rates, 674
- Forward start options, 210
- Free cash flow, 345, 463, 465, 784
- Friedman's test, 610–612
- F-tests, two-variable, 606–607
- Futures, 184–185, 211–212, 229
- Gamma, call, 492–493. *See also* Delta-gamma hedges; Inverse gamma options
- GANTT chart analysis, 446–453
- Gap analysis, 349–350
- Gap options, 212–213
- GARCH (generalized autoregressive conditional heteroskedasticity), 76, 665, 668–672, 673
- Garman-Kohlhagen model, 182, 199
- Generalized Black-Scholes-Merton model, 180, 184, 214–215, 232, 738. *See also* Black-Scholes option pricing model
- Geometric averages, 88–90, 189–190
- Glantz, Morton, 634, 640, 642
- Goodness of fit tests, 608–609
- Graduated barrier options, 213–214
- Greeks, 491–495
- Growth:
 baseline, 283
 exponential, 254–256, 264–266
- Gumbel Maximum Distribution, 337
- Harmonic averages, 90–91
- Harvest model, 390–394
- Hedges. *See* Risk hedges
- Heteroskedasticity, 44, 46, 100–101, 239–240, 242. *See also* GARCH
- High-tech manufacturing, 801–809
- Histogram (tab), 511
- Historical data:
 distributional fitting and, 33
 elasticity and, 386–390, 538
 forecasting and, 276, 283
 success rates and, 517–518
 value at risk and, 653–654
 volatility and, 668
- Hull-White models, 149
- Hurdle rates, 319–320
- Hypergeometric distributions, 83
- Hypotheses tests:
 advanced techniques, 590–623
 ANOVA, 619–623
 bootstrap simulation as, 36–37
 chi-square tests, 608–611
 classical, 40–42
 confidence intervals and, 580–583
 design of experiments and, 623–626
 in empirical simulation, 580–587
 Friedman's test, 610–612
 Kruskal-Wallis test, 612–614
 Lilliefors test, 613–615
 nonparametric methodologies, 607–618
 one-variable, 591–597
 runs test, 616–617
 sample size determination and, 623–626
 statistical analysis and, 113, 116
 in theoretical situations, 576, 578–582
 two-variable, 597–607
 types of, 591–594
 Wilcoxon signed-rank test, 616, 618
- ICDF (inverse cumulative distribution function), 54–56, 579
- Implied volatility, 663
- Index futures, 184–185
- Index options, 214–215
- Industry applications:
 banking, 293–320
 biotech, 287–292
 electric/utility, 321–329
 information security intrusion risk management, 329–348
 insurance asset liability management model, 349–354
 inventory, 169–172, 174–175, 366–371, 637–638
 manufacturing, 170–172, 287–288, 801–809
 oil and gas industry, 810–813
 pensions, 354
- Industry comparables, 442
- Infectious diseases, 546–548
- Inflation, 556, 673
- Information, value of, 810–817
- Information security intrusion risk management, 329–348
 attack models, 332–339
 attack scenarios, 339–342
 environmental details, 331–332
 financial impact, 344–346
 investment decisions, 346–348
- Inlicensing drug deal structuring, 289–290
- Input assumptions. *See* Assumptions
- Installation, software, 4–5
- Insurance asset liability management model, 349–354
- Integers decision variables, 62

- Integrated risk analysis:
 forecasting and, 460–462
 Monte Carlo simulation and, 463–464
 optimization and, 465, 468–472
 Real Options analysis and, 463, 465–468
- Intellectual property, 742, 745–747, 771, 804
- Interest payments, 141–144, 534–537
- Interest rates:
 debt analysis and, 145
 floating *versus* fixed, 479–480
 inverse floater bonds and, 407–413
 mean-reverting, 138–140, 147–152, 673, 690
 premiums on, 125–126, 131–132
 risk and, 472–473
 term structure of, 673, 674–675, 684, 690–691
 volatility of, 139, 422–423, 679–680
- Intermediate Node Equations, 425–430, 698–699, 703
- Internal credit risk rating model, 133–134
- Internal optimization model, 169
- Internal rate of return, 146, 344, 463, 542, 562
- Internal ratings-based approach, 293
- Interpolation, 258–263, 674–677, 684–685
- Inventory, 169–172, 174–175, 366–371, 637–638
- Inverse cumulative distribution function (ICDF), 54–56, 579
- Inverse floater bonds, 407–413
- Inverse gamma options, 215–216
- Investments:
 fixed income, 472–473
 information security and, 346–348
 portfolio allocation, 372
 return on, 123–124, 456–459, 542–545
 simulations and, 542–545
 staged-gate, 292, 802, 815, 818
- J Curves, 254–256
- J-S Curves, 76. *See also* S-growth curves
- Jump-diffusion, 106, 216–217, 245, 774–776
- Kendall's tau, 19
- KMV, 295, 437
- Kruskal-Wallis test, 612–614
- Kurtosis, 217
- Kusiatin, Uriel, 287, 291
- Languages, 696
- Lattice Maker module, 714–715
- Lattices. *See also* Binomial lattices; Real Options
 Super Lattice Solver (SLS)
 multinomial, 695, 705, 707–709, 768, 795–797
 options-adjusted spreads, 420–421
 pentanomial, 709, 767–769
 quadrinomial, 709, 774–776
 trinomial, 705, 708–709, 777–779, 795–797
- Law of Large Numbers, 40, 624
- Lease *versus* buy valuation, 631–633
- Left-tailed hypotheses tests, 591, 594
- Leptokurtic options, 217–218
- Liabilities, 349–354
- Lilliefors test, 613–615
- Linear interpolation, 258–263
- Linear optimization, 63
- Linear regression, 103–104, 240–241, 394–399
- Linear trend detection, 119
- Loans, 634–639, 642–643. *See also* Credit analysis
- Logarithmic cash flow returns approach, 664–666, 681
- Logarithmic present value returns, 665, 666–669, 681
- Logistic S-growth curves, 76, 264–266
- Lookback options, 188–190, 218–222
- Loss given default, 301–303
- Lottery numbers, winning, 84–88
- Lower barrier options, 725–727, 818
- MAD (mean absolute deviation), 284
- Management assumptions and guesses, 666, 681
- Manufacturing, 170–172, 287–288, 801–809
- MAPE (mean absolute percent error), 284, 286
- Market research, 159–164, 167, 802–803
- Market share, 267–268
- Market-traded instruments, 432
- Market uncertainties, 810, 814
- Market values:
 of assets, 137–138
 of debt, 147–148
 of interest rate risk, 139
- Markov chains, 77, 267–268
- Markowitz efficient frontier optimization
 procedure, 63–64, 70, 362, 367
- Mathematical Integration Approximation Model, 93–96
- Maturity, 76, 125, 127, 129, 130, 141, 145–146, 149, 178, 180, 183, 186, 190, 191, 193, 196, 197, 200–203, 204, 213, 218, 223–224, 226, 232, 234, 238, 264–265, 295, 405, 407, 414, 417, 420, 424, 426, 430, 439, 487, 535, 652, 673, 679–680, 690, 697, 699, 705, 715, 716, 719, 732, 737–739, 742, 743, 748, 756, 763, 771, 782, 821–823
- Matrix:
 regret, 165
 variance-covariance, 474–475 (*see also* Covariance)
- Maximin analysis, 164–165, 168, 222–223
- Maximum likelihood estimation (MLE), 76–77, 436
- McKinsey discounted cash flow model, 640
- Mean:
 hypotheses tests and, 583, 594, 596–598, 599, 600, 602
 median *versus*, 92
- Mean absolute deviation (MAD), 284
- Mean absolute percent error (MAPE), 284, 286
- Mean-reversion:
 forecasting/regression diagnostics and, 106, 245
 of interest rates, 138–140, 147–152, 673, 690
 options, 777–779
 trinomial lattices and, 795

- Mean-squared error (MSE), 284
 Median, 92
 Media streaming, 329
 Meeting, probability of, 109–111
 Merton models. *See also* Generalized
 Black-Scholes-Merton model
 of debt analysis, 147–148
 internal options (private company), 441
 market options (industry comparable), 442
 MG1 single arbitrary queuing model, 177, 355
 M/G/k blocked queuing model, 177, 355
 Micronumerosity, 46, 101, 240, 242
 Military portfolio, 379–385
 Minimax analysis, 165, 168, 222–223
 Mixed decision variables, 62
 MLE (maximum likelihood estimation), 77, 436
Modeling Risk: Applying Monte Carlo Simulation, Real Options Analysis, Stochastic Forecasting, and Portfolio Optimization (Mun), 2, 12, 248, 269, 274, 315, 360, 365, 511
 Modeling toolkit software, 1–2
 Modified binomial lattices, 407–413, 420–421
 Money, time value of, 562–570
 Monitoring periodicities, 191–192, 200, 233–234
 Monte Carlo simulations:
 asset liability management and, 350
 banking and, 304, 306–312, 316
 basic simulation model and, 510–513
 biotech industry and, 288, 289, 291
 continuous portfolio allocation and, 359–360
 correlations and, 20–22, 529–530
 decision analysis and, 156–158, 161–163, 168, 171, 178
 discrete project selection and, 364
 information security and, 331, 333, 342, 346
 integrated risk analysis and, 463–464
 investment decisions and capital budgeting and, 542
 optimization and, 62–63
 queuing models and, 357
 retirement funding and, 557–558
 Risk Simulator and, 2–8
 running, 6–16
 surgical success rates and, 518–520
 valuation model and, 644
 value at risk and, 306–312, 647–650, 653
 Moody's, 133, 295, 437
 Mortgages, 141–144
 MSE (mean-squared error), 284
 Multicollinearity, 51, 106, 108, 245–246
 Multidimensional simulations, 552–555
 Multinomial Lattice Solver, 695, 705, 707, 768, 795–797
 Multiple Asset or Multiple Phased module, 695, 704–705, 706, 707
 Multiple assets competing options, 779–781
 Multiple-phased complex sequential compound options, 787–789, 790
 Multiple-phased sequential compound options, 786–787, 788
 Multiple-phased simultaneous compound options, 793–794
 Multiple regression modeling, 248–253, 269–270
 Multiple variable distributional fitting, 682–684, 685, 686
 Multivariate regression, 77
 Mutual exclusivity of options, 781–782
 Negative binomial distributions, 548–552
 Nelson-Siegel (NS) interpolation model, 676–677
 Nested combinatorial options, 781–782, 823
 Net present value and discounted cash flow analysis, 344–346
 Nonlinear extrapolation, 77, 118, 258–263, 271–272
 Nonlinearity, 46–47, 241–242
 Nonlinear optimization, 63
 Nonlinear rank correlation charts, 503
 Nonlinear tornado and sensitivity charts, 503–509
 Nonparametric bootstrap simulations, 587–589
 Nonparametric correlations, 19
 Nonparametric hypothesis tests, 607–618
 Nonstationarity, 120, 122
 Normal distributions, 79–86, 574–576, 577
 Normality of errors:
 forecasting/regression diagnostics and, 47, 49, 104–106, 243, 245
 statistical analysis and, 113, 116–117, 119
 NS (Nelson-Siegel) interpolation model, 676–677
 Objectives, 62–63
 Oil and gas industry, 810–811
 One-variable tests:
 T-tests, 591–594, 595
 Wilcoxon signed-rank test, 616–618
 Z-tests, 594, 596–597
 Operational risk, 356–358, 653–656
 Opportunity costs, 165
 Optimal pricing with elasticity, 386–390
 Optimal trigger values, 741, 759, 814–817
 Optimization. *See also* Dynamic optimization;
 Static optimization
 asset allocation optimization model, 358–363
 banking and, 315–319
 with continuous decision variables, 64–70
 continuous portfolio allocation, 356–361
 with discrete integer variables, 70–73
 discrete project selection, 362–366
 examples of, 58–62
 harvest model, 390–394
 integrated risk analysis and, 465, 468–472
 internal optimization model, 169
 inventory optimization, 366–371
 investment portfolio allocation, 372
 Markowitz efficient frontier procedure, 63–64, 70, 362, 367
 methods of, 63–64
 military portfolio and efficient frontier, 380–385
 module, functions of, 3

- optimal pricing with elasticity, 386–390
 ordinary least squares, 394–399
 portfolio, 56–70
 simulation-optimization, 63, 315, 359, 360, 364
 stochastic, 63–64, 313–315, 400, 404
 stochastic portfolio allocation, 400–404
 terminology of, 60–66
 value at risk and, 317–319, 647–650
- Options.** *See also* American options; Barrier options; Bermudan options; Call options; Customized options; Employee stock options; European options; Exotic options; Put options; *Real Options entries*
 abandonment, 739–748, 763–767
 Asian lookback, 188–190
 asset or nothing, 190–191
 average, 188–189
 barrier, 158, 168, 191–192, 200–201, 213–214, 233–234, 725–727, 728–730, 731–733, 818
 binary digital, 193–194
 cash or nothing, 195
 chooser, 196–197, 228, 763–767, 770–773
 collar, 224–225
 commodity, 198
 compound, 223–224
 contraction, 748–755, 763–767, 803–804, 806, 808
 contract *versus* futures contract, 212
 credit spread, 131–132
 currency, 199–200, 205–207, 487–488
 on debt, 422–423
 deferment, 810–813
 delta portfolio, 651–652
 dual variable rainbow, 767–769
 embedded, 350–351, 420
 exchange assets, 203
 expansion, 756–767, 804, 806
 extreme spreads, 204–205
 fairway, 226–227, 405–406
 fixed strike, 218–220
 floating strike, 220–222
 foreign equity, 205–208
 foreign exchange, 182–183, 199–200, 205–206
 foreign takeover, 209
 forward start, 210
 futures, 184–185, 211–212, 229
 gap, 212–213
 index, 214–215
 inverse gamma, 215–216
 jump-diffusion, 106, 216–217, 245, 774–776
 leptokurtic, 217–218
 lookback, 188–190, 218–222
 mean-reversion, 777–779
 multiple assets competing, 779–781
 mutual exclusivity of, 781–782
 nested combinatorial, 781–782, 823
 path-dependent/path-independent, 781–782
 payoff values and, 414–416
 perpetual, 225
 plain vanilla, 424–431
 quanto, 208
 with sensitivity, 180–181
 sequential compound, 781–791, 815, 817
 simultaneous compound, 791–794
 skewed, 217–218
 supershare, 230
 switching, 817–820
 time switch, 231
 two-asset, 212, 222–223, 233–236
 uneven dividend payments, 237
 writer extendible, 238
- Options-adjusted spreads lattices, 420–421**
Options analysis:
 binary digital instruments, 405–406
 on debt, 422–423
 inverse floater bond, 407–413
 options-adjusted spreads lattices, 420–421
 plain vanilla options, 424–431
 trading strategies, 413–419
- Ordinary least squares, 394–400**
Outcomes distribution, 79–81
Outcomes probabilities, 153, 159–161
Outliers, 46–92, 103, 240–242
Output forecasts. *See* Forecast(s)
- Pairwise correlations, 525–530**
Parametric correlations, 19
Path-dependent/path-independent options, 781–782
Payoff values:
 decision analysis and, 153, 157, 159–161, 168, 172–173
 exotic options and, 218–222
 options and, 414–416
- PDF (probability density functions), 54–56, 573**
Pearson's correlation coefficient, 19
Pearson's product moment correlations, 51–52, 108–109, 246
Pentanomial lattices, 709, 767–769
Periodicities, monitoring, 191–192, 200, 233–234
Perpetual options, 225
PERT (program evaluation review technique), 446–453
Perturbations:
 dynamic *versus* static, 25, 29–32
 sensitivity analysis and, 496–498, 504–505
- Pharmaceutical development, 814–817**
Plain vanilla options, 424–431
PMF (probability mass functions), 54–56, 673
Poisson distributions:
 Central Limit Theorem and, 83
 industry applications and, 342
 queuing models and, 176–177, 354–356
 Six Sigma quality control and, 573–574, 575, 576
- Poisson jump-diffusion process, 216**
Population variance, 610

- Portfolio allocation:
 banking and, 313–314
 continuous, 356–361
 investment, 372
 stochastic, 399–404
- Portfolio efficient frontier, 382, 385–386, 470–472
- Portfolio optimization. *See* Optimization
- Portfolio risk return profiles, 474–476
- Precedents, 496–498, 504–505
- Precision control, 18–22
- Preferences, run, 515
- Prices. *See also* Black-Scholes option pricing model
 capital asset pricing model, 320
 credit risk analysis and, 129–130
 debt analysis and, 138–140, 147–148, 151–152
 elasticity and, 386–390
 of loan fees model, 642–643
 quantity and, relationship between, 539–540
 strike, 218–224
- Private companies, 441
- Probability. *See also* Default probabilities
 of meeting, 109–111
 outcomes, 153, 159–161
 statistical, 571–576
 steady state, 268
 to volatility, 666, 668
- Probability density functions (PDF), 54–56, 573
- Probability mass functions (PMF), 54–56, 573
- Process Capability Index (Cpk), 627
- Profiles:
 portfolio risk return, 474–476
 risk, 163–164
 simulation, 6, 8–9, 515–516
- Profit cost analysis, 135–136
- Program evaluation review technique (PERT), 446–453
- Projectile motion, 96–99
- Project management:
 cost estimation model, 443–446
 critical path analysis, 446–453
 project timing, 453–455
- Proportions, 596–597, 602–606
- Protective put positions, 417, 821–826
- Public companies, 437–440
- Purchase. *See* Acquisitions; Buy decisions
- Put options:
 American, dividends and, 736–738
 call and put collar strategy, 224–225
 debt analysis and, 149–150
 definition of, 211
 mean-reversion and, 777–779
 plain vanilla, 424–431
 protective, 417, 821–826
 put on call options, 223
 simple, 795–799
- Quadrangular lattices, 709, 774–776
- Qualitative forecasting, 72
- Quality control. *See* Six Sigma quality control
- Quantitative forecasting, 74
- Quanto options, 208
- Queuing models, 176–178, 354–356
- Rainbow options, 763–765
- Random walk, 49, 51, 106, 216, 245
- Range accruals, 226–227
- Rank correlation chart, 31–32, 503
- Ratios:
 calendar-days, 232
 return to risk, 129–130, 356–361, 400–401, 470–472
 Sharpe, 62, 63, 66, 73–74
 trading-days, 232
 weighting of, 123–124
- Real estate, commercial, 456–459
- Real Options analysis, 158, 168, 353, 459, 463, 465–468
- Real Options Analysis: Tools and Techniques, 2nd Edition* (Mun), 425, 562, 681, 696–698
- Real Options Analysis Toolkit, 697
- Real Options Strategic Case Studies:
 build or buy decision, 801–809
 deferral options, 810
 farm-outs, 810–813
 optimal trigger values, 814–817
 switching options, 817–820
 value of information, 810–813, 814–817
 warrant valuation, 821–826
- Real Options Super Lattice Solver (SLS):
 abandonment options and, 739–748
 American options and, 697–699, 715–717
 Bermudan options and, 716–718
 chooser options and, 763–767, 770–773
 contraction options and, 748–755
 dual variable rainbow options and, 767–769
 European options and, 697–699
 exotic options and, 178–182, 186, 226, 770–773
 expansion options and, 756–762
 forecast module of, 3
 integrated risk analysis and, 463, 465
 introduction to, 694–715
 jump-diffusion options and, 774–776
 Lattice Maker module of, 714–715
 mean-reversion options and, 777–779
 Multinomial Lattice Solver and, 695, 705, 708–709, 768, 795–798
 Multiple Asset or Multiple Phased module of, 695, 704–705, 706, 707
 multiple assets competing options and, 779–781
 optimization module of, 3
 plain vanilla call and put options and, 424–431
 Risk Simulator and, 4
 sequential compound options and, 781–791
 simple call and put options and, 795–798
 simulation module of, 2–3
 simultaneous compound options and, 791–794
 Single Asset and Single Phased module of, 695, 697–704

- SLS Excel Functions module of, 696, 712–714
 SLS Excel Solution module of, 695, 709–711
 Recruitment budget, 548–555
 Reference assets, 236
 Regression:
 bivariate, 394–400
 diagnostic tool, 42, 44–52, 100–109, 239–247, 270
 multiple, modeling, 248–253, 269–270
 multivariate, 77
 Regret matrix, 165
 Relative returns, 89–90
 Retirement funding, 556–559
 Return(s):
 on investments (ROI), 123–124, 456–459, 542–545
 logarithmic cash flow, 664–666, 681
 logarithmic present value, 665, 666–667, 681
 relative and absolute, 89–90
 to risk ratio, 129–130, 356–361, 400–401, 470–472 (*see also* Sharpe ratio)
 risk return profiles, 474–476
 Rho, call, 492–494
 Right-tail capital requirements, 657–661
 Right-tailed hypotheses tests, 591
 Risk:
 analysis, 460–473, 474–476, 803–809, 810
 asset-liability, 349–350
 capital analysis, 293
 debt analysis and, 138–140, 147–148, 151–152
 information security intrusion risk management, 329–348
 operational, 354–356, 653–656
 preferences, 172
 profile, 163–164
 return profiles, 474–476
 returns to risk ratio, 129–130, 356–361, 400–401, 470–472 (*see also* Sharpe ratio)
 tolerance levels, 347–348
 Risk-free rate volatility, 674–685, 708
 Risk hedges:
 delta-gamma hedges, 477–478
 delta hedges, 214, 478
 fixed *versus* floating rates, 479–480
 foreign exchange cash flow model, 477–482
 foreign exchange exposure, 487–491
 Risk-neutral, 690, 775, 795
 Risk Simulator, introduction to, 2–7
 RMSE (root mean-squared error), 284
 ROI (return on investment), 123–124, 456–459, 542–545
 Roulette wheel, 560–561
 Runs test, 616–617
 Salvage values, 735–744
 Sample size determination, 623–626
 Scenario analysis, commercial real estate, 458–459
 Scholes. *See* Black-Scholes closed-form model;
 Black-Scholes option pricing model;
 Generalized Black-Scholes-Merton model
 SC (Schwarz Criterion), 277
 Seasonality, 272, 283
 Seasonal lending trial balance analysis, 637–639
 Security, information intrusion risk management, 329–348
 Seed values, 513–514
 Sensitivity:
 analysis, 25, 29–33, 505
 charts, 496, 501–505, 508–509
 debt sensitivity models, 145–146
 Greeks, 491–495
 options with, 180–181
 tables, 25, 27
 tornado analysis and, 25, 496–501, 503–507
 Sequential compound options, 781–791, 815, 818
 Serial correlations, 276–277
 S-growth curves, 76, 264–266
 Sharpe ratio, 62, 63, 66, 74
 Ships in the Night, 109–111
 Sigma sample, 624
 Simple call and put options, 795–797
 Simple chooser options, 196, 228
 Simple put options, 791–793
 Simulation-optimization, 63, 315, 359–360, 364
 Simulations:
 basic simulation model, 510–516
 correlation and, 525–530
 data fitting, 531–534
 debt repayment and amortization, 534–537
 demand curve and elasticity estimation, 538–541
 infectious diseases, 546–548
 investment decisions and capital budgeting, 542–545
 module, 2–3
 multidimensional, 552–555
 profile, 6, 8–9, 515–516
 recruitment budget, 548–556
 reports, 42–43
 retirement funding with VBA macros, 556–559
 roulette wheel, 560–561
 surgical success rates, 517–525
 time value of money, 562–570
 Simultaneous compound options, 791–794
 Single Asset and Single Phased module, 695, 697–704
 Six Sigma quality control:
 capability measures, 627–631
 hypotheses tests (advanced techniques), 590–623
 hypotheses tests in empirical simulations, 583–587
 hypotheses tests in theoretical situations, 576, 578–582
 nonparametric bootstrap simulations, 587–589
 sample size determination and design of experiments, 623–626
 statistical probabilities and, 571–576
 Skewed averages, 91–93
 Skewed distributions, 217

- Skewed options, 217–218
 Skewness distributions, 36–38
 SLS Excel Functions module, 696, 712–714
 SLS Excel Solution module, 695, 709–712
 Software requirements, 3–6
 Spearman's rank correlation (Spearman's R), 19, 22, 52, 108–109, 247
 Specification levels, 627–628
 Sphericity of errors, 104, 243
 Spider charts, 25, 26–28, 33, 496–301, 504–506
 Spline extrapolation, 77–78, 258–263
 Spot curves, 472–473
 Spot rates, 678
 Spot yields, 684
 Spreads:
 bearish/bull, 417
 credit, 125–132, 434
 extreme spreads options, 204–205
 on futures options, 229
 Staged-gate investment process, 292, 802, 815, 817
 Standard deviations, 529, 580–583, 624
 Standard & Poor's 500, 214, 236
 Static covariance method, 661–663
 Static *versus* dynamic perturbations, 25–26, 29–32
 Stationarity, 106, 120, 122
 Statistical analysis tools, 52–57, 111–122
 Statistical capability measures (Cpk), 627–628
 Statistical confidence intervals, 580–583
 Statistical probabilities, 571–576
 Stochastic optimization:
 continuous portfolio allocation, 358–359
 discrete project selection and, 364
 military portfolio and, 382
 simulations and, 63–64
 stochastic portfolio allocation and, 401–402
 Statistics:
 descriptive, 112–113, 114
 forecast, 14
 tab, 511, 515
 Theil's U, 286
 Steady state probability, 268
 Stochastic optimization:
 banking and, 315
 continuous portfolio allocation and, 360
 description of, 63–64
 discrete project selection and, 364
 stochastic portfolio allocation and, 400, 404
 Stochastic portfolio allocation, 400–404
 Stochastic processes:
 forecasting/regression diagnostics and, 49–50, 78, 106–107, 245–246, 273–275
 statistical analysis and, 113, 120, 122
 Straddle positions, 417
 Strangle positions, 417
 Strategy trees, 802, 803, 811, 815, 818
 Strike prices, 218–224
 Suboptimal exercise, 720–724
 Success rates, surgical, 517–525
 Super Lattice Solver (SLS). *See* Real Options Super Lattice Solver (SLS)
 Supershare options, 230
 Surgical success rates, 517–525
 Switching options, 817–820
 Terminal Node Equations, 425–430, 698–699, 702–703
 Theil's U statistic, 286
 Theta, call, 492, 494
 Time horizon, 303, 344
 Time-series analysis, 78, 113, 119–122, 257–258, 283–286
 Time-series ARIMA, 276–282
 Time-series data:
 analytics and, 90–91
 diagnostic tools and, 47, 49–52
 extrapolation and interpolation of, 684–689
 forecasting and, 241, 245, 258–263, 276–282
 regression diagnostics and, 103–104, 106
 volatility and, 668
 Time switch options, 231
 Time value of money, 562–570
 Tornado analysis, 22–33, 458, 496, 503–506
 Trading-days ratio, 232
 Trading strategies, 413–419
 Traveling financial planner, 58–62
 Trend analysis, 113, 118, 119, 283
 Trial balances, 637–638
 Trials, 8, 9, 12–13, 22, 34, 37, 54, 58, 59, 60, 63, 81, 85, 87, 267, 315, 316, 374, 402, 514, 515, 518, 521, 523, 525, 548–549, 552, 558, 560, 571–572, 573, 588
 Trial version of software, 1–2
 Triangular distribution, 446
 Trigger values, 741, 759, 814–817
 Trinomial lattices, 705, 708–709, 774–779, 795–797
 Truncation, 12
 T-tests, 591–594, 595, 597–601
 Two asset options, 212, 222–223, 233–236
 Two-phased sequential compound options, 783–786, 815, 817
 Two-phased simultaneous compound options, 791, 793
 Two-tailed hypotheses tests, 591
 Two-variable tests:
 F-tests, 606–607
 T-tests, 597–601
 Wilcoxon signed rank tests, 616, 618
 Z-tests, 602–606
 Uncertainty. *See also* Monte Carlo simulations
 debt ratings and spread under, 131–132
 industry applications and, 334
 market, 810, 814
 optimization under, 59, 62
 private, 810

- Underlying asset, 127, 139, 178, 182, 184, 188, 189, 190, 191, 193, 200, 205, 206, 208, 211–212, 214, 216, 217, 219, 220, 221, 222, 226, 229, 233, 235–236, 237, 295, 405, 417, 422, 424, 439, 477–478, 491–493, 695, 697, 704, 705, 708, 709, 719, 731, 737, 739, 767–769, 774–775, 777–778, 779–781, 786, 795
- Uneven dividend payments options, 237
- Unit capability measures, 627–628
- Upper barrier options, 728–730
- U.S. Treasury securities, 680–689
- Utility analysis, 172–173, 321–329
- Valuation. *See also* Payoff values
of break-even inventory, 637–639
of buy *versus* lease, 631–633
of classified loan borrowing base, 634–636
of convertible warrants, 821–826
of debt, 129–132, 147–148, 151–152
ESO Valuation Toolkit, 717–718, 721–722
expected values and, 156, 161, 163–164
of firm in financial distress, 640–641
of information, 810–817
market values and, 137–139, 147–148
optimal trigger values and, 741, 759, 814–817
of pricing loan fees model, 642–643
salvage, 739–748
seed, 513–514
of time value of money, 562–570
valuation model, 644–646
- Valuation lattice, 704–705, 709, 712, 781, 782
- Value at Risk, 303–312
economic capital and, 313–314
foreign exchange exposure and, 487, 489
Monte Carlo simulations and, 306–312, 647–650, 653
operational and credit risk and, 653–656
optimization and, 316, 647–650
options delta portfolio and, 651–652
right-tail capital requirements and, 657–661
static covariance method and, 661–663
structural models of, 304–306
- Valuing Employee Stock Options* (Mun), 717
- Variables. *See also* Decision variables;
One-variable tests; Two-variable tests
custom, 703
discrete integer, 70–73, 362–366
distributional fitting and, 33–35, 682–684, 685, 686
dual, rainbow options, 767–769
- Variance-covariance matrix, 474–475. *See also*
Covariance
- Variance Inflation Factor (VIF), 51, 108, 246–247
- Variance(s):
analysis of (ANOVA), 610, 611, 618–623
charts, 32
hypotheses tests and, 584, 598–601, 606, 607
population, 610
- Variation, percent explained, 503
- Vasicek models (Oldrich Vasicek), 149–152, 690–691
- VBA (Visual Basic for Applications), 556–560
- Vega, call, 492, 494–495
- Vesting, 716–718, 723–724, 821–826
- VIF (Variance Inflation Factor), 51, 108, 246–247
- Violations of assumptions, 46, 101, 240
- Visual Basic for Applications (VBA), 556–560
- Volatility:
of assets, 137–138, 222
barrier options and, 726
computations, 664–672
EWMA, 664, 665, 668
GARCH, 664, 665, 668–672, 681
implied, 663
of interest rates, 139, 422–423, 679, 680
inverse floater bonds and, 407, 410
logarithmic cash flow returns approach, 664–666, 681
logarithmic present value returns approach, 665, 666–668, 681, 759
management assumption approach, 664–666, 681
to probability, 666, 668
Real Options SLS and, 712
risk-free rate, 680–689, 712
sensitivity analysis and, 505
simulations and, 542–545
value at risk and, 661
- Warrants, valuation of, 821–826
- Weighted least squares, 436
- Weighting of ratios, 123–124
- Wilcoxon signed-rank test, 616, 618
- Wong, Victor, 349
- Writer extendible options, 238
- Xi, call, 492–495
- Yield curves:
asset liability management and, 349–354
Cox-Ingersoll-Ross model, 673–674
curve interpolation, 674–677
debt analysis and, 138–140, 146, 151–152
forward rates from spot rates, 678
term structure of volatility, 679–680
U.S. Treasury risk-free rates and cubic spline curves, 680–689
Vasicek model, 690–691
- Z-scores, 580
- Z-tests, 436, 594, 596, 597, 602, 606