

- 30/360 fixed rate day-count fraction, 650
 180-day barrier option, asset price path, 295
 88888 account, 506
- Accrued interest, 75, 869
- Active index futures contracts, market value, 472
- Adjusted R-squared, 847, 851
- After-trading cost gain, 53
- Aggregate rho, 356
- Aggressive stocks, 827
- Agricultural futures
 options, introduction, 763
 options, trading volume, 752
 trading volume, 752
- Agriculture, commodity derivatives, 751–758
- All-or-nothing (AON) options, 261–267
 risk measurement, 264–265
- All-or-nothing (AON) order, 869
- Alpha. *See* Jensen's alpha
- Alps Air, 595–596
- Amalgamated Wireless Australasia Ltd. (AWA Ltd.),
 risk management lesson, 575–587
- American option. *See* American-style options
- American Stock Exchange (AMEX), 16–17, 383, 384
 adoption. *See* Exchange-traded funds
 ETFs, trading activity, 493
 information/data, 482
 options, introduction, 605
 SPDRs, 484, 487
 shares, dollar value, 484
 stocks, calendar days (median number), 394
 webpage, 483
- American-style call
 early exercise, prospect identification. *See* Dividend-paying stock
 lower price bound, 180–181, 191
 value, computation, 417–418
- American-style call option
 early exercise, 181–182, 191–193
 exact valuation. *See* Dividend-paying stock
 exception, 303
 exercise price, 417
 lower price bound, examination, 181
 valuation. *See* Dividend-paying stock
 writing, 406
- American-style futures options, valuation, 627
- American-style FX put option, 323
 values, 341
- American-style knock-out FX put option, valuation (binomial method usage), 314
- American-style options, 199, 869
 no-arbitrage price relations, 190, 197. *See also*
 Futures contracts
 put-call parity, 188–190, 195–196
 terms, 587
 valuation, 398–399
 value computation, quadratic method (usage), 340
- American-style put
 early exercise, prospect identification. *See* Dividend-paying stock
 lower price bound, 183–184, 193
 quadratic approximation, 338
 risk characteristics, summary, 343
- American-style put option
 early exercise, 184, 193–194
 JR parameters, valuation, 312
 lower price bound, examination, 184
 valuation
 CRR, usage, 311
 two-period trinomial method, usage, 324
 value, 311
 computation, 399–401
- American-style put-call parity
 arbitrage portfolio trades, 188
 support, 189, 196
 arbitrage trades, support, 197
- American-style USD/GBP options, values/early exercise premiums (computation). *See* Forward exchange rates; Spot rates
- Amortizing swap, 869
- Analysis of variance (ANOVA), 834, 845
 results, 821, 838
 table, 846
- Analytical delta values, 342
- Annualized basis, 54
- Annualized volatility, 540
 computation, 560
- ANOVA. *See* Analysis of variance
- Anticipatory hedge, 5, 869
- AON. *See* All-or-nothing
- Arbitrage, 869. *See also* Triangular arbitrage
 CDO, 695
 engagement, inequality, 736

- Arbitrage (*Cont.*)
- opportunities, 711
 - absence. *See* Costless arbitrage opportunities
 - price relations/valuation equations/methods. *See* Common stocks
 - profit, 195
 - strategy, 52, 736
 - table, 188
 - trades, listing, 193
 - trading strategy, 190
- Arbitrage portfolio trades, 203. *See also* American-style put-call parity; European-style put-call parity
- support. *See* European-style call
 - usage. *See* Assets; Futures
- Arbitrager, 869
- Arbitrageur, 52
- Arithmetic asset price, 294
- Arithmetic Brownian motion, 707
- Asay formula, 229
- Asian option, 294, 869
- Ask price, 501, 869
- Ask rate, quality, 651
- Asset lattice, nodes, 314
- Asset price logarithm
- change, 327
 - distribution, 376
 - modeling, 250
 - numerical values, 307
 - two-period lattice, 307
- Asset prices
- 95% confidence interval, computation, 212
 - change, 235–238
 - computation. *See* Conditional expected asset prices
 - distribution, 377. *See also* Discrete asset price distribution; Log-normal asset price distribution
 - logarithm, mean, 304
 - eta, function, 237
 - expected asset conditional, computation, 220–222
 - fixed level (excess), probability computation, 215–217
 - gamma, function, 238
 - increase, 254
 - lattice, creation, 307–308, 313, 323–324
 - numerical values, two-period lattice, 307, 309
 - path. *See* 180-day barrier option
 - percent change, 236–237
 - probability density function, 553
 - rho, function, 239, 240
 - risk, hedging, 355
 - theta, function, 242
 - two-period lattice, 308
 - upper/lower barrier, 294
 - up-step coefficient, 322–323
 - variance, computation, 212
- vega
- function, 241
 - identification, 355
- Asset-backed securities, 683
- Asset-or-nothing call, 261
- option, 261
 - delta values, 267
 - purchase, terminal profit, 262
- Asset-or-nothing options, 524, 869
- Asset-or-nothing put, 263
- Assets
- allocation, 634, 869
 - adjustment, futures (usage), 634
 - book value, 429
 - continuous rates, modeling, 122–123
 - discrete cash dividend payment, 197
 - discrete cash flow payment, future value computation, 124
 - European-style call options (price equivalence demonstration), arbitrage portfolio trades (usage), 199
 - hedging, futures contracts (usage), 147–148
 - income generation, 217
 - notation, 296
 - options prices, futures options prices (no-arbitrage relations), 199
 - position
 - future value. *See* Leveraged asset position
 - profit function. *See* Long asset position
 - terminal profit diagrams. *See* Long asset position; Short asset position
 - price appreciation, expected rate, 377–378
 - profit function, 362–363
 - risk premium, 146
 - wealth, 106
- Assignment, 869
- At-the-money, 869
- At-the-money option
- buy-write strategy (return distributions), Monte Carlo simulation (usage), 532, 533
 - identification, 555
 - implied volatility, 403
 - value, absence, 461
- At-the-money put, purchase price, 593
- At-the-money rights, 439
- At-the-money S&P500 index option prices, usage. *See* Implied volatilities
- At-the-money warrants valuation, dilution effects (assessment), 444
- Australian Options Market, 17
- Australian Stock Exchange, 10
- irregularities, 576
- Autocorrelation, test, 817–818
- Automatic exercise, 869
- Average daily cash dividends. *See* Dow Jones Industrial Average; Standard & Poor's 500 index

- Average option, 869
 Average price option, 294
 Average rate option, valuation, 332–333
 equality, 597
 Average-rate derivatives contracts, 747
 AWA Ltd. *See* Amalgamated Wireless Australasia Ltd.
- Back office, function, 506
 Backwardation, 136–137, 869
 implication, 751
 Balance sheet
 CDO, 696
 risk, 869
 management, FX futures/options (usage), 598
 Bank discounts, 61
 Bank for International Settlements
 data, 735
 information, 606
 semiannual bank surveys, 36
 Bankruptcy filings, 679
 Barings Bank PLC
 demise, 506
 risk management lessons, 506–510
 scandal, Nikkei 225, 508
 Barings Futures (BFS), 507–508
 Barrier level, 296, 297
 Barrier option, 870
 Barrier options, 294–299. *See also* Double barrier options
 focus, 295
 valuation, 312–314
 Barrier price, coincidence, 314
 Basis, 870
 fair value, 497, 499
 mispricing, 497, 870
 point, 870
 rate swap, 18, 870
 risk, 148, 870
 BBA. *See* British Bankers Association
 Bear market, 870
 Bermuda option, 870
 Beta, 870. *See also* Options; Stocks
 estimation, 114. *See also* Common stocks
 BEY. *See* Bond equivalent yield
 BFS. *See* Barings Futures
 Bid prices, 501, 870
 equality, 559
 Bid/ask midpoint, 483
 Bid/ask price bounce, 167–168
 Bid/ask spot/forward exchange rates, 566
 Bid/ask spread, 658
 Binary options, 232, 870
 Binomial approximation method
 application, steps, 313
 approximation error, 325
 Binomial distribution, mean, 306
 Binomial framework, 455
 Binomial lattice
 computation, 715
 development, short rate distribution (assumption), 718–719
 node, 717
 recombination, 714
 Binomial method, 303–321, 325, 342
 accuracy, degree (assessment), 314–317
 application, steps, 306–312
 coefficients, usage, 400, 455
 usage. *See* American-style knock-out FX put option; Spread option
 valuation methods (accuracy, degree), assessment, 316–317
 Binomial model, 870
 usage. *See* Risk-averse valuation; Risk-free hedge portfolio; Risk-neutral valuation
 Binomial option pricing model, trinomial option pricing model (relationship), 323
 Bivariate normal distributions. *See* Cumulative bivariate normal distributions
 Bivariate normal probability
 approximation, 300–302
 computation, 301, 416
 Black futures option valuation formula, 321
 Black model, 228, 675, 870
 Black/Scholes formula, 227–228
 Black-Scholes model, 870
 Black-Scholes/Merton (BSM). *See* Frictionless BSM; Idealized BSM
 alternative expressions, equivalence, 229–230
 assumptions, 207, 287
 usage, 327
 average implied volatilities. *See* Lucent Technologies; Octel Communications, Inc.
 call
 denotation, 435
 call option formula, 536
 partial derivatives, 421
 European-style put option formula, 630
 formula, 224, 226–232, 254
 reduction. *See* European-style futures options
 special cash, 321
 usage, 432
 framework, usage, 420
 model, 201, 254
 presumption, 398
 risk-free hedge development, 224
 usage. *See* Continuously compounded returns
 option valuation, 373
 formula, 303, 520, 702
 formula, derivation, 253–255
 framework, 249
 option value, nonlinear function, 456
 risk-neutral valuation mechanics, 292
 Block trade, 870

- Bloomberg, 63
 Board Crush, 754
 Bogle, John, 482
 Bond equivalent yield (BEY), 62, 78–79, 870
 reported rate, 78
 Bond portfolio, interest rate risk hedge
 duration, usage, 72–73
 duration/convexity, usage, 72–75
 Bondholders, face value, 420
 Bonds
 expected return/risk relation, 438
 face value, 55, 69, 425
 issues, private placements, 429
 log-normally distributed prices, 619
 market
 illiquidity, 688
 values, 604
 options, 8, 870
 valuation, 724–726
 par amount, 55
 payments, promises, 588
 public issuance, 429
 valuation, 721–724
 Bonds values, 423, 424
 estimation
 stock information, usage, 431–433
 stock option price information, usage, 431–433
 stock price information, usage, 429–430
 illustration, 427
 Taylor series expansion, 86
 Books, 19
 Bootstrapping technique, 640
 Borrowing portfolio, 870
 Box, 870
 Brady bond swap, 699
 Brand new issue, 870
 Breakeven asset price, 372, 870
 Breakeven price, 365
 Breakeven probabilities, 372–373
 Bretton Woods Agreement, 565, 763
 Britain, implied forward interest rate (computation), 135–136
 British Bankers Association (BBA), 607, 680–682, 689
 Interest Settlement Rate, 607
 survey, 680
 Brokerage business, handling, 506
 Brokers, 871. *See also* Commission
 Brownian motion, 871. *See also* Arithmetic Brownian motion; Geometric Brownian motion
 BSM. *See* Black-Scholes/Merton
 Bull spread, 871
 Business cycles, range, 452
 Butterfly spread, 871
 Buyer swap, 871
 Buy/write, 871
 Buy-write index portfolio (BXM) (CBOE), performance estimate, 115–117
 Buy-write return distributions, central limit theorem (relationship), 530–533
 Buy-write strategy. *See* Index options
 maximum monthly return, 532
 terminal profit diagram, 369
 BXM. *See* Chicago Board Options Exchange Buy-Write Index
 CAC-40, 487
 CAD bonds
 currency swap, addition, 589–590
 forward strip, addition, 590–591
 Calculation amount, 38, 649, 871
 Calendar
 days, median number. *See* American Stock Exchange; NASDAQ; New York Stock Exchange
 spread, 23, 871
 Calibration, 871
 process, usage, 712
 Call on call, 287–288
 Call on maximum, 281–283
 valuation, 283–284
 Call on minimum, 285
 Call option, 290
 valuation, 290–291
 Call options, 871
 holder, 319
 exercises, 189
 prices, inclusion. *See* Implied volatilities
 profit function, 364–366
 purchase, terminal profit. *See* Asset-or-nothing call option; Cash-or-nothing call option
 series, 559
 stocks, impact, 420–421
 value, 276
 Call options on maximum/minimum, valuation. *See* Maximum; Minimum
 Callable bonds, 722–723, 871
 Callable swaps, 871
 Calls
 characteristic, 354
 feature, price computation. *See* Coupon-bearing bonds
 lower price bound. *See* European-style call portfolio, expressions, 352
 prices, 405
 Canada given spot rate, implied risk-free rate (computation), 571, 573
 Canadian bonds, value, 589
 Capital Asset Pricing Model (CAPM), 89, 104–110, 205, 871
 assumptions, 112
 CAPM-based portfolio performance measures, 111

- Capital Asset Pricing Model (*Cont.*)
 expected return/risk mechanics, 350
 futures, fit, 143
 mechanism, 355
 risky securities/portfolios, evaluation, 782
 usage. *See* Perfect substitutes
- Capital gain, 53
- Capital market line (CML), 105–106, 871
 calculations, 108
- Capital-guarantee notes, 512
- Capitalizations (caps), 871. *See also* Interest rate caps
 exercise price, determination. *See* Gold; Over-the-counter gold
 prices, 714
- Caplet, 871
- CAPM. *See* Capital Asset Pricing Model
- Carry costs/benefits
 guidelines, 124–125
 understanding, 121–125
- Cash advance, 410
- Cash and carry, 871
- Cash CDO, 696
- Cash dividends
 payments, 128
 sum, 492
- Cash equivalent, 92, 871
- Cash flows, management, 625
- Cash generation. *See* Straddle
- Cash market, 871
- Cash rebate, 297
- Cash settlement, 5–6, 554, 871, 872. *See also* Options
 cash settlement
 usage, 546
- Cash transaction, 4
- Cash-and-carry portfolio, 622
- Cash-and-carry T-bond position, 686
- Cashed-in option, 461
- Cash-or-nothing call, 262
- Cash-or-nothing call option
 purchase, terminal profit, 263
 valuation, 263–264
- Cash-or-nothing option, 262
- Cash-or-nothing options, 524, 872
- Cash-or-nothing put, 524
- Cash-settled contract, 545
- Cash-settled futures, 546
- Catalytic cracking, 872
- CBOE. *See* Buy-write index portfolio; Chicago Board Options Exchange
- CDRs. *See* Government National Mortgage Association
- CDS. *See* Credit default swap
- Central limit theorem, 818
 relationship. *See* Buy-write return distributions
- Centralized market, 12, 872
- CEV. *See* Constant elasticity of variance
- CFE. *See* Chicago Board Options Exchange
- CFTC. *See* Commodity Futures Trading Commission
- Chart analysis, 872
- Cheapest-to-deliver, 615, 872. *See also* Futures bonds, 622
 identification, 623. *See also* Futures
- Chicago Board of Trade (CBT), 469
 conversion. *See* Mid American Exchange
 factors, 612. *See also* U.S. Treasury bonds
 system, 612, 620–621
 corn futures contract, 622
 decision, 383, 470
 derivatives exchange, 12
 exchange-traded soybean contract market, domination, 753
 futures, 604
 GNMA contract market, rise/fall, 605
 soybean
 complex, trading activity, 756
 futures contracts, trading, 755
- T-bond futures
 contract, 618
 modification, 603
- ten-year U.S. Treasury note futures
 contract, 611
 trading activity, 611
- Treasury bond, trading activity, 611
- U.S. Treasury bond futures
 contract, 610
 duration, 626–627
 net cost of carry relation, 618–627
 options contract, 617
- Chicago Board Options Exchange Buy-Write Index (BXM), 115–117, 383, 469, 530
 historical performance, 534–537
 index, monthly returns, summary statistics, 534
 month-end total return indexes, 535
 performance measures (estimation), monthly returns, 536
 standardized monthly returns, distribution, 537
- Chicago Board Options Exchange (CBOE), 384
 CBOE 100, 480
Constitution and Rules, 385
 contemplation. *See* Trading
 formation, 16–17
 Futures Exchange (CFE), 541
 launch. *See* Market Volatility Index futures
 S&P 100 index option, 480
 stock options, listing, 480
 trading. *See* One-week options
 website, 27
- Chicago Mercantile Exchange (CME), 16, 731
 Board of Directors, 679
 Eurodollar futures
 contract, 608
 contract specifications, 615
 options futures, 616
 trading activity, 609

- Chicago Mercantile Exchange (*Cont.*)
 futures trading, 565
 FX futures option contracts, relative trading volume, 569
 launch. *See* Quarterly Bankruptcy Index
 products, 478
 re-denomination effect. *See* Standard & Poor's 500 futures
 T-bill futures contract, 605
 three-month Eurodollar futures, 606
- Chicago Produce Exchange, 16
- CHIDIST, 805
- Chi-square distribution, 802–806
 critical values, 864
 degrees of freedom, 802, 808
 normality, test, 803
 ten degrees of freedom, 864
- Chi-square value (5% probability level/ten degrees of freedom), 803
- Chooser options, 275–278, 872. *See also* Complex chooser option
 lives, comparison. *See* Standard options
 valuation, 277–278
 equation. *See* European-style chooser options
- CIR. *See* Cox Ingersoll and Ross
- Circuit breaker, 872
- Cirtron, Robert L., 666
- Clearinghouse, 15–16, 19, 872
 role, 21–22
- Cliquet option, 273, 872
- CLNs. *See* Credit-linked notes
- CML. *See* Capital market line
- CMT. *See* Constant maturity Treasury
- CNBC, Squawk Box, 498–499
- Code of Hammurabi, 11
- Coefficient of determination. *See* R-squared
- Coefficients, description, 455
- Coffee Sugar and Cocoa Exchange (CSCE), 17
- Collar agreements, 408. *See also* Structure collar agreement
 cap exercise, determination. *See* Gold; Over-the-counter gold
- Collars, 872. *See also* Stock prices; Zero-cost collars
- Collateral
 buying, 625, 871
 inclusion, 624
 selling, 886
- Collateralized debt obligation (CDO), 681, 695. *See also* Arbitrage; Balance sheet; Cash CDO; Synthetic CDOs
- Collateralized Depositary Receipts (CDRs). *See* Government National Mortgage Association
- Collateralized loan, 625
- Collect-on-delivery options, 269
- COMEX. *See* Commodity Exchange
- Commercial banks, term deposits, 625
- Commission, 872
 broker, 872
 merchant. *See* Futures
- Commodity, 121, 872
 fund, 872
 futures, 872
 options, 872
 prices, short-term movements, 335
- Commodity derivatives, 731, 872
 references/readings, 769–770
 risk management lessons, 748–751
 total notional amount, proportion, 735
- Commodity Exchange Act of 1936, 763
- Commodity Exchange (COMEX), 16
 division. *See* New York Mercantile Exchange
 futures contract, 763
- Commodity Futures Modernization Act, 383
- Commodity Futures Trading Commission (CFTC), 384, 872
 ban. *See* Domestic agricultural commodities options
 governance, 26
 regulation, 26
- Commodity swaps
 contracts, 736–757
 fixed price, computation, 741–743
- Commodity trading advisor (CTA), 872
- Common stocks
 beta, estimation, 825–827
 derivatives, arbitrage price relations/valuation equations/methods, 393
 usage, 428
 valuation, constant dividend growth (usage), 84–85
 volume-weighted average, 412
 weighted portfolios, 498
- Compensation agreements, 451
 references/readings, 465–466
- Complex chooser option, 275
- Complex derivatives, risk (valuation/measurement), 774
- Compound options, 287–291, 872
- Compounding, 873. *See also* Continuous compounding
- Conditional expected asset prices, computation, 219–224
- Conditional expected values, expressions, 223–224
- Conditional value-at-risk, 222
- Conditional VAR (CVAR), 222, 509
- Confidence interval, 831–832, 845. *See also* Regression line
 computation. *See* Asset prices; Slope
- Confidence level, usage. *See* Maximum dollar loss
- Constant dividends
 growth, 84
 usage. *See* Common stocks
 yield models, 458–459
 yield rate assumption, 520
 yield stock options, 228

- Constant elasticity of variance (CEV), 504
- Constant maturity Treasury (CMT)
 - rates, 638
 - illustration, 640, 641
 - reverse engineering, 640
- Constant yield, 157
 - swap, 873
- Constant-parameter models, 706–713
 - application, 708–713
- Constant-parameter short rate processes, 706–708
- Constructive sales, 408
- Contango, 136, 873
 - negative value, implication, 751
- Contingency order, 873
- Contingent pay options, 269–271
- Contingent pay put options, valuation, 271
- Contingent-pay option, 873
- Continuous compounding, 873
- Continuous dividend income, contrast. *See* Discrete dividend income
- Continuous log-normal asset price distribution, 377–378
- Continuous rates, 178–190. *See also* Forwards modeling. *See* Assets
- Continuously compounded daily return, 209
- Continuously compounded discount rate, 588
- Continuously compounded interest rates, 54–55
- Continuously compounded mean return, 873
 - mean continuously compounded return, relation, 250–252
- Continuously compounded rate. *See* Return
- Continuously compounded returns, 530
 - BSM model, usage, 542
 - mean, 211
- Continuously compounded zero-coupon yield rate, 709
- Contract expiration, 500
- Contractual obligation, 873
- Convenience value, 873
- Convenience yield, 122, 736
- Convergence, 873
- Conversion, 185, 873
 - factor, 612–613, 873
 - rates. *See* Euro
- Convertible bonds, 873
 - face value/maturity, 447
 - valuation, 444–448
 - illustration, 446–447
- Convexity, 59–60, 873. *See also* Coupon-bearing bonds
 - calculation, 59–60
 - computation, yield to maturity (usage). *See* Coupon-bearing bonds
 - consideration, ignoring, 645
- Corner, 20, 873
- Corporate bonds
 - discussion, 439
 - expected loss
 - computation, 434–435
 - present value, computation, 425–426
 - stock price information, 430–431
 - valuation, 420–435
 - call option, exclusion, 421–423
 - stock information, usage, 432–433
 - stock option price information, usage, 432–433
 - value, replication, 428
- Corporate securities, 419
 - expected returns, computation, 433–434
 - references/readings, 449–450
 - valuation, 420
 - framework, development, 419
 - problem, 431
- Corporate stocks, expected returns (computation), 434–435
- Correlation, 783–784. *See also* Serial correlation
 - coefficient, 783
 - estimation, 792–793
 - estimator, 787–788
 - parameters, estimation, 152–153
- Cost of carry, 873
- Cost of carry rate. *See* Options; Risk-neutral net cost of carry rate
 - value, 321
- Cost/benefit analysis, 314
- Costless arbitrage, 52, 873
 - opportunities, 89, 203–204, 395
 - absence, 51–52, 464, 571, 717
 - absence, impact, 774
 - trades, 736
- Costless arbitrage trades, 127
- Counterparty, 4, 873
 - risk, 16, 873
- Counters, 12
- COUP, 64
- Coupon, 873
 - bond, 873
 - weighted average term to maturity, 66
 - interest rate, equivalence, 640
 - period, 613
 - rate, 873
 - swap, 39, 873
- Coupon interest payments
 - guarantees, 699
 - meeting, 420
- Coupon-bearing bonds (coupon bonds), 55, 64–79, 722, 873
 - call feature, price computation, 77–78
 - conventions, 69–79
 - convexity, 66–67
 - computation, yield to maturity (usage), 70–71
 - duration, 66
 - approximation, computation, 67–68
 - computation, yield to maturity (usage), 70–71

- Coupon-bearing bonds (*Cont.*)
 duration/convexity approximation, computation, 67–68
 fixed-rate bond, comparison, 654
 impact, 420
 marketplace trading, 75–79
 price lattice, 722
 risk management, 71–72
 risk measurement, 66–68
 valuation, 64–65
 value computation, zero-coupon yield curve (usage), 65–66
 yield to maturity (computation), yield curve (usage), 70
- Coupon-bearing callable bond valuation, no-arbitrage pricing model (assumption), 724
- Coupon-bearing CMT rates, 641
- Coupon-stream, price computation, 77
- Courts & Co., 506
- Covariance, 783–784, 873. *See also* Random variables; Semicovariance
 estimation, 792–793
 estimator, 787–788
- Covariance, estimation. *See* Variance/covariance
- Covered call strategies
 expected return/volatility relation, 353
 terminal profit diagram, 369
- Covered call trading strategies, expected returns/risks, 351
- Covered calls, 874
- Covered write, 874
- Cox Ingersoll and Ross (CIR) derivation, 708
- Cox-Ross-Rubinstein (CRR) binomial method, valuation error, 315
- Cox-Ross-Rubinstein (CRR) imposition, 307
- Cox-Ross-Rubinstein (CRR) method, probability, 310
- Cox-Ross-Rubinstein (CRR) parameters, 305–306, 318
 usage, 309, 310. *See also* American-style put option
- Cox-Ross-Rubinstein (CRR) possibilities, 313
- Crack spread, 23, 874
 futures options, trading, 320
- Credit card debt, 679
- Credit default, 679
 forward, 697
 products, 679
- Credit default swap (CDS), 681, 687–691. *See also* Single-name CDSs
 confirmation, 689
- Credit derivatives, 679, 874. *See also* Global credit derivatives
 contracts
 physical settlements, percentage, 689
 reference entities, appearance, 684
 institutional usage, 682, 683
 outstanding, notional value (proportional), 682
 security issuer, 681
- Credit event, 679, 874
- Credit option, valuation. *See* Fixed payment credit option
- Credit products, 679
 markets, 680–685
 references/readings, 704
 risk management lesson, 698–701
- Credit protection
 purchase cost, computation, 692–693
 sale, 683
- Credit risk, 12, 874. *See also* Over-the-counter derivatives markets
 premium, 697
- Credit spread, 679
 call option, 702
 forward, 697–698
 options, 701–703
 valuation, 702–703
 products, 679
- Credit Suisse, 413
- Credit-linked notes (CLNs), 680, 681, 694–695, 874. *See also* Synthetic CLN
 flowchart, 694
- Critical value, 828
- Cross hedging, 874
 ineffectiveness, 747
- Cross-rate option, 874
- Cross-rate relation, 574–575, 874
- Cross-sectional regression, errors (elimination), 856
- CRR. *See* Cox-Ross-Rubinstein
- Crude oil
 weekly returns, 748
 world production, 738
- Crush spread, 754, 758, 874. *See also* Reverse crush spread
- Crushing, 874
- CSCE. *See* Coffee Sugar and Cocoa Exchange
- CTA. *See* Commodity trading advisor
- Cubic splines
 interpolation, 79, 874
 model, usage, 640
 usage, 647
- Cum-dividend, 874
- Cumulative bivariate normal distributions, 289
- Cumulative standard normal density function, 797
- Cumulative univariate normal distributions, 289
- Currency forwards, 40–41
- Currency options, 8, 874
- Currency price, Monte Carlo simulations (usage), 328
- Currency products, 565
 markets, 565–570
 references/readings, 599
 risk management, 587–598
 lesson, 575–587
 valuation, 571–575

- Currency swaps, 18, 874
 - addition. *See* CAD bonds
 - usage. *See* Foreign financing
- Curve-fitting methods, 647
- CUSIP number, 688
- Customers
 - direct interface, 506
 - lost goodwill, 735
- Customized currency options, 570
- CVAR. *See* Conditional VAR

- Daily price limit, 874
- Daily settlement, 874
- Datastream, 534
- DAX 30, 487
 - returns, 848–849
- Day order, 874
- Day trader, 874
- Dealers, 874
- Debt
 - securities, creditworthiness/liquidity, 624
- Declaration date. *See* Dividends
- Deep market, 874
- Deep out-of-the-money put, 236
- Default
 - occurrence, 420
 - probability, 425
 - function, 428
 - protection, purchase cost (computation), 691–692
- Default-free asset, 874
- Defensive stocks, 827
- Deferred swap, 674, 874
- Degree of freedom, 866, 867. *See also* Chi-square distribution; One-tailed test; Two-tailed test usage, 789
- Delivery, 874
 - date, 874
 - month, 874
 - settlement, 5, 874
- Dell leaps, price/volume/open interest information, 391
- Dell stock options, price/volume/open interest information, 389–390
- Delta, 245, 256–257, 874. *See also* Futures change, 237–238
 - constraint, 523, 525
 - hedge, 331, 357
 - hedging, 539
 - numerical approximation. *See* FX put option; Put options
 - positive value, 235
 - usage, 235–236
 - values. *See* Asset-or nothing
- Delta risk
 - exposure, 361
 - hedge, 358–360
 - one-day hedge, 360–362
- Delta-neutral, 875
 - hedge portfolio, 236
- Derivatives
 - continuous dividend yields (inclusion), no-arbitrage price relations/valuation equations/methods. *See* Stock indexes
 - disasters, 775
 - discrete dividends (inclusion), no-arbitrage price relations/valuation equations/methods. *See* Stock indexes
 - instruments, U.S. accounting rules, 746
 - lessons, 773–775
 - price movements, 249
 - regulation, 26
 - terms, 869–891
 - total notional amount, percentage, 606, 733. *See also* Interest rate derivatives; Single-currency interest rate derivatives
 - types, 774
 - valuation, 775
 - foundational assumption, 509
- Derivatives contracts, 3, 875. *See also* Implied volatilities
 - elimination, 254
 - expected return/risk relation, 774
 - trading, 384–392
 - valuation, 326, 392–406
 - discussion, 774
- Derivatives markets, 3
 - evolution, 11–19
 - existence, 773
 - reasons, 8–10
 - references/readings, 42
- Designated maturity, 39
- Designated Order Turnaround (DOT), 875
- Deutsche Bank, 606
- Deutsche Terminborse (DTB), 538
 - launch. *See* Volatility
- Diagonal spread, 875
- Dial Corporation (DL) shares, 388
- Digital options, 232, 875
- Dilution factor, 875
 - substitution, 445
- Directional bets, 405
- Dirty price, 76
- Discount bonds, 54–66, 875
 - implied yield, computation, 56
 - marketplace trading, 61–64
 - price change, approximation
 - convexity, usage, 60
 - duration, usage, 58–60
 - trading, 61
 - valuation, 55–56
 - value lattice, 713
 - values, Vasicek model assumptions, 712
- Discount factor, 55, 875. *See also* Forwards

- Discounts, 61, 875
- Discrete asset price distribution, 377
- Discrete cash dividend payments, 191, 393–395
- Discrete cash flow payment, future value computation. *See* Assets
- Discrete dividend income, continuous dividend income (contrast), 489–494
- Discrete dividends
 assumption, 458
 future value form, 494
- Discrete flows, 123–124, 190–197. *See also* Forwards
 incorporation, 317–319
- Discrete probability density function (discrete pdf), 781
- Discrete-time reversion rate, 336
- Disney, Roy E., 412
- Distribution, mean, 210
- Disturbance assumption
 nonlinearity, 852–854
 violations, 852–858
- Dividend-paying stock
 American-style call options
 exact valuation, 415–418
 valuation, 318–319
 American-style calls
 early exercise, prospect (identification), 192
 American-style puts, early exercise (prospect identification), 194–195
 number, listed options, 395
- Dividend-paying stock, forward contract (value computation), 128
- Dividends, 875
 capture, 875
 declaration date, 393, 875
 growth. *See* Constant dividend growth
 index, 491
 payment, 399, 452
 date, 393, 875
 protection, 875
 spreads, 406–407
 opportunity, identification/engagement, 407
 yield, 349, 351, 875. *See also* Standard & Poor's 500 index
 levels, 452
- DJIA. *See* Dow Jones Industrial Average
- DL. *See* Dial Corporation
- Dollar value of one basis point (DV01), 57
- Domestic agricultural commodities options, CFTC ban, 763
- DOT. *See* Designated Order Turnaround
- Double barrier options, 294
- Doubling, 875
 strategy, 507
- Dow, Charles H., 489
- Dow Jones Industrial Average (DJIA). *See* Price-weighted DJIA
- cash dividends, 492
 computation, 489
 dividends, 492–494
 futures contract, 474
 index
 average daily cash dividends, 493
 level, 280
 returns, 504
 stocks, trading, 490
- Down-and-in call, 294
- Down-and-in option, 875
- Down-and-out call, 294, 295, 692
 valuation, 298–299
- Down-and-out option, 875
- Downside price risk, 408
- Down-step
 coefficient, 317
 change, 321
 probabilities, 312
- Downtick, 875
- Downward biased contracts, 166
- Downward-sloping environment, 548
- Drift rate, 249
 adjustment, 337
- Dual trading, 875
- Dummy variable, 843
 slope shifter, 844
 usage. *See* Means
- Dummy variable slope-shifter, usage. *See* Return
- Duration, 57, 875. *See also* Coupon-bearing bonds;
 Target duration
 approximation, computation. *See* Coupon-bearing bonds
 computation, yield to maturity (usage). *See* Coupon-bearing bonds
 definition, 58
 usage. *See* Bond portfolio; Discount bonds
- Duration-based approaches, equivalence, 633–634
- Duration-based hedging, 72
- Duration-based optional hedge ratio, 633
- Durbin-Watson (DW) statistic, 856
- Durbin-Watson (DW) test. *See* Null hypothesis
- Durbin-Watson (DW) test statistic, significance points, 868
- DV01, 59, 875
- DW. *See* Durbin-Watson
- Dynamic hedge, 875
- Dynamic hedging effects (capture), Monte Carlo simulations (usage), 329–332
- Dynamic insurance
 index futures
 stock portfolio/dynamic adjustment, usage, 527–528
 usage, 525–526
 risk-free bonds
 stock portfolio/dynamic adjustment, usage, 527–528

- Dynamic insurance (*Cont.*)
 usage, 523–525
 stocks, usage, 523–525
- Dynamic portfolio insurance, 518, 875
- Dynamic portfolio insurance, creation
 risk-free bonds
 usage, 524–525
 stock index futures
 stock portfolio/dynamic adjustment, usage,
 528–529
 usage, 526–527
 stock portfolio, usage, 524–525, 526–527
- Early exercise, 455–458, 875
 checking. *See* Optimal early exercise
 motivation, 319
 optimality, evaluation. *See* Long-term ESO
 premium, 339, 875
 proceeds, 318
- ECU. *See* European Currency Unit
- EDGAR. *See* Electronic Data Gathering Analysis
 and Retrieval
- Effective date, 38, 650, 875
- Effective interest rate, 54, 876
- Efficiency frontier, 97
- Efficient portfolios, 94, 876
 identification, risky securities (usage), 97–101
- EFV. *See* Expected future value
- Electronic Data Gathering Analysis and Retrieval
 (EDGAR), 412
- Elementary statistics, 779
 objectives, 779–780
 references/readings, 818–819
- Embedded lookback option, 463
- Embedded quality option, valuation. *See* U.S.
 Treasury bonds
- Employee stock options (ESOs), 451–455, 876
 early exercise, optimality (evaluation). *See* Long-
 term ESO
 indexed exercise prices, inclusion, 459–460
 reload features, inclusion, 460–463
 valuation. *See* Indexed ESO
 maximum stock price, usage, 456–458
 reload features, inclusion, 461–463
 value, 459
- Employee stock purchase plans (ESPPs), 451, 463–
 465, 876
 valuation, 465
- End-of-month option, 876
- End-of-period portfolio value, 161
- End-of-period stock price, 463
- Energy, commodity derivatives, 737–748
- Equity basis swap, 19, 876
- Equity FLEX options, 392
- Equity index, appreciation, 512
- Equity notes. *See* Protected equity notes
- Equity option, 876
- Equity swap, 18–19, 876
- Equity tranche, toxic waste, 696
- Equity-linked notes, 512
- Error sum of squares (SSE), 834, 846
- Errors-in-the-variables problem, 876
- Escrowed dividend, present value, 416
- ESOs. *See* Employee stock options
- ESPPs. *See* Employee stock purchase plans
- Estimate, standard error, 808
- Estimated slope coefficient, biasing, 168
- Estimation, 786–795
- Eta, 245, 257, 876
 usage, 236–237
- ETFs. *See* Exchange-traded funds
- Euro
 futures contract, 568
 futures option contract, 570
 national currencies, conversion rates, 567
 option contract, 570
- Eurodollar futures, 607–610
 contract, 632, 876. *See also* Chicago Mercantile
 Exchange
 options, 31–33, 615
 three-month Eurodollar futures, 17
- Eurodollars, 376
 contracts, 876
 options, 33
 swap rates, 643
 time deposits, 625, 643, 876
- European Currency Unit (ECU), 876
- European option, 876
- European-style barrier options, expected returns/
 risks, 349
- European-style barrier options, valuation
 definitions, requirement, 296
 equation, 297
- European-style call, 177
 lower price bound, 178–180, 190–191
 terminal value, 440
 value, finding. *See* Stock indexes
- European-style call on maximum, valuation, 334–
 335. *See also* Risky assets
- European-style call option, 180, 232
 lower price bound
 arbitrage portfolio trades, support, 179, 191
 examination, 180
 price equivalence (demonstration), arbitrage port-
 folio trades (usage). *See* Assets; Futures
 valuation, 224–232
- European-style chooser options, valuation equa-
 tion, 275
- European-style compound options, valuation, 415
- European-style contingent pay call option, 270
- European-style Eurodollar futures option, 629
- European-style futures options
 risk measures, summary, 244–245

- European-style futures options (*Cont.*)
 valuation
 Black formula, BSM formula reduction, 627
 equations, summary, 244–245
- European-style options, 198–199, 337
 expected return/beta relation, 350
 expected return/volatility relation, 351
 no-arbitrage price relations, 190, 197. *See also*
 Futures contracts
 put-call parity, 185–187, 195
 examination, 186–187
 risk, measurement, 234–247
 risk measures, summary, 244
 valuation, 397–398
 equations, summary, 244
 problems, 262
- European-style put, 177
 BSM formula, 264–265
 lower price bound, 182, 184, 193
 value, finding. *See* Stocks
- European-style put option
 current/intermediate values, 310
 lower price bound, examination, 183
 simulation runs, 328
 valuation, 232–234
 simulation run, 327
- European-style put option, theta, 242
- European-style put-call parity
 arbitrage portfolio trades, 185
 support, 195
 development, 424
 usage. *See* Perfect substitutes
- European-style USD/GBP values, computation. *See*
 Futures; Spot currency
- European-style valuation equation, 455
- Excel
 regression routine, usage. *See* Simple linear regression
 SOLVER, 74, 99, 712
 solution, imprecision, 361
 usage, 716
 usage, 98
- Excess kurtosis, 786
 estimation, 789–792
- Exchange call options, valuation, 280–281
- Exchange options, 278–281, 876
 formula, usage. *See* Two-asset case
 valuation, 445
- Exchange rates, 876
 values, 591
- Exchange rules, 387
- Exchange-traded call, 287
- Exchange-traded derivatives
 contracts, standardization, 20–21
 examples, 27–33
 markets, attributes, 19–33
 transparency, importance, 24–26
- Exchange-traded funds (ETFs), 470, 482–484
 creations/redemptions, 483
 option classes, 475
 trading. *See* New York Mercantile Exchange
 activity. *See* American Stock Exchange
 unit trust style, AMEX adoption, 483
- Exchange-traded interest rate derivatives, 604
- Exchange-traded markets, 33
- Exchange-traded stock options, 452
- Ex-coupon bond price, 724
- Ex-dividend date, 394, 397, 876
- Ex-dividend instant, 406
- Ex-dividend price, 406
- Exercise, 876
- Exercise price, 7, 296, 297, 403, 876. *See also* In-
 the-money exercise prices; Options; Out-
 of-the-money exercise prices
 characteristic, 354
 condition, 225
 continuum, 553
 differences, 275
 elimination, 559
 number, computation, 521
 partial derivative, relation, 257
 present value, 290
 relationship. *See* Gap options; Implied volatilities
- Exotic nonstandard option, 261
- Exotic option, 876
- Expectation operators, properties, 786
 list, 786
- Expectations theory, 876. *See also* Unbiased expect-
 ations theory
- Expected asset price, 374
 computation, 212
 illustration, 376–377
 conditional, 219
 prediction, futures (usage), 146–147
- Expected future standard deviations/correlation, 152
- Expected future value (EFV), 310
 present value, 309–310, 324–325
- Expected future volatility, 529
- Expected long-term volatility, predictors, 452
- Expected loss, present value, 424–425, 691
- Expected profit computation, straddle (impact),
 378–379
- Expected recovery value, 876
- Expected return on market, 351
- Expected return rates, 697
- Expected return/beta relation. *See* European-style
 options
- Expected return/risk management applications, 543–
 544, 549
- Expected return/risk relation, 438
- Expected returns/risks, 143–148, 348–353. *See*
also Covered call trading strategies; Euro-
 pean-style barrier options; Protective put
 trading strategies

- Expected returns/risks (*Cont.*)
 individual options, 348–350
 relation, 144–145. *See also* Net cost of carry
- Expected return/volatility relation. *See* Covered call strategies; European-style options
- Expected stock return, 350, 351, 353
 percentage, 354
- Expected terminal call conditional, 416
- Expected terminal price, computation, 377
- Expected terminal profit/return, 373–379
- Expected utility of terminal wealth. *See* Terminal wealth
- Expected value, 876
- Expiration, 876
 cycle, 610
- Expiration date, 876
 characteristic, 354
 usage, 553
- Expiration to exercise, 319
- Expiration-day effects, analysis, 500
- Explained sum of squares, 834
- Ex-split date, 876
- Extendible bond, 876
- F* distribution, 814–816
 critical values, 866, 867
 degrees of freedom, 815
- F* value, ten degrees of freedom, 866
- Face value, 876. *See also* Bonds
- Fair bet, 90, 877
- Fair value, 497–498, 668, 877. *See also* Basis
- FASB Statement No. 133, 746
- FDIST, 816
- Feasibility, 877
- Federal funds rate (setting), Federal Reserve (impact), 667
- Federal Reserve, impact. *See* Interest rate ceilings
- Federal Reserve Bank of New York, 640
- Ferruzzi, soybean holdings (increase), 44–45
- Ferruzzi Finanziaria S.p.A., 43–46
- Fill-or-kill (FOK) order, 877
- Financial asset, 877
- Financial futures, 877
- FINV, 816
- First-mover advantage, 470–471
- First-order approximation, 57
- Fixed exchange rate computation. *See* Forward exchange rate curve
- Fixed income securities, 55
- Fixed payment credit option, valuation, 693–694
- Fixed-against-floating swap, 39, 877
- Fixed-for-floating commodity swap, 736–737
- Fixed-for-floating interest rate swaps, 37–38
- Fixed-for-floating rate swaps, 652, 877
- Fixed-for-floating swaps, 39, 871, 886
 rates, 649
- Flat volatilities, 672
- FLEX options, CBOE introduction, 520
- Floating exercise price
 existence, 292
 inclusion. *See* Lookback call options
- Floating rate bond
 valuation, zero-coupon yield curve (inclusion), 655–657
 value, 655
- Floating rate day-count fraction, 39
- Floating rate option, 39
- Floating rate payments, transfer risk, 653
- Floating-rate day-count fraction, 651
- Floorlet, 877
- Floors, 877. *See also* Interest rate floors
 brokers, 877
 prices, 714
 traders, 877
 trading, 479
- FOK. *See* Fill-or-kill
- Foreign currency (FX)
 cross rates, 575
 derivatives, 877
 forwards, valuation, 571
 futures, valuation, 571
 operation, 576
 put option, delta (numerical approximation), 341
 spot currencies, options, 568–570
- Foreign currency (FX) futures
 options, 568–570
 contracts, relative trading volumes. *See* Chicago Mercantile Exchange
 usage. *See* Balance sheet risk; Transactions
- Foreign currency (FX) futures contracts
 relative trading volumes, 568
 trading, 567–568
- Foreign currency (FX) options, 228, 583
 no-arbitrage price relations, 572
 usage. *See* Balance sheet risk; Transactions
 valuation equations, 572
- Foreign exchange policies/regulations, 683
- Foreign financing (obtaining), currency swaps (usage), 588–591
- Forward exchange rates, 877
 American-style USD/GBP options, values/early exercise premiums (computation), 587
 curve, swaps (fixed exchange rate computation), 579–581
 term structure, 566, 889
- Forward forward volatilities, 671
- Forward index level, computation, 555, 558
- Forward loan, interest rate (lock-in), 82–83
- Forward net carry rates, implying, 135
- Forward price movements, 249–250
- Forward rates
 computation, zero-coupon yield curve (usage), 81–82
 implied risk-free rate, computation, 571

- Forward rates of interest. *See* Interest
- Forward strip, addition. *See* CAD bonds
- Forwards, 3, 4, 121
- commitment, 877
 - continuous rates, 125–127
 - contract, 877
 - strip, 579
 - usage. *See* Short-hedging
 - contrast. *See* Options
 - curves, 578, 877
 - basis, fixed rate computation. *See* Swaps
 - discount, 566
 - discount factors, 80, 877
 - computation, zero-coupon yield curve (usage), 81–82
 - discrete flows, 128–129
 - markets, 877
 - options, 877
 - premium, 566, 574, 877
 - prices, 877
 - futures prices, equivalence, 133
 - references/readings, 141
 - start option, 878
 - start swap, 878
 - swaps, 674, 877
 - transaction, 4, 877
 - usage, 4–7. *See also* Hedging; Long-hedging
 - valuation, 125–130, 395–396. *See also* Foreign currency
 - volatility, 878
 - curve, 672, 878
- Forward-start call, 274–275
- options, valuation, 273
- Forward-start options, 271–273
- lives, comparison, 272
 - valuation equations, 272
- Four-year coupon-bearing bond valuation, no-arbitrage pricing model (usage), 723
- Four-year coupon-bearing puttable bond valuation, no-arbitrage pricing model (usage), 725–726
- Fractional distillation, 739, 878
- Frequency distribution, 780–781
- Frictionless BSM, 505
- Frictionless markets, 52–54, 878
- Front-running, 878
- FT-SE 100, 487
- index, 469
- Full carry, 878
- Full price, 76
- Fundamental analysis, 878
- Future cash flow dates, 638
- Futures, 121
- account, margin balances (computation), 23–24
 - basis risk, 473
 - commission merchant, 878
 - delta, 356
 - European-style call options (price equivalence demonstration), arbitrage portfolio trades (usage), 199
 - European-style USD/GBP values, computation, 583–586
 - expiration
 - cheapest-to-deliver, 620, 622
 - cheapest-to-deliver bond, identification, 620–621
 - fair value, 497
 - GBP/USD options values, computation, 583–586
 - hedge ratio, tailing mechanics, 750
 - log-normally distributed prices, 619
 - market, CFTC monitoring, 20
 - position. *See* Telescoping futures position
 - cash flows. *See* Long futures positions
 - terminal values, comparison. *See* Long forward positions
 - premium, 884
 - prices, 878
 - profit function, 364
 - references/readings, 141, 515–516, 635
 - risk management strategies, 143
 - series, Greeks computation, 356
 - term to maturity, shortness, 598
 - usage. *See* Expected asset price; Hedging
 - valuation, 130–135, 395–396. *See also* Foreign currency
 - vega, 356
- Futures contracts, 6, 15, 878
- American-style options, no-arbitrage price relations, 198
 - European-style calls/puts, value computation, 245
 - European-style options, no-arbitrage price relations, 198
 - identification, 152
 - market value. *See* Active index futures contracts
 - physical delivery, 546
 - size/maturity, 591
 - strip, 579
 - trading, 732. *See also* FX futures contracts
 - usage, 6, 591
- Futures Industry Association Monthly Report*, 471, 475
- Futures options, 197, 228–229, 878. *See also* Eurodollar futures options; Futures-style futures options; Index futures options contracts. *See* Standard & Poor's 500 index trading, 478
- prices, no-arbitrage relations. *See* Assets quadratic approximation, application, 337
 - trading. *See* Crack spread
 - volume, proportion, 734
- Futures-style futures options, 229
- Futures-style settlement, 878
- FX. *See* Foreign currency

- Gamma, 245, 257, 878
 decrease, 357
 usage, 237–238
- Gamma-neutral, 878
- Gap call option
 terminal payoff, 269
 valuation, 267–269
- Gap options, 267–269, 878
 construction, all-or-nothing options (usage), 267
 values, exercise price (relationship), 270
- Garman-Kohlhagen model, 878
- Gasoline
 consumption, 741
 correlation, 748
 daily prices. *See* Unleaded gasoline
- Gaussian quadrature method, 301
- Gauss-Markov process, 335
- GBP/USD options values, computation. *See* Futures;
 Spot currency
- Gekko, Gordon, 52
- Generalized differences, denotation, 857
- Generic interest rate swaps, 652
- Geometric asset price, 294
- Geometric Brownian motion, 207–209, 706
 usage, 326–333
- Geometric progression, sum, 86–87
- Global credit derivatives
 exposures, 684
 bond rating, 685
 outstanding, notional amount, 681
- GLOBEX, 478, 878
- GNMA. *See* Government National Mortgage Association
- GOFO. *See* Gold forward
- Going long, 5, 878
- Going short, 5, 878
- Gold
 bullion
 level. *See* Standard & Poor's 500 index
 price, 762. *See* Standard & Poor's 500 index
 commodity derivatives, 758–768
 consumption, 761–762
 demand, 761
 derivatives markets, 762–764
 collar agreement, cap exercise price (determination), 766–768
 trading, number, 764
 loan, mechanics, 765
 net cost of carry relation, 764–766
 production, 760–761
 risk management strategies, 766–768
 safe haven, 762
 three-month lease rates, 765
 usage, 760
 world consumption, 763
 world production, 761
- Gold forward (GOFO)
 rate, 765–766, 878
 three-month rate, 765
- Goldfeld-Quandt test, 854
- Goodness of fit, 833–835, 847–849
- Good-till-cancelled (GTC) order, 878
- Gosset, William Sealey, 806
- Government debt, financing, 610
- Government National Mortgage Association
 (GNMA)
 Collateralized Depository Receipts (CDRs), 604
 futures, 17
 pass-through certificates, 603
- GPM. *See* Gross processing margin
- Grade, 878
- Grade basis risk, 149
- Great Britain pound (GBP), 40
- Greeks, 264, 304, 878
 computation, 356
 derivation, 234, 255–260
 relation, 255–256
 reporting, 245
- Gross price, 76
- Gross processing margin (GPM), 158, 754, 878
 change, 757
- GTC. *See* Good-till-cancelled
- Guarantee, 679, 878
- Guns, 878
- Haircut, 625, 879. *See also* Variable prepaid forward
- Heating oil
 daily prices, 749
 futures prices, differences, 751
 weekly returns, 748
- Hedgable risk, 154
- Hedge, 879. *See also* Long-term short hedge;
 Short-term long hedge
 computation. *See* Risk-minimizing hedge
 funds, 624
 horizon, 171
 position, 22–23
 setting. *See* Risk-minimizing hedge
 tailing, 134, 154, 889
- Hedge portfolio, 355, 511
 binomial model, usage. *See* Risk-free hedge
 portfolio
- Hedged portfolio, 355
 delta, 356
 risk exposures, 358
- Hedger, 879
- Hedging, 5, 71, 879. *See also* Margins; Portfolio
 value; Price risk; Revenue risk; Risk;
 Uncertain hedging; Value
 effectiveness, 73
 forwards, usage, 129. *See also* Long-hedging

- Hedging (*Cont.*)
 futures
 contracts, usage. *See* Assets
 usage, 134
 options, usage. *See* Long-hedging; Short-hedging
 risk factors, usage, 164–166
 selling, impact, 10
 Heteroscedasticity, 854–856
 correction, 855
 Historical prices, collection, 152
 Historical volatility, 879
 HKFE. *See* Hong Kong Futures Exchange
 Holding period, 533, 879
 Homoscedasticity, 822
 Hong Kong Futures Exchange (HKFE), 17, 469
 Hooke, John, 576
 Horizontal option spread, 879
 Horizontal spread, 879
 Hybrid, 879
 Hypothesis
 difference, test. *See* Means; Paired sample
 mean, test, 809–810
 test. *See* Intercept; Multiple linear regression;
 Regression; Slope
- IBM
 arbitrage, 52
 market, movement (correlation), 795
 monthly stock returns, 789–792
 performance, 109
 returns, 792
 shares, closing, 54
 stock, 108
 market index returns, 792–793
 Idealized BSM, 505
 i.i.d. *See* Independent and identically distributed
 IMM. *See* International Monetary Market
 Immediate-or-cancel (IOC) order, 879
 Immunization, 879
 Implicit volatility, 879
 Implied financing cost, 879
 Implied forward discount factor, 80–81, 879
 Implied forward interest rates, computation. *See*
 Britain
 Implied forward rate, 879
 Implied repo rate, 879
 Implied standard deviation (ISD), 879
 computation, 712
 Implied variance, computation, 559–560
 Implied volatilities, 403–406, 879. *See also* At-the-
 money option; Merger events; Short-term
 options
 basis, 405
 derivatives contracts, 544–548
 exercise price, relationship, 503
 increase, 405
 smile/sneer, 504
- Implied volatilities, computation
 at-the-money S&P500 index option prices,
 usage, 502
 call option prices, inclusion, 397–398
 Eurodollar futures option price, usage, 630–631
 process, 536
 T-bond futures option prices, usage, 627–628
 Implied volatility function (IVF), 504–506
 Implied yield to maturity, 588
 In cash settlement, 6
 Income gain, 53
 Income rate, 303
 change, 239–240
 Increased-value VIX, 545
 Increment convenience yield, 736
 Independent and identically distributed (i.i.d.), 156
 Index amortized swap, 879
 Index arbitrage, 494–497, 879
 Index futures
 options, 478–480
 usage. *See* Dynamic insurance; Stock portfolios
 Index options, 480–482, 879
 buy-write strategies, 530–537
 Index participants, 879
 Index portfolio (return distribution), Monte Carlo
 simulation (usage), 532, 533
 Index puts
 options, 519
 purchase. *See* Static portfolio insurance
 Indexed ESO, valuation, 459–460
 Indexed exercise prices, inclusion. *See* Employee
 stock options
 Index-linked notes, 512
 Indices. *See* Price-weighted indexes; Value-weighted
 indexes
 portfolios (insuring), index put (usage), 520
 products. *See* Stock indexes
 returns, correlation. *See* U.S. stock market
 indexes; U.S. stock markets
 Initial margin, 22, 879
 Initial public offerings (IPOs), 9
 Initial values, computation, 522–523. *See also* Port-
 folios
 Institutional customer, 879
 Insurance premium, maximum (identification), 92
 Interbank, 879
 Interbank loans, market-determined rates, 667
 Intercept, hypothesis test, 829–831. *See also* Regres-
 sion line
 Intercommodity spreads, 23
 Interest
 accumulation factor, computation, 555
 forward rates, 80, 877
 implied forward rates, 80–81, 656
 payments, swap valuation, 659–660
 spot rate, 79

- Interest, risk-free rate, 147, 235, 278, 296
 assumption, 531
 excess, 114
 level, 356, 502
 purchase, financing, 622
- Interest rate caps, 669–673, 879
 valuation, 670–672
 flat volatility rate curve, usage, 672–673
 zero-coupon yield curve, usage, 672–673
- Interest rate ceilings, removal (Federal Reserve impact), 625
- Interest rate collars, 669–673, 879
 valuation, 670–672
- Interest rate derivatives, 880
 evolution, 604–606
 total notional amount, percentage. *See* Single-currency interest rate derivatives
 valuation, no-arbitrage pricing models (usage), 714
- Interest rate floors, 669–673, 880
 valuation, 670–672
- Interest rate parity (IRP), 573–574, 880
- Interest rate products, 603, 637
 markets, 604–616
 numerical valuation, 705
 references/readings, 727
 references/readings, 635, 676–677
 risk management
 applications, 631–634
 lesson, 666–669
- Interest rate swaps, 18, 605, 648–665
 cash flows, hypothesis, 652
 confirmation. *See* Over-the-counter interest rate swaps
 valuation, 654–655
- Interest rates. *See* Continuously compounded interest rates
 bet, 668
 change, 238–239
 decreases, 660
 equivalence. *See* Coupon
 futures, 606–615, 880
 level, 351
 lock-in. *See* Forward loan
 logarithm change, volatility rate (impact), 720
 mechanics, 51, 54–55
 references/readings, 85–86
 no-arbitrage models, 713–720
 options, 615–616, 880
 risk hedge, duration (usage). *See* Bond portfolio swap. *See* Plain-vanilla interest rate swap
 term structure, 64, 79–83, 889
 unlimited borrowing/lending. *See* Risk-free interest rate
- Intermarket spread, 880
- Intermediate coupon payments, 617
- Internal rate of return (IRR), 699, 880
- International Monetary Market (IMM), 16–17
- International Petroleum Exchange (IPE), 16
- International Securities Exchange (ISE), 384
- International Swap and Derivatives Association (ISDA), 648–649, 651
 2000 ISDA Definitions and Annex to the 2000 ISDA Definitions, 35, 648
 Annex to the 2000 ISDA Definitions, 39
 contract term standardization role, 680
 ISDA Master Agreement, 35, 648
 Word document file, usage, 688
- In-the-money, 880
- In-the-money at expiration, 233, 416
- In-the-money exercise prices, 403
- In-the-money option, 288
- Intracommodity spread, 23, 880
- Intraday basis mispricing. *See* Standard & Poor's 500 futures
- Intraday prices. *See* Standard & Poor's 500 futures; Standard & Poor's 500 index
- Intraday S&P500 index levels, 502
- Intrinsic value, 179, 880
- Inverse floater, 701
 appearance, 650
 duration, 664–665
 calculation, 665
 valuation, 660–661
 fixed/floating rate bonds, difference, 663–664
 valuation, zero-coupon yield curve (inclusion), 661–662
- Inverse floating rate swap structures, 660
- Investment alternative, VIX futures (usage), 549–550
- Invoice price, 613–615, 880
- IOC. *See* Immediate-or-cancel
- IPE. *See* International Petroleum Exchange
- IPOs. *See* Initial public offerings
- IRP. *See* Interest rate parity
- IRR. *See* Internal rate of return
- ISD. *See* Implied standard deviation
- ISDA. *See* International Swap and Derivatives Association
- Ito's lemma, applications, 248–250
- IVF. *See* Implied volatility function
- Japanese yen (JPY), 577
- Jarque-Bera statistic, 535
- Jarque-Bera test. *See* Stock markets
- Jarrow-Rudd (JR) parameters, 306
 usage. *See* American-style put option
- Jarrow-Rudd (JR) possibilities, 313
- Jensen's alpha, 113
- Jet fuel, weekly returns, 748
- Jetmaker, 591–592
 agreement, 595
- Johnson-Shad Accord (1984), 383
- Johnson-Shad Agreement, 880
- Junior bonds, 437

- Kansas City Board of Trade (KCBT), 17, 470
 Kappa, 880
 KCBT. *See* Kansas City Board of Trade
 Koval, Andy, 576
 hedging, absence, 577
 supervision, absence, 577
 trading limits, disregard, 577
 Kurtosis, 785–786. *See also* Negative kurtosis;
 Positive kurtosis
 estimation. *See* Excess kurtosis
 estimator, 789
- Lambda, 880
 Large market capitalization firms, 549
 Last trade price, 880
 Lattice, 880
 Lattice-based procedures, 326–327
 Law of one price, 52, 880
 LEAPS. *See* Long-term equity anticipation securities
 Leaps
 lower price bound, computation, 396–397
 price/volume/open interest information. *See* Dell
 leaps
 Lease rate, 764, 880
 Least squares estimator, 824
 Least-cost risk-minimizing hedge portfolio, identification, 360–361
 Leeson, Nicholas William, 506–509
 Legging into, 880. *See* Transactions
 Leland, Hayne, 518
 Leland-O'Brien-Rubinstein (LOR), 518, 523
 Lemma. *See* Ito's lemma
 Lending portfolio, 102–103, 106, 880
 Leverage, 880
 implicit degree, 349
 Leveraged asset position
 future value, 126
 terminal values, 125
 Leveraged swap, 880
 LIBOR. *See* London Interbank Offered Rate
 LIFFE. *See* London International Financial Futures
 and Options Exchange
 Limit down, 880
 Limit move, 880
 Limit order, 880
 Limit up, 880
 Linear interpolation, 79, 881
 Linear regression. *See* Simple linear regression
 Liquid market, 881
 Liquidity, 881
 preference theory, 881
 LME. *See* London Metal Exchange
 Local, 881
 Locked-in value, 408
 Log-normal asset price distribution, 209–212
 Log-normal bond prices, option valuation equations, 627–628
 Log-normal distribution, 719–720, 881
 usage, 795
 Log-normal interest rates, option valuation equations, 629–630
 Log-normal price distribution, 207–224, 509
 Log-normal terminal price, 215
 Log-normally distributed asset prices, 233
 London Bullion Market Association, 766
 London Corn Trade Association, 16, 731
 London Interbank Offered Rate (LIBOR), 881
 basis. *See* One-month LIBOR; Six-month LIBOR
 rate, usage. *See* Short-term LIBOR rate
 receipt, 40
 six-month rate, 649, 652–654, 665, 685–686
 increase, 667
 receipt, 673
 three-month rate, 670, 765
 London International Financial Futures and Options
 Exchange (LIFFE), 17, 229, 469
 London Metal Exchange (LME), 16
 London Traded Option Market (LTOM), 17
 Long asset position
 profit function, 362–363
 terminal profit diagram, 363, 364
 Long call position
 profit function, 364
 terminal profit diagram, 366
 Long forward positions
 long futures positions, terminal values (comparison), 131
 long telescoping futures positions, terminal values (comparison), 132–133
 Long futures position, terminal profit diagram, 364
 Long futures positions, cash flows, 130
 Long hedge, 881
 Long position, 881
 Long put position
 profit function, 367–368
 terminal profit diagrams, 367
 Longer-term contracts, 476
 Long-hedging
 forwards, usage, 593–594
 options, usage, 594–595
 Long-run average short rate, 710, 712
 Long-term American-style call, 192
 Long-Term Capital Management (LTCM)
 collapse, 538
 index option strategy, 543
 trading strategies, 538
 Long-term equilibrium price, 335
 Long-term equity anticipation securities (LEAPS),
 31, 387, 881
 Long-term ESO (early exercise), optimality (evaluation), 454
 Long-term fixed-rate bonds, purchase (financing),
 668
 Long-term fixed-supply contracts, hedging, 748

- Long-term interest rate risk
 - exposure, 160
 - usage. *See* Short hedge
- Long-term short hedge, 632–633
- Long-term U.S. Treasury bonds, deliverable supply, 610
- Lookback call, valuation, 293
- Lookback call options, 881
 - floating exercise price, inclusion (terminal payoff), 292
- Lookback options, 291–294
 - variations, existence, 292
- Lookback put option, 291, 881
- LOR. *See* Leland-O'Brien-Rubinstein
- Louisiana Purchase, 506
- Lower bound, 881
- Lower price bound. *See* American-style call; American-style put; European-style call; European-style put
- Lower semicorrelation, 785, 788
- Lower semicovariance, 788
- Lower semivariance, 784
 - estimator, 788
- LTCM. *See* Long-Term Capital Management
- LTOM. *See* London Traded Option Market
- Lucent Technologies (LU)
 - daily stock price behavior, 402
 - daily trading volume, 404
 - stock options, average BSM implied volatilities, 404
- Macrohedge, 881
- Maintenance margin, 22, 881
- Major Market Index (MMI), 474
- Managed portfolio, turnover, 482
- Margin calls, 626, 881
- Margining system, 16, 19, 881
- Margins, 881
 - balances, computation. *See* Futures imposition, 22–23
 - risk, hedging, 158–160
 - calculation, 159–160
- Margrabe model, 623
- Marked-to-market, 130
 - absence, 749
 - daily basis, 538
 - gain, 131
- Market
 - disruption event, 542
 - efficiency, 881
 - frictions, 881
 - integrity, 15, 881
 - interest rates, Fed funds rate (impact), 667
 - makers, 356, 881
 - earnings, 505
 - order, 881
 - performance, measure, 486
 - portfolio, 105, 881
 - portfolio, composition, 106
 - calculations, 108
 - price. *See* Risk
 - return
 - stock return prediction, development, 833
 - risk
 - alteration, index futures (usage). *See* Stock portfolios
 - premium, 206
 - segmentation theory, 881
 - timing, 881
 - transparency, 19, 36, 881. *See also* Over-the-counter derivatives markets
 - value stocks, ranking. *See* Standard & Poor's 500 index
 - volatility rate, movements, 549
- Market capitalization. *See* Standard & Poor's 500 index
 - firms. *See* Large market capitalization firms
 - stocks, empirical return distributions, 536
- Market maker, inventory, 536
- Market Volatility Index (VIX), 544
 - calculation procedure, 553
 - computation, S&P500 index option prices (usage), 556–558, 561–562
 - construction, 553–562
 - daily levels, 545
 - index, 546
 - option contract, 551
 - spot price, convergence, 547
- Market Volatility Index (VIX) futures
 - contracts, 546
 - open interest, 547
 - price
 - convergence, 547
 - estimation, 548
 - trading, CBOE launch, 538
 - usage. *See* Investment alternative
- Market-if-touched (MIT) order, 882
- Market-indexed security, 882
- Market-on-close (MOC) order, 500, 882
- Marking-to-market process, 6
- Markowitz, Harry, 97
- Mark-to-market, 626, 882
 - gains/losses, 133, 134
- Maturity dates, 697, 882
- Maximum. *See* Call on maximum; Put on maximum
 - call options, valuation, 285–286
 - options, 281–287
- Maximum dollar loss (computation), time period/confidence level (usage), 218–219
- Maximum possible loss computation (95% confidence), 796–801
- Maximum share price, 410

- Mean, 782. *See also* Normal distribution; Sample estimation, 789–792
estimator, 787
test. *See* Hypothesis; Zero mean
- Mean continuously compounded return, relation. *See* Continuously compounded mean return
- Mean reversion, 335–337, 707
price, 336
asset price path, simulation, 336
- Mean-reverting process, estimation, 709
- Mean-reverting process/model movements, 335
- Means
difference (test), dummy variable (usage), 842–844
equivalence, test, 810–811. *See also* Paired sample hypothesis difference, test, 811–812
- Mean-stddev, 116
- Mean-variance portfolio performance measures, 533
- Merger events, implied volatilities, 401–406
- Merton model, 228, 430
- Mesokurtic distribution, 786
- Metals
commodity derivatives, 758–768
consumption, 761–762
derivatives markets, 762–764
futures/futures options, trading volume, 759
net cost of carry relation, 764–766
production, 760–761
risk management strategies, 766–768
- Mexican coupon stream, risk premium (isolation), 700
- Mexican par spread. *See* Stripped Mexican par spread
- Mexico, credit risk (long exposure), 701
- MEXSPD, 701
- MG Refining and Marketing (MGR&M), risk management lessons, 748–751
- Microhedge, 882
- Microsoft Corporation (MSFT), 397
- Mid American Exchange (MidAm)
CBOT affiliate, 753
financial contracts, CBT conversion, 753
- Midmarket rate, 651
- Minimum. *See* Call on minimum; Put on minimum
call options, valuation, 285–286
options, 281–287
- Minimum selling price, 92, 882
- Minimum share price, 410
- Minimum variance hedge, 882
- MIT. *See* Market-if-touched
- MM. *See* Thirty-day money market index
- MMI. *See* Major Market Index
- MOC. *See* Market-on-close
- Modified conversion factors, 621
- Money market, 882
deposits, monthly returns (summary statistics), 534
hedge, 592
short-hedging, 592
- Money spread, 882
- Monte Carlo simulation, 303, 326–337, 882
approximation method, 597
procedure, 531
usage, 327, 374. *See also* At-the-money option; Currency price; Dynamic hedging effects; Index portfolio
- Monte Carlo valuation procedure, 337
- Monthly input rates, maturities, 642, 644
- Montreal Exchange, 17
- Multicollinearity, 852
- Multiple flows, 596–597
- Multiple linear regression, 841–858
estimation, 842
explanatory variables
inclusion, 852
omission, 849–850
individual parameters, hypothesis tests, 842–845
model, 841
assumptions, 842
selection, 847–849
prediction, 847
specification errors, 849–852
- Multiple listing, 882
- Multiple regression, 822
model usage, 164
- Multivariate regression, usage, 647
- Mutual fund industry, 482
- Naked call, 882
- Naked option position, 882
- Naked position, 882
- NASDAQ
100 index, 474, 481
stocks, calendar days (median number), 394
trades, assurance, 500
- n -asset exchange option, development, 278
- National currencies, conversion rates. *See* Euro
- Natural hedge, 882
- NAV. *See* Net asset value
- Nearby contract, 882
- Nearby options, 403
- Negative kurtosis, 789
- Negative value, implication. *See* Contango
- Net asset value (NAV), 483
- Net cost of carry, 121, 733, 882
expected return-risk relation, 145–146
relation, 127, 622–623, 733–737, 882. *See also* Chicago Board of Trade; Gold; Metals; Perfect substitutes
rewriting, 626
- Net present value (NPV), 882
- Netting, 882
- New York Coffee Exchange, 16
- New York Cotton Exchange, 16, 731
- New York Futures Exchange (NYFE), 17, 473

- New York Mercantile Exchange (NYMEX), 16, 731
 COMEX division, 760
 energy futures/futures options, trading volume, 737
 ETF trading, 737
 futures, listing, 152
 petroleum complex, trading activity, 744–745
 trades. *See* Petroleum
 unleaded gasoline, trading, 741
- New York Mercantile Exchange (NYMEX), trading, 320
- New York Stock Exchange (NYSE), 473
 markets, 384
 stocks, calendar days (median number), 394
- Nikkei 225. *See* Barings Bank PLC
 futures contracts, trading, 507
 option straddles, 508
- Nixon, Richard, 763
- No-arbitrage futures options relations, 197–198
- No-arbitrage inter-market relations, 198–199
- No-arbitrage models. *See* Interest rates
- No-arbitrage price relations, 121, 175, 578, 619.
See also American-style options; European-style options; Stock indexes
 development. *See* Swaps
 impact, 774
 options, 396
 references/readings, 141, 200
- No-arbitrage pricing framework, 718
- No-arbitrage pricing models, 882
 application, 712
 assumption. *See* Coupon-bearing callable bond valuation
 one-period binomial lattice, 715
 short rate distribution assumption, 716
 three-period binomial lattice, 717
 short rate, log-normal distribution (assumption), 721
 two-period binomial lattice, 716
 short rate, log-normal distribution (assumption), 720
 usage. *See* Four-year coupon-bearing bond valuation; Four-year coupon-bearing puttable bond valuation; Four-year zero-coupon bond; Interest rate derivatives
- No-arbitrage relations, 494–506, 565, 616–631
- No-arbitrage valuation, 494–506, 616–631
- Node values, 314
- Nominal rate, 54
- Nondividend-paying stock options, 227–228
- Nondividend-paying stocks, listed options (number), 395
- Nonlinear programming problem, 97, 882
- Nonlinearities, 852. *See also* Disturbance assumption
- Nonnormality, 858
- Nonquarterly expiration cycles, 479
- Nonrecombining lattice, 708
- Nonsimultaneous price observations, 168
- Nonstandard options, 232, 882. *See also* Exotic nonstandard option
 analytical valuation, 261
 references/readings, 299–300
- Normal distribution, 714–719, 795–801, 882
 function. *See* Standard normal distribution function
 mean, 792
 standard deviation, 792
- Normal probability plot, 858
- Normality, test. *See* Chi-square distribution; Stock markets
- NORMSDIST, 326, 797, 800–801
- NORMSINV, 326, 798, 800–801
- Northrop Gruman Corporation, 688
- Notional principal, 882
- NPV. *See* Net present value
- NQLX markets, 383, 384
- Null hypothesis, 830
 DW test, 856
- Numerical delta, 342
- NYFE. *See* New York Futures Exchange
- NYMEX. *See* New York Mercantile Exchange
- NYSE. *See* New York Stock Exchange
- Obligation, 7
- Obligation to pay fixed, 39, 882
- OBO. *See* Order book official
- O'Brien, John, 518
- Observed call price, setting, 536
- OCC. *See* Options Clearing Corporation
- OCIP. *See* Orange County Investment Pool
- OCO. *See* One-cancels-the-other
- Octel Communications, Inc. (OCTL)
 daily stock price behavior, 402
 daily trading volume, 404
 implied volatility, 405
 stock options, average BSM implied volatilities, 404
 volatility, decrease, 404
- October 1987 market crash, 543
- OEX. *See* Standard & Poor's 100 index
- Offsetting order, 883
- Off-the-run issues, 639
- OLS. *See* Ordinary least squares
- Omega, 883
- Omitting relevant explanatory variables, 165
- One price. *See* Law of one price
- One-cancels-the-other (OCO) order, 883
- OneChicago Exchange (ONE), single stock futures
 contract (trading), 386
- OneChicago markets, 383
- One-month LIBOR, basis, 649
- One-month options, 530
- One-month reset rates, 649

- One-period binomial lattice. *See* No-arbitrage pricing models
- One-period binomial model, 202
- One-tailed tests, *t*-distribution (ten degrees of freedom), 807
- One-to-one stacked hedge, 750
- One-week options, CBOE trading, 481
- On-the-run issues, 639
- On-the-run securities, 77
- OPEC, influence, 739
- Open interest, 25, 883
usage, 6–7
- Open outcry, 883
- Optimal early exercise, checking, 311–312
- Optimal hedge, 150, 883
- Option at expiration, valuation, 308–309, 313, 324
- Option holder, optimal reload exercise behavior, 461
- Option seller's/writer's loss, 8
- Option valuations, 324–325
equations. *See* Log-normal bond prices; Log-normal interest rates
equations/methods, 397–401
two-period trinomial asset price lattice, usage, 323
- Optional cash settlement, 410
- Optional sharing rule, 410
- Options, 175, 347, 883. *See also* FX futures; FX options; FX spot currencies
alternatives, comparison, 596–597
analytical valuation. *See* Standard options
beta, 237
class, 27, 883
contracts, 883
trading, 732. *See also* Futures options
cost of carry rate, 289
exercise price, 175, 387
forwards, contrast, 175–178
hedging, 539
life, 307
nodes, valuation, 309–310
notation, 296
numerical valuation, 303
references/reading, 344–345
parameters, 270
portfolios, 350–353
analysis, 362
dynamic risk management, 353
premium, 883, 884
price
elasticity, 348
linear homogeneity, 283, 335
references/readings, 200, 380, 515–516, 635
risk measures, numerical evaluation, 343
series, 27, 354, 403, 883
Greeks, computation, 356
identification, 558–559
strike price, 175
type, 883
unexpected changes, management, 353–362
considerations, 360–362
framework, 353–360
usage, 7–8. *See also* Long-hedging; Short-hedging
writer, 883
zero-sum game, question/solution, 92–93
- Options Clearing Corporation (OCC), 384, 883
protection, 387
usage, 22
- Options on futures. *See* Futures options
- Options trading, 388
corporations, impact, 414
historical statistics, 384
tick size, minimum, 387
- OPTVAL
Excel Function Library, usage, 315
function, 109, 234
application, 335
Function Library, 81, 132, 213, 356, 441
usage, 252, 398, 793
Library, 343
- Orange County Investment Pool (OCIP)
risk management lesson, 666–669
supervision, absence, 669
- Order book official (OBO), 883
- Ordinary least squares (OLS), 883
estimation, 823–824
requirement, 824–825
- Ordinary least squares (OLS) regression, 79, 822
approaches, equivalence, 633–634
assumptions, 823
line, estimation, 826
origin, usage, 838–841
risk-minimizing hedge, relation, 154–156k
usage, 848
- Ornstein-Hulenbeck process, 335
- Osaka Stock Exchange (OSE), 507
- Out barriers, 295
- Out trade, 883
- Out-of-the-money, 883
- Out-of-the-money exercise prices, 403
- Out-of-the-money puts, 505
- Outright position, 22, 883
- OV_APPROX_ASIAN_OPT_MC, 333, 597
- OV_APPROX_MAXMIN_OPT_MC, 335
- OV_APPROX_SPRD_FOPT_BIN, 745–746
- OV_APPROX_SPRD_OPT_BIN, 320–321
- OV_APPROX_STD_OPT_BIN, 315
- OV_CORP_BONDDELTA_FIRM, 434
- OV_CORP_BOND_FIRM, 446
- OV_CORP_CVBOND_FIRM, 446–447
- OV_CORP_CV_FIRM_STOCK, 448
- OV_CORP_FIRM_STOCK, 430–431, 433, 436–438
- OV_CORP_PROB_DEFAULT, 692
- OV_CORP_RECOVERY_VALUE, 426, 692
- OV_CORP_RFBOND_STOCK_SPLIT, 427

- OV_CORP_STOCKDELTA_FIRM, 434
 OV_CORP_STOCK_FIRM, 422–423, 691
 OV_CORP_WARRANTDELTA_STOCK, 442
 OV_CORP_WARRANT_STOCK, 441–443
 Overnight repo, 625, 883
 rate, 625
 Over-the-counter (OTC) dealer, 332
 Over-the-counter (OTC) derivatives, 11, 883
 disadvantage, 11–12
 notional amount, 19
 trading, reemergence, 18
 Over-the-counter (OTC) derivatives contracts
 American-style option features, 264
 examples, 37–41
 Over-the-counter (OTC) derivatives markets
 attributes, 33–41
 contract flexibility, 35–36
 credit risk, 37
 regulation, absence, 36
 transparency, 36–37
 Over-the-counter (OTC) gold (collar agreement),
 cap exercise price (determination), 766–768
 Over-the-counter (OTC) interest rate swap
 confirmation, 650
 specifications, 648
 Over-the-counter (OTC) market, 37, 287, 733, 764
 demand, 519–520
 disadvantage, 11–12
 offerings, 764
 Over-the-counter (OTC) option dealer, 353
 Over-the-counter (OTC) swaps, 579
 contracts, usage, 749
 Over-the-counter (OTC) trading, 16
 Overwrite, 883
 OV_FOPTION, 245
 OV_FOPTION_ISD, 503
 OV_FOPTION_VALUE, 232, 525, 767
 OV_FORWARD, 135, 573
 OV_IR_CONV_ED_YIELD, 608
 OV_IR_CONV_REPO_YIELD, 626
 OV_IR_CONV_TBOND_CONVFAC, 613
 OV_IR_FIXED, 65, 69
 OV_IR_FLOAT_INVERSE, 664
 OV_IR_TS_INTERPOLATE, 647, 742
 OV_IR_TS_ZERO_FROM_CMT, 642
 OV_IR_TS_ZERO_FROM_EDFUT, 646
 OV_IR_TS_ZERO_FROM_SWAP, 644
 OV_NS_BARRIER_OPTION, 298–299, 693
 OV_NS_COMPOUND_OPTION, 291
 OV_NS_EXCHANGE_OPTION, 460
 OV_NS_GAP_OPTION, 269
 OV_NS_LOOKBACK_OPTION, 293
 OV_NS_MAXMIN_OPTION, 284, 286
 OV_NS_PROTECTED_EQUITY_NOTE, 514
 OV_NS_RATCHET_OPTION, 275
 OV_OPTION, 231
 OV_OPTION_ASSET_EV, 221
 OV_OPTION_ASSET_PROB, 216, 218, 373
 OV_OPTION_ASSET_PROB_INV, 218
 OV_OPTION_ISD, 398, 502, 628
 OV_OPTION_VALUE, 231, 247, 315, 426, 585
 usage, 692
 OV_PERF, 116
 OV_PROB_PRBN, 282
 OV_PROB_PRUN, 213, 252, 301
 OV_PROB_PRUN_INV, 213
 OV_PROFIT_ASSET, 370
 OV_PROFIT_OPTION, 370
 OV_STAT, 794
 OV_STAT_AUTOCORREL, 170, 817
 OV_STAT_BOX_PIERCE, 818
 OV_STAT_OLS_SIMPLE, 109, 155
 OV_STAT_SEMICOR, 794
 OV_STAT_TCNST, 809
 OV_STOCK_OPTION_VALUE_BIN, 400, 453
 OV_SWAP_COMMODITY, 139, 140, 743
 OV_SWAP_COMMODITY_QUANTITY, 743
 OV_SWAP_CURRENCY, 580
 OV_TS_LATTICE_RMIN, 719
 OV_TS_VALUE_CAPLET, 673

 Pacific Coast Exchange (PCE), 383
 Pacific Exchange (PCE), 384
 Pacific Stock Exchange (PSE), 17
 Paired sample, means
 equivalence test, 812–813
 hypothesis difference, test, 813
 Par amount. *See* Bonds
 Par bonds, 640
 yield, 883
 curve, 883
 Par grade, 883
 Par swap rate, 884
 Par value, 884
 Parameter estimation, importance, 775
 Partial derivatives, 254
 relation. *See* Exercise price
 Partial expectation, 884
 Participation percentage, 884
 Participation rate, 512
 Passive hedge, 884
 Passive portfolio insurance, 518, 520–523, 884
 dynamic portfolio insurance, selection (con-
 siderations), 529–530
 Passively insured portfolio, payoff contingencies,
 523
 Path dependent option, 884
 Pay-later options, 269, 884
 Payoff, 884
 structure, 268
 Payoff contingencies, 285
 writing. *See* Two-security portfolio
 PCE. *See* Pacific Coast Exchange; Pacific Exchange
 pdf. *See* Discrete probability density function

- PENs. *See* Protected equity notes
- PERCENTILE, 800
- Perfect substitutes, 129, 884
implication
 CAPM, usage, 146
 European-style put-call parity, usage, 186
 net cost of carry relation, 130
- Petroleum, 737–748
derivatives
 markets, 739–741
 valuation, 741–746
futures contracts, NYMEX trades, 740
production/consumption, 737–739
risk management strategies, 746–748
spread contracts, 745
- Philadelphia Stock Exchange (PHLX), 17, 383, 384
 EUR option contract, 569
 FX options, 570
- Physical asset, 121, 884
- Physical commodity, holding (storage costs), 178
- Pit, 884
- Plain-vanilla currency swap, 578
- Plain-vanilla interest rate swap, 9, 37–40, 606, 884
agreement, 637
fixed rate discovery, zero-coupon yield curve (inclusion), 657–658
- Population, 782
sample, statistical contrast, 780
- Portfolio value
change, 354
hedging, 160–163
increase, 357
one year to expiration, 523, 525
- Portfolios, 884
allocation
 risky securities, usage, 94–97
 risky securities/risk-free security, usage, 102
composition, S&P tracking, 430
dividends, present value (subtraction), 520
gamma, 355
identification, risky securities (usage). *See* Efficient portfolios
initial values, computation, 522–523, 524–525
insurance, 884. *See also* Dynamic portfolio insurance; Passive portfolio insurance
market capitalization. *See* Standard & Poor's 500 index
performance measurement, 110–117
profit functions, 368–372
risk attributes, 357
theory, 93–104, 884
units, lock-in. *See* Stock indexes
weights, computation, 524, 526, 528
- Position, 884
limit, 26, 884
trader, 884
- Positive kurtosis, 789
- Power, definition, 814
- Power of a test. *See* Test power
- PPP. *See* Purchasing power parity
- Preannouncement levels, 403
- Preferred habitat theory, 884
- Premium, 497
- Premium/discount size, summary statistics (calculation), 483
- Pre-open stock market predictions, 498–499
- Prepaid forward contracts, prices, 279
- Prepaid forward price, 272
- Present value. *See* Expected future value; Expected loss
computation. *See* Corporate bonds
- Price appreciation, expected rate. *See* Assets
- Price limit, 884
- Price risk, 10, 884
hedging, 148–156
 revenue risk hedging, comparison, 157–158
minimization, 149–151
sources, 333
- Price uncertainty, sources, 329
- Price-weighted DJIA, 469
- Price-weighted index divisor, 489
- Price-weighted indexes, 487–489
- Primary market, 884
- Principal-protected notes, 512
- Private placements, 429
- Probabilities, 803
1% level, 867
5% level, 866
computation. *See* Asset prices
 threshold asset prices, usage, 212–219
density function. *See* Asset prices
distribution, 780–781, 795–818
expressions, 223–224
levels, 864, 865
symmetry, 376
- Processing margin. *See* Gross margin
- Procter & Gamble, 489
- Profit diagram, 884
- Profit functions, 362–372. *See also* Call options
- Program trading, 498, 884
- Proprietary trading, 506
- Protected equity notes (PENs), 884
creation, 512–513
valuation, 513–514
- Protection buyer, 679
- Protection seller, 679
- Protective put, 369, 885
- Protective put strategies, terminal profit diagram, 370
- Protective put trading strategies
 expected returns/risks, 351
 expected return/volatility relation, 354
- PSE. *See* Pacific Stock Exchange
- Pull rate, 710, 712

- Purchasing power parity (PPP), 582–583
 test, 847–849
- Pure discount bond, 885
- Put on call, 288–289
- Put on maximum, 286
- Put on minimum, 286–287
- Put on put, 289–290
- Put options, 287, 885
 delta, numerical approximation, 265. *See also*
 FX put option
 profit function, 367–368
 series, 559
 terminal values, 30
 value, computation, 426
 vega, 241
- Puttable bonds, 723–724
- Puttable swap, 885
- Put-call parity, 369, 885. *See also* American-style options; European-style options
 application, 424
 arbitrage portfolio, 185
 trades. *See* American-style put-call parity;
 European-style put-call parity
 price, 185
 relations, 188
 writing, 424
- Puts
 characteristic, 354
 number, computation, 521
 portfolio, expressions, 352
 prices, 405
- p*-value, 838
- QQQQs, 484
- Quadratic approximation, 337–341, 885
 application. *See* Futures options
 method, 303
 components, 339
 computations, 587
 usage, 343, 627
- Quadratic method, usage. *See* American-style options
- Quality option, 622, 754, 885
 valuation. *See* U.S. Treasury bonds
 comparison, 623
- Quantity risk, 885
- Quarterly Bankruptcy Index (QBI), CME launch, 679
- Quarterly expiration cycles, 479
- Quarterly interest payments, 660
- Quoted bid-ask spread, 9, 885
- Quoted price, 75
- RAES. *See* Retail automatic execution system
- Random variables, 780–786
 list, 786
 positive/negative covariance, 784
- Ratchet call options, valuation, 274–275
- Ratchet options, 273–275, 885
- Rate capped swap, 885
- Ratio spread, 885
- Ratio swap, 701, 885
- Ratio vertical spread, 885
- Real asset, 885
- Realized volatility
 computation, 246–247
 derivative contracts, 539–544
 implied volatility, option price comparison,
 246–247
 swap, settlement price (computation), 540–541
- Recombining lattice, 708
- Reference asset, 681
- Reference entity, 681
 appearance. *See* Credit derivatives
- Reference issuer, 681
- Reference obligation, 681
- Refining capacity, 738
 world production, 738
- Regression. *See* Simple linear regression; Weighted least squares regression
 errors, elimination. *See* Cross-sectional regression
 estimation, issues, 167–170
 hypothesis tests, 846
 parameters, hypothesis tests, 827–831
 program, application, 835–838
 specification, omitted variable (effect, examination), 850–851
 statistics, 838, 845
- Regression analysis, 821
 objectives, 821
 references/readings, 858–859
 usage, 709
- Regression line
 intercept
 confidence intervals, 831
 hypothesis tests, 829
 slope, 829
 confidence intervals, 831
 hypothesis tests, 828
- Regression sum of squares (SSR), 834, 835, 846
- Relative systematic risk, estimation. *See* Stocks
- Reload features, inclusion. *See* Employee stock options
- Replicating portfolio, 464, 885
- Reported price, 75
- Repurchase agreements (repos), 624–626. *See also*
 Reverse repo; Term repo
 securities, 625
 usage, 624
- Reset date, 39, 654, 885
- Residual sum of squares, 834
- Residual variances, 854
- Retail automatic execution system (RAES), 885
- Retail customer, 885
- Retractable bond, 885

- Return
- continuously compounded rate, 208
 - distribution
 - semistandard deviation, estimation, 793–795
 - semivariance, estimation, 793–795
 - relation stationarity (test), dummy variable slope-shifter (usage), 844–845
 - risk-free rate, 505
 - standard deviation, 549
- Return swap, total rate, 890
- Return/risk
- management
 - applications. *See* Expected return/risk management applications
 - strategies, 510–514
 - profiles, 695
 - relationship, 89
 - references/readings, 117–118
- Returns
- volatility, 443
- Revenue risk, hedging, 156–158
- comparison. *See* Price risk
- Reversal, 885
- Reverse conversion, 185, 885
- Reverse crush spread, 885
- Reverse repurchase agreements (reverse repos), 624, 885
- Reversing in/out, 886
- Rho (carry), 258, 886
- increase, 357
 - usage, 238–240
 - value, 238, 239
- Rho (interest), 886
- Rho-neutral (carry-neutral), 886
- Rho-neutral (interest-neutral), 886
- Rights, 7, 439, 886
- RIMM, 246
- Risk
- attribute, movement, 355
 - aversion, 886
 - avertor, 90
 - exposure, negation, 355
 - factors, usage. *See* Hedging
 - market price, 881
 - measurement, 533. *See also* Coupon-bearing bonds
 - alternatives, 113–114
 - development, 57
 - multiple sources, hedging, 163–166
 - numerical measurement, 341–343
 - preferences, 886
 - premium, 145, 886
 - sources, 319–320, 333–334
 - tolerance, 549, 886
- Risk management, 587–598. *See also* Coupon-bearing bonds; Currency products
- applications. *See* Interest rate products
 - foundational management, 509
 - lessons, 506–510
 - strategies, 143, 347, 406–414. *See also* Futures references/readings, 171, 380
- Risk measures, numerical computation (accuracy assessment), 265–266
- Risk-adjusted basis, 113
- Risk-averse investors, 206
- Risk-averse valuation, binomial model (usage), 204–206
- Risk-bond, collateral, 411
- Risk-free bonds, 129, 179
- equivalence. *See* Risky bonds
 - inclusion, 427
 - long position, 420
 - portfolio, 426–427
 - units, 428, 429, 527
 - usage, 428. *See also* Dynamic insurance; Dynamic portfolio insurance
 - zero-coupon yield curve, 136
- Risk-free borrowing, 185
- obligation, 183
- Risk-free hedge, formation, 305
- Risk-free hedge portfolio
- approach, 204
 - binomial model, usage, 202–204
- Risk-free interest rate, 127, 223
- assumption, 298
 - illustration, 435
 - unlimited borrowing/lending, 53
- Risk-free rate, 886. *See also* Return; Term-specific risk-free rate
- implied risk-free rate, computation. *See* U.S. risk-free rate
 - value, 590
 - yield curve, 555
- Risk-free securities, market, 698
- Risk-free zero-coupon interest rate, 638
- Riskless rate, 886
- Risk-minimizer, 886
- Risk-minimizing hedge, 147–148, 749
- computation, 153–154
 - relation. *See* Ordinary least squares regression setting, 152–154
- Risk-minimizing portfolio, discovery, 100–101
- Risk-neutral investor, 94, 886
- Risk-neutral net cost of carry rate, 400
- Risk-neutral option valuation principles, application, 337
- Risk-neutral probability, 233, 288, 416
- Risk-neutral valuation, 289, 886
- adoption, 629
 - binomial model, usage, 204
 - intuition, 202–206
- Risk-neutrality, assumption, 306
- Risky assets, 281
- European-style call on maximum, valuation, 334–335

- Risky bonds, 426–427
 - risk-free bonds, equivalence, 424–425
- Risky securities/portfolios, evaluation, 782
- Robustness, testing, 169–170
- Rogue Trader*, 506, 509
- Roll model, 886
- Rounding factor, 39
- R-squared, 847. *See also* Adjusted R-squared
 - coefficient of determination, 834–835
 - computation, 835
- Rubinstein, Mark, 518

- Safe-return certificates, 512
- Sage, Russell (entrepreneur), 187
- Sale repurchase agreement, 624, 886
- Sample
 - mean, 782
 - statistical contrast. *See* Population
- Sample correlation coefficient, 788
- Sampling error, 328
- Samuleson, Paul A. (formula), 224–226
- Scale-free covariance, 783
- Scalper, 886
- Scratch trade, 886
- Seasoned new issue, 886
- Seat, 886
- Second nearby options, 403
- Secondary market, 9, 886
- Securities, 886
 - absence, 443
 - name, variable, 412
- Securities and Exchange Commission (SEC), 886
 - Form 4, 412
 - governance, 26
 - impact, 383
 - registration, 385
 - regulation, 26
 - regulatory jurisdiction, 483
- Security market line (SML), 106–107, 886
 - calculations, 108
- Security position, tail value-at-risk (computation), 222
- Self-financing trading strategy, 886
- Seller, 886
- Selling. *See* Collateral
- Semiannual interest payments, 660
- Semicorrelation, 785
 - estimation, 793–795
 - estimator, 788
- Semicovariance, 785
 - estimation, 793–795
 - estimator, 788
- Semistandard deviation, 785
 - estimation. *See* Return
 - formula, 114
- Semivariance
 - estimation. *See* Return
 - estimator. *See* Lower semivariance
 - semi-standard deviation, relationship, 784–785
 - usage, 533
- Senior bonds, value, 436
- Senior management, understanding (absence), 509
- Serial correlation, 856–858
 - presence, 857
- Series, 886
- Settlement price, 412, 886
 - determination, 688
- SFE. *See* Sydney Futures Exchange
- Share price, 447. *See also* Maximum share price; Minimum share price
 - abnormal behavior, 402–403
 - behavior, 401–402
 - minimum/maximum, 410
- Shareholder record date, 393, 887
- Shares, pledge, 410
- Sharing rule. *See* Optional sharing rule
- Short, 887
- Short asset position
 - coverage, 196
 - terminal profit diagram, 363
- Short call position, terminal profit diagram, 366
- Short futures, right, 754
- Short futures position, terminal profit diagram, 364
- Short hedge, 887
 - bond portfolio, long-term interest rate risk (usage), 633
- Short hedger, 5
- Short maturities, inversion, 555
- Short put position
 - profit function, 367
 - terminal profit diagrams, 368
- Short rate
 - log-normal distribution, assumption. *See* No-arbitrage pricing models
 - normal distribution, 715–717
 - assumption. *See* Binomial lattice
- Short sale, 887
 - freedom, proceeds (usage), 53–54
- Short squeeze, 20, 887
- Short volatility, 887
- Short-hedging. *See* Money market
 - forward contract, usage, 591–592
 - options, usage, 592–593
- Shorting-against-the-box, 408
- Short-rate movements, defining, 708
- Short-rate parameters, calibration, 712
- Short-rate process, Vasicek derivation, 707
- Short-term borrowings, usage, 668
- Short-term interest, 721
 - rate, 148, 254
- Short-term LIBOR rate, usage, 675
- Short-term long hedge, 631–632
- Short-term options, implied volatilities, 452
- Short-term rates, 625

- SIMEX. *See* Singapore International Monetary Exchange
- Simple interest rate, 887
- Simple linear regression, 822–838
estimation
 Excel regression routine, usage, 837–838, 839–841
 formulas, 836
 origin estimation formula, 841
- Simple method, 310
- possibilities, 313
- Simple return, 887
- Simulation parameters, 532
- Singapore International Monetary Exchange (SIMEX), 507
- Single flows, 591–598
- Single future cash payment, 55
- Single stock futures
 contract, trading. *See* OneChicago Exchange
 historical statistics, 384
 trading, 383
- Single-currency interest rate derivatives, total notional amount, 19
 percentage, 607, 637
- Single-name CDSs, 681
- Six-month LIBOR, 667
 basis, 649
- Skewness, 785
 degrees, 532
 estimation, 789–792
 estimator, 789
- Slope
 coefficient estimate, 163
 confidence interval, computation, 832
 hypothesis test, 829–831. *See also* Regression line
 prediction, 832–833
- SML. *See* Security market line
- Smoothing. *See* Yield curve
 methods, 647
- SOLVER. *See* Excel
- SOQ. *See* Special opening quotation
- Southwest Airlines, annual report (2003), 746
- Sovereign risk, 683
- Soybean markets, 751–758
 acquisitions, 44–45
 activity (Spring 1989), 43
 confrontation, 45–46
 crisis, 45–46
 development, 43–44
 postponement, 44
 derivatives
 markets, 754–757
 valuation, 757
 emergency action, 46–47
 futures
 contracts, trading. *See* Chicago Board of Trade
 crush spread, daily closing levels, 758
 production/consumption, 753–754
 risk management strategies, 757–758
 squeeze, 43–47
 stability, 47
 USDA markets, 758
- SPDRs. *See* Standard & Poor's Depository Receipts
- Special cash settlement quotation, usage. *See* Standard & Poor's 500 index
- Special opening quotation (SOQ), 545
- Specialist, 887
- Speculation, 4, 887
 trading restriction/regulation, circumvention, 10
- Speculative bubble, 12, 887
- Speculative gain, 4
- Speculator, 887
- Spot currency
 European-style USD/GBP values, computation, 583–586
 GBP/USD options values, computation, 583–586
- Spot exchange rate, 887
- Spot market, 887
- Spot price, 887
- Spot rates, 593, 595, 887
 American-style USD/GBP options, values/early exercise premiums (computation), 587
 term structure, 79, 889
- Spot transactions, 4, 565
- Spread, 497, 887
 contracts. *See* Petroleum
- Spread option
 valuation, binomial method (usage), 320–321
 value, computation, 745–746
- Spreader, 887
- SPTR. *See* Standard & Poor's 500
- Squared residuals, sum, 824
- Squawk Box. *See* CNBC
- SSE. *See* Error sum of squares
- SSR. *See* Regression sum of squares
- SST. *See* Total sum of squares
- Standard & Poor's 100 (S&P 100) index, 480
 option contract, 481
 options (OEX), implied volatilities, 433
- Standard & Poor's 500 (S&P500)
 calls, 544
 cash dividends, 492
 dividends, 491–492
 yield, report, 492
 futures, intraday prices, 519
 monthly returns, 817
 pre-announcement period, 402
 put option volume, 544
 return, confidence interval, 833
 three-month variance futures contract, 542
 total return index (SPTR), 534
 month-end total return indexes, 535
 standardized monthly returns, distributions, 537

- Standard & Poor's 500 (S&P500) index, 198, 887
 average daily cash dividends, 491, 492
 daily levels, 545
 dividend yield, 493
 futures
 contract, 477
 options contract, 479
 gold bullion price/level, 762
 intraday prices, 519
 levels. *See* Intraday S&P500 index levels
 monthly returns, summary statistics, 534
 performance measures, estimation, 536
 portfolio, 283
 market capitalization, 487
 market value stocks, ranking, 488
 special cash settlement quotation, usage, 499–501
 total cash dividends, 493
- Standard & Poor's 500 (S&P500) index options
 average implied/realized volatility, 537
 implied volatility, 538
 prices, 504
 usage. *See* At-the-money option; Market Volatility Index
- Standard & Poor's Corporation, credit rating, 384
- Standard & Poor's Depository Receipts (SPDRs), 483
 traded shares/share dollar value. *See* American Stock Exchange
- Standard American-style put, 313
- Standard deviation, 483, 887. *See also* Normal distribution
 computation. *See* Implied standard deviation
 estimation, 152–153, 789–792
 formula, 114
 relationship. *See* Variance
- Standard error, expression, 811
- Standard normal density function, 796
- Standard normal distribution
 area, 862–863
 function, 797
- Standard options, 887. *See also* Nonstandard options
 analytical options, 201
 references/readings, 248
 lives
 chooser option lives, comparison, 276
 comparison, 272
- Standardized contracts, 19
- State Investment Fund (SIF), 698
 portfolio, composition, 701
- State of Wisconsin Investment Board (SWIB), risk management lesson, 698–701
- Static hedge, 887
- Static portfolio insurance (creation), index puts (purchase), 520–523
- Statistical method, 780
- Statistical tables, 861
- Stochastic volatility assumptions, 504
- Stock dividends, 887
- Stock index futures, 477–478, 888
 option contracts, contract volume, 475
 relations/valuation, 494–499
 U.S. exchange listing, 471
 usage. *See* Dynamic portfolio insurance
- Stock index products, 469. *See also* Strategy-based stock index products
 contract volume, U.S. exchange trades, 476
 contracts, number (U.S. exchange trades), 476
 evolution, 470–477
 references/readings, 515–516
- Stock indexes, 887
 composition, 484–494
 derivatives
 continuous dividend yields (inclusion), no-arbitrage price relations/valuation equations/methods, 496
 discrete dividends (inclusion), no-arbitrage price relations/valuation equations/methods, 495
 European-style call, value (finding), 230–232
 European-style put, value (finding), 233–234
 expected volatility, time-series variation, 544
 markets, 470–484
 options, 478–482, 501–506, 888
 contracts, contract volume, 475
 sale, 538
 portfolio units, lock-in, 123
- Stock markets, 384–392
 indexes, returns (correlation). *See* U.S. stock markets
 markets
 predictions. *See* Pre-open stock market predictions
 price movements, abnormality, 487
 returns
 normality, Jarque-Bera test, 805–806
 normality, test, 804–805
 volume/volatility, importance, 385
- Stock portfolios, 426–427
 beta, 510
 hedging, forward contract (usage), 129
 insuring, 518–530
 market risk alteration, index futures (usage), 510–511
 market value, 510
 risk
 alteration, 511
 level, 520
- Stock prices, 350, 353
 assumption, 406
 collar, 408, 888
 information. *See* Corporate bonds
 usage. *See* Bonds values
 lattice, 456
 computation, 461
 level, 354

- Stock prices (*Cont.*)
 midpoint, 397
 usage. *See* Employee stock options
 value-weighted arithmetic sum, 471
- Stock return prediction. *See* Market
- Stocks
 basket, 471
 beta, 349, 351, 353, 354
 expected return/risk relation, 438
 parameters, 447
 forward contract, value computation. *See* Dividend-paying stock
 futures, 385–386
 contract, value, 396
 inclusion, 427
 market values, 604
 options, 27–31, 387–392. *See also* Dell stock options
 average BSM implied volatilities. *See* Lucent Technologies; Octel Communications, Inc.
 exchange, listing decision, 385
 products, 383
 references/readings, 415
 returns
 correlation, absence, 549
 series, variance differences (test), 816–817
 short selling, 10, 410
 split, 888
 synthetic short sell, stock futures (usage), 133–134
 total market value, 486
 total risk/relative systematic risk, estimation, 108–110
 units, 428
 usage. *See* Dynamic insurance; Dynamic portfolio insurance
 valuation, 83–85, 392–406
 constant dividend growth, usage. *See* Common stock valuation
 formula, 83, 888
 values, 423, 424
- Stock-style settlement, 888
- Stop-limit order, 888
- Stop-loss order, 888
- Storage, 888
 costs, 182, 733, 741, 888
 rate, 734
- Straddle, 371, 888
 cash generation, 508
 impact. *See* Expected profit computation
 profit, 378
 function, plotting, 371–372
 risk-averse probabilities, computation, 372–373
 risk-neutral probabilities, computation, 372–373
- Straight bonds, expected return/volatility rate, 447
- Strangle, 888
- Strap, 888
- Strategy-based stock index products, 517
 references/readings, 552–553
- Strike price, 888. *See also* Options
 intervals, 392
- Strike spread, 888
- Striking price, 7, 888
- Strip, 137, 888. *See also* U.S. Treasury strips
 hedge, 888
- Stripped bond, 888
- Stripped Collateralized Fixed Rate USD Par Bonds, 699
- Stripped Mexican par spread, 700
- Stripped Treasury bonds, trading, 63–64
- Stripped Treasury notes, trading, 63–64
- Structure collar agreement, 408–409
- Student Loan Marketing Association swapped interest payments, 18
- Student *t*-distribution, 806
- Subordinated bonds, valuation, 436–438
- Subordinated debt, valuation, 435–436
- Sums of squares, computation, 835
- Swaps, 121, 637
 agreement, 748
 averaging method, 649
 contracts, 18, 888. *See also* Commodity swaps dealer, 888
 fixed exchange rate computation, time-varying quantities (inclusion), 581–582
 forward curve basis, fixed rate computation, 138–140
 forward exchange rate, computation. *See* Fixed exchange rate computation
 no-arbitrage price relations, development, 578–579
 rates, 574, 888. *See also* Eurodollars
 references/readings, 141, 676–677
 valuation, 136–140
- Swaptions, 888
 valuation, 673–675
 illustration, 675–676
- SWIB. *See* State of Wisconsin Investment Board
- Switching option, 888
- Sydney Futures Exchange (SFE), 17, 229, 396
- Synthetic asset, 889
- Synthetic CDOs, 695–697
 flowchart, 697
- Synthetic CLN, 694–695
- Synthetic derivatives, 889
- Synthetic fixed supply contracts, end-user creation, 750
- Synthetic long call, 889
- Synthetic long put, 8889
- Synthetic short call, 889
- Systematic risk
 estimation. *See* Stocks
 performance measures, 112–113
- Tail value-at-risk, computation. *See* Security position

- Tailing the hedge. *See* Hedge
- Tangency risky-security portfolio, composition (identification), 102–104
- Target duration, 889
- Taxpayer Relief Act of 1997, 408
- Taylor series expansion. *See* Bonds values
- T-bills. *See* U.S. Treasury bills
- T-bonds. *See* U.S. Treasury bonds
- TDIST, 809
- t*-distribution, 806–809
 - critical values, 865
 - degrees of freedom, 842
 - derivation, 806
 - normal distribution, contrast, 807
 - ten degrees of freedom. *See* One-tailed tests; Two-tailed tests
- Technical analysis, 889
- Telescoping futures position, 131–133
 - cash flows, 132
 - terminal values, comparison. *See* Long forward positions
- Term repo, 625, 889
 - rate, 625
 - usage, 666
- Term structure. *See* Forward exchange rates; Interest rates; Spot rates
- Term to maturity, 598
- Terminal asset price, 328
 - decrease, 368
 - probability, 375
- Terminal futures, 198
- Terminal option value, 462
- Terminal profit diagrams. *See* Buy-write strategies; Long asset position; Long call position; Long futures position; Short asset position; Short call position; Short futures position
- Terminal put option value, 328
- Terminal values, 203
 - computation, 521–522
- Terminal wealth, expected utility, 91, 876
- Termination date, 38, 650, 889
- Term-specific risk-free rate, 579
- Test power, 854
 - type I/type II errors, 814
- Thales, transactions, 11
- Theoretical value, 889
- Theta, 259–260, 889. *See also* European-style put option
 - computation, 361
 - usage, 241–243
- Theta-neutral, 889
- Thirty-day money market index (MM), month-end total return indexes, 535
- Three-month time intervals, consideration (ignoring), 645
- Three-month variance futures contract. *See* Standard & Poor's 500
- Three-period binomial lattice. *See* No-arbitrage pricing models
- Threshold asset prices, usage. *See* Probabilities
- Through delivery, 6
- Tick, 889. *See also* Uptick
- Tick size, 889
 - convention, 481
 - minimum. *See* Options
- Time, discrete intervals, 348
- Time decay, 242, 243
- Time deposits. *See* Eurodollars
- Time increment, 706
- Time premium, 889
- Time spread, 889
- Time to expiration, 296, 297, 456
 - change, 241–243
 - computation, 554
 - differences, 275
- Time value, 179, 889
 - decay, 889
- Time-deposit rates, 643
- Time-series regression specification, 114–115
- Time-series variation. *See* Stock indexes
- Time-varying parameters, 714
- Time-weighted arithmetic average, 649
- Time-weighted average, 647
- Timing option, 624, 889
- TINV, 809
- T-notes. *See* U.S. Treasury notes
- Total cash dividends. *See* Standard & Poor's 500 index
- Total commodity futures, proportion, 734
- Total cost of carry, 123
- Total rate of return swap (TRORS), 685–687
 - flowchart, 686
- Total return swap, 685–687
 - confirmation, 687
- Total risk
 - estimation. *See* Stocks
 - performance measures, 110–112
- Total sum of squares (SST), 833, 834, 845
- Toxic waste. *See* Equity tranche
- Trade confirmation, 506
- Trade date, 38, 649, 890
- Trading
 - activity, averages, 478
 - costs, 8–10
 - absence, 52–53
 - savings, 9
 - frequency, 168–169
 - regulation, circumvention. *See* Speculation
 - restrictions, 10
 - circumvention. *See* Speculation
 - reverse, 15
 - strategies, 406–414

- Trading (*Cont.*)
 volatility options, launching (CBOE contemplation), 538
 volume, 403, 732
 Trading halt, 890
 Tranche, usage, 695
 Transactions
 costs, 890
 hedging. *See* Uncertain transaction
 legging into, 507
 risk
 exposure, 591
 management, FX futures/options (usage), 591–597
 Transfer risk. *See* Floating rate payments
 Transparency, 890. *See also* Market; Over-the-counter derivatives markets
 importance. *See* Exchange-traded derivatives
 Transportation costs, 546
t-ratio, 109, 813
 Treasury bills, trading, 61–63
 Treasury bonds, trading. *See* Stripped Treasury bonds
 Treasury notes, trading. *See* Stripped Treasury notes
 Treynor ratio, 112–113
 Triangular arbitrage, 574–575, 890
 opportunity, profit (computation), 575
 Trinomial approximation method, approximation error, 325
 Trinomial method, 303, 321–326, 342
 accuracy, degree (assessment), 325–326
 application, 323–325
 Trinomial model, 890
 Triple-witching hour, 482, 500
 TRORS. *See* Total rate of return swap
 TSE-35, 487
t-test, 812
 Tulip bulb speculations, 12
t-value, excess, 865
 Two-asset case, exchange option formula (usage), 278
 Two-day settlement, considerations (ignoring), 645
 Two-period binomial lattice. *See* No-arbitrage pricing models
 Two-period lattice, 307. *See also* Asset price logarithm
 Two-period trinomial asset price lattice, usage. *See* Options
 Two-period trinomial method, usage. *See* American-style put option
 Two-security portfolio, payoff contingencies (writing), 464
 Two-tailed tests, 865
t-distribution, ten degrees of freedom, 807
 Type I error. *See* Test power
 Type II error. *See* Test power
 Unbiased estimator, 787
 Unbiased expectations theory, 890
 Uncertain transaction, hedging, 595–596
 Uncovered option, 890
 Underlying instrument, 17, 890
 Underpriced condition, 890
 Unexpected changes, management. *See* Options
 Unhedged portfolio, 355
 Unit normal distribution, 327
 random drawing, generation, 326
 Univariate normal distributions. *See* Cumulative univariate normal distributions
 subscript, addition, 416
 Univariate normal probability, approximation, 252
 Unleaded gasoline, daily prices, 749
 Unsystematic risk, 890
 Unwinding, 20, 890
 Up-and-in option, 890
 Up-and-out American-style put, 313
 Up-and-out option, 890
 Up-step, 305–306
 coefficient, 317
 assumption, 322
 change, 321
 probabilities, 312
 Uptick, 890
 rule, 890
 Upward sloping environment, 548
 U.S. dollar (USD), 40–41
 bonds, 588–589
 denomination, 594
 LIBOR, swap, 637
 USD-LIBOR-LIBO, 651
 U.S. *Indexed Assets Survey*, 482
 U.S. risk-free rate, implied risk-free rate (computation), 571, 573
 U.S. short-term benchmark, 667
 U.S. stock markets
 focus, 500
 indexes, returns (correlation), 473
 U.S. stock option trading volume, option exchange (share), 385
 U.S. Treasury bills (T-bills), 889, 890
 continuously compounded interest rate, 706
 futures, 889, 890
 option, 254
 U.S. Treasury bonds (T-bonds), 889, 890
 30-year bonds, issuance (cessation), 610
 coupons, difference, 612
 eligibility, CBT conversion factors, 614
 embedded quality option, valuation, 623–624
 exercise price, 283
 futures, 610–611, 889, 890. *See also* Chicago Board of Trade
 options, 615–616
 U.S. Treasury instruments, 639–643
 U.S. Treasury notes (T-notes), 890
 futures, 610–611, 890

- U.S. Treasury strips, 63, 890
 bonds, 452
- USD. *See* U.S. dollar
- USDA announcement. *See* Soybean markets
- USD-LIBOR-LIBO, 39
- UST, due date, 700
- Utility of wealth function, 89, 890
- Utility theory, 89–92
- Valuation. *See* Coupon-bearing bonds; Stocks
 error, oscillation, 315
 methods, accuracy degree (assessment). *See* Binomial method
 taxes, impact, 53
- Valuation assumptions, 51
 references/readings, 85–86
 usage, 51–54
- Valuation-by-replication, 891
- Value
 constraint, 523, 525
 hedging, 162–163
 lattice. *See* Discount bonds
- Value Index, computation, 471
- Value Line Composite Index futures contract, 470
- Value Line index, 471
- Value-at-risk (VAR), 217–218, 798. *See also* Conditional value-at-risk
 tail, 222
- Value-weighted arithmetic sum. *See* Stock prices
- Value-weighted indexes, 486–487
 dividend income, 490
- Vanguard Group, 482
 500 Portfolio, 487
 Vanguard Index Trust--500 Portfolio, 482
- VAR. *See* Value-at-risk
- Variable prepaid forward (VPF)
 contracts, 409–413, 891
 haircut, 413
 transaction, construction, 411
- Variance, 782, 891. *See also* Covariance; Semivariance
 computation. *See* Asset prices
 contracts, contrast. *See* Volatility
 equivalence, test, 815–816
 estimation, 789–792
 estimator, 787
 forward contracts, payoff structure (long positions/short positions), 543
 futures contract. *See* Standard & Poor's 500 payoffs, 542
 standard deviation, relationship, 783
- Variance/covariance, estimation, 151
- Variation margin, 22, 891
- Vasicek model, 711–713
- Vasicek model, two-period lattice, 709
 short rate assumption, 710
- Vega, 258–259, 891. *See also* Futures decrease, 357
 identification. *See* Asset prices
 usage, 240–241
- Vega risk
 exposure, 361
 hedge, 358–360
 one-day hedge, 360–362
- Vega-neutral, 891
- Vertical bear spread, 891
- Vertical bull spread, 891
- Vertical spread, 891
- Vesting period, 455, 891
- VIX. *See* Market Volatility Index
- Volatility, 891. *See also* Historical volatility; Implied volatilities
 contracts, variance contracts (contrast), 542–543
 derivatives, 538–551
 contracts, realization, 539–544
 estimates, 714
 estimation, 452
 forwards, 539
 contracts, payoff structure (long positions/short positions), 543
 futures, DTB launch, 538
 predictors. *See* Expected long-term volatility
 shorting, 556
 spread, 571, 891
- Volatility rate, 273, 350, 354, 710, 712
 calculation, 721
 change, 240–241
 computation, 421
 impact. *See* Interest rates
 increase, 424
 level, 308, 340
 specificity, 671
- Volume, 891
- VPF. *See* Variable prepaid forward
- Vulnerable derivative, 891
- Warehouse rent, 190
- Warrants, 891
 expiration, 440
 issuance, incentives, 441
 terminal value, 440
 valuation, 439–444
 dilution effects, assessment. *See* At-the-money warrants valuation
 illustration, 441–443
- Washington Agreement, 766
- Wealth constraint, 96, 891
- Wealth function. *See* Utility of wealth function
- Weather-induced spikes, 738
- Weeklys, listing, 481
- Weighted average term to maturity. *See* Coupon
- Weighted least squares regression, 823
- Wheat forward contract, 5
- White noise, 817
- Wildcard option, 624, 891

- Windfall gain, 461
Windfall loss, 461
Wine
 commodity derivatives, 768–769
 futures, 768
Winnipeg Commodity Exchange, 16, 731
World Gold Council, 760
- Yield curve, 891
 implication. *See* Zero-coupon bonds
 riding, 666
 smoothing, 646–648
Yield risk, 10, 891
Yield stock options. *See* Constant dividends
Yield to maturity, 69, 891
 compounding, 640
 computation, yield curve (usage). *See* Coupon-bearing bonds
 usage, 69
- Zero mean, test, 808–809
- Zero-cost collars, 766
Zero-coupon bonds, 55, 434, 721–722, 891
 prices, yield curve implication, 711
 trading, 61
 valuation, no-arbitrage pricing model (usage).
 See Four-year zero-coupon bond
Zero-coupon corporate bond, 690
Zero-coupon rates, 643, 645
 determination, 639
 identification, 638–646
Zero-coupon yield curve, 64, 79, 578
 calculation, 716, 717, 721
 estimation, 638–648
 inclusion. *See* Floating rate bond; Inverse floater;
 Plain-vanilla interest rate swap
 increase, 68
 rates, consideration, 720
 usage. *See* Coupon-bearing bonds; Forward discount factors; Forward rates
Zero-coupon yields, 645
Zero-sum game, 8, 891