

## Index

- Abu Dhabi Investment Authority (ADIA) 26  
 academic institutions, investor base statistics 28–32  
 accelerated contributions 181–2, 242–4  
 accounting requirements 3, 6, 26, 29–32, 49, 153–4, 211, 253, 261–5  
 acquisitions 18–19  
 ad hoc adjustments, mean/variance approaches 68–9  
 adaptive market hypothesis (AMH) 219–20  
 adjusted current ratio (ACR) 114–17  
 Adveq fund performance assessments 215–16  
 adverse selection 20  
 advisory boards, limited partnerships 45–7, 264  
 AFPs 29–30  
 agendas, risk management 249–51  
 aggregated returns 191–202, 224–30  
 AIG 234  
 Almeida 86  
 alphas 65–73  
 AlpInvest Partners 81, 83, 84–5  
 alternative assets 1–13, 15–93, 163–87, 207–8, 249–55, 258–65  
   *see also* hedge funds; illiquid, . . . ; private equity funds; real assets  
 Alternative Investment Fund Manager Directive (AIFMD) 13, 150–1, 251, 258–9, 260  
 annualizing terminal returns backwards 130–6, 144–8  
 Apple, dividends 48  
 ‘appropriate consideration’ requirements of ERISA 35, 40–1  
 arbitrage 97, 219  
 ARD VC firm 57  
 Argentina 118  
 Arrow, Kenneth 210  
 Asia 1–4, 25–32, 97, 118, 189, 259  
 asset allocations 1–13, 23, 36–41, 53–7, 59–73, 76–8, 82–93, 97–105, 113–21, 139–48, 154, 259–65  
 asset classes 4–5, 6–8, 15–93, 144, 161, 185–7, 207–20, 258–65  
 asset managers 5, 6, 7, 20, 31–2, 33–41, 47, 53–7, 79–93, 251–5  
 asset protection needs, historical background 34–5  
 asset-backed securities (ABSs) 245  
 asset–liability management (ALM) 12, 31–2, 38, 70–3, 251, 257  
 assets under management (AuM) 1–2, 3, 6, 21–3, 25–32, 40–1  
 Astrea 235–6, 238  
 asymmetric information 49–51, 55, 84–6  
 ATP 71  
 auctions, secondary markets 82–3  
 auditors 103, 153–4, 166, 208, 264  
 Australia, statistics 27  
 autocorrelations 172–7  
 available resources (AR) 157–9  
 ‘back loading’ decelerated contributions 182–3  
 back-testing 124–9, 162–3, 164, 178, 184–7, 262–5  
 balance of payments crises 107, 118–21  
 bankruptcies 76–7, 85–6, 209  
 banks 1, 3–5, 23–32, 41, 70, 78–9, 82–93, 107, 109–21, 141–8, 155–9, 234–48, 252–5, 258–65  
 Basel Committee on Banking Supervision 9, 78, 102, 107, 110–11, 181, 184–7, 208–9, 246, 249, 257, 258–9, 263–4  
 Basel II 102, 246  
 Basel III 9, 78, 102, 107, 110–11, 181, 246, 257, 258–9, 263–4  
 Bayesian approach 185, 221, 259–60  
 benchmarking processes 12, 40–1, 100–1, 109, 141–3, 209–20, 221–30, 263–5  
 beta risk 8, 65–73  
 biases 50–2, 62–6, 81, 97, 104–5, 124, 165–6, 178–87, 207–8, 224–30, 253–5

- bid spreads 90–2  
 bid–ask spreads 89–92  
 Black, Fisher 41  
 Black–Litterman approach 68–9, 100–1, 259–60  
 Blackstone Group 5, 29, 53  
 blending of cash flow models 179–81  
 ‘blind pool’ investments 128–9, 207, 221, 243–4  
 BNP 234–6  
 boards of directors 252–5, 264  
 bonds 1–4, 8, 11, 17–20, 23–4, 31–5, 38, 41,  
     67–8, 71–3, 107, 116–17, 136, 141–3,  
     149–53, 211–20, 233–48  
 bottom-up models 12, 164, 165–6, 189–202,  
     221–30, 236–48  
 ‘bow factors’ 168–71, 183–4  
 Brazil 31–2, 118  
 built-in tensions, risk management 253–5  
 Burgiss 124, 135–6  
 business ‘angels’ 52  
 business models 5  
 business plans 5, 260–5  
 buy-and-build strategies 141, 184–5  
 buyers, secondary markets 8, 75, 76–7, 79–82, 93,  
     113, 166  
 buyouts 18–20, 21–3, 24–5, 26, 31–2, 35–41,  
     45–57, 60–73, 97–105, 126–48, 159, 192–3,  
     213, 259–65  
     *see also* leveraged . . .
- California Public Employees’ Retirement System  
     (CalPERS) 1, 26, 71–2, 77, 151, 215–16  
 California State Teachers’ Retirement System  
     (CalSTRS) 26  
 call options 192–3  
 Cambridge Associates 124  
 Campbell Lutyens 82  
 Canada 1, 26, 53–4  
 Canadian Pension Plan Investment Board 1, 71–2  
 capita market line 152–3  
 capital adequacy requirements 9, 10, 13, 78–9,  
     103–5, 107, 184–7, 234–6  
 Capital Asset Pricing Model (CAPM) 8, 64–73,  
     97–105, 152–3, 171, 259  
 capital calls 2, 5, 11, 20, 45–57, 59–73, 76–9,  
     110–21, 125–9, 143–4, 149–60, 161,  
     167–87, 195–202, 226–30  
 Capital IQ 64  
 capital risk 9, 12, 107–8, 110–21, 144, 233–48  
 ‘CAPM in reverse’ approach 68–9, 100–1  
 Carlyle Group 5, 53  
 carried interest holders 12, 45–6, 189–208  
 ‘cash drag’ 157–9  
 cash flow adjustments (CFAs) 132–6  
 cash flow libraries 11, 12, 172–7, 179–87, 243–4  
 cash flow modelling 2, 8–13, 19–20, 46–7, 71–3,  
     76–8, 80–2, 87–93, 105, 111–12, 113–21,  
     124–48, 151, 154–60, 161–87, 189–202,  
     207, 221–30, 239–48, 250, 253–5, 258,  
     260–5  
     definition 161–7  
 cash management/forecasting 161–87, 260–5  
 cash-flow-at-risk (CFaR) 10, 143–4  
 catch-up provisions 192–206  
 Center of Private Equity Research (CEPRES) 66,  
     110–11  
 central banks 1, 3–4  
 chained modified Dietz formula 125–9  
 Chile 29–30  
 China 30–1, 97  
 China Investment Corporation (CIC) 26  
 classification schemes 164–7, 189–202, 207–20  
 clawback clauses 189–202  
 closed-end funds 20, 209, 213–20  
 cluster analysis 139–41  
 co-investments 5, 7, 20, 24–32, 43, 54–5, 103–5,  
     139–41, 237, 263–4  
 Cogent Partners 82, 83–4, 89–90  
 Colbert’s Ordinance on Commerce of 1673 56  
 collateral 2, 12, 20, 70, 233–48  
 collateralized debt obligations (CDOs) 18, 20, 70,  
     233  
 collateralized fund obligations (CFOs) 233–48  
 Collier Capital 85  
 commitment risk 11, 149–60  
 commitments 2, 5, 7–8, 9, 10, 20, 21–3, 24–32,  
     45–57, 59–73, 76–93, 97, 104, 107–21,  
     125–48, 149–60, 161–87, 218, 226–30,  
     243–4, 245–8  
 committed capital (CC) 168–71  
 commodities 1, 3, 17–20  
     *see also* farmland . . . ; forestry . . . ; natural  
     resources . . . ; oil and gas . . .  
 company-level data, alpha/beta estimates 65–6  
 comparable fund similarities, fund  
     ratings/gradings 218–20, 221–30  
 compliance officers 13, 249–55, 259–65  
 compound interest, hurdle rates 192, 196–206  
 confidence intervals, VaR 10, 123–48  
 confidentiality needs, IT systems 262  
 conflicts of interest 52, 212, 251–5, 261–5  
 consistency requirements 186–7  
 continuous-time cash flow models 171  
 contributions *see* capital calls  
 control issues, limited partnerships 47–9, 53–5,  
     57  
 convertible bonds 234–6  
 convexity 246  
 copyrights real assets 1  
 corporate bonds 8, 17–20, 23–4, 31–2, 35, 72,  
     149–51, 233–48  
 corporate governance 12–13, 37, 49, 54, 60–1,  
     209–20, 251–65

- correlations 4, 10, 37, 64–73, 102, 139–48,  
 172–7, 183–4, 243–4, 251  
 costs of capital 141–3, 193  
 counterparty risk 264  
 coupons, bonds 246–7  
 Court of Chancery 34  
 creative accounting 211, 253  
 credit cards 245  
 credit defaults, definition 211  
 credit lines 150–1  
 credit rating agencies 12, 136, 211–20, 233–48  
 credit ratings 3, 12, 110–11, 136, 207–20,  
 233–48  
 credit risk 4, 8, 9, 12, 71–2, 107, 108–21, 208–9,  
 221–30, 248, 257, 264–5  
 crisis-related responses 3–4, 29–32, 49–50, 69,  
 76–9, 100, 103, 107, 112, 149–51  
 currency overlay strategies 120–1  
 currency swaps 120–1  
 current ratio (CR) 114–17  
 cycles, illiquid assets 6, 18–19, 21–3, 89–93,  
 115–17, 124–48, 167–70, 194–202, 215–16,  
 221–30, 243–4  
 cyclical illiquidity concepts 4–5, 20, 21–3  
  
 data-driven projections (bootstrapping) 164–5  
 databases 11, 12, 59–73, 87–93, 99–102, 105,  
 120, 124–48, 163–87, 207–8, 212–20,  
 222–30, 243–4  
 de Finetti, Bruno 99–100  
 ‘de-smoothing’ returns 67–8, 127–8  
 deal-by-deal basis 43, 54, 191–202  
 deal-level data, alpha/beta estimates 65–6  
 debt markets 1–4, 8, 12, 17–20, 23–4, 31–5, 38,  
 41, 67–8, 71–3, 116–17, 136, 141–3,  
 149–53, 209–10, 211–20, 233–48  
 debt-to-equity ratios 65, 248  
 decelerated contributions, cash flow modelling  
 182–3  
 default risk 110–11, 124, 155–9, 209, 211–20,  
 233–48  
 defaulting options, limited partners (LPs) 47, 112,  
 149–51, 159, 161  
 defined benefit pension plans (DBs) 6, 17, 25–32,  
 48, 70–1  
 defined contribution pension plans (DCs) 6, 17,  
 26–32, 53–4  
 Delaware Limited Partnerships 44  
 ‘democratic’ approaches to risk management  
 251–2, 261  
 Denmark 27, 71  
 denominator effect 138–9  
 derivatives 5, 33, 102–5, 120–1, 192–3, 209  
   *see also* exchange-traded funds; forwards;  
   futures; options; swaps  
 Derman, Emanuel 41  
  
 design considerations, risk management policy  
 33–41, 262–5  
 Deutsche Bank 85, 234–6  
 development considerations, risk management  
 policy 262–5  
 Dietz formula 125–9  
 direct investments 5, 7, 20, 24–32, 43, 53–4, 141  
 discounted cash flows (DCF) 88–92  
 discounts 8, 11, 53, 77–9, 85–6, 87–93, 111–12,  
 124–48, 151–3, 217, 264  
 distressed investment funds 21–3, 24–5, 79–82,  
 92, 98, 105, 113–21, 161, 222–30  
 distribution provisions 190, 191  
 distribution waterfalls 12, 189–206, 237–8,  
 239–44  
 distributions 2–3, 12, 46–7, 59–73, 76–9, 104,  
 112–21, 125–48, 149–53, 161, 167–87,  
 189–206, 221–30, 235–6, 237–8, 239–44  
 diversification 1–8, 10, 11, 31–2, 33–41, 57, 59,  
 64–73, 78–9, 82–3, 93, 98–105, 111–21,  
 136–41, 144, 149–50, 165–87, 208–9,  
 234–48, 259–65  
 divestments 45–57, 60, 80–2, 131–48  
 dividends 46–7, 48, 243–4  
 documentation 13, 153–4, 257–65  
 Dodd–Frank Act 23, 258–9  
 downside risks, upside risks 9, 97, 102–5, 111,  
 192–3, 216–17, 248, 249–55  
 Draper, Gaither and Anderson (later Draper  
   Fisher Jurvetson) VC firm 57  
 due diligence 31–2, 35–41, 97, 103–5, 109–10,  
 150–1, 212–20, 226–30, 260–5  
 duration 31–2, 38, 246  
 dynamic risk 13, 68–9, 259–65  
  
 EBITDA 60, 88–92  
 economic infrastructure, definition 19  
 efficient frontiers 152–3  
 efficient market hypothesis 97, 105, 152–3, 219  
 efficient portfolios 4, 39, 41, 64–73, 97, 105, 124,  
 152–3, 219  
 emerging economies 1–4, 6, 17, 30–2, 41, 98,  
 100–2, 105, 107, 118–21, 222, 259–60  
 Employee Retirement Income Security Act  
 (ERISA) 1979 35, 40, 44  
 endowment effect (status quo bias), definition  
 51–2  
 endowments 1, 2–3, 6, 11, 23–32, 44, 51–2,  
 76–93, 116–17, 167–87, 263–5  
 energy real assets 1, 17–20, 21–3, 24–5, 161,  
 213–14  
 environmental, social and governance issues  
 (ESGs) 103, 252  
 equities 1–4, 7–8, 12, 17–20, 23–4, 31–2, 41,  
 46–7, 48, 52, 59–73, 100–1, 116–17, 140–3,  
 149, 152, 208–9, 233–48

- equity risk, private equity funds 4, 71–2  
 ERISA *see* Employee Retirement Income Security Act  
 ESMA *see* European Securities and Markets Authority  
 estimated probabilities 98–102, 225–8  
 EURIBOR 237  
 Europe 1–4, 13, 21–4, 25–32, 33, 36–7, 38, 44–5, 56–7, 60–1, 65, 78, 85–6, 100–2, 107, 118–21, 150–1, 189, 251, 258–9, 260  
 European Capital Adequacy Directive IV 78  
 European Insurance and Occupational Pensions Authority (EIOPA) 100, 107, 126–7  
 European Securities and Markets Authority (ESMA) 254, 257–65  
 European Venture Capital and Private Equity Association (EVCA) 26, 107, 113, 126–7, 157–8, 189  
 evergreen funds 48–9, 52–3  
 evolutionary forces 219–20, 265  
 Ewan Marion Kauffman Foundation 81  
 ex-ante lock-in investment periods, definition 19–20, 32, 49  
 ex-post periods 20, 49, 119  
 excess returns 7–8, 10, 59–73, 97–105, 216–20, 225–30, 247–8  
 exchange-traded funds (ETFs) 5, 20  
 exit strategies 43, 47–8, 75, 101, 125–9, 140–1, 151–3, 194–202, 242–3  
 expected lifetime projections 174–7, 221–30  
 expected performance grades 221–30  
 expertise 207–9, 220, 223–30, 261  
 external agencies, fund ratings/gradings 211–15  
 external consistency requirements, cash flow modelling 186–7  
 extreme events 11, 76–7, 123–4, 178–87, 211, 221, 224–5, 228–30, 242–4  
 extreme value theory (EVT) 109  
  
 failures 221, 224–5, 228–30, 250–1, 257  
 fair values 9, 113–21, 124–48  
 Fama–French CAPM extension model 69–70  
 Fama–French small cap index 64  
 family offices 1, 6, 23–32, 44, 70–3, 79–93  
 farmland real assets 1, 19, 24–5  
 fees 7–8, 45–7, 48–9, 52, 53, 54, 61–73, 81–2, 128–9, 174, 190–202, 240  
 Feri's investment ratings 213–14  
 FHP-Rating 214  
 fiduciaries, prudent investing 34–41, 251  
 fiduciary ratings of firms 211–12  
 financial innovations 34–5, 48, 52–3, 228, 234–6  
 financial intermediaries 24–32, 57, 75–6, 82–93  
 financial measures, excess returns 7, 60–73  
 Financial Services Authority (FSA) 250, 254  
 First Alabama Bank of Montgomery v. Martin 35  
 Fitch 235–6  
 fitness rankings 212–13  
 floating rate notes (FRNs) 237–44  
 'floor' waterfall arrangements 193–202  
 forecasts, definition 162–3  
 foreign exchange reserves 2, 26  
 foreign exchange risk exposures 103–4, 108, 117–21  
 forestry real assets 1, 17–20, 21–3, 24–5, 72  
 forwards 120–1  
 foundations 1, 6, 23–32, 44, 70–3  
 Franzoni *et al* (2012) CAPM extension model 69–70  
 Freedom of Information Act (FOIA) 62–3  
 'front loading' accelerated contributions 181–2  
 fund managers 5, 7, 9, 23, 31–2, 43–57, 104–5, 107–21, 137–41, 161–87, 189–202, 207–20, 221–30, 251–5  
   definition 43, 44–5, 251–2  
 fund ranking concepts 209–20  
 fund ratings/gradings 3, 12, 87–8, 110–11, 136, 164, 207–20, 221–30, 240–4  
 fund scoring concepts 209–20  
 fund-level data, alpha/beta estimates 65–7  
 funding risk 9, 11, 59, 76–9, 103–5, 107–10, 111–21, 128–9, 149–60, 264  
 funding tests 9, 107–9, 113–21, 143–4  
 fundraising 47–9, 52, 86–7  
 funds-of-funds 20–3, 28–32, 44, 45–6, 47, 79–93, 116–17, 151, 214, 234–48  
 futures 120–1  
  
 game theory 165–6  
 general partners (GPs) 3, 5, 7–8, 11, 12, 20, 24–32, 43–57, 59–73, 82–93, 101–5, 110–21, 136, 141, 149–60, 164, 189–202, 207–20, 221–30, 259–65  
 German sovereign debt 3–4  
 Ghilarducci, Teresa 39  
 global aspects of alternative investing 1–4  
 global financial crisis from 2007 2–4, 5, 8, 11, 20, 29–30, 69, 76–9, 85–6, 107, 111–13, 121, 126–7, 144, 149–51, 153, 159, 181, 235–6, 242–5, 258, 264–5  
 'go naked' strategies 120–1  
 'goal keeper' roles, risk management 253  
 Goldman Sachs 252  
 governance 12–13, 37, 49, 54, 60–1, 209–20, 249–65  
 government agencies 28–32, 190  
 government bonds 3–4, 11, 17–20, 23–4, 34, 35, 41, 71–3, 107, 152–3  
 Government of Singapore Investment Corporation (GIC) 26  
 granular asset class buckets 71–2, 73  
 Greece 235

- growth capital funds 24, 71–3, 92, 98, 101, 130–1, 133–6, 148, 170–1, 207–20, 222–30, 259–65  
 gut feelings 99–102  
 Harbourvest Partners 29, 85  
 hard hurdles 193, 200–2, 206  
 Harvard Management Company (HMC) 76–7, 150–1  
 HEC-Dow Jones Private Equity Fitness Ranking 212–13  
 HEC-Dow Jones Private Equity Performance Ranking 213  
 hedge funds 1–4, 5, 17–20, 21, 53, 70, 71–3, 76–7, 79–93, 141–3, 219, 233, 251  
 hedging 102–5, 119, 120–1  
 herding behaviours 3, 7, 38–41  
 ‘hierarchical’ approaches to risk management 251, 252, 254, 261  
 high-yield (junk) bonds 8, 72, 141–3  
 Hoek’s model 170  
 ‘home runs’ 101–2  
 hunches 99–102  
 hurdle rates 12, 46–7, 189–206  
 idiosyncratic risk 5, 64–5, 108–9  
 illiquid assets 1–13, 15–93, 95–105, 107–21, 123–48, 149–51, 153, 155–9, 181, 189–206, 207–20, 233–48, 249–55, 257–65  
   *see also* alternative . . . ; private equity funds; real assets  
   as an asset class 4–5, 6–8, 15–93  
   definition 1, 5, 17–20  
   types 1–13, 17–32  
 illiquidity factors, limited partnerships 12, 49–52, 244–8  
 ILPA Private Equity Principle 190, 191, 219  
 implied correlations 139–41  
 ‘imprudent’ investments 34–5, 39  
 industrial companies, CFaR 10, 143–4  
 inflation 1, 34–5, 52, 70–3  
 information asymmetries 49–51, 55, 84–6  
 information provisions, unquoted portfolio companies 49–50  
 informed judgments 68–73, 260–5  
 infrastructure real assets 1, 17–20, 21–3, 24–5, 30–2, 53, 72, 161, 193, 210, 213–14, 233–48  
 institutional investors 1–4, 6, 38–41, 43–57, 59, 71–3, 76–93, 126–53, 161, 167–87, 249–55, 262–5  
   *see also* endowments; foundations; insurance companies; pension funds  
 insurance companies 6, 12, 23–32, 44, 70–3, 78–93, 102–5, 107, 116–17, 126–48, 151–3, 233–48, 252–5  
 interest payments, limited partnerships 46–7, 56, 235–6  
 interest rate risk 246  
 interest rates 3–4, 64–5, 70–3, 112, 135–6, 141–3, 152–3, 155–9, 192–202, 237–8, 241–8  
 interim IRRs (IIRRs) 170–1, 196–202, 222–30  
 internal age 174–7, 221–30  
 internal assessment approaches, fund ratings/gradings 211, 215–16  
 internal consistency requirements, cash flow modelling 186–7  
 internal fund grading systems 87–8, 164, 211, 215–16  
 internal risk management systems 11, 73, 161–87, 259–65  
 International Monetary Fund (IMF) 3  
 International Swaps and Derivatives Association (ISDA) 209  
 Internet platforms 82, 108–9  
 intuition 98–102, 108–9, 210–11  
 invested capital-at-risk (iCaR) 138–41  
 investment consultants, prudent investing 37–41  
 investment methods 3, 5, 7, 20, 43–57, 103–5, 139–41, 236–7, 263–5  
 investment strategies 13, 257, 259–65  
 investment trusts 53  
 investor base 1–5, 6, 17–20, 23–32, 38–41, 44–7, 70–3, 76–93, 245–8, 249–55, 257–65  
   *see also* banks; family offices; institutional investors; limited partners; sovereign wealth funds  
 IPOs 178  
 Ireland 235–6  
 IRRs 61–3, 87–92, 109, 110–11, 119, 124, 131–6, 145–6, 156–60, 170–1, 172–7, 183–4, 193–202, 222–30, 241–4  
 ISO/IEC 15504 (SPICE) 40  
 IT systems, risk management 13, 257–65  
 Italy, statistics 27  
 J-curves 8, 10, 80–2, 116, 124, 128–9, 143–4, 227–30, 241–4  
 Japan 4, 30–1  
 JP Morgan Government Bond Index 152  
 judgment 68–73, 98–102, 164–7, 178–87, 207–20, 260–5  
 junior notes, securitizations 234–7, 238–48  
 ‘just-in-time’ commitments 46  
 Keynes, John Maynard 39  
 KKR GP 29, 53  
 Knight, F.H. 98–9, 101, 105  
 Kocis *et al* 161, 164–7, 171–2  
 Kohlberg Kravis Roberts 5  
 Kuwait Investment Authority (KIA) 26

- Latin America 30–2, 118  
 legal issues, limited partnerships 7, 44–7, 55–7, 78–9, 100–1, 102–5, 107  
 legal operational risk 107, 249–55  
 Lehman Brothers 2, 29, 76, 85, 107, 144  
 ‘lemons problem’, secondary markets 50–1, 84–6  
 leverage issues 11, 114–17, 149–53, 154–9, 238, 245–8, 263–5  
 leveraged buyouts (LBOs) 18–20, 21–3, 24–5, 26, 31–2, 35–41, 45–7, 60–73, 97–105, 126–48, 159, 161, 192–3, 213, 259–65  
 Lexington Partners GP 29  
 liability-driven investing (LDI) 70–3  
 LIBOR 237–8, 241  
 libraries 11, 12, 172–7, 243–4  
 life insurance 23–32, 52, 70–3, 141–3  
 lifespans, limited partnerships 5, 20, 45–7, 48, 52, 57, 118–19, 124–48, 168–72, 173–87, 194–202, 221–30, 243–4  
 lifetime projections 173–7, 183–4, 195–202, 221–30  
 limited partners (LPs) 5–12, 17–23, 24–32, 43–57, 59–73, 76–93, 103–5, 107–21, 123–48, 149–60, 161, 178–87, 189–202, 250–1, 254, 257, 258–65  
 Limited Partnership Act 1907 44–5  
 limited partnership agreements (LPAs) 12, 45–57, 110, 155–6, 189–202, 219, 264  
 limited partnerships 2–9, 17–23, 32, 43–57, 59–73, 76–93, 107–21, 128–48, 161–87, 189–202, 207–20, 221–30, 233–48, 253–65  
   critique 9, 11, 43, 47–8, 52–5, 57, 107–21, 149–50, 207–20, 253–4, 257–65  
   definition 5, 6, 7, 17, 20, 32, 43–7, 57, 128–9  
   relationships between parties 51–2, 109–10, 190–1, 251–5  
   self-liquidating aspects 46, 48, 57, 108–13  
   statistics 8, 20–3, 45–7, 77–93, 110–21, 126–48, 222–30  
   structures 7, 43–57  
 Lipper ratings 211  
 liquidation benefits 47–9, 77  
 liquidity concepts 2–13, 17–20, 113–21, 161–87, 208–20, 233–48  
 liquidity ratios, funding tests 9, 113–21  
 liquidity risk 2–9, 11, 12, 59–73, 76–93, 103–5, 107–8, 110–21, 129, 154–9, 161–87, 208–20, 233–48, 264–5  
 liquidity-motivated sellers, secondary markets 76–9  
 listed private equity 5, 7, 20, 24–5, 43, 52, 53, 90–1, 100–1, 124–9, 263–4  
 listed vehicles 5, 7, 20, 24–5, 43, 52, 53, 90–1, 100–1, 124–9, 263–4  
 loan treatments, undrawn commitments 11, 150–1, 154–9  
 look-through requirements by auditors/regulators 166  
 loss analysis, secondary markets 2–3  
 loss aversion, definition 51–2  
 loss given default (LGD) 108–13, 124  
 LPX 50 index 53, 100–1, 126–7  
 Luxembourg 236  
 McKinsey Global Institute 30  
 Malthus, Thomas 219  
 management fees 7–8, 45–7, 48–9, 52, 53, 54, 61–73, 81–2, 128–9, 174, 190–202, 240  
 management styles 207–8, 217–20, 223–30  
 margin calls 2, 76–9  
 mark-to-market valuations 2–3, 25–6, 29–32, 68, 87–93, 109–21, 123, 124, 143–4  
 market liquidity risk 2–3, 9, 20, 59, 107–8, 110–21, 264–5  
 market risk 8, 12, 66, 64–73, 107, 112–21, 123, 124–48, 165, 209, 233–45, 247–8, 257, 264–5  
 market size 1–4, 6, 17, 20–3, 83–7, 93  
 maximum likelihood projections 163  
 mean/variance approaches 4, 59, 64–5, 68–73, 98, 124–9  
 meetings 261–2  
 MENA, statistics 30–1  
 Merton’s intertemporal CAPM 171  
 Mexico 118  
 mezzanine funds 92, 98, 105, 161, 192, 233–7, 238–48  
 MidOcean Partners 85  
 model risk 164–7, 253–4  
 model-driven projections 164–5  
 models 8, 11, 12, 13, 64–73, 97–105, 152–3, 161–87, 189–206, 207–20, 221–30, 239–44, 253–5, 261–5  
   definitions 162–7  
 modern portfolio theory (MPT) 33–41, 64–5, 98–105  
 modified Dietz formula 125–9  
 monetary policies, Europe 3–4  
 money markets 20  
 ‘money-chasing-deals’ phenomenon 23  
 monitoring controls 10, 103–5, 109, 161–87, 212–20, 221–30, 252–5, 257–65  
 Monte Carlo simulations 10, 130–6, 141–3, 171, 175–7, 225  
 Morningstar ratings 211, 214  
 mortgages 34, 35, 107, 233–48  
 MSCI EM index 101, 152  
 multiple-based carried interest calculations 200–2, 205–6  
 mutual funds 12, 184, 211, 213–14  
 Myners Report (2001) 28–9

- Napoleonic Code of 1807 56  
 NASDAQ 67, 100–1  
 natural resources real assets 17–20, 21–3, 24–5, 161  
 negative yields, US Treasury bonds 3  
 net asset values (NAVs) 8, 10, 61–73, 75, 76–8, 81–2, 83–93, 97, 108–13, 123–48, 153–4, 166, 168–77, 197–202, 222–30, 236–7, 244–8  
 net paid-in capital 108–21  
 net present values (NPVs) 10, 110, 124–48, 151–3, 156–8, 196–202  
 New Zealand 27, 71–2  
 non-financial risks 102–5  
 non-probabilistic cash flow models 11, 164, 167–71, 183–4  
 Norges Bank Investment Management 41  
 Norway 40–1, 71–2  
  
 objectivity concepts 99–105, 164–7, 207–8, 221–30  
 OECD Guidelines on Pension Fund Asset Management 31, 38, 252  
 off-balance sheet items, undrawn commitments 11, 154–9  
 oil and gas real assets 1, 17–20, 21–3, 24–5, 161  
 OMERS PE 53–4  
 Ontario Municipal Employees Retirement System 53–4  
 Ontario Teachers' Pension Plan 26  
 operational measures 7, 60–73, 221–30  
 operational risk 13, 107, 210, 249–55, 257–8, 262–5  
 operational status grades, fund ratings/gradings 221, 224–5, 228–30  
 opportunity costs 9, 131–2, 141–4, 152–3, 157–9, 161–2  
 optimal portfolio allocation 7, 8, 67–73, 150–60, 165–6, 259–65  
 options 120–1, 192–3  
 organizational structures 13, 251–2, 257, 261–5  
 out-of-the-money options 192  
 outstanding commitment level (OCL) 114–17  
 overcommitment ratios (OCRs) 114–17, 150–60, 245–6  
 overcommitment reserve (OR) 157–9  
 overcommitments 11, 114–17, 149–60, 245–8, 263–5  
 overcommitted capital (OCC) 157–9  
 overdistributions to GPs, deal-by-deal problems 191  
  
 paid-in capital (PIC), non-probabilistic cash flow models 168–71  
 parameters, cash flow modelling 163–87, 216–18  
 Partners Group GP 29, 84, 90  
  
 Pastor–Stambaugh CAPM extension model 69–70  
 Paul Capital Partners 85  
 payment waterfalls, securitizations 237–8, 239–44  
 Pearl 234–6  
 peer groups, fund ratings/gradings 12, 218–20, 223–30  
 pension funds 1–7, 12, 17, 23–32, 33–41, 44–7, 48, 53–7, 70–3, 77–93, 107, 118–21, 126–48, 151, 233–48, 252–5, 263–5  
 perceptions of risk 251, 253–5, 257–65  
 performance issues 3, 7–8, 12, 46–7, 48–9, 52, 54, 57, 59–73, 85–93, 101–2, 104–5, 109–21, 126–48, 164, 165–6, 169–87, 192–3, 207–20, 221–30  
 performance risk, fund ratings/gradings 212  
 permissible markets, risk management policy 263–5  
 Pevera 126  
 Pine Street 234–6  
 'placebo effect', risk management 255  
 'plausibility story' rewards, banks 41  
 portfolio risk 10, 31–2, 33–4, 38–41, 123–48  
 portfolio theory 33–41, 64–5  
 portfolios 1–12, 17–32, 33–41, 52, 57, 59–73, 75, 78–9, 82–3, 87–93, 98–105, 109–21, 123–48, 149–60, 165–87, 208–9, 233–48, 249–55, 257–65  
 'Pragma-Report' 36–7  
 predictions, definition 162–3  
 preferred returns 189, 192–202  
 Prequin 25, 86–7, 90, 124, 126–7, 135–6, 138, 222  
 PREVI pension fund, Brazil 31–2  
 prices 9, 10, 50–1, 75, 84–6, 87–93, 108–9, 111–12, 113–21, 166, 243–4  
 primary infrastructure investments, definition 19  
 primary markets, secondary markets 8, 75, 90–1, 263–4  
 Prime Edge 234–6  
 Princess 234–6  
 principal/agent problems 102–3  
 principles-based approaches to risk management 13, 257–65  
 'principles-cum-rules' systems 258  
 private equity funds 1–5, 6–13, 17–20, 21–41, 44–57, 59–73, 76–93, 97–105, 107–21, 124–48, 149–60, 165–6, 181, 189–206, 207–20, 222–30, 233–48, 258, 264–5  
*see also* leveraged buyouts; venture capital  
 definitions 18–20  
 statistics 1–4, 6, 8, 17–23, 24–32, 35, 59–73, 101–2, 110–21, 126–48, 222–30  
 types 18–19  
 private equity secondary funds, statistics 21–3  
 private individuals, investor base 28–32, 44  
 private pension funds, statistics 25–32

- probabilistic cash flow models 11, 12, 164, 167, 171–7, 179–87, 189–202  
 probabilities 9, 10, 11, 12, 97–105, 108–21, 123–48, 162–87, 189–202, 215–16  
 profits and losses 191–202  
 projections 162–87, 210–11, 221–30  
 prudent investing 6–7, 12–13, 31–2, 33–41, 114–17, 141–3, 251–5, 262–5  
     definition 6–7, 33, 36–7, 41, 262  
 Prudent Investor Act (PIA), US 7, 36–41  
 prudent investor rule 7, 36–41, 262  
 prudent man rule 7, 34–41  
 pseudo risk metrics 109  
 psychological factors, qualitative assessments 207–8  
 public market equivalent (PME) 7–8, 61–73, 218  
 public pension funds 25–32, 44, 263–5  
 purchased primaries, definition 80–2  
 pure private equity strategy 158–60
- qualitative assessments 3, 9, 12, 99–102, 103–5, 110–11, 136, 164–7, 187, 189–202, 207–20, 221–30, 240–4, 250–5, 257–65  
     definition 207–8, 223–4  
 quantitative analysis 99–105, 108–21, 123–48, 159, 164–87, 207–20, 221–30, 240–4, 250–5, 257–65  
 quantitative easing 3–4, 30–1  
 quantitative investment rules 30–1, 33–41, 78–9
- ranges of values, model uses 163–87, 225–30  
 rate of contribution (RC) 168–71  
 rate of distribution (RD) 168–71  
 rating downgrades 3, 235–6  
 ratio analysis, funding tests 9, 113–21  
 RCP & Partners 211–12  
 real assets 1–5, 6–13, 17–20, 21–32, 41, 51–7, 71–2, 76–93, 97–105, 107–21, 143–4, 161, 213–14, 233–48  
     *see also* commodities; energy . . . ; forestry . . . ; infrastructure . . . ; natural resources; real estate . . .  
     definition 19–20  
 real estate investment trusts (REITs) 20, 100–1  
 real estate real assets 1, 3, 17–20, 21–3, 24–5, 32, 34, 41, 72, 100–5, 120–1, 141–3, 161, 209, 213–14, 233–48  
 real options, definition 19  
 realizations, limited partnerships 46–7  
 Rebonato, R. 99–100, 184–5, 209  
 recessions 2–4, 5, 8, 11, 20, 29–32, 49–50, 69, 76–9, 85–6, 107, 111–13, 121, 126–7, 144, 149–51, 235–6, 242, 264–5  
 ‘red-flag’ criteria 224–5, 228–30  
 references 267–76
- regulatory requirements 3, 6, 7, 10, 13, 23–4, 26, 29–32, 33–41, 44–7, 78–9, 100–1, 102–5, 107, 123–9, 153–4, 162–4, 166, 178, 181, 184–7, 208, 234–6, 246, 249–55, 257–65  
     *see also* accounting . . . ; Basel . . . ; Dodd–Frank Act; legal issues; Solvency II  
 relationships between parties 51–2, 109–10, 190–1, 251–5  
 remunerations, risk managers 13, 250, 254–5, 261–5  
 reporting systems 13, 153–4, 257–65  
 reputational risk, operational risk 47, 107, 207–8, 249  
 responsibilities, risk management policy 262–5  
 rest of world (RoW), statistics 24, 25–32  
 return indexes 126–7  
 returns 1, 3–4, 7–12, 19–20, 23, 28–9, 30–5, 36–41, 49–52, 53–7, 59–73, 78–93, 97, 98–105, 109–11, 119–21, 124–48, 149–60, 161–87, 189–202, 207–20, 222–30, 250–1, 259–65
- risk 1–5, 6, 7–13, 23–32, 33–41, 49–52, 59–73, 84–6, 93–105, 107–21, 123–48, 149–60, 161–87, 189–202, 207–20, 221–30, 249–55, 257–65  
     definition 9, 97–105, 107–13, 257, 264  
     perceptions 251, 253–5, 257–65  
     types 4, 8, 9, 36–41, 107–21, 208–9, 249–55, 257, 264–5  
     uncertainty contrast 9, 97–102  
 risk appetites 4, 76–93, 101, 152–3, 159, 190, 249, 251–5, 258–65  
 risk attitudes 4, 76–93, 101, 152–3, 159, 190, 249, 251–5, 257–65  
 risk aversion 4, 76–93, 101, 152–3, 159, 190, 249, 251–5, 258–65  
 risk exposure 9, 10, 84–6, 103–5, 107–21, 123–48, 250–1, 254, 257, 258–65  
 risk factor allocation approach 4, 7–8, 23, 59–73  
 risk limits, risk management policy 264–5  
 risk management 1–13, 31–2, 33–41, 43–57, 70–1, 73, 75–93, 97–105, 107–21, 123–48, 149–60, 161–87, 189–202, 207–20, 221–30, 233–65  
     best practices 13, 255, 257–65  
     definitions 12–13, 102–5, 109–10, 249–55, 257  
     due diligence 97, 103–5, 109–10, 150–1, 212–20, 226–30, 260–5  
     guidelines 5–13, 31–2, 38, 252  
     organizational structures 13, 251–2, 257, 261–5  
     principles-based approaches 13, 257–65  
     rules-based approaches 13, 257–65  
     stakeholders 251–5, 262–5  
 risk management policy 12–13, 249–55, 257–65  
 risk managers 12–13, 249–55, 257–65  
 risk measurement 8–12, 95–230, 250–5, 257–65

- risk models 8, 9, 12, 13, 64–73, 97–105, 108–21,  
 124–48, 152–3, 161–87, 189–206, 207–20,  
 239–44, 253–5, 257–65  
 risk premiums 2, 4–5, 7–8, 17, 20, 28–9, 33, 43,  
 49–52, 59–73, 89–93, 101–5, 111–12,  
 152–3, 159, 253–5  
 risk profiles 39, 259–65  
 risk quantifiability 9, 10, 12, 97–105, 108–21,  
 123–48, 159, 164–87, 189–202, 209–20,  
 250–5, 257–65  
 risk tolerance 39, 102–5  
 risk-free rates 64–73, 152–3, 155–9, 192  
 risk-neutral asset pools 71–3, 259–60  
 Robinson and Sensoy's (2011) sensitivity analysis  
 63–6, 70–3  
 rolling forecasts 163–87, 260–5  
 Rubin, Bob 252  
 rules-based approaches to risk management 13,  
 257–65  
 runs on sovereign debt 3  
 Russia 118  
  
 S&P 500 61–7  
 S&P ratings 211–12  
 safe assets 3–4, 34–5  
 Savage, Leonard J. 99–100  
 scaling operations, cash flow modelling 176–7,  
 180, 183–4, 207, 221–30  
 scenario analysis 9, 10, 11, 13, 113–21, 125–48,  
 162–3, 178–87, 239–44, 260–5  
 school construction 30–1  
 screening issues, fund managers 192–3, 217–18  
 secondary buyouts, definition 75  
 secondary infrastructure investments, definition  
 19  
 secondary markets 2–8, 45–6, 49, 50–1, 59,  
 75–93, 103–5, 110–21, 151, 166, 216–17,  
 235–6, 243–4, 263–4  
   concepts 8, 50–1, 75–93, 113, 151, 166,  
   216–17, 235–6, 263–4  
   critique 8, 50–1, 75–93, 264  
   definition 75  
 securitizations 3–4, 12, 18, 20, 70, 233–48  
   critique 235–6, 244–8  
   definition 233–7  
   statistics 234–6  
 self-liquidating aspects of limited partnerships 46,  
 48, 57, 108–13  
 self-regulations 258–65  
 'sell' signals 2–3  
 sellers, secondary markets 8, 75, 76–93, 113, 151  
 semi-probabilistic models 167  
 senior notes, securitizations 234–48  
 sensitivity analysis 63–6, 70–3, 178–87  
 'shallow pockets' funds 165–6  
 Sharpe ratio 64–5  
  
 'the silver bullet' model desires 179–80  
 Silver Leaf 234–6, 238  
 simple interest, hurdle rates 192  
 simulations 10, 130–6, 141–3, 171, 175–7, 225,  
 239–48  
 'skin into the game', GPs 190  
 Slyngstad, Yngve 41  
 social choice theory 210  
 social infrastructure 19, 30–1  
 soft hurdles 193–205  
 Solvency II standard approach 100, 102, 107,  
 126, 246, 258–9, 263–4  
 South Sea 'Bubble' 34  
 Southern Cross GP 29  
 sovereign debt market 3–4, 11, 17–20, 23–4, 34,  
 35, 41, 71–3, 107, 235–6  
 sovereign wealth funds (SWFs) 1–4, 5, 6, 23–32,  
 40–1, 44, 71–2, 79–93  
 special purpose vehicles (SPVs) 233–48  
 speculation 34–5, 219, 262  
 stakeholders, risk management 251–5, 262–5  
 stale pricing, optimal allocations 67–8, 127–9  
 Standard & Poor's 234–6, 239, 241–2  
 standard deviations 37, 64–5, 67–8, 116, 125–9  
 'standard' funds 228  
 stapled transactions 82  
 start-up companies, definition 18–19  
 State of Connecticut Retirement Plans and Trust  
 85  
 statistical probabilities 98–102  
 stochastic processes 59, 149–50, 170–1, 174–7,  
 179–80  
 stock market crash of 1987 77–8, 107  
 stock markets 1, 7–8, 59–73, 77–8, 100–1, 107,  
 235–6  
 straight carries 192–202  
 strategic group centre points 219  
 strategic measures, excess returns 7, 60–73  
 strategic sellers, secondary markets 78–9  
 stress factors, VaR 126–7, 139–41, 181  
 stress testing 11, 13, 180–7, 242–4, 261–5  
 structural risk, fund ratings/gradings 212  
 structurally illiquid investments, definition 6,  
 19–20  
 structured finance 12, 233–48  
 structured secondaries, definition 83  
 sub-prime mortgages 107, 245  
   *see also* global financial crisis from 2007  
 subjectivity concepts 9, 12, 97, 98–102, 103–5,  
 108–9, 127–9, 153–4, 164–7, 178–87,  
 189–202, 207–20, 221–30  
 successes 217–18, 250–1  
 super profits 45  
 Supreme Court of Alabama 35  
 Supreme Judicial Court of Massachusetts 34  
 SVG Diamond structures 235–6

- swaps 71–2, 102–3, 209  
 Swensen, David 25, 52, 167  
 Swiss sovereign debt 3–4  
 syndication aspects of co-investments 54–5  
 system environment, risk management 13, 257–9, 261–5  
 systematic (non-diversifiable) risk 65–73, 81, 171  
  
 tail risk 11, 76–7, 123–4, 178–87  
 tallying approaches, fund ratings/gradings 210–11  
 Taneo 235–6  
 target returns, secondary markets 88–93  
 tax 18, 44, 53, 190  
 technology-driven sectors, VC 19, 40, 61–2, 101–2, 107, 125–6, 178  
 Tenzing 234–6  
 term risk, real assets 4, 8, 71–2  
 terminal wealth dispersions 129–36  
 terms and conditions, limited partnerships 47, 51, 155–6, 189–202  
 Thomson Economics 68  
 Thomson Reuters 112, 125–9, 135–8, 213, 222  
 Thomson Reuters VentureXpert 135–6, 137–8, 213, 222  
 Thomson Venture Economics (TVE) 61–2, 124, 135–8  
 time horizons 17–20, 103–5, 109–21, 123–48, 155–9, 246, 259–65  
 time series, returns 97–102, 124–48, 164–71, 173–7  
 Tolkamp's model 169–70  
 top-down models 12, 164, 165–6, 189–202, 221–30, 242–8  
 total value to paid-in (TVPI) 91–2, 129–41, 145–8, 160, 171, 172–7, 183–4, 192–202, 207, 222–30, 243–4  
 tranches, securitizations 235–48  
 transaction volumes, secondary markets 83–6, 93  
 transformation of risks, securitizations 244–8  
 transparency issues 2–4, 7, 39–41, 44–5, 49–50, 53, 65–73, 82–3, 89–93, 97–105, 166, 184, 251–5, 261–5  
 Treasury bills 11, 152–3  
 trends, illiquid assets 4, 6, 17, 26–32  
 Treynor ratio 64  
 trust issues, risk management 258  
 trustees, prudent investing 33–41  
 turnarounds 24–5, 50, 79–82, 92, 105  
  
 UBS 79, 81, 82, 83–4  
 UC *see* undrawn commitments  
 uncertainty 9, 38–41, 43, 47–9, 57, 66, 79–92, 97–105, 149–50, 180–7, 210–20, 259–65  
 undrawn commitments 10, 11, 107–8, 110, 113–21, 128–48, 149–60, 161, 167–87, 218, 245–8  
 Uniform Prudent Investor Act (UPIA), US 36, 38  
 United Kingdom (UK) 4, 34–5, 44–5, 56–7, 118–21, 258  
 United States (US) 1–4, 6–7, 18, 20–32, 33–41, 44–57, 60–73, 85–93, 97–105, 107, 118–21, 189, 191–202, 249, 258, 263–5  
 unquoted portfolio companies, information provisions 49–50  
 unrealized capital gains and losses (UCGLs) 52  
 unrecognized/unrealized gains 9, 111  
 upside risks, downside risks 9, 97, 102–5, 111, 192–3, 216–17, 248, 249–55  
 US Department of Labor, prudent investment 7, 35, 40  
 US Treasury bonds 3, 71–2  
 'use test' regulatory requirements 13, 185–7, 259–65  
  
 validation and verification of models 184–7, 250, 258  
 valuations 2–3, 8, 10, 13, 25–6, 29–32, 48, 50–1, 61–73, 75, 86–93, 97–105, 108–9, 111–21, 123–48, 150–60, 167–87, 222–30  
 value chains 60–73  
 value-at-risk (VaR) 10, 123–48, 181  
 variance 4, 59, 64–73, 98–105, 124–9  
 variance-covariance 67–8  
 venture capital (VC) 7, 18–19, 21–3, 24–5, 26, 31–2, 35–41, 45–6, 47–8, 55–7, 61–73, 88–93, 97–105, 110–21, 126–48, 161, 165–6, 172, 178, 186, 189–90, 192–3, 210, 214–15, 222–30, 235–48, 259–65  
   definition 18–19, 101–2, 165–6  
 verification and validation of models 184–7, 250, 258  
 vintage year diversification 136–41, 144, 152, 169–87, 241–4  
 'virtual fund' valuation basis (VF), undrawn commitments 155–60  
 volatilities 3, 10, 11, 25–6, 66–73, 124, 129–36, 143–8, 167–87, 200–2, 243–4, 260–5  
 Volcker Rule 78  
  
 Washington State Plan Investment Board 1, 26  
 WEF (2011) 71–2  
 Wilson's CreditPortfolioView 110–11  
 World Economic Forum (WEF) 29–30  
  
 Yale 11, 25–6, 52, 68–9, 167–71, 176–7, 183–4  
 yields 1, 3–4, 8