## CFA

| * Reason keywords * Read context & instruction * Paraphrase + generalize | | * Return vs risk ← PF efficient ← diverse * Liquid, cap efficient, Inf & purchase pw, size * Tax = liability if sell; absorb R & ∂ | |
| --- | --- | --- | --- |
| Buy / Receive / Long / Borrow / Duration +  Appreciation / undervalued / Price expect to +  Long only, +capacity, loss limit, intuitive, LT, ideology  Ex. M&A exposure —> Sell M&A insurance  Benefit from M&A = + M&A = long = short put | | Sell / Pay / Short / Lend / Hedge / Write / Fear  Depreciation / overvalued / Price expect to -  Short squeeze, hard, costly to borrow, position limit  Ex. Life insurance —> Buy life insurance  Fear - life = Benefit from - life = - life = put | |
| Diverse = right tail skewness = low active ∂ | | Less diverse = left tail risk, extreme downside | |
| ST = short term, goal: - ∂ ← momentum, misprice | | LT = long term, goal: + r ← liquid premium+, ALT+ | |
| R | Return, performance - ∂ | ∂, risk, variance | = StD^2 = volatility^2 |
| å, alpha = value-added r, Security Select Skill, timing | | Cov, covariance | = [X-E(X)][Y-E(Y)] / n |
| ß, beta | F, ∂ factor = volatility to market | Cor, correlation | = Cov / StD.X\*StD.Y |
| Inf | inflation | ∆ (OPTION + J) | Change = end/begin - 1 |
| Div | dividend, income | Liquidity | Public & FU & ETF + VS OTC |
| Trade cost | MGMT, commission, b/a spread, trading, custody, admin, tech infra | Size scale Pro  Con | Gov, Access: ALT, manager  Capacity needs, neg market impact |
|  |  |  |  |
| DER, derivative | OPT = options, F&F = FU & FW = futures & forward, swap | Initial outlay -, quick, liquid (- if OTC), leverage  Position limit, credit ∂, counterparty ∂, rollover ∂ | |
| Pooled: MF | Trade at NAV, T+1 end | Fundamental | Theory foundation, equilibrium, MVO |
| Pooled: ETF | Trade Premium/Discount, T+0 | Top down | Macro, allocation to industry / Factor |
| HF | Hedge Fund | Bottom up | Micro, position, holding |
| Bond + | + fixed receive, + Dur | Technical | Regression, History not repeat |
| Underlying + | + f&f = buy basis = Spot - f&f < 0 | - Factor ∂, ß | r-rf; SML; HML = low multiple; WML |
| YEN / [USD] + | + USD = + YEN/USD swap | - Monte CS | Scenarios, NO Normal, Sensitive |
|  |  | BM, Benchmark | Relative style index, active track ∂, IR |
|  |  |  | Absolute, rf T-bill + %, total ∂, SR |

## 

## CME

| 9 Challenges  1 ECON data | Time lag | = the older data, the less reflective of now |
| --- | --- | --- |
| Revision, re-base | = change in definition / calculation |
| 2 measure bias | Survivorship, remove failures  Appraisal, low frequency  High frequency | = +estimate r  = -estimate ∂ (smooth) -Cor !!  = precise Cor, ∂; less precise mean |
| 3 historical | Regime change !!, NO stationary | = too long range → environment change, alter ∂-r relation |
|  | Normal distribution | = skewness, fat tails |
| 4 ex post data →  ex ante biased proxy | NO reflect Neg event  Pos momentum → Pos estimate | = -estimate ∂ +estimate r  Look ahead |
| 5 analyst method | Data mining !! mis-generalize | = repeatedly search → include irrelevant variables; Once → all the time; unreliable |
|  | Time period | = Period specific → All the time; ST → LT |
| 6 ignore condition | r-∂ relation changes in expansion, contraction/recession, recovery | |
| 7 Cov Misinterpretation | | = Cor <> causation |
| 8 BF | Anchoring  Status quo  Confirmation  Overconfidence  Prudence  Availability | = + initial impression  = + recency → avoid change  = + own opinion  = - bad event  = + history data → + ∂  = + significant experience, memory |
| 9 model & input | Model, parameter, input | |

| Pro/Con  ECON metric  Structural  Quant | Robust model  Quickly generate output  Quant analysis of exogenous variables  Disciplined & consistent analysis  Foundation in FINE theory | Complex & time-consuming  False sense of precision & signal  Inputs (x) NO easy to forecast  Relationships No static/stationary, regime change  NO predict turning points |
| --- | --- | --- |
| Leading  Indicator  Diffusion | Simple & intuitive to build, qualitative  Readily available  Easy to predict turning points | Look ahead bias = NO public for that time  Current data NO reliable as input  Provide more than binary direction |
| Checklist | Limited complexity  Flexible & broad = inc. / exc. any items | Subjective, manual → limited depth, NO consistent  Time-consuming!! |

| Tool, ∂ | Factor / target | Large number, less factor  Less sampling error  cross-sectional | Biased, inconsistent |
| --- | --- | --- | --- |
| Formal tools: 1) DCF; 2) Risk Premium, CAPM; 3) Statistical = | | | |
| Sample | E, ∂, Cor | Unbiased, consistent | Small number  Sampling error  NO cross-sectional |
| Shrinkage | 0.8\*history+0.2\*estimate | Efficient |  |
| Time-varying series | ARCH, mean reversion | ∂ clustering, shock | å+ß<1 |
|  |  |  |  |
| R, ST, Taylor rule | = neutral real r + Inf + 0.5×(GDP% E – trend) + 0.5×(Inf E – target) | | |
| R, bond | = YTM = rf + term + credit + liquidity premium | | |
| ∂. bond  emerging market EM | Bond: Legal  Econ: competitive, account deficit  Politics: per capita income | | Equity = Bond + Govern (insider, disclosure, ACCT, transparency) |
| R, equity !!  Grinold Kroner  GDP = economy | = D/Price + %∆Price ← return $ = income + price growth  %∆Price = %∆P/E + %∆Share in GDP (S) + %∆GDP (g of GDP)  ← Price = P/E \* E/GDP \* GDP  %∆GDP = labor input (force + participation) + labor productivity (tech + capital) | | |
| Singer Terhaar  Sharpe R = rp / ∂ | r.i (risk premium) = Cor(market, i) \* ∂.i \* rp,market / ∂market →  r.i (risk premium) = Cor(market, i) \* ∂.i \* SR.market; Cor 100% segmented = 1 | | |
| R, real estate  Profile=bond+equity | = cap r + growth rate - %∆cap r → cap r = NOI / Price  = r.bond + equity risk premium | | ∂^2, de-appraisal = (1+λ)/(1-λ)\*∂.appraise^2 |
| R, FX | LT real rate the same → Nominal r, Inf +, FX - | | ST → r +, FX + |
| FX Paradox, 2 of 3 | (1) control money policy → interest r, (2) fixed FX, (3) unrestricted $ flow | | |
| Net export ← Current +, Capital - | ST r +, GDP +, unrestricted money flow +, integration + (r -), policy ease +, Current account +; Capital account, ST ++, LT - ← Overshoot | | |

| Business Cycle !! | recovery | early / late expand | slowdown | contraction |
| --- | --- | --- | --- | --- |
| Spending | + | ++ / + | Peak → - | - - bankruptcy |
| Inf, CPI (LAGGING) | - | + (bottom) / + | + | -, peak → deflation |
| Sensitivity | Cash = Real estate = - bond; Stock = ∂ | | | |
| Money → ST & Inf  Fiscal → LT & real r | loose = stimulative | - loose /  + tight, soft landing | tight = restrictive | + loose |
| + deficit = - tax & + gov bond  → higher [Inf + real r] | | - deficit  → lower [Inf + real r = nominal r] | |
| ST r = Floating r  = Cash, Money Market | Bottom - → + | ++ | Peak + → - | - - |
| Unattractive: 0 > int r = deflation; Attractive if 0 bound: 0 = int r > deflation | | | |
| Real Estate ≈ Cash |  |  |  | -, rental -, price - |
| LT r = Bond ≈ Real int r  (CONCURRENT) | Bottom | + or = / + | Peak | -, price +, attractive |
| Yield Curve | steep | + flat | flat → invert | + steep |
| Credit spread ≈- Inf | + |  |  | + |
| Private borrowing | + | + | - | - |
| Equity  (LEADING) | + | + / ∂+  Trend growth | -, Peak for quality stock | Bottom  ∂+, price- (buy) |
| Cyclical, risky(+LEADING) | + | ? / - |  |  |

| Role AA !! |  | r | Cor equity, - Diverse | - Inf | ∂ | Cyclical outperform in high growth |
| --- | --- | --- | --- | --- | --- | --- |
| D & FX |  |  |  |  |  |  |
| Bond | Gov, Inv-grade, non indexed, rf | L | L to Neg | Deflation | L | N, outperform in recession |
| Index: Inf linked, TIPS  Floating coupon |  |  | H |  | N, outperform in good ECON |
| Yield, Credit | H |  |  | H | Y |
| Equity | Public | H |  |  | H | Y |
| Private  More concentrated | H+ | Diff than Public Equity = idiosyncrasy & liquid premium |  | H+ | Y, + tenure in recession |
| ALT  Less transparent  Seek market inefficiency | Estate, REIT/Private | M | H | H+, -estimated | Y |
| Asset |  | L | H | Y |
| - Public, Commodity |  |  | H++ | Y |
| - Gold !! |  | LL | H | N |
| - Private, Timberland | H |  | H |  |
| - HF | neutral, speciality | H | L |  | L |  |
| long/short, event | H |  |  | M to H |  |

## 

## AA

| ECON Ass = Financial | + Extended (PV): Money in = human capital (future earnings), pension in, inheritance  Money out = Consumption, education, other support | |
| --- | --- | --- |
| **Strategy LT AA**  **1. Asset** | MVO → Sharpe R = (R.PF - R.b) / ∂ → + Equity  R.benchmark = risk-free rate, required return  Utility = E(R.PF) - 0.005 \* A \* ∂^2 (0.5 if %) | NO other, liability, goal, constraint  NO absolute level of PF ∂  + asset SR <> + PF SR |
| Global PF | 1) baseline 2) - diversifiable ∂ → 3) - illusion of control, availability (home, familiarity) | |
| Pro  Foundation  Intuitive  VS Con | Sensitive to input → mean, variance, Cor  Concentrated in a subset → NO diversify risk  NO other → liability, goal, constraint  Single-period framework → path dependent  Only long positive weight → adjacent corner PF | Reverse → implied r →  Black L → analyst view + diverse  Resampled Monte → average frontiers  + real world constraints → realistic  ∂ budgeting / ∂ factor based  + illiquid assets  Non normal → semi ∂, drawdown  Monte Carlo → + trade cost, tax |
| ∂ | budgeting → (R.PF - Rf)/MCTR = ß\*∂ = same | parity → ACTR = ∂PF / n = W \* MCTR |
| **2. Liability** | - Shortfall ∂ → + Fixed = Equity as potential | Legal & quasi, uniform, forecast |
| Surplus  Two PF  Integrated | Asset - Liability  Hedge / r-seeking (partial variants ← Neg ratio)  Comprehensive ← liability ∂ factor | = linear Cor of Ass-L (Cor Matrix)  = conservative inv ← Pos funded ratio  = complex, multiple periods |
| **3. Goal** | Max r, given prob & tenure → mental account | NO legal, varied, NO law of large # |
| **∂ modeling** | | |
| Ass class → overlap ∂ factor | Homogeneous  Mutually exclusive  Diverse  Complete, preponderant  Other factors, inclusive | NO real estate + stock as 1  NO public + private stock as 2  Cor < 0.95  Classes = majority investable  Liquidity + transaction cost |
| ∂ factor | Control ∂ exposure BUT NO directly investable → isolate ∂ factor ← long / short | Inf, SML, HML, real interest r = Inf linked bond |
| **Adj, risk policy, rebalancing** | | |
| Tactic vs weight | Tactic ST AA = ST deviation ∂→ + / - timing  ∂ source = monitor + trade cost  Discretionary = quality; System = quant = - bias | XX - weighted index  → decision to adj weight XX |
| Band !! | + ≈ ∂ (Q), Tax = B/(1-T), Cor, momentum, illiquid  - ≈ ∂ (Text) | ← % Range, corridor = disciplined  VS calendar = lower overhead |
| Price PUT | Illiquid asset price = K - PUT → illiquid R  K = liquid asset price (fair market) → liquid R | liquid premium = illiquid R - liquid R |

## DER

| C+K=P+S | Bear | Neutral / Specific Price | Bull |
| --- | --- | --- | --- |
| -∂, - Der | -C = -S-P = Covered P | -C-P = -Straddle | -P = S-C = Covered C, upper limit |
| ≈, ±Der | P-C = -FW = K-S  Bear Spread | Calendar Spread, time decay | C-P = FW; Collar = S+P.L-C.H  Bull Spread = C.L-C.H |
| +∂, +Der | P = -S+C = Protective C | C+P=Straddle.ATM, Strangle.OTM | C = S+P = Protective P, lower limit |
| Delta = slope = ∆Price.Der / ∆Price.S  C, OTM, ATM, ITM = 0 → 1  P, 0 → -1; S, FW = 1 | | volatility trade + ∂ factors: ∆, γ, T  γ Gamma, Max @ ATM  Theta = absolute value | ∂ volatility, Smile VS  Skew: implied volatility P > C →  C-P (Risk Reversal) |

| Exposure Target = Exposure PF + f | Bond exposure = Mod Dur \* MV;  BPV = Mod Dur \* MV \* 0.01% (1BP) | Equity exposure = ß \* MV |
| --- | --- | --- |
| Bond f →  Bond Swap  021 R9 Canaw | BPV.T = BPV.P + n \* BPV.f / Convert F  BPV.f = Mod Dur \* MV \* 0.01%  MV = contract size \* market price | Equity f → ß.T \* MV.T = ß.P \* MV.P  + n \* ß.f \* MV.f \* multiplier  Equity Swap is -liquid |
| Volatility VIX index NO → FU, OPT  Contango → - VIX FU, OPT ← VIX & Variance is reversed position ← VIX decreases MORE VS spot VIX | Variance swap → Hedge tail risk; ex. Gain in five months on a purchase of $1,000,000 vega notional of a one-year variance swap on the S&P 500 at a strike of 15% (annual):   * Over the next five months, the S&P 500 experiences a realized volatility of 20%; * At the end of the five-month period, fair strike of a new seven-month variance swap on S&P 500 will be 18%; The annual interest rate is 1.50%   Variance notional = 1,000,000/(2\*15) = 33,333  Variance diff = (5/12\*20^2+7/12\*18^2-15^2)=130.67  PV=33,333\*130.67/(1+1.5%\*7/12) = 4,317,880 | |
| Change % = (FFE - 2.625%)/(2.875% - 2.625%) = 80% ← | Implied Federal Funds Effective (FFE) Rate = (100 - price)% = 2.825% at 97.175  Current target range midpoint = (2.75% + 2.5%)/2 = 2.625%  Future changed target range midpoint (+25bp) = (3% + 2.75%)/2 = 2.875% | |
| FX, shown in D/F  → YEN/USD +, YEN -, YEN Spot - f = positive basis > 0, USD +, YEN/USD swap + | 1 + r.DomesticC = (1+r.FC) (1 + FX)  ∂DC^2 = ∂FC^2 + ∂FX^2 + 2Cor\*∂FC\*∂FX  ∂DC = (1+r.free)∂FX where r.FC = r.free  % range deviation = 100% - hedge ratio  Cor (FX, FC) - → ∂(DC)+, å+  Carry trade: + r, with + ∂ & trading cost, when market stable | No hedge: LT, revert to fair $ equilibrium, 0 sum, Neg Cor(FX, PF), multi FX = fundamental  Hedge: ST, inefficient pricing, trade deficit / surplus, central bank policy, High Cor(FX, bond), risk aversion, liquid needs = technical (NO where should trade BUT will trade, when); historical (pattern, trend to repeat) |
| Hedge method  Single match, no rebalance, seek ∂ +  Dynamic, rebalance  Proxy, macro hedge | Cost: Bid/Ask spread & Roll at maturity  Upfront premium for OPT, NO for F&F  Admin infrastructure, personnel & tech  Opportunity forego potential favorable move | Passive = 0∂, mimic benchmark  Discretionary = 5%, neutral (no market view, non trending), less ∂  Active = 10% + ∂, FX separate asset  Overlay = active + outsource to FX expert |
| FW Cash flow  028 R10 Rosario  1. Inception: + f  2. At maturity, swap settle, FW roll | Investor risk hedger = +OPT for PROTECT = - exposure, high ∂ → + ∂  Speculative OPT trade = -OPT for PREMIUM = + exposure, high ∂ → - ∂ | Vehicles: FW, cheap, no cost, liquid  FU, less liquid for FX ← limited pair  NDF, Non-Deliverable FW = settled in FC ← restriction so no F&F  OPT: put & put spread, collar, seagull |

## Bond

| r + → P - → - bond !!  Tier 2 = $ known & time NO, term insurance | Diverse; Cor change  Regular CF  - Inf ∂: floating; Inf linked, TIPS | Risk: rf; Spread & Credit (macro VS micro)  Liquidity ≈+ credit, issue frequency, size, new (on the run), ST |
| --- | --- | --- |
| Tax, T% interest > cap gain (NO offset between) | * When constructing, MAX capital gain NO harvest loss!! * When liquidating, harvest loss for Taxable; indifferent for NON Taxable | |
| rf → interest r + Y curve   * Duration: ∆r small * Convexity: ∆r big | Mac Dur → immunize Parallel shift → lock in CF yield = IRR of CF | Convexity, dispersion - → - structure model ∂, Twists & Non-Para shift ← Key Rate Dur & PVD of CF   * Effective Dur & Conv → CF unpredictable, Der, mortgage |
| Modified Dur → Portfolio  > Empirical Dur, market regression |
| r = rolling Y(∆t) →Coupon + ∆P%(∆t) = roll down r =P.end/P.beg-1  + ∆P%(∆Y, ∆spread) = - Dur\*∆Y + 0.5\*Convexity\*∆Y^2  + Default Loss = POD \* LGD  + ∆FX = (1+R.fc)(1+R.fx) - 1  Excess spread = spread + (- Spread Dur)\*∆spread + Default Loss  Excess r = r.managed - r.BM | | DTS (Dur Times Spread)  = Eff Spread Dur \* Spread (for high Y)  = Spread Dur \* ∆S (for inv grade)  Spread Dur \* S \* ∆S/S = DTS \* ∆S%  ∆P/P = ∆P% = Spread Dur \* ∆S  Butterfly Spread = 2M-H-L: Pos B S = - B |
| 1. Liability  1.1 Duration match, Immunization → - shortfall  ON balance sheet B/S | * CF inefficiency * Complex & Rebalancing * Cheap * ASSUMING para shift | * PV A >= PV L * Mac / Eff Dur A ≈ Dur L (< or >)   Money D = D\*PV; BPV = Money D\*0.01%   * Conv A least & >= Conv L |
| PV A > L, OFF B/S  1.3Contingent=1.1+Active  Tender offer | 1.2 CF match, OFF B/S   * CF repay * Simple, intuitive → pricey * Rebalancing NO required | 1.4 Der Overlay !! ∆Ass + ∆Der = ∆L →  BPV.Ass + N \* BPV.Der = BPV.L  BPV.Der = BPV CTD / Convert Factor  BPV.A\*∆Y.A+BPV.Der\*∆Y.Der=BPV. L\*∆Y.L |
| 2. Total return Asset only 2.1 Active VS Passive | 2.2 Pure full replication = costly  ≈ match, r, ∂, Dur ≈ | 2.3 Enhanced stratified sampling = cheap  = + match, r, ∂ +; Dur ≈ |
| 3. Credit Spread≈ -rf & Inf  G-Spread = YTM - Gov r | I-spread = YTM - swap r = intuitive  ASW (ass swap) = coupon r - swap r | Z-spread = DCF using spot rate = precise  OAS = for OPT embedded = precise |

## 

## Equity

| Capital gain  Div income  Diversification  - Inf ∂, price power | Size / Cap VS Style  Growth, g+ → high P/E  Value, Div+ → low Book value, P/E  Blend = Core | Segment, Geo: developed, EM, frontier  Econ: sector, industry  Market served: downstream  Production: upstream |
| --- | --- | --- |
| Concentration !!  Effective # stock  = 1/HHI =1/∑Wi^2 | Benchmark: Rule-based; Transparent; Investable ← buffering, packeting | Weighting: Price, same #, Price bias  Market-cap, same cap%, big cap bias  Equal, same $, small cap bias, rebalance |
| r ← Div & capture;  Stock lending;  Activist; - OPT | Vehicles: (A) Pooled: MF, ETF; (B) Der overlay: Completion, Rebalance, FX | ∂ Tracking error ← Intra-day trade; Cost;  Cash Drag → Equitize desired exposure   * ETF = + liquid , + error ← + outlay / NAV diff, interest rate = ref r + BP * DER = - liquid (if OTC), - error ← - outlay, interest rate = ref r, quick implement, flexible reverse, liquid |
| 1. Passive  Smart ß factor VS Index | * Index: Full replication; Blended * Stratified sampling, quality, cost - * Optimization, quant model past, ∂ - |
| 2. Active  Con  trait | 2.1 Fundamental, + outperform, FINE stats  Value trap, growth trap  Subjective, discretionary, å (SSS, exp.)  Forecast future  Select securities → company ∂  Rebalance continuously | 2.2 Quant, Optimize, + alpha, adjust ß F  Survivorship, look ahead, overfitting  Exe (turnover constraints, lack short, cost)  Quant overcrowding  Objective, systematic, statistical model  Use history data → past NO repeat  More securities → PF ∂  Rebalance regularly |
| 2.1 Bottom up  P/E, P/B, multiple  Value = low multiple | Value: Relative, Contrarian, Deep Value, Income: +Div, High Quality: Buffett + Intrinsic  Restructuring & distressed debt: bankruptcy  Special: divesture, spin-off, M&A | Growth = LT or ST misprice / sentiment  Earning G, LT consistent VS ST momentum  GARP = G at reasonable price = P/E:G |
| 2.3 Factor  Reward: size, value, momentum, (value/growth trap if ignoring others)  -: seg, sector | 2.2 Top down: Segment country geo, Econ sector rotation, thematic, ∂ Der | 2.4 Activist, HF; <10%; shorter, a few years → Okay FINE & bad MGMT |
| Hedged PF: Fama 3, assume linear relation  Mimicking: pure, dollar neutral, 1 factor 1 unit  Timing: style rotation; Tilting: long only | NO “pure”: nonlinear relation NO captured  middle quantile ignored, long concentrated, assume NO short limit |
| 2.5 Market Neutral, Pair Trading = 0ß &  high active share  = 2å & low ∂.active | r.active% = IR \* ∂.active = ß + (å + ε, luck)  All, r%\*$ = Breadth exp.= IR = IC \* TC \* √BR  ß = factor +weight outperform  å + ε = CME, SSS, ß Timing!!, ε idiosyncrasy  $ = Position sizing, scale, how much $ | ∂.active ← ß + share; contribution =∂ß1/∂PF  ∂ß1 = ∑ß1\*ßiCov(1,i) = ∑W1\*Wi\*Cov(1,i)  Active share=½|W.PF-W.BM| → + ∂.active  Relative ∂ = +IR, tracking ∂ to BM = ∂.act  Absolute ∂ = +SR, size, tracking ∂ = ∂ |
| Long/short 130/-30  Net exposure = 100; Gross = 160  diverse - market ∂ | Style: Holding, each position, 9 box →  Data intensive, costly  Precise, identify change quickly, individual  Hard to identify significant Der position | Return, regression history →  Minimal info, quick, cheap, widely used  Hard to identify current style (history data)  Hard to identify more aggressive position |

## 

## ALT

| HF  Conditional F = Equity, Credit, Currency, ∂ | Approach → + undervalue  Diverse ←- ß, ∂ → + r å  - Inf ← Real estate, assets | Dynamic; conditional linear regression r  r = ∑exposure \* risk factor + [unexplained]  = ∑ßn\*Fn + [å + ε + ß?\*F? (omitted factor)]  ß = exposure changes in situations |
| --- | --- | --- |
| Equity  market ß  Diverse Long | Long short = net long ex. 130/-30  Dedicated short biased = net short  Equity market neutral = only å, 0ß | = market trend rise; lever, liquid  = short squeeze; neg ß, low r  ← Non-trending market = mid r, liquid |
| Event | M&A = soft, NO public; hard, public  Distressed = liquidation + reorg = equity like | = short put / insurance on M&A, lever, liquid  →senior > junior secured > unsecured > convert |
| Relative  Bond | Fixed income   * Yield curve = + calendar spread * Carry trade = + illiquid off run, - on run * L/S credit = + high yield, - inv grade | Dur matched → hedge term ∂  = Low Cor, short put profile, High lever  = trade less frequent, thinly |
| Convertible bond = + bond - stock  High bond issuance, mid ∂, okay liquid | Short squeeze; Credit risk; Time decay of call; Left tail risk |
| Opportunistic  Der intensive →  High positions, diverse, right trail & lever & liquid | Global Macro = Contrarian, Qualitative  Top down, directional or thematic | Contrarian → No crowding effect  Worst for mean-reverting low ∂ market |
| Managed FU = Momentum, Quant  Time series momentum = past repeat, 1 bond  Cross sectional momentum = relative r in sections is predictable, 30 bonds, 15/-15 | Momentum → Crowding effect, trending impact  Quant → systematic  Heterogenous outcome  High lever → + volatile |
| Specialty  Diverse r å | Volatility trading = ET / OTC OPT; VIX FU & OPT; OTC variance / volatility swap | Pos Conv  Low initial outlay with high r |
| Reinsurance  Insurer: ∂ transfer, capital, solvency | GOAL → FV pay out < FV in →  - surrender & ongoing premium pay; die earlier |
| Multi Manager  !!  Multi strategy + lever but depends | Multi Strategy  Efficient, fast, tactical  Transparent  Investor friendly fee → - netting risk  Operational risk  - diverse → left tail ∂  - liquid ← gating | FOF  -, Agent principal dilemma ← NO reflect opinion  -  -  + diverse → - extreme ∂, - key person ∂  + liquid, accessible for smaller investors |

| Inv Horizon  private vs public | >15 years, r focused, + private = illiquid premium  <15 yrs, ∂ focused, + public, + DER, + 2nd market = - lock-up, - entry-exit process |
| --- | --- |
| Due diligence!! | Public = need less due diligence (2nd market, REIT, ETF)  Private = need more ← less transparent |
| Governance  Exist, in place? | Reporting frame  Asset inv policy, objectives, decision making |
| Transparency  Easy to implement? | MAIN Concern, but NO expect full transparency for ALT, especially private  Reporting frequency  Asset inv transparency / blind pool |
| AA | 1. Monte Carlo Simulation (relax normal assumption)  2. Risk factor based  3. MVO (over concentrate), MVO with constraints &  Conditional VaR = Address left long tail risk = neg skewness = alter decision |
| Traditional | Intuitive in describing the roles of asset classes  Easy to explain (basic understanding)  Identify mandates  Certain constraints (overhead cost, in-house)  overestimate diversification, -∂ (smooth)  Group assets, commingle |
| Risk based | NO group assets = separate assets of actually similar risks  Risk factor & framework & R pattern, for public NO private ALT  NO stable = shifting = sensitive to look-back historical period  Implementation hurdles |
| Performance BM | Custom index proxy = mix equity & fixed  Peer group = NO good substitute = hard to identify peer |
| Performance | Stale pricing = appraisal method = smoothing |
| Monitoring  Key Person Risk  Style drift  Inv Risk  Client/Asset turnover, profile | MGMT change  Inv universe, strategy change  Complexity  Gain / Loss, profile change, impacting performance |

## 

## Private

| Info, FIIICC | Family, ID, inv background, inv preference, client’s goal & risk, career | |
| --- | --- | --- |
| Goal, objective | Priority = needs / retirement, inv, philanthropy, discretionary  Quantify = amount, cash flow in & out | |
| Risk tolerance | + Time, amount, flexibility | - goal importance, spending needs |
| Risk capacity, tolerance, perception | Objective  Capacity | Subjective  Tolerance = NO change, seek / averse  Perception = change |
| Skill | Tech: PF construction\*, language | Soft: educate about finance |
|  | | |
| Capital Sufficiency  Looking ahead CME | Deterministic, straight line growth | Monte Carlo S, average r & ∂, tax  75-90%, prob NO magnitude |
| Retirement planning | Mortality table: survival prob, spending until death (lifespan) | Monte Carlo S = scenarios (tax), flexible  Annuity pricing = goal based, living fees |
| IPS | | |
| Background & Objective | IPS = meet objective & constraints  Review IPS → Trade | |
| Parameters | ∂, time, asset out of scope, ESG, liquidity, constraints | |
| PF AA | Strategic, Tactical | |
| PF MGMT | Discretionary, rebalance, Tactical, implement | |
| Duties & responsibilities | & review | |
| Appendix | Modeled PF behavior = possible performance outcome  Modeled PFstats = CME = r, ∂, cor | |
|  | | |
| P AA construction | traditional | goal-based |
| Reporting, one way  Review, two way | Asset Allocation  Performance: summary & detail, history  Trade: deposit & withdraw, buy & sell  Other: FX currency exposure, benchmark, CME, edu | |
|  | | |
| Segment million  Net worth  0.1, 1, 5, 50 | 0-0.1, MF & ETF: robo-advisors  0.1-1: mass affluent, digital | 1-5: high, customary tax & estate plan  5-50: very, fully discretionary, + classes  50-: ultra, multi-generational, complex |
| Evaluation !!  Now & future | Goal achievement | * R & ∂ within IPS * Succeed without adj * Liquid, capital sufficiency |
|  | Process consistency | Guideline, ongoing, coordinate, fee |
|  | P performance, R & ∂ | * of each portion * Within IPS * Targeted R |
| Risk & Tax factors  Considerations | * Return vs risk ← PF efficient ← diverse * Liquidity, capital efficient, purchasing pw * Tax = liability if sell | |
| Wealth transfer  !! 44 Enlow\* | Gift, now  Recipient r & tax rate  Gift tax rate | Bequest, future  Giver r & tax rate, before bequest  Inheritance tax rate |
|  | | |
| Goal of transfer !! | owner, control over succession | no owner = sell / separate = asset protection |
| Business | Equity monetization | Tax free exchange  Leveraged recapitalization  Charitable remainder trust (Donor & beneficiary) |
| Personal | Loan secured w/o put (Int = tax expense) | ESOP |
| Real estate | Mortgage financing | Sale & lease back (no tax trigger)  Donor advised fund (Donor) |

|  | | Net worth = Traditional | | Net WEALTH = ECON = Conditional | |
| --- | --- | --- | --- | --- | --- |
| FIN Asset | | Personal, House, Future VESTED | |  | |
| Liability | | Loan, mortgage | | Future BEQUEST  Future Consumption (PV) | |
| Human Capital  - COR w FIN asset | |  | | Future UNVESTED pension  Future earnings = ∑ wage \* (1+growth) ^ t / (1 + rf + risk adj) ^ t;  t ≈ death, work years  risk adj ≈ earning volatility, Cov +, capital -, ins - | |
|  | | | | | |
| Insurance / Annuity parties | | Premium Payer | | Owner (policy, contract) | |
| Trigger, happen to WHOM | | The insured / Annuitant | |
| Remainder Receiver | | Beneficiary (only for life insurance) | |
| Annual net payment = Premium - Div / (1+discount r)  Cost index = Annual net payment / # of policy | | | | Premium at begin, Div at end  # of policy = face value / 1,000 | |
| Life insurance, HLV vs human needs, !! 84 & 85 | | Replace PV future earnings  Provide estate / legacy liquidity  Expenses from death (funeral) | | Needs analysis → insurance = needs - ass  HLV, Human Life Value = PV human capital - existing life insurance | |
| Death  Annuity  Universal (perm) | | = Term (temp), whole life (perm)  = - Longevity risk  = Invuniverse | |  | |
| Disability | | Regular specific job (highly skilled)  Any job by education, experience  Any job | | Comprehensive & costly  General & cheap | |
|  | |  | |  | |
| Health insurance | | Provider | | Medical fees | |
| Indemnity | | Any | | Reasonable customary | |
| Preferred org | | Many of large network (preferred) | | Low | |
| Health maint org | | Office visits (ailment) | | Min - 0 | |
| Comprehensive major | | Comprehensive (major medical) | | Most | |
|  | |  | |  | |
| Annuity | | Age -, payout -  Certainty +, payout - = + OPT | | Variable: inv universe  Advanced: starting late at > 85 | |
| Risk, high impact severity | | Avoid: high frequency, impact | | Transfer: low frequency, high impact | |
|  | | Reduce | | Retain | |

## Institution

|  | Gov Principal: Board, strategy  In Agent: Committee, office, staff  Ext = board, 3rd party, broker, consultant | Size+, ALT, HF&private+  Regulate, report, tax, ACCT  BIG = 12 b; ALT 500 m  small = 100 m; 10% budget |
| --- | --- | --- |
| Norway = Passive + In  Endowment = Active + Out  Canada = Active + In | Passive = - ∂, å value, ALT, fee, complex (Inv, gov, exp.), +size (capacity, impact)  Inhouse = + internal capabilities, transparent, - key person manager ∂, inv universe  Liability Driven Inv: L-covered, NO hedge Inf / longevity ∂ | |
| Pension, No Tax  Payment  Contribution  Inv decision  Shortfall risk  Mortality / Long ∂ | DB, ER  Contract  ER + ee may  ER  ER  ER (pooled mortality risk) | DC, EE choice  Based on contribution & Inv r  EE + er, known rate  EE + er menu  EE  EE |
| DB: Report SURPLUS, ASSET → - Contribution → Benefit shareholder  Discount rate = high-grade bond < R → vested - → return + | | A\*DA = E\*DE+D\*DD\*YD/YA; E^2\*∂E^2 = A^2∂A^2+D^2∂D^2-2A\*D\*∂A\*∂D\*Cor |
| IPS  Mission  To  Objective | LDI: DB (LT), Insurer (?), Bank (ST)  = Manage A/L  = ∂: position vs tolerance; Dur & Conv, liquidity (fund ratio)  = LDI → NO r or BM | SWF, Endowment & Foundation (LT+)  = sustain spending, scholarship  = (1) purchasing power of assets, - Inf;  (2) sufficient r to sustain spending  = real r with acceptable ∂ |
| Both = tight regulate; Ins general & separate accounts, life LT, p&c ST | | NO tax (5% money out for Foundation) |

## 

## Trading

| Trade | å decay +, ∂ averse + = urgent, aggressive + = market impact +, execution ∂ -  Price ∂ + → Price diff + → execution ∂ + proxied by PF ∂  Error reporting: maintain a log; resolve with less adverse impact; NO report to clients | |
| --- | --- | --- |
| Price  Pre / Intra | Known, ST & active, big order  Decision = ST å, +- value  Pre Close = quant  Arrival = urgent, neg move, % dec | LT, fundamental value, small order  VMAP volume = + outlier  TMAP time = during trading, - outlier |
| Post / Target | Closing = Index, min tracking ∂, Unknown until after closing, LT & passive | ST, for trading NO evaluation  Price target = limit order = ST å, +- value |
| Exe Algorithm Algo | Urgent → market impact +   * Open market = info leak * Arrival = adverse move, small < 15% * Liquid seeking / opportunistic = multi venue, large >20% | Liquid aggregator / DARK POOL  = ANON, - info leak / intention / transparency PRE trade → - certain to fulfill  = ALL reported POST trade  Smart Order Router = prob, condition |
| Scheduled = large order into smaller = no urgent (-market impact), 0 neg move →   * POV, % of volume = liquid +, NO within interval; * VMAP = within interval (ex. 1 day), U curve (LARGE at open & close), big order * TMAP = within interval BUT LT preferred, small order | |
|  | Large = High touch (HT)  Urgent = Principal; NO Urgent = Agent  Illiquid = RFQ | Illiquid market (Fixed & OTC) = HT  Liquid market (ETF, ETDer) = algo low touch |
| Equity, liquid | HT Broker (& for illiquid) | Algo (Electronic for small liquid) |
| Bond, il | HT Broker RFQ (& for small) | HT Agency |
| ET.DER, liquid | FU market, Algo / Electronic; DMA for small | |
| OTC Der, il | HT Broker, NO central clearing | HT Agency, NO central clearing |
| Spot FX, il | HT Broker RFQ | Algo, HT Agency; DMA for small |
|  | | |
| 1. Measure  Implement  Shortfall =  (1) execution cost +  (2) opportunity cost + (3) fee  $ cost | (1) execution cost = delay (slippage) cost + trading cost (price at placing)  = (buy - arrival + arrival - decision price) \* buy unit  Delay cost = (arrival - decision) \* buy unit  Arrival, Trading cost = (buy - arrival) \* buy unit  (2) opportunity cost = (closing price - decision price) \* NO buy unit  (3) fee = unit fee \* buy unit   * Decide, place by PM * Arrive, receive, release by trader / agency * Execute, buy * Opportunity, close | |
| $/share cost  BP cost  Smaller or more negative = better | $/share = cost / share  BP = $\*10000 / (unit\*share)  Market adjusted cost = arrival cost BP - ß index cost BP  Arrival cost BP = buy / arrival - 1  Index cost BP = buy / arrival - 1 | Market impact  Market adj cost = impact, pressure by the order  Arrival cost = impact, rising market itself |
| 2.1 Attribution  Break down  Same Equity | 2.1.1 R.E = AA + SS + interaction  Bottom up, micro, each position  Top down, macro, allocation or factor  Factor, factor | 2.1.2 Risk  Relative, tracking ∂ to BM, common  Absolute, total ∂, T-bill as rf + ?% |
| 2.2 BM  SAMURAI | Market, BM  PF | Style R = BM - market  Active R = PF - BM |
| 3. Appraisal !!  Performance  Conclusion | Sharpe = (Rp - Rf)/∂p  Treynor = (Rp - Rf)/∂ systematic  (Rp - Rf) = å + ß(R.market-Rf) + e | \*Appraisal = å + StD(e)  Information = (R.PF-R.BM)/∂(PF-BM)  Sortino = (R.PF-R.BM)/∂semi = penalize downside |
|  | | |
| Universe | Suitability, style, philosophy (active vs p)  Efficient market → bad & good less diff | I, explicit cost of commision to bad, + avoid  II, opportunity, omission of good, less painful |
| Quantitative  - Attribution & appraisal: skill  - Capture ratio  - Drawdown | Style Analysis = attribution & appraisal  1. Return, RBSA, top down, imprecise  Straightforward & less data  NO window dressing  BAD for illiquid stale, ex. venture capital | 2. Holding Based, HBSA, bottom up, precise  Risk factors & exposure  Window dressing ← snapshot of PF  BAD for illiquid stale |
| Quality, due diligence | Inv = process & people, PF, philosophy  !! key person risk, staff turnover, | Operational = infrastructure (firm, vehicle, term, monitoring) & track record accuracy |
| Vehicle & Term  - Liquid | !! Closed end fund & ETF = + liquid  SMA = direct owner, custom = + liquid | Open end fund = daily liquidity = - liquid  Pooled = indirect, decide by fund = - liquid |
| - Fee  !! | Symmetric = NO Max / Min fee, fully exposed to up and downside = bankruptcy risk +  AUM based = - fee in rising market, “sticky” | Asymmetric = Max / Min cost → CALL  Ex. Sharing fee = reward upside  Performance based = + cost in rising market but also when underperforming, align client interest, smooth upside ∂ |
| Closet indexing, claim active but passive  = charge incentive fee for active MGMT | Soft lock = + redemption fee |
| Base fee = charged no matter  Standard fee = fee at breakeven | Sharing fee $ = sharing % \* Active r  Active r = r - Base fee |
| Risk ∂ MGMT  = Stop loss | Frequency agree with signal | !! Hard stop → frequent trade  Liquid asset → less trading cost |

## 

## Ethics

| Code = CFA & candidate; Passed but NO enrolled <> candidate  Firm is encouraged but NO member | | AMC = firm  GIPS = firm/independent entity, NO composite |
| --- | --- | --- |
| Professional | Law = legal, cultural, religious laws  Independence = disclose gift (no approval → violate NO this but Employer); fee NO linked | Misrepresentation = use “WILL” opinion; typo & no adj; plagiarism; no verify/disclose 3rd  Misconduct = affect job; dishonest |
| Market | Material nonpublic information (MNI) = reliable; impact (key event, famous analyst) | Manipulate = multi accounts to + volume; NO for Exchange, trading strategy, tax purpose |
| Clients | Loyal = Beneficiary (Plan & Trust), Mandate/IPS (MF); Soft dollar benefit client;  Fair trade = priority; NO equally  Suit = can hedge if within style; 3rd is suit | Performance = composites, each including similar style; disclose simulate data  Confidential = FORMER + now + prospective; NO PII |
| Employer | Employer = Full & Part time at work, NO affect job OR abuse assets  Compensation = from client / subject company = employer WRITTEN approval & disclose | Supervisor = investigate & limit if violation, just warning NO enough |
| Inv | Reasonable = NO change ranking if pressured = irrelevant to COI | Retention: Regulation >> CFA (7 yrs); Hard and/or E-copy |
| Disclose: Related & POTENTIAL: B2B & indie relation (job offer even turned down); holding; director  $$$ = (1) ST bonus package < 1 year; (2) Referral: %  Trading & holding = trade after client; ANY INV personnel & $;  Terminate relation > Invest COI company if disclosed > restrict list (for broader universe) | | Conflict of interest (COI)  NO sensitive company’s strategy meeting  Priority: client > employer > self & relative (within clients NO violate this but fair trade)  Trading or IPO  Disclose: Extended absence of leadership |
| Compensate  Client = disclose NO Amount BUT relation & holding = meet all  Employer (1) disclose amount $ & written approval = meet all  (2) disclose $ & NO approval = VIOLATE Employer; meet Independence, COI | | Compliance, Designated & qualified; employee or officer; independent of INV process or CIO |
| Backup; client, employee, related; Hard and/or E-copy; Repository (monitor, trade, analyze if big) |
| Frequency  MM =Return | QQ = Performance & Inv State, 30 days after Q ends | YY = Suitability review, sooner of PRE big change (beyond IPS) |
| GIPS  047 & 048 !! | R = end/beg - 1; Total R = (1+R1) \* (1+R2) - 1  Cash flow, denominator, weighted using ratio | Return, numerator, NO discounted → only actual; simulated only as appendix |
| Composite  Fee discretionary must YES, # of PF vs composite   * 1 PF → >=1 composites, include any position of style * 1 composite → NO Max / Min PF   Free discretionary may ?  Free non-discretionary must NO | | Fees either GROSS or NET (before or after) tax & fees; Average OR Expected fees; items of fees when asked; Trading fee exclude custody |
| Reporting >= 5 years since claim, building up to >= 10 years; since inception if <= since; 53 !! |
| Record Portability | Job change = Primary & independent decision maker; track record; jobs break < 2 months | Merger, A + B = A, A comply, B NO comply  → 1 year grace period |