Reading 7: The Behavioral Finance Perspective

1. Expected utility (U) = Σ (U values of outcomes × Respective Prob)

2. Subjective expected U of an individual = Σ [u (xi) × Prob (xi)]

3. Bayes’ formula = \( P(A|B) = \frac{P(B|A) \times P(A)}{P(B)} \)

4. Risk premium = Diff. b/w Certainty Equivalent and Expected Value

5. Perceived value of each outcome = \( U = w(p_1)v(x_1) + w(p_2)v(x_2) + \ldots + w(p_n)v(x_n) \)

6. Abnormal return (R) = Actual R – Expected R

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Reading 8: The Behavioral Biases of Individuals

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Reading 9: The Behavioral Finance Perspective

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Reading 10: Behavioral Finance and Investment Processes

1. After-tax (AT) Real required return (RR) % = \( \frac{\text{Client’s required expenditures in Year n}}{\text{Net Investable Assets}} \)\times \left(1 - \text{tax rate}\right)

2. AT Nominal RR % = \( \frac{\text{Projected needs in Year n}}{\text{Net Investable Assets}} \) + Current Annual (Ann) Inflation (Inf) % = AT real RR% + Current Ann Inf% \text{ Or }

3. Total Investable assets = Current Portfolio - Current year cash outflows + Current year cash inflows

4. Pre-tax income needed = AT income needed / (1-tax rate)

5. Pre-tax Nominal RR = (Pre-tax income needed / Total investable assets) + Inf%

If Portfolio returns are tax-deferred:

6. Pre-tax projected expenditure $ = AT projected expenditure $ / (1 - tax rate)

7. Pre-tax real RR % = Pre-tax projected expenditures $ / Total investable assets

8. Pre-tax nominal RR = (1 + Pre-tax real RR%) \times (1 + Inflation rate%) – 1

If Portfolio returns are NOT tax-deferred:

9. AT real RR% = AT projected expenditures $ / Total Investable assets

10. AT nominal RR% = (1 + AT real RR%) \times (1 + Inf%) – 1

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Reading 11: Taxes and Private Wealth Management in a Global Context

1. Average tax rate = Total tax liability / Total taxable income

2. AT Return = \( r \times (1 - t_i) \)

3. AT Future Accumulations after n years = \( \text{FVIF} = \text{Initial Invst} \times [1 + r (1 - t_i)]^n \)

4. Tax drag ($) on capital accumulation = \( \text{Acc capital without tax} – \text{Acc capital with tax} \)

5. Tax drag (%) on capital accumulation = \( \frac{\text{Acc capital without tax} – \text{Acc capital with tax}}{\text{Acc capital without tax}} \)
tax) / (Acc capital without tax – Initial investment)

6. Returns-Based Taxes: Deferred Capital Gains:
   • AT Future Accumulations after n years = FVIFcg = Initial Invst × [(1 + r)n(1 − tcg) + tcg]
   • Value of a capital gain tax deferral = AT future accumulations in deferred taxes – AT future accumulations in accrued annually taxes

7. Cost Basis
   • Capital gain/loss = Selling price – Cost basis
   • AT Future Accumulation = FVIFcgb = Initial Invst × [(1 + r)n(1 − tcg) + tcg − (1 − B) tcg] = Initial Invst × [(1 + r)n(1 − tcg) + (tcg × B)]
   Where, B = Cost basis
tcg × B = Return of basis at the end of the Invst horizon.
   When cost basis = initial Invst → B = 1, FVIFcgb = Initial investment × [(1 + r)n(1 − tcg) + tcg]

8. Wealth-Based Taxes
   • AT Future Acc = FVIFw = Initial Invst [(1 + r)(1 − tw)]n
   Where, tw = Ann wealth tax rate

9. Blended Taxing Environments
   a) Proportion of total return from Dividends (pd), taxed at a rate of td.
pd = Dividends ($) / Total dollar return
   b) % of total return from Interest income (pi), taxed at a rate of ti.
   pi = Interest ($) / Total dollar return
   c) % of total return from Realized capital gain (pcg), taxed at a rate of tcg.
p cg = Realized Capital gain ($) / Total dollar return
   d) Unrealized capital gain return: Total Dollar Return = Dividends + Interest income + Realized Capital gain + Unrealized capital gain
   Total realized tax rate = [(pi × ti) + (pd × td) + (pcg × tcg)]

10. Effective Ann AT R = r* = r(1 − total realized tax rate)
    Where, r = Pre-tax overall return on the portfolio and r* = Effective ann AT R

11. Effective Capital Gains Tax = T* = tcg(1 − pdtd − pdtd − pcgcg) / (1 − pdtd − pdtd − pcgcg)

12. Future AT acc. = FVIF Taxable = Initial Invst [(1 + r*)n(1 − T*) + T* − (1 − B) tcg]

13. Initial Invst (1 + Accrual Equivalent R)n = Future AT Acc

14. Accrual Equivalent R = (Future AT Acc / Initial Invst)1/n − 1

15. Accrual Equivalent Tax Rates = r(1 − TAE) = RAE = TAE = 1 − RAE

16. In Tax Deferred accounts (TDAs) Future AT Acc = FVIF TDA = Initial Invst[(1 + r)n(1 − Tn)]

17. In Tax-exempt accounts FVIF TaxEx = Initial Invst(1 + r)n
   • FVIF TDA = FVIF TaxEx(1 − Tn)

18. AT asset wt of an asset class (%) = AT MV of asset class ($) / Total AT value of Portfolio ($)

19. AT Initial invst in tax-exempt accounts = (1 − T0)

20. FV of a pretax $ invested in a tax-exempt account = (1 − T0)(1 + r)n

21. FV of a pretax $ invested in a TDA = (1 + r)n(1 − Tn)

22. Investors AT risk = S.D of pre-tax R (1 − Tax rate) = σ(1 − T)

23. Tax alpha from tax-loss harvesting (or Tax savings) = Capital gain tax with unrealized losses – Capital gain tax with realized losses
   Or
   Tax alpha from tax-loss harvesting = Capital loss × Tax rate
24. Pretax R taxed as a short-term gain needed to generate the AT R equal to long-term AT R = Long-term gain after-tax return / (1 – short-term gains tax rate)

8. Taxable Gifts = \( R_{\text{TaxableGift}} = \frac{FV_{\text{Gift}}}{FV_{\text{Request}}} \) 
\[ \frac{1 + r_d(1 - t_d)}{1 + r_e(1 - t_e)} \] 

9. Value of a taxable gift (if gift & asset (bequeathed) have equal AT R ) = \( (1 - T_b) / (1 - T_s) \)

10. The relative after-tax value of the when the donor pays gift tax and when the recipient’s estate will not be taxable (assuming \( r_e = r_c \) and \( t_i = t_c \)):
\[ R_{\text{TaxableGift}} = \frac{FV_{\text{Gift}}}{FV_{\text{Request}}} \] 
\[ \frac{1 + r_d(1 - t_d)}{1 + r_e(1 - t_e)} \] 

11. Size of the partial gift credit = Size of the gift \( \times T_g \)

12. Relative value of generation skipping = 1 / (1 – Ti)

13. Charitable Gratuitous Transfers = 
\[ R_{\text{CharitableGift}} = \frac{FV_{\text{CharitableGift}}}{FV_{\text{Request}}} \] 
\[ (1 + r_g)^n + T_g \left[ \frac{1 + r_e(1 - t_e)}{1 + r_e(1 - t_e)} \right]^{T_e} \] 

14. Credit method = \( T_c = \text{Max} \{ T_b, T_s \} \)

15. Exemption method = \( T_b = T_s \)

16. Deduction method = \( T_D = T_R + T_S - T_b T_S \)

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Reading 12: Estate Planning in a Global Context

1. Estate = Financial assets + Tangible personal assets + Immoveable property + Intellectual property

2. Discretionary wealth or Excess capital = Assets – Core capital

3. Core Capital (CC) Spending Needs = \( \sum p(Survival_j) \times Spending_j / (1 + r)^j \)

4. Expected Real spending = Real annual spending \( \times \) Combined probability

5. CC needed to maintain given spending pattern = Annual Spending needs / Sustainable Spending rate

6. Tax-Free Gifts = \( R_{\text{TaxFreeGift}} = \frac{FV_{\text{TaxFreeGift}}}{FV_{\text{Request}}} \) 
\[ \frac{1 + r_d(1 - t_d)}{1 + r_e(1 - t_e)} \] 

7. Relative value of the tax-free gift = 1 / (1 – Te)

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Reading 13: Concentrated Single Asset Positions

1. Human Capital \( HCO = \sum_{t=1}^{N} \frac{W_t}{(1 + r)^t} \)

2. Income yield (payout) = \( \frac{\text{total ongoing annual income}}{\text{initial purchase price}} \)

3. Mortality wghtd. NPV = \( mNPV_0 = \sum_{t=1}^{N} \frac{p(t) W_t - (1 + g_t)}{(1 + r + y)^t} \)

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Reading 14: Risk Management for Individuals

1. Funded Status of Pension Plan (PP) = MV of PP assets – PV of PP liabilities

2. Min RR for a fully-funded PP = Discount rate used to calculate the PV of plan liabilities

3. Desired R for a fully-funded PP = Discount rate used to calculate the PV of plan liabilities + Excess Target return

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Reading 15: Managing Institutional Investor Portfolio

1. Defined-Benefit Plans:

2. Min RR for a fully-funded PP = Discount rate used to calculate the PV of plan liabilities

3. Desired R for a fully-funded PP = Discount rate used to calculate the PV of plan liabilities + Excess Target return