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) = [P (B|A) / P (B)]× P (A)
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) + … + w (p_n) v (x_n)
6. Abnormal return (R) = Actual R – Expected R

Reading 8: The Behavioral Biases of Individuals

Reading 9: The Behavioral Finance Perspective

Reading 10: Behavioral Finance and Investment Processes

1. After-tax (AT)*Real* required return (RR) % $= \frac{\text{Client's required expenditures in Year n}}{\text{Net Investable Assets}} = \frac{\text{Projected needs in Year n}}{\text{Net Investable Assets}}$
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% *Or*

   AT*Nominal* RR% = (1 + AT Real RR%) × (1 + Current Ann Inf %) – 1
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%

<u>If Portfolio returns are tax-deferred:</u>

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 %) × (1 + Inflation rate%) – 1

<u>If Portfolio returns are NOT tax-deferred:</u>

9. AT real RR% = AT projected expenditures $ / Total Investable assets
10. AT nominal RR% = (1 + AT real RR%) × (1 + Inf%) – 1
11. Procedure of converting nominal, pre-tax figures into real, after-tax return:
    - Real AT R = [Expected total R – (Expected total R of Tax-exempt Invst × wt of Tax-exempt Invst)] × (1 – tax rate) + (Expected total R of Tax-exempt Invst × wt of Tax-exempt Invst) – Inf rate

      Or
    - Real AT R =[(Taxable R of asset class 1 × wt of asset class 1) + (Taxable R of asset class 2 × wt of asset class 2) + …+ (Taxable return of asset class n × wt of asset class n)] × (1 – tax rate) + (Expected total R of Tax-exempt Invst × wt of Tax-exempt Invst) – Infrate

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 × (1 – t_i)
3. AT Future Accumulations after n years = $FVIF_i$= Initial Invst × $[1 + r (1 – t_i)]^n$
4. Tax drag ($) on capital accumulation = Acc capital without tax – Acc capital with tax
5. Tax drag (%) on capital accumulation = (Acc capital without tax – Acccapital with

tax) / (Acc capital without tax – Initial investment)

6. Returns-Based Taxes: Deferred Capital Gains:
   - AT Future Accumulations after n years = $FVIF_{cg}$= InitialInvst. × $[(1 + r)^{n} (1 – t_{cg}) + t_{cg}]$
   - 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 = $FVIF_{cgb}$= Initial Invst × $[(1 + r)^{n} (1 – t_{cg}) + t_{cg} – (1 – B) t_{cg}]$ =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,
     $FVIF_{cg}$=Initial investment × $[(1 + r)^{n} (1 – t_{cg}) + t_{cg}]$

8. Wealth-Based Taxes
   - AT Future Acc = $FVIF_{w}$ = Initial Invst $[(1 + r) (1 – t_{w})]^{n}$
     Where, t_{w} = Ann wealth tax rate

9. Blended Taxing Environments
   a) Proportion of total return from Dividends (p_d), taxed at a rate of t_d.
      p_d = Dividends ($) / Total dollar return
   b) % of total return from Interest income (p_i), taxed at a rate of t_i.
      p_i = Interest ($) / Total dollar return
   c) % of total return from Realized capital gain (p_{cg}), taxed at a rate of t_{cg}.
      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 = $[(p_i× t_i) + (p_d× t_d)+ (p_{cg}× t_{cg})]$

10. Effective Ann AT R = r* = r $(1 – p_it_i – p_dt_d – p_{cg}t_{cg})$ = 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* = t_{cg} $(1 – pi – p_d – p_{cg}) / (1 – p_it_i – p_dt_d – p_{cg}t_{cg})$

12. Future AT acc. = $FVIF_{Taxable}$ = Initial Invst $[(1 + r^*)^{n} (1 – T^*) + T^* – (1 – B) t_{cg}]$

13. Initial Invst $(1 + \text{Accrual Equivalent R})^{n}$ = Future AT Acc

14. Accrual Equivalent R = (Future AT Acc / Initial Invst) $^{1/n}$– 1

15. Accrual Equivalent Tax Rates = r $(1 – T_{AE})$ = R_{AE} = T_{AE} = $1-\frac{R_{AE}}{R}$

16. In Tax Deferred accounts (TDAs) Future AT Acc = $FVIF_{TDA}$ = Initial Invst$[(1 + r)^{n} (1 – T_n)]$

17. In Tax-exempt accounts $FVIF_{taxEx}$ = Initial Invst $(1 + r)^{n}$
    - $FVIF_{TDA}$ = $FVIF_{taxEx}$ $(1 – T_n)$

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 = $(1 – T_0)$

20. FV of a pretax $ invested in a tax-exempt account = $(1 – T_0) (1 + r)^{n}$

21. FV of a pretax $ invested in a TDA = $(1 + r)^{n} (1 – T_n)$

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)

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 = $\sum_{j-1}^{N} \frac{p(Survival_j) \times Spending_j}{(1+r)^j}$

4. Expected Real spending = Real annual spending × Combined probability

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

6. Tax-Free Gifts = $RV_{TaxFreeGift} = \frac{[1+r_g(1-t_{ig})]^n}{[1+r_e(1-t_{ie})]^n(1-T_e)}$

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

8. Taxable Gifts = $RV_{TaxableGift} = \frac{[1+r_g(1-t_{ig})]^n(1-T_g)}{[1+r_e(1-t_{ie})]^n(1-T_e)}$

9. Value of a taxable gift (if gift & asset (bequeathed) have equal AT R) = $(1 - T_g) / (1 - T_e)$

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 $r_g = r_e$ and $t_{ig} = t_{ie}$):

$$RV_{TaxableGift} = \frac{FV_{Gift}}{FV_{Bequest}} = \frac{[1+r_g(1-t_{ig})]^n(1-T_g+T_gT_e)}{[1+r_e(1-t_{ie})]^n(1-T_e)}$$

11. Size of the partial gift credit = Size of the gift × T_gT_e

12. Relative value of generation skipping = 1 / $(1 - T_1)$

13. Charitable Gratuitous Transfers = $RV_{CharitableGift} = \frac{FV_{CharitableGift}}{FV_{Bequest}}$

$$= \frac{(1+r_g)^n + T_a[1+r_e(1-t_{ie})]^n(1-T_e)}{[1+r_e(1-t_{ie})]^n(1-T_e)}$$

14. Credit method = T_C = Max [T_R, T_S]

15. Exemption method = $T_E = T_S$

16. Deduction method = $T_D = T_R + T_S – T_RT_S$

Reading 13: Concentrated Single Asset Positions

Reading 14: Risk Management for Individuals

1. Human Capital $HC_0 = \sum_{t=1}^{N} \frac{W_t}{(1+r)^t}$

   extended model $HC_0 = \sum_{t=1}^{N} \frac{p(S_t)\, W_{t-1}(1+g_t)}{(1+r_f+y)^t}$

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

3. Mortality wghtd. NPV = $mNPV_0 = = \sum_{t=1}^{N} \frac{p(s_t)\, b_t}{(1+r)^t}$

Reading 15: Managing Institutional Investor Portfolio

Defined-Benefit Plans:

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