FIXED INCOME SYNOPSIS

GENERALLY SPEAKING → $\sum_{}^{N} \frac{CF}{(1+R)^N}$

CF = Coupons + Par
R = Variable Discount Rate of CF's
N = # periods until maturation

1)
- Issuer of Fixed Income security (Bond), promises investors
  1) Return of Principal (Notional Value)
  2) Stated coupon rate (return for investors)
- Market for Fixed Income security (Bond), determines:
  1) Appropriate discount rate (r) for Cash Flows
     - Fixed Income involves Various sources of risk. A higher determination of risk results in all FUTURE CASH FLOWS BEING DISCOUNTED AT A HIGHER RATE TO COMPENSATE FOR UNCERTAINTY

2A)
- Example:
  - Issuer A: Less Risk
    - Principle: $100
    - Stated coupon: 5%
    - Number of payments: 1
    - * Discount Rate: 2.5% *

$$Price = \frac{105}{(1+.025)^1} = 102.44$$

Market will pay $102.44 today for $105 from Issuer A, to be paid in 1 year

2B)
Example (cont'd):
- Issuer B: More risk
  - Principle: $100
  - Stated coupon: 5%
  - Number of payments: 1
  - * Discount Rate: 5.5% *

$$Price = \frac{105}{(1+.055)^1} = 99.52$$

Market will pay $99.52 today for $105 from issuer B, to be paid in 1 year

Lower Rate = Lower Risk, Lower Return

DISCOUNT RATES OF FUTURE CASH FLOWS ARE PRIMARY DETERMINANTS OF FIXED INCOME PRICING

Higher rate = Higher Risk, Higher Return

3)
Sources of Risk: GENERAL

Default Risk: Risk that issuer does not pay (coupons and/or principal. This is a stated and intrinsic source of fixed income risk

Interest Rate Risk: In the case that investor allocates capital to bond at 2.5% discount rate, and market then moves discount rate to 3%, the investor has an UNREALIZED Loss/opportunity cost

→ Today: $\frac{105}{(1+.025)^1} = 102.44$ 1 day later: $\frac{105}{(1+.03)^1} = 101.94$

→ Investor HAS NOT LOST MONEY, investor has now PAID TOO MUCH for cash flows that are now discounted higher

→ If investor receives (coupon + principal), investor still makes (105 − 102.44 = 2.56) but has missed the opportunity to make (105 − 101.94 = 3.06)

→ Investor's competitor's may have paid at 3%, therefore the competitors have been MORE EFFICIENT w/ two most important concepts of Fixed Income: Price and Value

4) The goal of allocating capital to Fixed Income is to be as efficient as possible w/ Price and Value. Find opportunities where Value > Price, and limit paying when Value < Price. At the very least, do best to never take on unnecessary default risk.

THOUGHTS ON SCHOLARSHIP ALLOCATION

*** All commentary/thinking below is from the outside of USF Baseball looking in. There is much to learn on my end to say the least ***

$\sum \frac{CF}{(1+R)^N} \Rightarrow ??? \Rightarrow \sum \frac{CF}{(1+\Gamma)^N} \Leftrightarrow \sum \frac{CF}{(1+C)^N}$

USF scholarship $\propto$ $R \angle \Gamma$

Final thoughts: Approaching scholarship allocation/valuation/normalization, AT FIRST ATTEMPT may be messy following conventional Fixed Income structure. Think as swap? Possible structure?

1)

USF coaching staff will offer a player either a full or partial scholarship

- The player, in return for scholarship, will:
  1) Do their best to PERFORM TO the Principal scholarship amount
  2) Go above & beyond, OUTPERFORM scholarship amount
- The USF Coaching staff is offering the player a bond.
  - ↳ The USF coaching staff has confidence that ATLEAST the player will perform to the level of the scholarship
    - ↳ BUT ALSO be confident that the player will outperform the level of scholarship allocated
  - ↳ The player will provide periodic measures of performance (statistics)

3) Potential Variable Rate mortgage structure?

- USF Coaching PAYS Fixed Rate to player
  - Bank pays Depositors FIXED RATE,
- PLAYER pays Variable Rate (in performance)
  - Homeowner PAYS Bank Variable Rate, while bank pays them fixed rate on deposits

VARIABLE

- Mortgages are Vanilla Interest rate swaps
- Application of Valuation model to USF evaluation

N = Number of Payments (4)
R = Variable rate paid in HR production (in rate form)
Γ = Fixed rate paid to player (converted to rate form) (.05)
C = Arbitrary coupon

USF staff allocates to player: $\frac{C}{(1+\Gamma)^4} + \frac{C}{(1+\Gamma)^3} + \frac{C}{(1+\Gamma)^2} + \frac{C}{(1+\Gamma)^1}$

Player performs & pays: $\frac{C}{(1+R)^4} + \frac{C}{(1+R)^3} + \frac{C}{(1+R)^2} + \frac{C}{(1+R)^1}$

- NEED TO DEVELOP FIXED RATE
- FIXED RATE IS A FUNCTION OF SCHOLARSHIP ALLOCATED

USF to player: $\frac{100}{(1+.05)^4} + \frac{100}{(1+.05)^3} + \frac{100}{(1+.05)^2} + \frac{100}{(1+.05)^1}$ ↳ $354.59

Player to USF: $\frac{100}{(1+.03)^4} + \frac{100}{(1+.05)^3} + \frac{100}{(1+.01)^2} + \frac{100}{(1+.05)^1}$ ↳ $368.50

PLAYER OUTPERFORMED SCHOLARSHIP BY $13.91

2) SIMPLIFICATION

Player A scholarship statistic measure: HR Rate

Player A scholarship stat BENCHMARK: .05 (1 HR Rate)
Player A scholarship stat Benchmark CONVERTED to Price Determinant: .03 (w/ scholarship allocation in #)

- For 1 season: $\sum \frac{(.05)(100)}{(1+.03)^1}$ ← Normalize $= \frac{5}{1.03} = 4.85$
- After 1 season: $\frac{.03(100)}{(1+.03)} = \frac{3}{1.03} = 2.91$

Player A UNDERPERFORMS BENCHMARK

Inconsistent potentially. Would absolutely need to create system of Benchmarks. Are full scholarship players MORE or LESS Risky
↳ talk to coaches on an output basis

4) OR

USF to player: (100)(.05)+(100)(.05)+(100)(.05)+(100)(.05) = 2

Player to USF: (100)(.08)+(100)(.05)+(100)(.01)+(100)(.07) = 2

STRUCTURE OF DISCOUNT RATE VALUE MUST BE SYSTEMATIZED/NORMALIZED