

Module 9: Overview of FI Port Management

Role of FI :

1. Diversification
2. Regular CF
3. Inflation Hedge
 - Inflation - Linked Bonds. (protects **par & cpn from inflation**)
 - Floating - Coupon Bonds (protects **ONLY cpons. from inflation**)

Note:

- In a fully efficient market, Fixed-cpn nominal rate (NR), inflation-linked, floating-cpn bonds all are priced to **reflect the same consensus expectations of inflation**
- if actual inflation < expected \Rightarrow NR performs better
- if actual inflation > expected \Rightarrow NR performs worse.

FI Mandates.

Liability-based Mandates. (assets managed solely to meet expected future liability payouts).

- CF Matching
 - Duration Matching
 - Contingent Immunization (CI)
 - hybrid of active management & immunization
 - goal = have $PV(\text{Asset})$ exceed $PV(\text{Liabilities})$
 - Derivative Overlays.
 - using derivatives/swaps for duration matching
- Forms of immunization**

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Total - Return Mandates (doesn't seek meeting future liability but absolute return).

- Pure indexing
- Enhanced Indexing
- Active Management.

9.3 : FI Portfolio Measures.

Name.	Definition	Interpretation
Macaulay Duration	Weighted Avg. Time to receive CF	Higher Macaulay Duration => longer to receive CF & higher price vol.
Modified Duration	Macaulay Duration \div $(1 + \text{periodic yield})$	Approx. expected chg in price for 1% chg in yield
Effective Duration	Sensitivity to parallel shift to the yield curve	Used for complex bonds where CF are not certain
Key rate Duration	Sensitivity to change to the yield curve for a certain maturity while others remain unchanged	helps access non-parallel changes in yield curve.
Empirical Duration	Measuring int rate sensitivity derived from regressing bond returns against BM yield changes	Same as effective duration except it's based on past observed market behavior

Money Duration	Measure of monetary P/L. expected due to 1% change in yield (market value \times mod. duration)	Higher Dollar Duration \Leftrightarrow Higher ABS. CHG in prt. \$ when yield chg. by 1%
PVBP	Money Duration $\times 0.0001$.	Absolute chg in prt. value when yield chg. by 1%
Convexity	The extent to which the bond price behavior vs. chg. in yield is non-linear. (\oplus for fixed-cpn bond w/o option)	\oplus Convexity = bond price \uparrow more than implied by duration when yield falls, \downarrow less when yield rises.
Effective Convexity	Measures the non-linear relationship b/w bond price & chg. in yield curve, based on directly modeling chgr. due to changes in a BM Curve	Used for complex bonds where CF are not certain

Key factors to consider:

- investors will pay higher prices for higher convexity bonds (d accept lower yield vs. bonds with less convex).
- Convexity = 2nd order measure
- Convexity is directly related to the dispersion of CF in time around the MACAULAY DURATION of the bond.

Fixed-Income Portfolio Measure.

Macaulay & Modified Duration / Convexity of portfolio is estimated as cash-weighted duration of individual assets in the portfolio

$$\text{effective duration} = \frac{(PV_-) - (PV_+)}{2(\Delta \text{curve})(PV_0)}$$

$$\text{effective convexity} = \frac{(PV_-) + (PV_+) - 2(PV_0)}{(\Delta \text{curve})^2 PV_0}$$

Spread Duration = % sensitivity of a portfolio to 1% chg in Credit spreads.

Duration times spread (DTS) = spread duration \times credit spread

Usage of these measures:

- if expecting int. rate to fall
→ increase duration of portfolio
- if expecting credit spread to narrow
→ increase spread duration of portfolio

Correlations b/w FI sectors

- likely high b/w bonds in the same market
- High yield bonds are more likely to be affected by chg in spread than BM rate

Bond Liquidity

Issues leading to illiquidity include:

- Very large no. of bond issues can be quite small, each issuer's bonds are heterogeneous / different.
- Bond usually trades OTC. (i.e. increases cost to look for counterparty)

Liquidity varies across sectors but generally:

- ON-THE-RUN high-quality sovereign gov. bond has high liquidity & more HOMOGENEOUS, declines somewhat for older & OFF-THE-RUN.
- Corporate bond are far more varied & bonds w/ lower quality / size has less liquidity.

Effects of Liquidity on bond PM.

- pricing data
- portfolio construction
- dealer market \Rightarrow wider bid/ask spread

Alternatives to Direct Investments in Bond

- FI exchange-traded ETF
- Open-end mutual funds
- Derivatives (e.g. bond futures / options)

MODULE QUIZ 9.1

1. A credit analyst is evaluating the potential for fixed-income securities to provide an inflation hedge. Which of the following types of securities protects both the bond coupon and notional principal amounts from inflation?
 - A. Fixed-coupon bonds.
 - B. Inflation-linked bonds.
 - C. Floating-coupon bonds.
2. A fixed-income portfolio manager is seeking to outperform the Barclays Capital Aggregate Bond Index. Which of the following statements *most accurately* describes a pure indexing strategy for achieving the total-return mandate? Pure bond indexing:
 - A. allows large deviations from the risk factors of the index and seeks a high active return.
 - B. matches duration to the index, but some risk mismatches of sectors and quality are allowed.
 - C. seeks to exactly match all the risk factors of the index while allowing the manager some leeway on the individual bonds selected.
3. Regarding the varying liquidity characteristics among bond market subsectors, which of the following bond issues would typically lead to higher levels of liquidity?
 - A. Issuing a small corporate bond issue.
 - B. Issuing on-the-run sovereign government debt.
 - C. Issuing a corporate bond that is below investment grade.

1. B ✓ floating-rate bond only protects cpn from inflation

2. C ✓ A is active management, B is enhanced indexing

3. B ✓

Module 9.2 Modeling Return

EXAMPLE: Expected return of a bond portfolio

A fixed-income strategist wishes to forecast the expected return of a bond portfolio for the next year. She gathers the following information and assumes no reinvestment of cash flow:

Par value (notional principal) in millions	50
Average coupon rate of portfolio	3.0%
Coupon frequency	Semiannual
Horizon analysis	1 year
Average bond price of portfolio	101.500
Projected bond price in one year if yield curve is unchanged	102.419
Average bond convexity (C) of portfolio	28
Average bond duration (modified duration or MD) of portfolio	5.60
Expected average benchmark YTM change	-0.54%
Expected change in spread	-0.06%
Expected gains or losses versus investor's currency (for 40% of portfolio allocated to foreign bonds)	+3.925%

1. Coupon Income / Current Yield :

$$\frac{\text{cpn rate}}{\text{current bond. port price}} = \frac{3}{101.50} = 2.966\%$$

Note: since no re-investment of CF, doesn't matter that Cpn is paid semi-annually.

$$2. \text{ Roll-down Return} = (102.419 - 101.5) \div 101.5 \\ = 0.905\%$$

$$\textcircled{1} + \textcircled{2} = \text{ROLLING YIELD} = 3.86\%$$

3. Expected price change due to chg in BM. yield

$$= (-MD \times \Delta Y) + \left(\frac{1}{2} \cdot C \cdot \Delta Y^2 \right). \\ = (-0.54\% \cdot -5.6) + 0.54\%^2 \cdot 28 \cdot \frac{1}{2}. \\ = 3.065\%$$

4. Expected price due to chg. in credit spread.

$$= (-MD \times \Delta S) + \left(\frac{1}{2} \cdot C \cdot S^2 \right) \\ = (-0.06\% \cdot -5.6) + (-0.06\%)^2 \cdot 28 \cdot \frac{1}{2}. \\ = 0.337\%$$

5. Expected P/L vs. investors' currency:

$$= 3.925\% \cdot 40\% = 1.570\%$$

Module 9.3: Leverages & Tax Issues!

$$r_p = \text{port return (amount)} / \text{port equity}$$

$$r_I + \left[\frac{V_B}{V_E} \times (r_I - r_B) \right]$$

r_p = return on portfolio.

r_I = return on invested assets.

Ways to achieve leverage:

1. Repurchase agreement (repos)

Overnight 100MM @ 2.5% repo rate:

receives 100MM, pays back $100MM \cdot (1 + 1/360)$ the next day

haircut rate = % on top of the repo amount to provide additional security

2 Futures Contract

leverage = notional value / margin amount - 1

3 Swap Agreements.

e.g. 10 MM notional 5-year receive 4% fixed vs. pay LIBOR swap

⇒ buy 10MM 4% bond + borrowing 10MM at LIBOR.

4 Securities Lending

Rebate Rate = collateral earnings rate - security lending rate

Managing Taxable & Tax-Exempt Portfolios

Types of Tax Issues:

- Sources of Bond Return will have diff tax rate (Cpn vs. price return)
- Tax rate might get lower if holding for a longer period
- Cap loss might offset the cap gains or carry forward
- usage of tax-sheltered / tax-advantaged a/c

Strategies to manage taxable a/c :

- use cap losses to offset cap gain
- hold longer to realize long-term tax rate.
- hold longer to defer
- Consider diff b/w cap gain tax & int. rate tax.

Taxation of investments in mutual fund varies.

- Some countries use pass-thru taxation of gain (i.e. taxed when the fund realized a gain)
- some countries use deferred taxation of gain (i.e. taxed when investors sell the fund shares)

EXAMPLE: Taxable vs. tax-exempt portfolios

A manager must raise EUR5,000,000 to meet a client's need for funds. The client's portfolio is separately managed, and all tax issues are passed through and immediately taxable to the client. Income and capital gains tax rates are 38% and 15%, respectively. The manager is looking at two bonds and will sell all of one or of the other. Both have market value of EUR5,000,000 and have the same remaining maturity, coupon, and credit quality. Any taxes owed due to the sale are to be ignored in the analysis and covered by other client funds. Bond A has a significant unrealized gain, while bond B has a significant unrealized loss. The manager believes the bonds are substantially identical except bond B has a slightly higher yield.

Select the bond the manager will sell and explain why if the investor is (1) taxable, or (2) tax-exempt.

- 1). Taxable \Rightarrow sell B to realize a tax gain
- 2) Tax-exempt \Rightarrow sell A to retain B

**MODULE QUIZ 9.2, 9.3**

1. Suppose that a bond portfolio has 25 million in notional principal and an average annual coupon rate of 5%. The average bond duration of the portfolio is computed as 8, and the average convexity of the portfolio is 0.5. If an investor in this portfolio expects the average yield change to be 0.35% with no change in spread, the expected portfolio price change due to the investor's forecast is closest to:
 - A. -1.752%.
 - B. -2.799%.
 - C. -3.978%.
2. A credit investor is interested in using leverage in his portfolio to enhance return. Which of the following statements is *most correct* regarding the use of leverage and the risks that leverage creates when implemented in fixed-income portfolios?
 - A. If interest rates increase, the value of the leveraged portfolio and collateral decline.
 - B. Liability duration normally exceeds asset duration.
 - C. As long as funds can be borrowed at rates above the return earned on the investments made, leverage will enhance portfolio return.
3. When managing fixed-income portfolios for taxable investors, which of the following strategies should *most likely* be applied?
 - A. Realize capital gains to offset any losses.
 - B. Shorten holding periods to realize long-term, rather than short-term, capital gains.
 - C. Consider differentials in income versus gain tax rates when selecting investments.

$$1. -0.35 \times 8 + 2 \cdot 0.35^2 \cdot 0.5 \\ = -2.799\%$$

(B) /

$$-0.35\% \cdot 8 + \frac{1}{2} \cdot 0.35^2 \cdot 0.5 \\ = -2.7997\%$$

2. A /

3. C /

Realize capital losses to offset gains.
Extend holding period to realize long-term cap gains.

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