Overview of Fixed-Income Portfolio Management

1. INTRODUCTION

Fixed income markets incorporate:

i. Publicly traded securities (such as commercial papers, notes, bonds)
ii. Non-publicly traded securities (such as loans and privately placed securities)

2. ROLES OF FIXED INCOME SECURITIES IN PORTFOLIOS

2.1 Diversification Benefits

Fixed income when combined with other asset classes

- provide diversification benefits.
- may significantly lower portfolio risk

Note: Correlations among asset classes or volatility of asset class returns may Δ overtime or due to Δ in capital market dynamics.

2.2 Benefits of Regular Cash Flows

Fixed-income investments often provide regular cash-flow streams that can be sued to fund the projected future liabilities by matching the timing and amount of those liabilities.

2.3 Inflation Hedging Potential

Inflation-linked bonds:

- provide inflation-hedging benefits.
- are suitable for investors with long-investment horizon
- can result in superior risk-adjusted real portfolio returns
- Their return has two components: Real return plus additional return (directly linked to inflation rate).
- Their return volatility is relatively lower than conventional bonds & equities.

Various Bonds and Inflation Protection

	Fixed-coupon bonds	**Floating-coupon bonds**	**Inflation-linked bonds**
Coupon	Inflation unprotected	Inflation protected	Inflation protected
Principal		Inflation unprotected	

3. FIXED-INCOME MANDATES

Two broad classifications of fixed income mandates are:

- Liability-based mandates, also known as, structured mandates, asset/liability management (ALM), or liability-driven investments (LDI)
- Total return mandates

3.1 Liability-based Mandates

3.1.1 Cash Flow Matching

- Simplest immunization approach to match precisely all future liability streams by cash flows from fixed income investments
- this approach has no underlying assumptions
- In reality, perfect cash flow matching is difficult to achieve

3.1.2 Duration Matching

is an immunization approach that match duration of assets and liabilities in a way that when interest rates rise or fall, Δ in bond portfolio's market value closely match Δ in the liability portfolio.

Conditions: Two conditions that need to be satisfied:

i. Bond portfolio duration must be equal to the liability portfolio duration

ii. PV of bond portfolio's assets must be equal to the PV of bond portfolio liabilities at current interest rate levels.

Limitation: it protects against only a ***parallel*** change in yield curve

3.1.3 Contingent Immunization

A hybrid approach that combines immunization with active management approach when there is a surplus available i.e. when portfolio value > PV of liabilities.

3.1.4 Horizon Matching

A hybrid approach in which liabilities are sorted into short and long-term liabilities.

- For short-term liabilities apply cash flow matching approach.
- For long-term liabilities apply duration matching approach.

3.2 Total return Mandates

Total return mandates are generally structured to either track or outperform a benchmark.

3.2.1 Pure Indexing

- Full replication is done by owning all the bonds in the index in the same percentage as the index.
- Full replication is inefficient, costly & difficult to implement

3.2.2 Enhanced Indexing

The objective of this approach is to outperform the index by small risk factor mismatches

3.2.3 Active Management

The objective of active management is to outperform the underlying benchmark by opting for ***large risk factor*** mismatches on duration, sector weights and other factors

4. BOND MARKET LIQUIDITY

4.1 Liquidity among Bond Market Sub-sectors

Liquidity varies among different bond market subsectors.
Sovereign government bonds are *more liquid* than non-sovereign government bonds or corporate bonds because of the following features.

- Large issuance size
- Well organized issuers
- Treated as benchmark bonds or collateral in the repo market

Some common features of **corporate bonds** include the following:

- issued by various companies
- represent a wide range of credit quality
- issued by infrequent issuers are often less liquid than the bonds issued by companies with many different issues.
- small sized issues are less liquid than larger issues
- bonds with longer maturity are less liquid than nearer-term bonds

4.2 The Effects of Liquidity on Fixed-Income Portfolio Management

4.2.1 Pricing

- Pricing in bond markets is less transparent than equity markets.
- Generally, bonds are traded using recent price and value information.
- 'Matrix pricing' approach is usually used for infrequently traded bonds

4.2.2 Portfolio Construction

Investors' liquidity considerations are important in portfolio construction because there is a trade-off between liquidity and yield.

4.2.3 Alternatives to Direct Investment in Bonds

Fixed income derivatives are often more liquid than their underlying bonds. Investors can use two types of fixed-income derivatives:

i. Derivatives traded on exchange (e.g. futures, options on futures)
ii. Derivative traded over-the-counter (e.g. interest rate swaps, credit-default swaps)

Exchange-traded funds (ETFs) and **pooled investment vehicles** are also used as alternative to individual bonds.

5. A MODEL FOR FIXED-INCOME RETURNS

5.1 Decomposing Expected Return

Five Components of E(R) ≈ Yield income + Rolldown return + E(Δ in price based on investor's yields/yield spread views) – E(Credit losses) + E(currency gains & losses)

Where,

i)Yield income (or Current yield) = $\frac{Annual\ coupon\ payment}{current\ bond\ price}$

ii) Rolldown Return = $\frac{(Bond\ Price_{Ending} - Bond\ Price_{Begining})}{Bond\ Price_{Begining}}$

iii) $E(\Delta\ in\ price\ based\ on\ investor's\ views\ of\ yields\ \&\ yield\ spreads)$ = [-MD× $\Delta Yield$]+ $\frac{1}{2} \times Convexity \times (\Delta Yield)^2$

iv) Expected credit losses = bond's probability of default × expected loss severity.

5.2 Estimation of the Inputs

- Yield income is the easiest component to estimate
- Rolldown return is also straight forward.
- The other three components are quite uncertain

5.3 Limitations of the Expected Return Decomposition

- Fixed-income return decomposition is an approximation.
- Model assumes that all intermediate cash inflows are reinvested at the YTM.
- Model ignores other factors, such as 'local richness or cheapness effects' &'potential financing advantages'

6. LEVERAGE

6.1 Using Leverage

Leverage Portfolio Return r_P

$$= \frac{Portfolio\ Return}{Portfolio\ Equity}$$

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

To recognize the significance of leverage on returns, the above equation can be decomposed into two portions:

$$r_P = r_I + \frac{V_B}{V_E}(r_I - r_B)$$

If $r_I > r_B$ leverage ↑ the portfolio return
If $r_I < r_B$ leverage ↓ the portfolio return

6.2 Methods for Leveraging Fixed-Income Portfolios

6.2.1 Future Contracts

- Futures contracts are important source of leverage
- Leverage$_{Futures}$ = $\frac{Notional\ Value - Margin}{Margin}$

(where margin is invested equity)

6.2.2 Swap Agreements

- Interest rate swaps are equivalent to long-short bond portfolio.
- **fixed-rate payer** effectively short a fixed-rate bond and long a floating rate bond and the value of the swap for the fixed rate payer ↑ when interest rates ↑.
- **fixed-rate receiver** effectively long a fixed rate bond and short a floating-rate bond and the value of the swap for the fixed-rate receiver ↑ when interest rates ↓.

6.2.3 Structured Financial Instruments

- Structured financial instruments are constructed to redistribute risk.
- Inverse floater is a type of structured financial instrument whose coupon rate has an inverse relationship to the market interest rate e.g. Coupon rate = 15% - (1.5 x Libor$_{3\text{-month}}$)

6.2.4 Repurchase Agreements

- an important source of short-term financing.
- Repos are kind of collateralized loans.
- In a repurchased agreement, security owner (borrower) sell a security for cash and agrees to repurchase it from the lender at a specific future date and an agreed on price
- Repo agreements may be **cash driven** or **security driven**.
- On the basis of settlement, repos can be categorized as **bilateral** repos or **tri-party** repos.

6.2.5 Security Lending

- Two motives of security lending are i) to facilitate short selling & ii) for collateralized borrowing or financing.
- In a short selling, short seller borrows the security from someone else and then sells the security and receives immediate payment. The short seller later returns the security.
- In financing-motivated loan, a bond owner lends securities to investor and receives cash.
- Unlike repos, security lending transactions are open-ended

6.3 Risks of Leverage

Leverage can significantly ↑the magnitude of losses even for moderate valuation declines.

7. FIXED INCOME PORTFOLIO TAXATION

7.1 Principles of Fixed-Income Taxation

Some common tax principles of fixed-income investments are:

- Compared to interest income, capital gains/losses are taxed at ↓ rates.
- Zero-coupon bonds investors are required to pay tax on imputed interest income (i.e. amortization of discount in some countries).
- Capital losses can be used to reduce capital gains and can be carried forward or in some jurisdictions can be carried back.
- In some countries short-term capital gains are taxed at ↑ rate than long-term capital gains.

Some tactics to manage fixed-income portfolios for tax purposes include the following:

- Prudently cancel out capital gains and losses.
- Carefully realize short-term gains if short-term capital gain tax rate > long-term capital gain tax rate.
- Realized losses can be used to offset current or future capital gains.
- Extend holding periods to defer taxes.
- Take into account the trade-off between capital gains and income.

7.2 Investment Vehicles and Taxes

Different investment vehicles are taxed differently based on type of assets involved and jurisdiction.