Hi and welcome,

This is a brief sample to provide you with an idea of what my PMT Exam study notes look like.

The style is to provide key content coverage followed by working examples.

If you have written the exam before, you can use my materials to get back up to speed very quickly.

If you are a first time writer, you can use my materials to help focus your study efforts and build your knowledge base.

If you have any questions, please do not hesitate to reach out to me by email.

All the best,

Prof Brian Gordon, CFA, CFP, CIM, MBA, FCSI
Director of Learning
Exam Success

Chapter 8
Managing Fixed Income Portfolios: Trading Operations, Management Styles, and Box Trades

Introduction

Bond portfolio management strategies can be passive or active, but fixed income portfolio management is more than just these two styles. The value of a bond portfolio is derived from the yield curve; essentially, bond portfolio management entails the selection of bonds and replacing the maturing ones with new ones.

This chapter discusses a firm's fixed income trading operations, passive bond portfolio management strategies, and how to protect the portfolio against interest rate fluctuations, among others.

Fixed Income Trading Operations

Roles and Responsibilities

In most firms, the management duties are split into two roles: **portfolio manager** and **trader**. In small firms, one person performs both.

Portfolio manager

- Creates the investment mandate, goals, and restrictions for each fixed income portfolio
- Develops and executes each portfolio's strategy
- Provides information to the head of fixed income markets
- Supervises all fixed income portfolio management staff, including traders, assistant portfolio managers, and any associated administrative personnel
- Provides information to assist a firm's marketing and client service personnel, including the outlook for the markets and positioning of the portfolios related to it, and explains the period performance (including a detailed performance attribution analysis that explains the sources of relative performance versus its specific performance benchmark index)
- Represents the firm at new client marketing meetings, client service meetings, industry conferences and interviews with the financial press.

Trader

- Provides the most effective execution of a portfolio manager's desired trades.
- Remains informed of a portfolio manager's detailed investment strategy.
- Keeps a portfolio manager apprised of the bond market's conditions and trends, and informs them as to how these market conditions can affect the portfolio manager's investment strategy.
- Maintains a good professional relationship with the fixed income sales and trading staff from brokers/dealers the firm does business with.

Interest Rate Sensitivity

Interest rate risk is the variation in bond value as a result of changes in market yields. It affects investors in two ways:

1. **Price risk** – variation in market value
2. **Reinvestment rate risk** – the chance that future proceeds will be reinvested at a lower future interest rate.

To choose between passive and active management, it's important to examine the sensitivity of bond values to interest rate changes. The factors that affect the price response are the inverse relationship between bond price and market rates, coupon paid, and the bond's maturity.

Two patterns of price sensitivity:

1. All else being equal, the longer the bond's maturity, the higher its sensitivity to changes in interest rates.
2. All else being equal, the lower the bond's coupon rate, the higher its sensitivity to changes in interest rates.

Macaulay Duration

- A zero-coupon bond makes a single payment (at its maturity, the principal), so the yield to maturity is based on the current price and maturity value
- A regular coupon bond is more complex since it makes a series of payments throughout its life (for instance, the true value of a 10-year semi-annual coupon bond is the sum of 20 semi-annual payments discounted at the rate pertaining to it from the current yield curve for that grade of bond)
- To deal with the valuation and time pattern, Frederick Macaulay devised a formula known as the Macaulay duration.

Equation 1 - Macaulay Duration

$$Macaulay\ Duration = \sum_{t=1}^{nxk} (t/k) \times \frac{CF_t}{\left(1 + (y/k)\right)^t} \times \frac{1}{P}$$

Examples of Calculating Bond's Total Duration Using the Macaulay Duration:

1) A $1,000 face value, 2-year, 5% semi-annual pay bond with 3% annual yield

Time in Years of Payment	Cash Flow*	Present Value of Payment**	Weight (Column 3 * 1/Bond Price)	Column 1 * 4
0.5	$25	$25/(1+1.5\%)^1 = \$24.63$	$24.63*(1/1,038.52) = 0.0237	0.0118
1	$25	$25/(1+1.5\%)^2 = \$24.26$	$24.26*(1/1,038.52) = 0.0233	0.0233
1.5	$25	$25/(1+1.5\%)^3 = \$23.90$	$23.90*(1/1,038.52) = 0.0230	0.0345
2	$1,025	$25/(1+1.5\%)^4 = \$965.73$	$965.73*(1/1,038.52) = 0.9299	1.8598
Coupon bond total		**$1,038.52**	**1**	**1.92**

Cash flow = (5%$1,000) = $50 per year ($25 per period because interest is paid semi-annually, so twice per year)
** 1.5% is the yield (annual is 3%, so semi-annual is 1.5%)

Hence, the coupon bond has a duration of 1.92 (shorter than its maturity).
In case of a zero-coupon bond, the Macaulay duration equals its maturity term.

Applications of the duration concept:

- Captures the portfolio's effective average maturity
- Measures its interest rate sensitivity
- Aids in immunizing it against interest rate sensitivity

Properties of Duration

Just like the portfolio's beta measures an equity's portfolio sensitivity to market movements, the modified duration of a portfolio measures its sensitivity to interest rates (equivalent to the dollar-weighted sum of the individual bonds' modified durations).

A bond portfolio's modified duration has five general properties:

1. A portfolio's modified duration is the dollar-weighted sum of individual bond modified durations.
2. The proportional change in a bond's price following a yield change is the product of modified duration and the change in a bond's yield to maturity.
3. For the same maturity, the higher a bond's coupon rate, the lower its modified duration.
4. For the same maturity, the higher a bond's yield to maturity, the lower its modified duration.
5. For the same coupon, the longer a bond's term to maturity, the greater its modified duration, except possibly when it is trading at a discount.

Property 1

A bond portfolio's modified duration is the *dollar-weighted sum of individual bond modified durations*.

Equation 2 - Modified Duration (Portfolio)