Evolution of Fixed Income Investments: The Path to a New World Approach

CFA Society of Pittsburgh

April 21, 2011

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Partner
GMO LLC
State of Play

• A brief history of fixed income investing
  -- Expanding investment options
  -- Advances in technology
  -- Evolution of portfolio management
State of Play

• A brief history of fixed income investing
  -- Expanding investment options
  -- Advances in technology
  -- Evolution of portfolio management

• Problems with popular investment mandates
State of Play

• A brief history of fixed income investing
  -- Expanding investment options
  -- Advances in technology
  -- Evolution of portfolio management

• Problems with popular investment mandates

• “New World Bond Management”
Expanding Investment Options

1960s

Bonds
Expanding Investment Options

- Bonds
- Mortgage-Backed Securities
- Futures

1960s  1970s
Expanding Investment Options

1960s

- Bonds
- Mortgage-Backed Securities

1970s

- Futures
- Options
- Zero Coupon Bonds/Currencies
- Non-Dollar Bonds/Junk Bonds
- Floaters

1980s

- CMOs
- Swaps/Caps/Collars
- REMICs/I/Os/POs
- Municipals
- ARMs/SLOBs
- Asset-Backeds
Expanding Investment Options

1990s

- Emerging Country Debt
- Securitized International Assets
- CAT Bonds
- Emerging Currencies
- Credit Default Insurance
- Securitized Loans, Leases and Receivables
- Inflation-Linked Bonds
Advances in Technology

Yield Book

1960s
# The Yield Book

### EXPANDED BOND VALUES TABLES

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Advances in Technology

1960s | 1970s

Yield Book | Inside The Yield Book

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Advances in Technology

Yield Book
Monroe Calculator
Wang Calculator
Computer Time Sharing/Telerate
HP-80/Reuters
HP-12C

1960s 1970s
Advances in Technology

1960s
- Yield Book
- Monroe Calculator
- Wang Calculator
- Computer Time Sharing/Telerate

1970s
- HP-80/Reuters
- HP-12C
Advances in Technology

- Yield Book
- Monroe Calculator
- Wang Calculator
- Computer Time Sharing/Telerate
- HP-80/Reuters
- PCs
- Mainframe Bond Analytics: BARRA, CMS
- Online Analytics: Bloomberg

1960s 1970s 1980s
Advances in Technology

- 1970s: PCs, Mainframe Bond Analytics, BARRA, CMS
- 1980s: Online Analytics, Bloomberg, Expert Systems, Electronic Trading
- 1990s: Packaged Analytics, Relational Databases, MATLAB, SQL, Intex
Advances in Technology

- High-Frequency Data/Trading
- Advanced Programming Languages
- Shareware
- Expanded Internet Bandwidth, Speed

2000s

??????????

2010s
Evolution of Portfolio Management

- Buy and Hold/Income and Tax Analysis
- Credit Analysis/Issue Selection

1950s
Evolution of Portfolio Management

1950s
- Credit Analysis/Issue Selection
- Buy and Hold/Income and Tax Analysis

1960s
- Break-Even/Yield Arbitrage
- Swaps
- Sinking Fund Strategies
Evolution of Portfolio Management

- **1950s**
  - Credit Analysis/Issue Selection
  - Buy and Hold/Income and Tax Analysis
  - Sinking Fund Strategies

- **1960s**
  - Active Management: Duration, Sector, Credit
  - Scenario Analysis
  - Term Structure Modeling
  - Valuation/Risk Models
  - Immunization/LDI/Indexing

- **1970s**
  - Break-Even/Yield Arbitrage Swaps
Evolution of Portfolio Management

1950s
Credit Analysis/Issue Selection
Buy and Hold/Income and Tax Analysis

1960s
Break-Even/Yield Arbitrage Strategies
Sinking Fund Strategies

1970s
Scenario Analysis
Active Management
Term Structure Modeling
Valuation/Risk Models
Immunization/LDI/Indexing

1980s
Multivariate Optimization
Convexity Management
Options Strategies
Evolution of Portfolio Management

- Model-Based Systematic Strategies
- Credit/Default Models
- Regime Change Models
- Structured Finance Analytics
- High-Frequency Trading

1990s | 2000s

“New World Bond Management”
Typical Benchmark-Oriented Bond Management is Bad

• Index composition drifts over time; the past is not representative
Typical Benchmark-Oriented Bond Management is Bad

- Index composition drifts over time; the past is not representative
- Popular benchmarks represent a fraction of the fixed income market
Typical Benchmark-Oriented Bond Management is Bad

• Index composition drifts over time; the past is not representative
• Popular benchmarks represent a fraction of the fixed income market
• Most indexes have little relation to investor objectives
Why own Bonds?

• Diversify equity exposure
Why own Bonds?

- Diversify equity exposure
- Hedge liabilities
Why own Bonds?

- Diversify equity exposure
- Hedge liabilities
- Hedge deflation/inflation
Why own Bonds?

• Diversify equity exposure
• Hedge liabilities
• Hedge deflation/inflation
• Gain foreign bond and currency exposure
Why own Bonds?

- Diversify equity exposure
- Hedge liabilities
- Hedge deflation/inflation
- Gain foreign bond and currency exposure
- Provide a source of liquidity
View of the “New World”
What’s the Right Beta?
What’s the Right Beta?

• Interest rate risk is the most important
What’s the Right Beta?

- Interest rate risk is the most important
- Beta through derivatives requires little cash
What’s the Right Beta?

• Interest rate risk is the most important
• Beta through derivatives requires little cash
• Local government term structures explain most bond price moves
What’s the Right Beta?

• Interest rate risk is the most important
• Beta through derivatives requires little cash
• Local government term structures explain most bond price moves
• Secondary exposures like credit or sector are best addressed when thinking about alpha
Equity Market Diversification

• Is it reasonable to expect bonds to offset stock market declines?
Equity Market Diversification

• Is it reasonable to expect bonds to offset stock market declines?
• What is the proper hedge ratio?
Worst Case Examples

Total Return
S&P 500
Quarterly 1980-2010

Source: GMO, Barclays
Historical Diversification

Total Return (75% Stock/25% Bond)
S&P 500, Barclays Aggregate and Government/Credit Bond Indexes
Quarterly 1980-2010
Historical Diversification

Total Return (75% Stock/25% Bond)

S&P 500, Barclays Aggregate and Government/Credit Bond Indexes
Quarterly 1980-2010

Source: GMO, Barclays
Hedged 75/25 Portfolio Returns

Portfolio Return (75% Stock/25% Bond)
S&P 500, Barclays Aggregate and Government/Credit Bond Indexes
Quarterly 1980-2010
Hedged 75/25 Portfolio Returns

Portfolio Return (75% Stock/25% Bond)
S&P 500, Barclays Aggregate and Government/Credit Bond Indexes
Quarterly 1980-2010

Source: GMO, Barclays
Hedged 25/75 Portfolio Returns

Portfolio Return (25% Stock/75% Bond)
S&P 500, Barclays Aggregate and Government/Credit Bond Indexes
Quarterly 1980-2010
Hedged 25/75 Portfolio Returns

Portfolio Return (25% Stock/75% Bond)

*S&P 500, Barclays Aggregate and Government/Credit Bond Indexes*

Quarterly 1980-2010

-20% -15% -10% -5% 0% 5% 10%

Recent Equity Bear Market
4Q07 through 1Q09

25% S&P 500/75% Barclays Aggregate

25% S&P 500/75% Barclays Long U.S. Government/Credit

Source: GMO, Barclays
Hedging Specific Liabilities

• A more-tractable problem
Hedging Specific Liabilities

• A more-tractable problem
• Regulatory changes are increasing the focus on liability-driven investing
Hedging Specific Liabilities

• A more-tractable problem
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• It’s key to determine how much hedging is desired and what form it should take
Hedging Specific Liabilities

• A more-tractable problem
• Regulatory changes are increasing the focus on liability-driven investing
• It’s key to determine how much hedging is desired and what form it should take
• Actuaries can provide a schedule of risk-free interest rate exposures to serve as a pension benchmark
# Sample Liability Benchmark

<table>
<thead>
<tr>
<th>Maturity (Years)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-1.8%</td>
</tr>
<tr>
<td>2</td>
<td>-0.1%</td>
</tr>
<tr>
<td>5</td>
<td>4.1%</td>
</tr>
<tr>
<td>10</td>
<td>12.1%</td>
</tr>
<tr>
<td>20</td>
<td>21.5%</td>
</tr>
<tr>
<td>30</td>
<td>41.3%</td>
</tr>
<tr>
<td>40</td>
<td>18.0%</td>
</tr>
<tr>
<td>50</td>
<td>4.9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Liability Value €245 million</th>
</tr>
</thead>
<tbody>
<tr>
<td>100.0%</td>
</tr>
</tbody>
</table>
Deflation/Inflation Protection

• What degree of protection is desired?
Deflation/Inflation Protection

- What degree of protection is desired?
- Scenario analysis is helpful in quantifying hedge ratios
Deflation/Inflation Protection

• What degree of protection is desired?
• Scenario analysis is helpful in quantifying hedge ratios
• If inflation falls (or rises) by X% what response is expected from bond portfolio?
Foreign Bond & Currency Diversification

• Foreign bonds: efficient way to gain non-domestic interest rate and currency exposure
Foreign Bond & Currency Diversification

• Foreign bonds: efficient way to gain non-domestic interest rate and currency exposure

• Additionally can provide exposure to offshore credit risks
Foreign Bond & Currency Diversification

• Foreign bonds: efficient way to gain non-domestic interest rate and currency exposure
• Additionally can provide exposure to offshore credit risks
• Excellent for hedging liabilities tied to foreign risk factors
Establishing a Beta Benchmark

• Must convert investment objectives into an investable bond benchmark
Establishing a Beta Benchmark

- Must convert investment objectives into an investable bond benchmark
- Assumptions about correlations between risks to be hedged and benchmark are required
Establishing a Beta Benchmark

• Must convert investment objectives into an investable bond benchmark

• Assumptions about correlations between risks to be hedged and benchmark are required

• Liability benchmarks are easy, equity hedging using bond benchmarks, more challenging
Equity Hedging Example

• A scenario approach is a useful way to frame the problem
Equity Hedging Example

• A scenario approach is a useful way to frame the problem

• An example:
  -- Expect to offset a third of S&P 500 losses in a quarter
Equity Hedging Example

• A scenario approach is a useful way to frame the problem

• An example:
  -- Expect to offset a third of S&P 500 losses in a quarter
  -- Assume when stocks decline, Barclays Long G/C Index rises by an amount equal to half the equity market loss
The Math

\[
\frac{\% \text{Stocks} \times \text{Stock Return} \times \frac{1}{3}}{\% \text{Bonds} \times \text{Stock Return} \times \frac{1}{2}}
\]
The Math

\[
\frac{\%\text{Stocks} \times \text{Stock Return} \times \frac{1}{3}}{\%\text{Bonds} \times \text{Stock Return} \times \frac{1}{2}} = \frac{\%\text{Stocks}}{\%\text{Bonds}}
\]

Rearranging gives us our Stock/Bond allocation ratio

\[
\frac{\%\text{Stocks}}{\%\text{Bonds}} = 1.5
\]

\[
\sim 60\% \text{ Stocks} / 40\% \text{ Bonds}
\]
Issues

• Relationship between stock and bond index returns is variable and not always negatively correlated
Issues

• Relationship between stock and bond index returns is variable and not always negatively correlated

• More reasonable to look at interest rate changes associated with falling stock prices and select a benchmark duration to produce the required result
Important Steps

• Provide a specific answer to the question, “Why do I own bonds?”
Important Steps

• Provide a specific answer to the question, “Why do I own bonds?”

• Establish an executable benchmark that captures the spirit, and in some cases the letter, of your objective
What About Alpha?

• Secondary to establishing an effective benchmark
What About Alpha?

• Secondary to establishing an effective benchmark
• Active strategies shouldn’t compromise benchmark effectiveness in meeting investment objectives
What About Alpha?

• Secondary to establishing an effective benchmark

• Active strategies shouldn’t compromise benchmark effectiveness in meeting investment objectives

• Good active bond managers can add value that is competitive with, and diversifies, equity alpha
I. Beta Exposures

Term Structure (Nominal or Inflation-Linked)

Currency

Credit Duration

Cumulative Liquidity
Investment Management Template

I. Beta Exposures

Term Structure (Nominal or Inflation-Linked)

Currency

Credit Duration

Cumulative Liquidity

II. Active Management Guidelines
Investment Management Template

I. Beta Exposures
- Term Structure *(Nominal or Inflation-Linked)*
- Currency
- Credit Duration
- Cumulative Liquidity

II. Active Management Guidelines

III. Account Structure
- Investment Universe
- Performance Objectives
- Fee Structure
## Beta Exposures

### Term Structure (Nominal or Inflation-Linked)

<table>
<thead>
<tr>
<th>U.S.</th>
<th>Euro</th>
<th>U.K.</th>
<th>Japan</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overnight Cash</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-Month</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-Year</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-Years</td>
<td>15%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-Years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-Years</td>
<td>45%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-Years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-Years</td>
<td>40%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-Years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50-Years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### −OR−

**Average Duration**

<table>
<thead>
<tr>
<th>U.S.</th>
<th>Euro</th>
<th>U.K.</th>
<th>Japan</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Currency

<table>
<thead>
<tr>
<th>U.S.</th>
<th>Euro</th>
<th>U.K.</th>
<th>Japan</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Credit Duration* (May be static or dynamically set as a function of relative valuation)

<table>
<thead>
<tr>
<th>U.S.</th>
<th>Euro</th>
<th>U.K.</th>
<th>Japan</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Normal Stressed

<table>
<thead>
<tr>
<th>U.S.</th>
<th>Euro</th>
<th>U.K.</th>
<th>Japan</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Day</td>
<td>10%</td>
<td>5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-Week</td>
<td>25%</td>
<td>13%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-Month</td>
<td>50%</td>
<td>25%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-Months</td>
<td>90%</td>
<td>70%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Guidelines

#### Term Structure *(Nominal or Inflation-Linked)*

- Overnight Cash
  - 3-Month
  - 1-Year
  - 2-Years
  - 5-Years
  - 10-Years
  - 20-Years
  - 30-Years
  - 40-Years
  - 50-Years
  - Total
  - **-OR-**
  - Average Duration

#### Currency

- Investment Grade
  - High Yield
  - Emerging
- 1-Day
- 1-Week
- 1-Month
- 3-Months

#### Credit Duration* *(May be static or dynamically set as a function of relative valuation)*

- USD: +/- 35%, all developed market term structures permitted +/- 1 year
- USD: +/- 20%, All developed market currencies permitted +/- 20%
- Minimum rating: BBB, Range: +/- 2 years
- Minimum rating: CCC, Range: +/- 1 year
- No local currency exposure, Range: +/- 2 years

#### Cumulative Liquidity

- U.S Treasuries, custodial sweep accounts
- U.S Treasuries only
- U.S Treasuries, foreign government bonds
- Government bonds, LIBOR-based AAA rated bonds

#### Active Management Guidelines

- +/- 10%
- +/- 15%
- +/- 10%

---

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III. Account Structure

<table>
<thead>
<tr>
<th>Derivatives permitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>No: Equities, municipal bonds, convertibles</td>
</tr>
<tr>
<td>Counterparties rated A or better, maximum 10%</td>
</tr>
<tr>
<td>Co-mingled funds require look-through</td>
</tr>
</tbody>
</table>

| 150 basis points, annualized, net of fees |
| 0.4 to 0.8 |
| 150 to 300 basis points |
| Rolling 5 years |

| 20 basis points |
| -Plus- |
| 25% of excess or return over beta, net of base fee and net of 3-month LIBOR; subject to high water mark |
Fixed Income Can Play a Valuable Role in Endowment Portfolios

• Diversification: Significant outperformance in bear equity markets
Fixed Income Can Play a Valuable Role in Endowment Portfolios

• **Diversification**: Significant outperformance in bear equity markets
• **Deflation/inflation hedging**
Fixed Income Can Play a Valuable Role in Endowment Portfolios

• Diversification: Significant outperformance in bear equity markets
• Deflation/inflation hedging
• Adding value: Many bond strategies are more effective than equity counterparts
Conclusions

• It’s critical to align portfolio beta benchmarks with investment objectives
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• Process begins by articulating explicit goals and incorporating them in an investable benchmark
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• Process begins by articulating explicit goals and incorporating them in an investable benchmark

• Bond beta and alpha decisions must fit within a broader asset allocation framework
The End