

CFA Level III, Study Session 7: Debt Investments

By Ron D’Vari, Ph.D., CFA

Managing Partner, Director of Research

State Street Research & Management

E-mail: rdvari@ssrm.com, <http://www.rondvari.com>, and Message (617) 351-2030

7. Asset Valuation - Debt Investments

-
1. Fixed Income Readings for the Chartered Financial Analyst Program: Level III Readings, Frank J. Fabozzi, ed. (Frank J. Fabozzi Associates, 2000)
 - A. “Managing Indexed and Enhanced Indexed Bond Portfolios,” Kenneth E. Volpert, Ch. 4
 - B. “Relative-Value Methodologies for Global Corporate Bond Portfolio Management,” Jack Malvey, Ch. 5
 - C. “International Bond Portfolio Management,” Christopher B. Steward, J. Hank Lynch, and Frank J. Fabozzi, Ch. 6

Note: Make sure to read the questions at the end of each chapter and their solutions.

7.1.A. “Managing Indexed and Enhanced Indexed Bond Portfolios”

Summary:

- Understanding of duration contribution as a bond portfolio spread change risk
- Understanding primary risk factors in a bond portfolio: curve sensitivities (duration), cash flow distribution (duration contribution by time period), sector and quality duration contributions, sector/quality/maturity/coupon weights
- Duration contribution from a sector/quality or security (=duration * %MV) measures impact to tracking error due to a spread widening event
- Difference between active and indexing approach is the level of matching/mismatching risk factors in a portfolio
- Enhanced indexing strategies through issue selection and curve/sector/quality positioning (opportunistic mismatching)

LOS

a) **Discriminate** among the following approaches to domestic bond management:

- pure bond indexing
- enhanced indexing by matching primary risk factors
- enhanced indexing by minor risk factor mismatching
- active management by larger risk factor mismatches
- “full-blown” active

Risk & Expected Return vs. Benchmark				
<i>Index</i> →				
<i>Enhanced Index</i> →				
<i>Active</i> →				
Pure Index Match	Matching Primary Index Factors	Minor Mismatches	Larger Mismatches	Full Blown Active
<ul style="list-style-type: none"> • Costly • Illiquid • For broad bond indexes, very inefficient 	<ul style="list-style-type: none"> • Minor tracking error • Less costly • Some alpha by selecting cheaper securities 	<ul style="list-style-type: none"> • Allows some relative value tilts • Small tracking error with commensurate alpha 	<ul style="list-style-type: none"> • Active views on major factors • Increased tracking error risk • Must overcome transactional costs and higher fees 	<ul style="list-style-type: none"> • Large active views • Different risk profile than index • Significant added-value (loss) expected
<ul style="list-style-type: none"> • Full replication • Attempts to match issue by issue • No value judgment 	<ul style="list-style-type: none"> • Matched <ul style="list-style-type: none"> - Duration - Curve - Sector - Quality - Callability 	<ul style="list-style-type: none"> • Matched duration • Minor mismatches <ul style="list-style-type: none"> - Curve - Sector - Quality - Callability 	<ul style="list-style-type: none"> • Some views on <ul style="list-style-type: none"> - Duration - Curve - Sector - Quality - Callability 	<ul style="list-style-type: none"> • Active duration and curve positioning • Large sector, quality, and callability mismatch

b) **Support** the argument for bond indexing;

- Broad diversification and exposure to maturity, sector and quality
- Lower costs are durable and predictable: 1) transaction costs, 2) management fees
- Higher returns than mean manager by definition because of mean gross of fee returns and lower costs
- Consistent performance vs. index

- c) **Discuss** the primary bond risk factors (duration, cash flow distribution, sector and quality percent, sector duration contribution, quality spread duration contribution, sector/ coupon/ maturity cell weights, and issuer exposure) and the process for addressing each factor in an indexing framework;

Primary Bond Risk Factors

Duration	Cash Flow Distribution			
<ul style="list-style-type: none"> Duration control alone is not adequate Effective duration only approximates sensitivity to parallel interest rate moves Other non-parallel risk measures needs to be 	<ul style="list-style-type: none"> Project portfolio and index cash flows by individual securities for discrete time buckets The present value of each cash flow is computed Duration contribution of each cash flow bucket is calculated by multiplying duration * %MV for each bucket. 			
	Time Period	% Present Value	Duration Contribution	% Duration Contribution

	Total	100	xxx	100
Sector and Quality Percent and Duration Contribution	Sector/Coupon/Maturity Cell Weights		Issuer Exposure	
<ul style="list-style-type: none"> Manage Percent in Sector and Quality <ul style="list-style-type: none"> Manage percent exposure in each sector and quality/ maturity buckets If matched vs. index would tend to match the yield Manage Sector and Quality Duration Contribution <ul style="list-style-type: none"> The most effective way of controlling tracking error Manage duration contribution exposure in each sector and quality/ maturity buckets If matched vs. index would tend to match <i>the industry/quality risk to sector/quality spread</i> changes Most important in lower quality and riskier categories 	<ul style="list-style-type: none"> Callable bonds exhibit negative convexity <ul style="list-style-type: none"> Premium bonds tend to act shorter in declining rate environment Discount bonds tend to act longer in rising rate environment Deviation in callability can lead to significant tracking error in volatile interest rate environment Convexity risk can be minimized by matching sector/coupon/maturity cells of callable sectors. Mortgage market is particularly sensitive to prepayment risk and negative convexity. Risk of mortgages is managed by matching index in a multidimensional matrix <ul style="list-style-type: none"> Maturity (balloon, 15-year, and 30-year) Sector (GNMA, FNMA, FHLMC) Coupon (50bp buckets) 		<ul style="list-style-type: none"> Percent market value limits without regard to issuers duration and issuer's index weight is not adequate Duration contribution = Duration * %MV Dur. Cont is measures impact to tracking error due to a spread widening event Relative duration contribution is the best way measuring tracking error risk from a given issuer 	

Primary Bond Index Matching Risk Factors

	Government	Corporate	MBS
Duration	Yes	Yes	
Percent Value Distribution of Cash Flows	Yes	Yes	
Percent in Sector and Quality		Yes	
Duration Contribution of Sector		Yes	
Duration Contribution of Quality Sector		Yes	
Sector/Coupon/Maturity Cell Weights		Yes	Yes
Issuer Exposure Control		Yes	

- d) **Compute** and interpret, based on duration contribution, a portfolio's exposure to spread changes versus the exposure of the portfolio's index;

- Percent limits to an issuer or sector deviation without regard to duration is not enough
- The best measure of impact of spread widening of a sector or issuer to the portfolio is *spread duration*

$$\text{Spread Duration} = \text{Weight} * \text{Effective Duration}$$

$$\text{Return Impact to Portfolio} \approx - \text{Change in Spread} * \text{Spread Duration}$$

- *Relative spread duration* to a sector or issuer

$$\text{Spread Duration of Portfolio} - \text{Spread Duration of Index}$$

(As measured for the same sector or issuer)

- For effective index strategies relative spread duration contribution limits needs to be established

e) **Discuss** index enhancement strategies, including lower costs, issue selection, yield curve positioning, sector and quality positioning, and call exposure positioning;

Enhancement Strategies

Lower costs	Issuer Selection	Yield Curve Positioning
<ul style="list-style-type: none"> • Shopping for lower fees • Lower transaction costs <ul style="list-style-type: none"> • Low turnover • Effective competitive trading 	<ul style="list-style-type: none"> • Avoid deteriorating credits • Avoid risk by diversification 	<ul style="list-style-type: none"> • Seek relative value in general parts of the curve • Look for parts of the curve with more favorable “roll down” characteristics
Sector and Quality Positioning		Call Exposure Positioning
<ul style="list-style-type: none"> • Yield tilt toward short corporates <ul style="list-style-type: none"> - Large break-even widening to treasuries - Spread roll down - Risks are default and/or recessionary spread widening • Periodic minor over and underweighting of sectors and qualities <ul style="list-style-type: none"> - Scaled back version of sector rotation in active strategies - Can use new cash flows/reinvestment to reduce transaction costs - Minimize corporate selling 		<ul style="list-style-type: none"> • Callable securities exhibit different durations in rising and declining rate environment <ul style="list-style-type: none"> - Premium bonds tend to act shorter in declining rate environment - Discount bonds tend to act longer in rising rate environment • Deviation in callability can lead to significant tracking error in volatile interest rate environment • Active management of callability could be a source of enhancement and tracking error but requires great skills

- f) **Explain** how to measure the success of a bond indexing or enhanced indexing strategy.
- “You cannot manage what you cannot measure”
 - To measure success need to consider two aspects:
 - Outperform *adjusted returns*
 - Maintain low and stable monthly tracking differences as measured by rolling 12-month standard deviation
 - Perform performance attribution
 - **Adjusted Returns:** Three major adjustments that need to be tracked
 - Pricing - portfolio need to be priced using index prices
 - Transaction costs due to
 - Cash contributions/withdrawals
 - Reinvestment of principal and coupon
 - Expenses:
 - Need to be kept low
 - Gross performance should be used for assessing tracking error
 - **Tracking Performance:** Measure rolling 12-month tracking error of *adjusted relative returns*
 - **Detailed Performance Attribution:** Required to measure with precision the risk matching and return enhancing strategies due to
 - Term structure
 - Sector and quality allocation at sector and subsector levels
 - Issue selection

7.1.B. “Relative-Value Methodologies for Global Corporate Bond Portfolio Management”

Summary

- Understand top-down and bottom-up approaches to relative value analysis
 - Primary methodologies of corporate relative value maximization: total return, primary market trading, liquidity and trading, secondary trading, structure, spread analysis, corporate curve, credit curve, and sector rotation
 - Understand risks of corporate bond structures (bullet, callable, sinking fund, and putables)
 - Understand corporate liquidity risk changes over time and its drivers: economic cycle, credit cycle, shape of the yield curve, supply, and season
 - Understand reasons for doing and not doing secondary trading
 - Understand the implications of credit curve shape and use it in strategy formulation
 - Application of primary methodologies of corporate value maximization in managing corporate portfolios
-

a) **Describe** relative value analysis, with reference to both the top-down and bottom-up approaches;

Relative Value Analysis: Ranking of fixed income investments in terms of *expected excess performance* by

- Sector/Credit (Agencies, ABS, MBS, and Corporate sectors)
- Structure (fixed or floater, bullet, callable, sinking fund)
- Issuers (GE, GM, Ford, etc.)
- Issues (2-yr, 5-yr, 10-yr, 30-yr, benchmark/reference, global/MTN, 144a, etc.)

Two Approaches to Global Bond Management:

- **Top-Down Approach:**
 - Form views on large scale economic developments
 - Based on views form asset allocation decisions (differentiate from the benchmark)
 - Select securities to implement sector allocation
 - Added (subtracted) value depends more on sector allocation decisions
- **Bottom-up Approach:**
 - Emphasize individual security selection
 - Often managers maintain a neutral stance on duration and sector allocation
 - Main source of added value is security selection

b) **Discuss** the primary methodologies for corporate relative value maximization;

Total Return Analysis:

- Detailed analysis of past returns and projection of future returns
 - Fundamentals: Economic cycle as a major determinant of corporate spreads (default risk premiums)
 - > E.g. prospect of recession increases corporate spreads and reduces their relative return vs. treasuries
 - Technicals: Noncyclical technical factors such as treasury supply can influence credit spreads and credit curve significantly
- While patterns do not always recur, understanding of past return patterns is essential in optimizing portfolios for better risk/return characteristics

Primary Market Analysis:

- Analyzing the new issue corporate supply and its impact on spreads
- New-issue supply effect on the spreads has been contrary to intuition
 - Often, in corporate markets new supply has helped corporate spreads as the activity has validated and enhanced secondary market valuations

- In absence of new supply, secondary traders lose market support from new issue market and raise their bids

Liquidity and Trading Analysis:

- Expected liquidity of issues influence portfolio decisions
- Liquidity is affected by:
 - Basic Factors: size/frequency/locality of issuance, MTN, private placements, and structure
 - Cyclical Factors: Economic cycle, credit cycle, shape of yield curve, supply, and season
 - Secular Changes: Regulatory push to higher transparency and technical innovation (ECNs) will lead to a trend of higher liquidity for large brand-name (“go-go”) issuers
- Managers can trade off liquidity with higher yield if they are not expecting to trade an issue/issuer (requires good up front risk analysis)

Secondary Trading Analysis:

- Driven by changes in expectations for capital markets and issuers
 - Macro Factors: Economic/credit cyclical changes, and curve changes
 - Industry Factors: Driven by cyclical economic changes, secular industry structure changes (internal and external competition),
 - Issuer Specific: Earnings and cash flow concerns, capital structure/leverage changes, event risk (merger and acquisition)
- Reasons to trade:
 - Yield/spread pick-up trades
 - Credit-upside trades (offensive) or Credit-defense trades
 - New issue swaps
 - Sector rotation trades
 - Curve adjustment trades
 - Structure trades
 - Cash flow reinvestment or investment of new cash contribution
- Reasons not to trade
 - *Portfolio Constraints*: Guideline restrictions in pension funds, Regulatory restrictions (insurance companies and banks), Global commercial banks investing in floating rate notes only
 - *“Story” Disagreement*: Rational analysts may disagree and that could be the basis of doing or not doing a trade
 - *Buy-and-Hold*: Traditional buy-and-hold investors have remained buy-and-hold investors due to accounting constraints. Some active bond managers have become quasi buy-and-hold managers to keep turnover down
 - *Seasonality*: During certain periods of the calendar year secondary and new issue activity slows down, e.g. quarter-ends and year-ends. As a result bids and offers may not reflect real market levels.

Spread Analysis:

- *Alternative Spread Measures*:
 - *Nominal Spread, Static or Zero Vol Spread*: Traditional spread measures for corporate bonds.
 - *OAS Analysis*: Use of OAS has diminished because of the rapid reduction of corporate bonds with embedded options and lack of models accounting for spread volatility
 - *Spread to Swap Curve*: Gaining momentum and has emerged as the common denominator to measure relative value
 - *Spread to Agency Curve*: It is unlikely to become a common convention. However, it may be used by portfolio managers to assess relative value vs. agencies.
- *Spread Tool Analysis*:
 - *Mean-Reversion Analysis*: Statistical analysis of a sector spread or spread between sectors to assess whether current deviations from the mean are significant – measured by number of standard deviation from the mean.
 - *Quality-Spread Analysis*: Analysis of the spread differentials between low and high quality credits. Upgrade quality when quality spreads get tight and go down in credit when quality spreads get wide.
 - *Percent Yield Analysis*: Based on analysis of corporate yields to government bond yields. Have proven not to be predictive.

Structural Analysis

- Analysis of performance of different structures
 - > It has become less important for the high-grade market as the global corporate bond market has become more homogeneous (intermediate bullets)
 - > Structural diversity still exists in high-yield and emerging markets
- Relative value decisions depend on: 1) curve outlook, 2) volatility outlook, and 3) interpretation of OAS model outputs
- Current Structures:
 - > *Bullets:*
 1. Front-end Bullets (1 to 5 year): Have great appeal. Used in barbell strategies with corporates and non-us institutions sometimes swap them to floating (“*Asset Swap*”)
 2. Intermediate Bullets (5 to 12 year): Most popular segment of corporate market
 3. Long Bullets (12 to 30 year): Have appeal to investors requiring positive convexity. 15-year is less popular than 20 and 30-year issues.
 - > *Callables:*

Typically 10NC5 (10 year maturity noncallable for 5 years)
Performance depends on curve and volatility moves

 - Callables underperform during falling and volatile interest rate environments

Option premium runs from 20 to 50bp, depending on capital market conditions
 - > *Sinking Funds:*

Different structures discussed in Level I
Series of partial retirement – some mandatory with option for additional call
Tend to outperform in rising rate environment (i.e. act shorter)
 - > *Putables:*

Grant option to investors to put bond back to issuer at par
Typically have a on-date put feature (European), with few offering second or third puts
Provide investors protection against

 - Sharp increases in interest rates
 - Credit deterioration, assuming issuer is still able to meet its obligations

Implied volatility of putable bonds (4% to 9%) have been lower typically than callable bonds (10% to 20%)
Implied volatility is calculated from an option-adjusted interest rate model
Putable structure issuance has decreased significantly and they are relatively scarce

Corporate Curve Analysis:

- Analysis of credit structure across credit ratings and maturity
- Analysis of the slope of issuer credit curve and credit spread curve
- Developing credit curve relative value views

Credit Analysis:

- Avoid credit downgrades (most important success factor)
- Seek credit rating upgrade/improvement candidates
- Identify contradiction in issuer/issue spreads
- Credit screening is tied to financial statement analysis, cash flows, earnings, management assessment, event risk, industry analysis, rating agency analysis review, relative spread movements, and latest news.
- True credit analysis is time consuming and requires experienced analysts
- Advantages of credit analysis is diminished with increasing expansion of global corporate market

- c) **Discuss** the implications of both cyclical changes (e.g., new issue supply) and secular changes (e.g., changes in dominant product structure) in the primary corporate bond market for the management of a fixed-income portfolio;

Cyclical

- Supply/demand patterns.
 - New issue have tended to support corporate spreads and contradicted intuition.
 - Supply supports secondary trading and better pricing information.
 - May not hold true for individual issues.

Secular

- Pace of change is often gradual (and change is frequently overlooked).
- Recent themes:
 - Globalization of corporate bond market
 - Eurobonds
 - Non-dollar bonds
 - The Euro
 - MTN has come to dominate the front of the corporate market
 - High yield has become an accepted asset class
 - Credit derivatives and structured notes are starting to become more acceptable
 - Corporate market is becoming more homogenous:
 - Focusing more on bullet structures and less on callables or putables
 - Shifting to intermediate 5-10 year maturities (diminishing 30-year)

- d) **Discuss** rationales for secondary trading and construct a secondary trade based on credit sector relative value;

- Yield/Spread Pick-up Trades:
 - It stems from yield maximizing behavior and is most common secondary trading (50%).
 - Yield maximizing might be illusive – ultimately risk avoidance and total return is more important
 - Remember total return is a more superior framework for assessing performance
- Credit-Upside Trades:
 - Reasoned on rating agency upgrade or credit improvement expectations
 - Popular in crossover credits (issues in between Ba2/ BB to Baa3/BBB-) – benefits both from credit and liquidity improvements
- Credit-Defense Trades
 - More important during periods of economic uncertainty
 - Avoid secular sector transformations (e.g. electric utilities and telecommunications)
 - Securities may have to be sold when downgraded below a certain level because of guideline restrictions – worst possible time to sell a security
- New Issue Swaps:
 - Perceived superior new issue liquidity prompts managers to swap from older issues
 - New issue is also used to add exposure to the new issuer
- Sector Rotation Trades
 - Shifting portfolio out of sectors expected to underperform into sectors expected to outperform
 - Have become more popular but not as much as in equity markets
 - Author expects this to continue being a new trend because expected improvements in liquidity and price transparency
- Curve Adjustment Trades
 - This is done in anticipation of yield curve and/or corporate yield curve moves
 - Trades can be yield curve neutral but express a view on spread curve
- Structure Trades
 - Are done in anticipation of yield curve and volatility outlook changes
 - Example: Sell premium callable corporates and buy bullets in anticipation of lower and more volatile interest rates.

- e) **Discuss** rationales for not trading;
- *Portfolio Constraints*: Guideline restrictions in pension funds, Regulatory restrictions (insurance companies and banks), Global commercial banks investing in floating rate notes only
 - *“Story” Disagreement*: Rational analysts may disagree and that could be the basis of doing or not doing a trade
 - *Buy-and-Hold*: Traditional buy-and-hold investors have remained buy-and-hold investors due to accounting constraints. Some active bond managers have become quasi buy-and-hold managers to keep turnover down
 - *Seasonality*: During certain periods of the calendar year secondary and new issue activity slows down, e.g. quarter-ends and year-ends. As a result bids and offers may not reflect real market levels.
- f) **Explain** the advantages of the swaps framework for evaluating corporate bond purchases;
- Allows managers to compare securities across fixed and floating markets.
The traditional nominal spreads do not work well for this objective.
 - The traditional nominal spreads are distorted by the “specialness” and technical factors of the U.S. treasuries.
 - Spreads measured vs. swap curve are becoming a single global standard to measure credit spread.
 - Extension of swap framework to high yield market is less relevant, as spreads are to measure default risk.
 - Drawbacks: The traditional nominal spreads are better understood by individuals and have much longer history.
- g) **Compute** a fixed rate corporate bond’s spread over LIBOR, using the swaps framework;
- Swap spread: fixed rate payer pays Treasury+Swap Spread and Receives Libor
 - Libor Spread = Treasury Spread – Swap Spread
 - Example: Ford 7.5% of 2005 trading at spread to treasury of 113bp and 5 year swap trading at 83bp.
Ford 7.5% of 2005 can be swapped to a floating instrument yielding Libor +113-83 or Libor+30
- h) **Evaluate** a corporate bond purchase based on mean-reversion analysis and contrast this method, and its limitations, with quality-spread analysis and percent yield spread analysis;
- *Mean-Reversion Analysis*:
 - Statistical analysis of a sector spread or spread between sectors.
 - It is used to assess whether current deviations from the mean are significant (cheap).
 - Significance is typically measured by number of standard deviation from the mean.
 - Limitations: Mean can be highly dependent on the market conditions.
 - *Quality-Spread Analysis*:
 - It is based on analysis of the spread differentials between low and high quality credits.
 - Decision rule is to upgrade quality when quality spreads are tight and go down in credit when quality spreads are wide.
 - *Percent Yield Analysis*:
 - Based on analysis of corporate yields to government bond yields.
 - Have proven not to be predictive.
- i) **Explain** how the different types of bond structures are used in a corporate bond portfolio;
- Structure analysis relates to analysis of performance of different structures
 - It has become less important for the high-grade market as the global corporate bond market has become more homogeneous (intermediate bullets)
 - Structural diversity still exists in high-yield and emerging markets

- Relative value decisions depend on: 1) curve outlook, 2) volatility outlook, and 3) interpretation of OAS model outputs

- Current Structures:

Bullets:

- *Front-end Bullets (1 to 5 year):*
 - Have great appeal.
 - Used in barbell strategies with corporates and non-us institutions sometimes swap them to floating (“Asset Swap”)
- *Intermediate Bullets (5 to 12 year):*
 - Most popular segment of corporate market
- *Long Bullets (12 to 30 year):*
 - Have appeal to investors requiring positive convexity. 15-year is less popular than 20 and 30-year issues.

Callables:

- Typically 10NC5 (10 year maturity noncallable for 5 years)
- Performance depends on curve and volatility moves
 - > Callables underperform during falling and volatile interest rate environments
- Option premium runs from 20 to 50bp, depending on capital market conditions

Sinking Funds:

- Different structures discussed in Level I
- Series of partial retirement – some mandatory with option for additional call
- Tend to outperform in rising rate environment (i.e. act shorter)

Putables:

- Grant option to investors to put bond back to issuer at par
- Typically have a on-date put feature (European), with few offering second or third puts
- Provide investors protection against
 - > Sharp increases in interest rates
 - > Credit deterioration, assuming issuer is still able to meet its obligations
- Implied volatility of puttable bonds (4% to 9%) have been lower typically than callable bonds (10% to 20%)
Implied volatility is calculated from an option-adjusted interest rate model
- Puttable structure issuance has decreased significantly and they are relatively scarce

j) **Compare** the credit spread curves of multiple issuers, construct a credit barbell strategy, and discuss what the shape of a credit spread curve implies about future credit spreads;

- Credit Spread Curve of Multiple Issuers: Plot of spread vs. maturity for several issuers
- Credit Barbell Strategy: Use a combination of yieldy short corporates (BBB or high yield) and long treasuries or higher rated agencies or corporates
- Steep credit curve implies higher forward credit spreads (analysis similar to forward curve analysis of Level II)
- Credit spreads tend to get steeper with higher credit risk (e.g. going from AA to A vs. going from BBB to BB)

k) **Explain** sector rotation;

- Shifting portfolio out of sectors expected to underperform into sectors expected to outperform
- Have become more popular but not as much as in equity markets
- Author expects this to continue being a new trend because expected improvements in liquidity and price transparency

l) **Justify** and/or critique a given corporate bond portfolio strategy that is based on relative value methodologies;

Top-down:

- Economic forecast: Interest, curve, and sector outlook and positioning
- Sector relative value
- Corporate curve analysis
- Asset allocation/sector analysis
- Issue selection: Credit analysis, spread analysis, and structure analysis

Bottom-Up (Primarily security selection)

- Primary market conditions (supply) – minor sector allocation/rotation
- Liquidity and Trading
 - Liquidity providing or demanding
- Secondary trading
 - Yield pick-up
 - Credit up or down
 - New issue swaps
 - Sector rotation
 - Curve adjustment
 - Structure
- Spread Analysis:
 - Mean-reversion
 - Quality-spread
 - Percent Yield Analysis.
- Structure Analysis
 - Bullets
 - Callables
 - Sinking Funds
 - Putables
- Credit Analysis:

m) **Construct** a corporate bond portfolio strategy using relative value methodologies, given relevant portfolio and market information.

- Application of above topics to a specific situation.

7.1.C. “International Bond Portfolio Management”

Summary

- Appropriate level of currency exposure in benchmark
 - Risk limit specification in global bond portfolios
-

Learning Outcome Statements

- a) **Discuss** the rationales for various levels of benchmark currency positions for a non-domestic bond portfolio;
- Choice of levels of currency exposures in global bond benchmarks may be
 - Unhedged
 - Hedged
 - Partially hedged
 - Active currency management
 - Driven by the belief that large gains (losses) can be made through actively managing currency exposure.
 - Currency risk is mostly managed by an overlay manager
 - Passive currency management
Comes in two basic varieties:
 - Fully hedged
Lowers overall risk (lower standard deviation to U.S. market)
 - Fully unhedged
Requires higher risk-tolerance
Study indicated that over a 15-year period hedged returns are far less than unhedged
 - Both active and passive currency management approaches are sub-optimal.
 - Recommended: An integrated approach that determines bond and currency allocations simultaneously.
 - A partially hedged strategy (50%) offers superior risk-adjusted returns versus fully hedged or unhedged. (See Exhibit. 2 on p. 146.)
 - Lower volatility than unhedged
 - Small reduction in return versus the unhedged
- b) **Compare** and contrast the risk limits that are typically included in the investment guidelines for a non-domestic bond portfolio with the risk limits of a typical domestic bond portfolio;

Domestic Limits

- Duration
- Sector
- Credit – minimum rating and portfolio average
- Issuer limit

International limits (in absolutes, relatives)

- All the above
- Currency exposure
- Country in and outside the benchmark
- Trading bloc (Dollar bloc, European, Asia, Japan)
- Liquidity – this concern is diminishing

- Duration: has pitfalls, but setting risk limits is useful.

c) **Explain** the following sources of excess return for a non-domestic bond portfolio: bond market selection, currency selection, duration management, sector selection, and investing outside the index;

- Excess returns: returns on top of the benchmark (after fees). This is often called “alpha.”

Bond market selection:

- Overweighting bond markets expected to outperform.
- Local currency performance between developed markets has ranged from 7% to 39%.

Currency selection:

- Currency movements have been shown to trend (as opposed to random walk).
- Active currency management may provide opportunity to add value
E.g. overweight currencies of countries with high real rates
- Pro: Active currency management could potentially double returns but has risk.
- Con: Volatility of currency returns is generally much higher than bond-market returns.

Duration Management:

- Similar to domestic management, international duration management can be a source of added value.
- It is more difficult in international markets because maturities longer than 10 years are often scarce.
- Duration management transaction costs are relatively low in U.S. because market for strips, futures, and swaps is well developed.
- International duration management is becoming easier as markets are becoming more developed (strips, futures, swaps).

Sector Selection:

- Sector allocations within a market.
Government versus non-government
- Sector choices are more limited outside of the United States
- Excluding U.S., corporate bonds account for only 5% of all debt outstanding
- Alternative choices
MBS
Eurobonds
Inflation Indexed bonds

Investing in Markets outside of the Index:

- Subject to guideline restrictions
- Can provide large excess return opportunities and tracking error
- Some developed markets are not included in index due to size
Finland (best performing bond market in 1995)
New Zealand (U.S. dollar return of 18% in 1996)
- Risk of out-of-index currency exposures must be considered
- Emerging markets can add value and risk – should be considered only for those investors with higher risk-tolerance

d) **Compare** and contrast duration management and sector selection in non-domestic and domestic markets;

Duration Management:

- Similar to domestic management, international duration management can be a source of added value.
- It is more difficult in international markets because maturities longer than 10 years are often scarce.
- Duration management is becoming easier as markets are becoming more developed (strips, futures, swaps).

Sector Selection:

- Sector allocations within a market.
 - Government versus non-government
- Sector choices are more limited outside of the United States
- Excluding U.S., corporate bonds account for only 5% of all debt outstanding
- Alternative choices
 - MBS
 - Eurobonds
 - Inflation Indexed bonds

e) **Discuss** the role of economic analysis in strategic allocation for a non-domestic bond portfolio;

- Strategic (medium term positioning):
 - Relies on fundamental analysis and economic outlook
 - Develops an outlook for the economic cycle (and bond and currency) in each market
 - Identify markets and currencies to overweight or underweight
- Tactical (short term positioning):
 - Relies on technical analysis, flow information.
- Usefulness
 - Interpretations of economic data by market participants (valuations) are frequently at extremes
 - Anticipating shifts in sentiment may be possible (oversold or overbought conditions)
 - Knowing and comparing several markets can reveal differences among them in expected future performance
- Forecasts
 - Should be made with a statement of conviction so that a strategic allocation can be made accordingly.
 - “Cheap” markets should be identified thus the PM can decide whether current valuations have fully priced in all the expected bad news.
- Factors used in economic analysis
 - Cyclical
 - Inflation
 - Monetary policy
 - Fiscal policy
 - Debt
 - Balance of payments
 - Politics

f) **Describe** covered interest arbitrage and explain how it leads to interest rate parity;

- *Interest Rate Parity*: describes the relationship of two countries’ interest rates and their related exchange rates.

- *Covered Interest Arbitrage*: process forcing interest rate parity

$$F_{H,I} = S_{H,I} ((1 + c_H) / (1 + c_I))$$

where:

$F_{H,I}$ = forward exchange rate between home currency (H) and foreign currency (I)

$S_{H,I}$ = spot exchange rate between home currency (H) and foreign currency (I)

c_H = short-term interest rate of home country (matching forward contract)

c_I = short-term interest rate of foreign country (matching forward contract)

- g) **Compute** a forward exchange rate and a forward exchange discount or premium, given a spot rate and short-term interest rates;

- *Forward Exchange Rate*:

$$F_{H,I} = S_{H,I} ((1 + c_H) / (1 + c_I))$$

- The *discount or premium* is the percentage change of the forward rate from the spot rate.

$$f_{H,I} = (F_{H,I} - S_{H,I}) / S_{H,I}$$

- h) **Explain** the following components of expected return for a country investment in each of an unhedged, hedged, cross-hedged, and proxy-hedged scenario: short-term interest rate return, excess bond return, and excess currency return;

General Procedure:

- Identify whether the portfolio is
 - Hedged
 - Unhedged
 - Cross-hedged
 - Proxy-hedged
- Identify Exposures:
- Weight each country by its value to the entire portfolio and sum the returns

Three Basic Components of Return:

- Short-term (risk-free) interest rate return
- Excess bond return = bond market return minus the country's risk free rate
- Excess currency return = currency return in excess of the forward premium or discount

Unhedged:

$$\text{Unhedged Return} = r_I + e_{H,I}$$

where:

r_I = Expected bond return for country "I" in local currency

$e_{H,I}$ = Expected percentage change of the home currency with the local currency "I".
"the currency return"

Hedged:

- Currency return is fully hedged using forward contracts.
- This discount or premium must be reflected in the returns for a holding period.
- Hence the currency return component is substituted with the forward discount or premium percentage change of the forward exchange rate from the spot rate ($e_{H,I}$).

$$\text{Hedged Return} = r_I + (c_H - c_I) = c_H + (r_I - c_I)$$

Currency return ($e_{H,I}$) has been replaced by forward discount or premium ($c_H - c_I$).

- Hence each country's contribution to return is the difference between its local return and risk-free rate added to the home country's risk-free rate.

Cross-hedged:

$$\text{Cross-Hedged Returns} = c_H + (r_I - c_I) + (e_{H,b} - f_{H,b})$$

Where

$e_{H,b}$ = the expected currency return

$f_{H,b}$ = the forward exchange rate discount or premium between the home currency and foreign currency.

Proxy hedged:

$$\text{Proxy Hedged Return} = c_H + (r_I - c_I) + [(e_{H,I} - e_{H,b}) - f_{b,I}]$$

Where

$e_{H,I}$ = expected currency return between country between I and the Home country

$e_{H,b}$ = expected currency return between country between b and the Home country

$f_{b,a}$ = the forward exchange rate discount or premium between a and b.

- i) **Compute** the expected excess return and expected local currency returns for two bond markets, given expected bond returns, local short-term interest rates, and currency appreciation or depreciation versus the home currency;

Application of above relationships.

- j) **Evaluate** two non-domestic bond markets and justify which market should be chosen for investment, based on the expected excess return in each market;

- k) **Recommend** and justify whether to hedge a bond market investment decision and, if hedging, whether to hedge, cross hedge, or proxy hedge;

- Compare expected total return under all options.

- l) **Explain** how breakeven rate analysis (forward rates) can be used to make relative value and currency hedging decisions between foreign bond markets (including how to adjust for differences in coupon and maturity for benchmark issues);

- Comparison of “break-even” forward rates and investor’s expectation (forecast) is instrumental in identifying opportunities.
- Breakeven Even Analysis: Setting the required return for one investment equal to the return of another over a given time period.
- The differentials between break-even and forecast interest rates are used to assess relative “richness” or “cheapness” between markets.
- Relative cheapness or richness is used to actively overweight or underweight markets to achieve an alpha over the benchmark.

m) **Calculate** the breakeven spread widening between two countries’ bonds;

Two forms:

- Simple breakeven analysis
- Hedged breakeven analysis

Simple Breakeven Analysis:

$$\Delta PR = \text{Price Return} = - \text{Duration} \times \Delta \text{Yield}$$

$$\Delta \text{Yield} = - \Delta PR / \text{Duration}$$

Hedged breakeven analysis

- Compute the forward premium (discount) between the two countries:

$$f_{H,I} \approx c_H - c_I$$
- Compare the two expected returns and solve for the “hedged breakeven return”.

To compare returns,

- Calculate the return of the “home” investment - the Holding Period Return (HPR)
- Calculate the hedged return of the foreign investment in home currency returns:

$$\text{Hedged Return} = c_H + (r_a - c_a)$$

- Compare the home investment return with the hedged return of foreign investment.

n) **Discuss** issues that affect security selection for foreign bonds (e.g., investor preferences, liquidity, and taxation issues).

Investor Preferences:

- Buying only benchmark issues
- Liquidity – bonds will trade “rich” because of benchmark status

Taxation:

- Some governments tax lower coupon issues more favorably
- Sometimes taxes are withheld when the coupon pays. Managers tend to “swap” issues for similar maturity securities with different coupon dates prior to receiving payment.
- Sometimes tax treatment varies by vintage (All bonds issued before 1998)
- Sometimes tax treatment varies by investor class (countries residents have favorable tax treatment.)

