Chapter 7

Global Bond Investing
Introduction

- In this chapter we look at:
  - Global bond market statistics
  - Major differences among bond markets
  - The international bond market
  - Emerging markets bonds, Brady bonds
  - Bond quotations, conventions and valuation
  - Duration of a bond
  - Various sources of return and risk from an international bond.
  - Various stages of international bond management.
  - Floating rate notes (FRN).
World Market Size

- The world market capitalization is higher than that of the equity market.
- Size of world bond market is estimated to be $66 trillion at the start of 2007.
- The relative share of each currency market depends not only on new issues and repaid bonds, but also on exchange rate movements.
Exhibit 7.1: Market Capitalization of Domestic Bond Markets Total $48.7 trillion

- United States: 45%
- Yen: 17%
- Euroland: 21%
- United Kingdom: 2%
- Others: 15%

The International Bond Market

- The major types of instruments are:
  - Straight bonds with fixed coupons
  - Floating-rate notes (FRNs) with a coupon indexed on a short-term interest rate
  - Bonds with some equity feature (convertibles).
- The euro is the major currency of issuance, followed by the dollar.
A note on terminology…

- In 1999, all bonds denominated in one of the former currencies of Euroland were translated into euros.
- This new denomination could create confusion between “Eurobonds” and “bonds issued in euros”.
- So to avoid this…
- From this point on, the term “international bond” is used in lieu of “Eurobond”.
Exhibit 7.2: Market Capitalization of International Bonds Total $17.6 trillion

Bond Indexes

- Less commonly available than stock indexes.
- Bond indexes are put to different uses:
  - An index calculated daily allows a quick assessment of the direction and movement of the market.
  - Total return bond indexes are also required for measuring the performance of a bond portfolio in a domestic or multicurrency setting (monthly or quarterly).
The Global Bond Market

- There is still no unified global bond market. Instead, the global bond market may be classified into three categories:
  - **Domestic bond market**
    - Issued by domestic borrower in local currency
  - **Foreign bonds**
    - e.g. Yankee, Rembrandt, Matador bonds
  - **International bonds**
    - Underwritten by a multinational syndicate
The Global Bond Market

- Domestic bonds:
  - Issued locally by a domestic borrower and are usually denominated in the local currency
  - Usually make up the bulk of the national bond market
  - Issuers include government, semi-government and corporate agencies
The Global Bond Market

- **Foreign bond market**
  - Issued on a local market by a foreign borrower and are usually denominated in the local currency.
  - Foreign bond issues and trading are under the supervision of local market authorities.
  - Foreign bonds include:
    - Yankee bonds (in the U.S)
    - Rembrandt bonds (in the Netherlands)
    - Samurai bonds (in Japan)
    - Matador bonds (in Spain)
    - Bulldog bonds (in the UK)
The Global Bond Market

- **International bond market**
  - Underwritten by a multinational syndicate of banks and are placed mainly in countries other than the one in whose currency the bond is denominated.
  - International bonds (Eurobonds) are not traded on a specific national market.
  - However, there are Eurobonds listed on the Luxembourg Stock Exchange to nominally satisfy the requirement of obtaining a public quotation at least once a year or quarter.
  - Developed in the 1960s and was early recognized as an efficient, low-cost and innovative market.
  - Avoids most national regulations and constraints and provides sophisticated instruments.
NEW ISSUE

Nippon Kokan Kabushiki Kaisha

8 per cent. Dual Currency
Yen/U.S. Dollar Bonds Due 2014

Issue Price: 101 per cent. of the Issue Amount

Issue Amount: ¥20,000,000,000
Redemption Amount at Maturity: U.S.$110,480,000

Nomura International Limited
Prudential-Bache Securities International
Bankers Trust International Limited
Credit Suisse First Boston Limited
EBC Amro Bank Limited
Generale Bank
Lloyds Merchant Bank Limited
Morgan Stanley International
Swiss Bank Corporation International

Mitsubishi Trust & Banking Corporation
(Europe) S.A.
Yamaichi International (Europe) Limited
Crédit Lyonnais
Dresdner Bank Aktiengesellschaft
Fujil International Finance Limited
Kleinwort, Benson Limited
Morgan Guaranty Ltd
Orion Royal Bank Limited
Union Bank of Switzerland (Securities) Limited
S.G. Warburg & Co., Ltd.

22nd January, 2004

Exhibit 7.3
International Bond Tombstone
International bond market - Characteristics

- The underwriting syndicate is made up of banks from numerous countries.
- Underwriting banks tend to use subsidiaries established in London or a foreign country with a favorable tax situation.
- Corporate borrowers use a subsidiary incorporated in a country with a favorable tax and regulatory treatment.
- For fixed-rate Eurobonds, the frequency of coupon payments is usually annual.
- International bonds are sold in a multistage process.
International bond market

- **Issuance Process**
  - Issuing syndicate:
    - issue is organized by an international bank called a lead manager.
  - Timetable of New Issue (total time: 5 to 6 weeks):
    - discussion between lead manager and borrower (2 weeks or more).
    - Announcement of international bond issue (1 to 2 weeks of preplacement).
    - offering day with final terms (2 week public placement)
    - Closing day: selling group pays for bonds
    - After closing day, the bonds can be publicly traded.
Exhibit 7.4: Timetable of a New International Bond Issue

- Discussion between borrower and lead manager, two weeks or more
- One to two weeks of preplacement ("gray market")
- Two-week public placement

- Decision to issue bond
- Announcement of bond issue
- Offering day with final terms
- Closing day: Selling group pays for bonds

Total elapsed time: Five to six weeks
International Bond Market

- **Issuance Process**
  - Dealing in international bonds:
    - Eurobond dealers created an around-the-clock market among financial institutions across the world, forming the International Capital Market Association (ICMA).
  - Eurobond Clearing Bond:
    - A trade is settled in three business days and the transactions are cleared through either Euroclear or Clearstream (formerly Cedel).
    - Euroclear and Clearstream collect a transaction fee for each book entry as well as a custody fee for holding the security.
Emerging Markets

- Several alternatives are available:
  - Domestic bonds
    - Various restrictions and liquidity problems reduce the amount available to foreign investors.
  - Foreign bonds
  - International bonds
  - Brady bonds
    - In 1990, the Brady plan allowed emerging countries to transform nonperforming debt into Brady bonds.
Emerging Markets - Brady Bonds

- Formulated in 1990, as a solution to the emerging market debt crisis of the 1980s.
- A Brady plan is a debt-reduction program whereby sovereign debt is repackaged into tradable Brady bonds, generally with collateral.
- Close to 20 countries have issued Brady bonds and the total market capitalization is close to $100 billion.
Brady Bonds - Characteristics

- Three main types of guarantees can be put in place:
  - principal collateral
  - rolling-interest guarantee
  - value recovery rights
- Two major types of Brady bonds have been issued:
  - par bonds (PARS)
  - discount bonds (DISCS)
- Other types of Brady bonds include:
  - Front-loaded interest reduction bonds (FLIRBs)
  - New-money bonds (NMBs)
  - Past-due interest bonds (PDIs)
Major Differences Among Bond Markets

- **Quotation**
  - Bonds are quoted in the form of a clean price net of accrued interest.
  - The full price (or value) of a bond is the sum of its clean price plus accrued interest. Or,
    - \( P = Q + AI \)
    - Where \( P = \) full price, \( Q = \) quoted price and \( AI = \) accrued interest
  - Accrued interest = Coupon \( \times \) (days since last coupon date/days in coupon period).
Full Price and Clean Price – An example

- **Question:** The clean price of a Eurobond is quoted at $Q=96\%$. The annual coupon is 5 percent, and we are exactly four months from the past coupon payment. What is the full price of the bond?

- **Solution:**

  \[ P = Q + \text{accrued interest} \]
  \[ = 96\% + (\frac{120}{360}) \times 5\% \]
  \[ = 97.67\% \]
Coupon Frequency and Day Count

- The day count convention known as “30/360” is commonly used in the USA, Germany, Scandinavia, Switzerland and the Netherlands.

- In the USA it is used for agency, municipal, corporate and foreign bonds.

- The day count on US Treasury bonds is actual number of days in a year of 365 or 366 days.

- The day count convention known as “actual/actual” assumes a 365 day year.
## Exhibit 7.5: Coupon Characteristics of Major Bond Markets

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>United States</th>
<th>U.S. Treasuries</th>
<th>Canada</th>
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</thead>
<tbody>
<tr>
<td>Usual frequency of coupon</td>
<td>Semiannual</td>
<td>Semiannual</td>
<td>Semiannual</td>
</tr>
<tr>
<td>Day count (month/year)</td>
<td>30/360</td>
<td>Actual/actual</td>
<td>Actual/365</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Australia</th>
<th>United Kingdom</th>
<th>Switzerland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usual frequency of coupon</td>
<td>Semiannual</td>
<td>Semiannual</td>
<td>Annual</td>
</tr>
<tr>
<td>Day count (month/year)</td>
<td>Actual/actual</td>
<td>Actual/actual</td>
<td>30/360</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Germany</th>
<th>Netherlands</th>
<th>France</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usual frequency of coupon</td>
<td>Annual</td>
<td>Annual</td>
<td>Annual</td>
</tr>
<tr>
<td>Day count (month/year)</td>
<td>30/360</td>
<td>30/360</td>
<td>Actual/actual</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Characteristic</th>
<th>Japan</th>
<th>International Bonds</th>
<th>FRNs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usual frequency of coupon</td>
<td>Semiannual</td>
<td>Annual</td>
<td>Quarter or semiannual</td>
</tr>
<tr>
<td>Day count (month/year)</td>
<td>Actual/365</td>
<td>30/360</td>
<td>Actual/360</td>
</tr>
</tbody>
</table>
Major Differences Among Bond Markets

- **Yield to Maturity:**
  - The yield to maturity (YTM) is the average promised yield over the life of the bond.
  - The convention used to calculate YTM varies across markets.
  - In the U.S, YTM is calculated at a semiannual rate and the result is multiplied by 2 to report an annualized rate.
  - Most Europeans calculate an annual, actuarial YTM.
  - The simple interest yield approach is also used in Japan.
Simple yield calculation - example

- **Question:**
  A four year bond has exactly four years till maturity and the last coupon has just been paid. The coupon is annual and equal to 5.5 percent. The bond price is 96 percent. Calculate its simple yield.
Simple yield calculation - example

Solution:

\[
\text{Simple yield} = \frac{\text{Coupon}}{\text{Current price}} + \frac{(100 - \text{Current price})}{\text{Current price}} \times \frac{1}{\text{Years to maturity}}
\]

\[
\text{Simple yield} = \frac{5.5}{96} + \frac{(100 - 96)}{96} \times \frac{1}{4}
\]

\[
\text{Simple yield} = 6.77\%
\]
Major Differences Among Bond Markets

- **Legal and Fiscal Aspects:**
  - **Bearer form (e.g., Eurobonds).**
    - The bearer of the bond is assumed to be its legal owner.
    - Provide confidentiality of ownership.
  - **Registered form (e.g., In the United States, owners must be registered in the issuer’s books)**
    - Allows for easier transfer of interest payments and amortization.
Major Differences Among Bond Markets

- **Tax aspects**
  - Avoiding double taxation was a major impetus behind the development of the international (Eurobond) market.
  - To attract foreign investors in their government bonds, most countries eliminate withholding taxes on foreign investment in their domestic bond markets.
Bond Valuation

- **Yield to maturity: Zero coupon bonds**
  \[ P = \frac{C_t}{(1 + r_t)^t} \]

- There exists an inverse relationship between market yield and bond price.

- **Yield to maturity: Coupon Bonds**
  \[ P = \frac{C_1}{(1 + r_1)^1} + \frac{C_2}{(1 + r_2)^2} + \ldots + \frac{C_n}{(1 + r_n)^n} \]

- The U.S. YTM is a mixture of an internal rate of return calculation to obtain the semiannual yield, and of a multiplication to transform it into an annualized yield.
Question: A six-year bond has exactly six years till maturity, and the last coupon has just been paid. The coupon is annual and equal to 5 percent. The bond price is 104 percent. What is its European YTM and U.S. YTM?
Solution: The European YTM is \( r \), given by the formula

\[
104 = \frac{5}{(1+r)^1} + \frac{5}{(1+r)^2} + \ldots + \frac{105}{(1+r)^6}
\]

We find \( r = 4.23\% \)

The U.S. YTM is \( r^1 \), given by the formula

\[
104 = \frac{5}{(1+r'/2)^2} + \frac{5}{(1+r'/2)^4} + \ldots + \frac{105}{(1+r'/2)^{12}}
\]

Hence \( r^1 = 4.186\% \)
Yield Curves

- Provides a meaningful estimate of the term structure of interest rates.
- To be useful, a yield curve must be drawn from bonds with identical characteristics except for their maturity.
- A yield curve derived from bonds trading at, or round, par (100 percent) is called the par yield curve.
Exhibit 7.6: Example of Yield Curve
Duration and Interest Rate Sensitivity

- Duration is a measure of interest risk for a specific bond.
- Mathematically, duration, D, can be written as:

\[
\Delta P = D \times \Delta r
\]

- For larger movements in yield, the convexity can be used.
- The bond return can be approximated as:

Return = Yield – D × (Δyield)
Duration - Example

Question:
You hold a government bond with a duration of 12. Its yield is 6 percent. You expect yields to move down by 20 basis points in the next few minutes. Calculate a rough estimate of expected return.
Duration - Example

Solution:

Given the very short horizon, the only component of return is the expected capital gain:

\[
\text{Return} = -12 \times (-0.2) = +2.4\%
\]
Duration – Example 2

**Question:**
You hold a government bond with a duration of 12. Its yield is 6 percent, although the cash (one-year) rate is 2.5 percent. You expect yields to move down by 20 basis points over the next year. Calculate a rough estimate of expected return. What is the risk premium on this bond?
Duration – Example 2

**Solution:**

Return = Yield – D x (Δyield)

= 6% - 12 x (-0.2)

= 8.4%

Risk premium is obtained by deducting the short-term interest rate = 2.5%
Credit Spreads

- The yield reflects a credit spread, or quality spread, over the default-free yield.

- International rating agencies (Moody’s, Standard & Poor’s, Fitch) provide a credit rating for most debt issues traded worldwide.

- The credit spread captures three components:
  - An expected loss component
  - A credit-risk premium.
  - A liquidity premium.
Credit Spreads

- On a specific bond market, one can draw yield curves for each credit rating; the credit spread typically increases with maturity.

- The migration probability is the probability of moving from one credit rating to another.

- The $n$-year migration table shows the percentage of issues with a given rating at the start of the year that migrated to another rating at the end of $n$ years.
Multicurrency Approach

- International interest rate differences are caused by a variety of factors including:
  - Differences in monetary and fiscal policies.
  - Inflationary expectations.
- Implied forward exchange rates:
  - The formula is:
    \[ F_t = S \frac{(1 + r_t^*)^t}{(1 + r_t)^t} \]
  - By comparing the yield curves in two currencies, we can derive the term structure of implied forward exchange rates and therefore, implied currency appreciation or depreciation.
Exhibit 7.7: Yield Curves in Different Currencies in 2007

Source: Data from Bloomberg, 2007.
Return on Foreign Bond Investments

- The return from investing in a foreign bond has three components:
  - During the investment period, the bondholder receives the foreign yield.
  - A change in the foreign yield ($\Delta_{\text{foreign}}$) induces a percentage capital gain/loss on the price of the bond.
  - A currency movement induces a currency gain or loss on the position.

\[
\text{Return} = \text{Foreign yield} - D \times (\Delta_{\text{foreign yield}}) + \% \text{ currency movement}
\]
Risk on Foreign Bond Investments

- The risk on a foreign bond investment has two major sources:
  - **Interest rate risk:** the risk that foreign yields will rise.
  - **Currency risk:** the risk that a foreign currency will depreciate.
- Credit risk should be taken into account for nongovernmental bonds.
Return and Risk on Foreign Bond Investments

- The expected return on a foreign bond is equal to the domestic cash rate plus a risk premium. The risk premium equals the sum of:
  - The spread of the foreign bond yield over the domestic cash rate.
  - The percentage capital gain/loss due to an expected foreign yield movement, and
  - The expected percentage currency movement.
Currency-Hedging Strategies

- Foreign investments can be hedged against currency risk by selling forward currency contracts for an amount equal to the capital invested.

- The decision to hedge depends on return and risk considerations. Hedging will turn out to improve return on a foreign bond if the percentage currency movement is less than the cash rate differential (domestic minus foreign); otherwise hedging will not be advantageous, ex-post.
Currency-Hedging Strategies

- Foreign investments can be hedged against currency risk by selling forward currency contracts for an amount equal to the capital invested.

\[
\text{Hedged Return} = \text{Foreign yield} - D \times (\Delta \text{foreign yield}) + \text{Domestic cash rate} - \text{Foreign cash rate}
\]
Currency-Hedging Strategies

- The expected hedged return is simply equal to the investor’s risk-free rate, the domestic cash rate, plus a risk premium equal to:
  - Spread of the foreign bond yield over the foreign cash rate, and
  - Percentage gain/loss due to an expected foreign yield movement
Currency-Hedging Strategies - Example

- You are British and hold a U.S. Treasury bond with a full price of 100 and duration of 15. Its yield is 6 percent. The dollar cash rate is 3 percent and the pound cash rate is 4 percent. You expect U.S. yields to move down by 15 basis points over the year. Give a rough estimate of your expected return if you decide to hedge the currency risk.
Currency-Hedging Strategies - Example

Solution

Hedged Return = Foreign yield – D × (Δforeign yield)
+ Domestic cash rate – Foreign cash rate

Hedged Return = 6 – 15 × (-0.15) + 4 – 3 = 9.25%

Risk premium = 9.25 – 4% = 5.25%
International Portfolio Strategies

- International portfolio management includes several steps:
  - Benchmark selection
    - for bonds, market cap weights are influenced by the relative national budget deficits.
  - Bond market selection
    - managers can cite:
      - monetary and fiscal policy
      - public spending
      - balance of payments
      - inflationary pressures
      - cyclical and political factors
International Portfolio Strategies

- Sector selection/credit selection
  - government, regional and municipal bonds
  - Mortgage-backed and public loan backed bonds
  - Investment grade corporate bonds
  - Inflation indexed bonds
  - Emerging market bonds

- Duration/yield management

- Yield enhancement techniques
  - For example, spreadsheet analysis
Exhibit 7.8: Volatility of Bond Markets Measured in Local Currency, in U.S. Dollars, and in Euros in % per year, early 2000s, Effas/Bloomberg Indexes

<table>
<thead>
<tr>
<th>Bond Market</th>
<th>In Local Currency</th>
<th>In Dollars</th>
<th>In Euros</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>4.8</td>
<td>4.8</td>
<td>10.6</td>
</tr>
<tr>
<td>Germany</td>
<td>3.7</td>
<td>10.4</td>
<td>3.7</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>5.4</td>
<td>9.3</td>
<td>9.3</td>
</tr>
<tr>
<td>Japan</td>
<td>4.2</td>
<td>12.9</td>
<td>12.5</td>
</tr>
</tbody>
</table>
International Portfolio Strategies

- Investment strategy is based on forecasted scenarios for interest rates, currencies and quality spreads.

- The three basic inputs are:
  - Changes in default-free yield curve for each currency
  - Changes in quality spreads
  - Changes in exchange rates.
Structured Notes

- A structured note is a bond (note) issued with some unusual clause, often an option-like clause.
- Issued by a name of good credit standing.
- Can be purchased as investment grade bonds by most institutional investors.
- Offer long-term options that are not publicly traded.
- Designed for specific investors wishing to take a bet on interest rates or currencies.
- The issuer will usually hedge the unusual risks of a structured note and end up with a plain vanilla bond at a low all-in cost.
Floating Rate Notes (FRNs)

- FRNs are a major segment of the international bond market.
- FRNs represent a quarter of all Eurobonds, with issues in euros and dollars playing a dominant role.
- Major issuers are financial institutions.
- FRNs are generally indexed to LIBOR. The rate is called EURIBOR for euros.
- The coupon on Eurobond FRNs is generally reset every semester or every quarter.
- FRNs have coupons that adjust to interest rates, so coupons react to interest rate movements rather than the bond price.
FRN - example

- A perpetual bond is issued by a corporation rated A with an annual coupon set at yearly LIBOR plus a spread of 0.30 percent. Some time later, LIBOR is equal to 6 percent, and the market requires a spread of 0.60 percent for such an A corporation. Give an estimate of the bond value on the rest date using the “freezing” method.
FRN - example

With the “freezing” method,
The coupon is supposed to be fixed at:

\[ C = 6\% + 0.30\% = 6.30\% \]

The market-required yield is supposed to be fixed at

\[ r = 6\% + 0.6\% = 6.6\% \]

An approximation of the value of this perpetual FRN is:

\[ P = \frac{6.30}{6.60} = 95.455\% \]
Floating Rate Notes (FRNs)

- FRNs exhibit great price stability when compared with straight bonds.
- The motivation for an investor to buy FRNs is to avoid interest rate risk.
- Bull FRNs strongly benefit investors if interest rates drop.
- An example of a bull FRN is a reverse (inverse) floater, set at a fixed rate minus LIBOR.
- Bear FRNs benefit investors if interest rates rise.
Exhibit 7.9: FRNs: The Stability of Reset Date Prices *Midland Bank, May 1987*


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Exhibit 7.10: The Impact of a Change in Market-required Spread Perpetual Midland Bank FRN, LIBOR Plus 0.25 Percent
Exhibit 7.11: Characteristics of Bonds, Assuming a Drop in Market Interest Rates

<table>
<thead>
<tr>
<th></th>
<th>Straight Bond</th>
<th>Straight FRN</th>
<th>Bull FRN</th>
<th>Bear FRN</th>
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<tr>
<td><strong>Coupon</strong></td>
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<td>↓</td>
<td>↑</td>
<td>↓↓</td>
</tr>
<tr>
<td><strong>Price</strong></td>
<td>↑</td>
<td>→</td>
<td>↑↑</td>
<td>↓</td>
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</tbody>
</table>
Collateralized debt obligation (CDO)

- A special type of structured note that allows structuring the credit risk assumed on a portfolio of bonds.
- A bank bundle together a set of bonds and sell the portfolio of bonds to a special purpose vehicle (SPV).
- In turn the SPV securitizes the portfolio and issues a set of structured notes called “tranches” or “slices”.
Exhibit 7.12: Example of a CDO

Bond 1
Bond 2
Bond 3

Trust

Tranche 1
1st 5% of loss
Yield = 30%

Tranche 2
2nd 10% of loss
Yield = 15%

Tranche 3
3rd 10% of loss
Yield = 7.5%

Tranche 4
Residual loss
Yield = 6%

Bond 100
Average yield 8%
Dual Currency Bonds

- A dual currency bond is a bond issued with coupons in one currency and principal redemption in another.

- Issued in two currencies with very different yield levels. The valuation ensures the fair coupon rate on the dual-currency bond is set in between the two yield levels.

- These are attractive because one is able to borrow money in a preferred currency but at a lower cost than directly issuing bonds in that currency.
Currency Option Bonds

- A currency option bond is one for which the coupons and/or the principal can be paid in two, or more currencies, as chosen by the bondholder.
- It benefits the investor who can always select the stronger currency.
- The interest rate set at issue is always lower than the yields paid on a single currency straight bond denominated in either currency.
- They offer long-term currency play with limited risk.