Chapter 18
INTERNATIONAL BOND MARKETS

Review: Last Class

• **Several & Diverse Topics**

- Multinational Capital Budgeting. Follow standard NPV process, incorporating taxes (local & foreign) and exchange rates.

◊ Use discount rates specific to the (systematic) risk of the country.

◊ Agency problem is dealt with sensitivity and break-even analysis.

- Capital Structure & Cost of capital. Use **WACC** to compute k_c:

$$k_c = \frac{D}{D+E} * k_d * (1 - t) + \frac{E}{D+E} * k_e$$

◊ We use k_c to discount CFs from projects.

◊ Many issues with k_e. An important issue: A model is needed for example:

(**CAPM**) $k_e = r_e = \mathrm{E}[r] = r_f + \beta\, \mathrm{E}[r_m - r_f]$

$\mathrm{E}[r_m - r_f]$ is the estimated risk premium (**ERP**), which we estimated using historical data. For EM, many adjustments to get a reliable ERP.

Review: Last Class

- Country Risk (CR)

- **CR** is the risk attached to an asset/liability given by its location (country). Usually measure by a letter (A: very good, C: bad)
- Different methods to compute CR: Qualitative ("consensus") & Quantitative ("weighted average of factor scores")
- The CR/letter is used to determine the **YTM** for government yields.
- Simple idea: Get lot of data to produce a single number that reflects the probability of default or economic crisis of a country/government.
- Main criticism: Lack of predictive power.

- Measures to reduce country risk:
  - A *cap* on the total amount invested in a particular country.
  - Diversification.
  - Credit/Political Risk Derivatives.

International Bond Markets

The bond market (debt, credit, or fixed income market) is the financial market where participants **buy and sell debt securities**, usually bonds.

Size of the world bond market ('24 debt outstanding): **USD 141.3 trillion**.

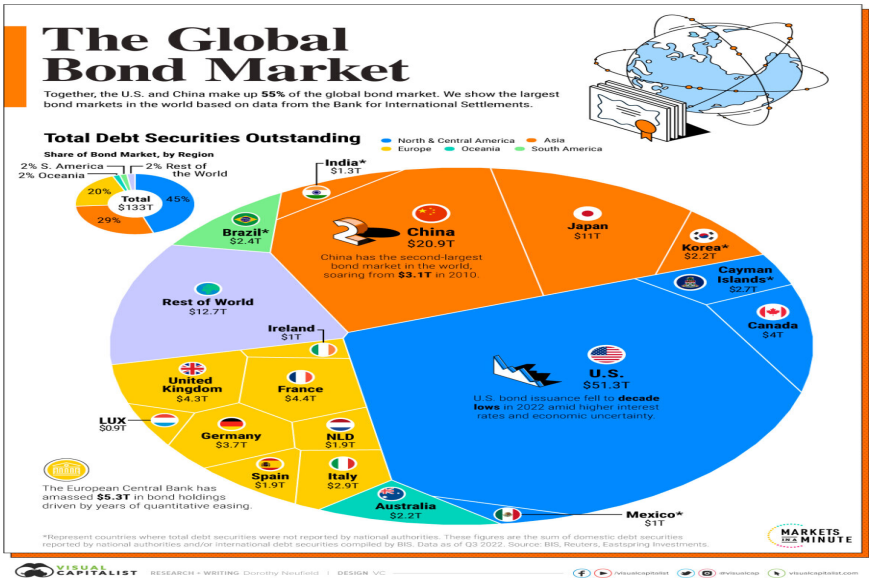
- U.S. bond market: **USD 47.4 trillion**.
- Corporate bonds: **USD 39.0 trillion**
- Governments and International Organizations: **68%**.

Organization

- Decentralized, **OTC market**, with brokers and dealers.
- Small issues may be traded in exchanges.
- Daily trading volume in the U.S.: **USD 822 billion**
- **Government debt dominates** the market.
- Used to indicate the shape of the yield curve.

• **A Global Bond Market**:

A truly global market (2022), though dominated by the U.S and China. .



• The world bond market is divided into three segments:

- **Domestic bonds:** Issued locally by a **domestic borrower**.
  Usually denominated in the **local currency**.
  Largest segment: **70%** of the bond market.
- **Foreign bonds:** Issued on a local market by a **foreign borrower**.
  Usually denominated in the **local currency**.
- **Eurobonds:** Placed mainly in countries other than the one in whose currency the bond is denominated.

Example: Distinction between bond markets.

(A) Domestic bonds.

In February 2015, Apple, the U.S. tech giant, issued bonds for **USD 6.5B** in the U.S. for placement in the U.S. domestic market.

(B) Foreign bonds.

In August 2015, Apple issued bonds for **AUD 2.25B** for placement in the Aussie market alone.

(C) Eurobonds.

In September 2015, Apple issued bonds for **EUR 2.8B** in London. The issue was underwritten by an international syndicate of securities houses, led by Goldman Sachs and Deutsche Bank. ¶

$\Rightarrow$ Foreign bond + Eurobond markets = International Bond Market.

Type of Instruments

Popular Instruments in International Bond Markets

i. Straight or fixed income bonds. (Most common type, by far)
ii. Partly paid bonds.
iii. Zero-coupon bonds. (Not very popular with investors)
iv. Floating rate notes (FRNs). (Second most common type)
v. Perpetual FRNs.
vi. Convertible bonds.
vii. Bonds with warrants.
viii. Dual-currency bonds.

Example: Straight bond

4.375% May 2015 Slovak Republic EUR bond

Amount =	**EUR 2 billion**
Issue date =	May 14. 2009
Face value: FV =	EUR 1,000
Coupon: **C** = **4.375%** =	**EUR 43.75**
Maturity: T =	**6 years** (**May 2015**)
Interest payment dates:	May 14

Every May 14, the Slovak Republic pays **EUR 43.75** to bondholders, for **6 years**. At maturity, May 14, 2015 it also pays back the principal. ¶

Note: Straight Eurobonds pay annual coupons.

• Tombstone of Slovak Republic's Eurobond

Example: FRNs ("floaters").

LIBOR + 1/8 **March 2024** Swedish Government USD bond.

Amount =	**USD 500 million**.
Issue date =	March 1 1984
T =	**March 1, 2024** (**40 years**).
FV =	USD 1,000
Coupon: C =	**6-mo. LIBOR + 1/8**
Interest payment dates:	March 1 and September 1

At the time the notes were offered (3/84), 6-mo. LIBOR was **10(7/16)%**

First Coupon = **10(7/16)%** + **(1/8)%** = **10(9/16)%** (known at issue).

Afterward, at the end of each 6-mo. period the interest rate on the notes is updated to reflect the current 6-mo. LIBOR rate for dollars. ¶

Note: FRNs in the Eurobond market pay semi-annual coupons.

Eurobond Markets

Euro-what?

• Euro-*zzz*: The currency of denomination of the *zzz* instrument is not the official currency of the country where the instrument is issued.

Example: A Malayan firm deposits USD not in the U.S. but with a bank outside the U.S., for example in Singapore or in Switzerland. This deposit is classified as a *eurodeposit*. ¶

Euromarket

- Offshore money market
- Low costs and lack of regulations
- Instruments traded in any currency.

The **Eurobond** market is just **one segment** of the Euromarket.

Characteristics of Eurobonds

• A Eurobond is an international debt security.

Structure: Similar to **standard debt security** used in **domestic markets**.

Basic characteristics:

- **Transferable** (usually, *bearer*).
- **Tradable**.
- **Medium- to long-term debt security**.
- Generally launched through a **public offering**.
- Generally **listed** on a stock exchange.
- **No** formal **government regulations.**

Transferability should be simple:

- **Bearer bond** (you have it, its yours)
- **Registered bond** (your name should be in a book to own the bond)

⇒ the majority of Eurobonds are bearer bonds.

• Attractive characteristic of Eurobond markets for issuers:

The Eurobond & Foreign bond markets seem to be **segmented**.

Example: The World Bank has issued in the U.S. foreign bond market and in Euromarkets. Issues of similar maturity have yielded 10 to 20 bps less.

Usual explanation: **No requirement** of registered form for Eurobond. ¶

⇒ Formal characteristics of Eurobonds: No different from domestic or foreign bonds.

⇒ The structure of the underwriting syndicate is the main difference between other bonds and Eurobonds.

Pricing Bonds: Brief Review

• **Price of a Bond**

The price of a bond (P) is determined by computing the NPV of all future cash flows generated by the bond discounted at an appropriate interest rate –i.e., the yield-to-maturity, or **YTM**.

$$P = C_1/(1+YTM) + C_2/(1+YTM)^2 + C_3/(1+YTM)^3 + ... + C_T/(1+YTM)^T$$

C_t = Cash flows the bond pays at time t. (C_T = $Coupon_T$ + Face $Value_T$)

• One-to-one relation between P and the **YTM** of a bond:

⇒ You know the **YTM**, you know P –given that you know the C_i's.

Example: A straight Eurodollar bond matures in 1 year.

C = 10%

FV_1 = USD 100

1) P = USD 95 ⇒ **YTM** = ?

$$P = (C + FV_1)/(1+YTM) \Rightarrow 95 = 110 / (1+YTM).$$

⇒ **YTM** = 110/95 – 1 ⇒ **YTM** = .1578947

2) **YTM** = **.1578947** ⇒ P = ?

⇒ P = 110/1.**1578947** = 95. ¶

• **Terminology**

– P = 100 (or 100% or 1) ⇒ "par" or "face value."

⇒ Simple mathematical fact: P = 100 ⇒ **YTM** = **C**.

– 100 bps = 1%

• **YTM**

YTM is determined by:

YTM = Base Rate (k_f) + ***Spread*** (Risk of Company)

$k_f = r_f$ = risk free rate = government bond (of similar maturity)

Spread (in bps) = Risk of company = determined by investment bank

The spread is related to **credit risk**. Given a risk category, there is a corresponding risk spread.

Other factors:

- **Liquidity** (50% of bond spread?)
- **Size of issue** (*price pressure* or *price impact*)

• Huang & Huang (2013): Corporate bond spreads are unusually high, given the low probability of default ("**credit spread puzzle**").

• **Technical detail**

Straight Eurobonds pay annual coupons, with annual **YTM**s (p.a.). But, reference yields are usually expressed s.a. (6-mo **YTM**).

⇒ Adjustments needed to align **YTM**s.

Example: A company issues a new Eurobond.

Data: A similar bond has a 6-mo **YTM** (s.a.) = **7.365% s.a.**

⇒ Transform a 6-mo **YTM** (s.a.) into an annual **YTM** (**p.a.**):

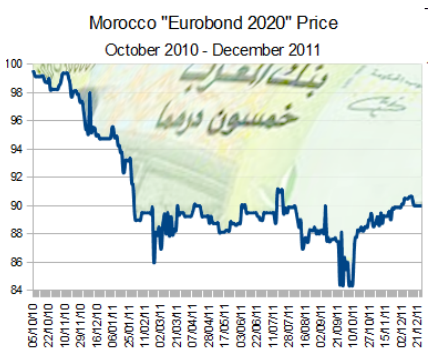
YTM (p.a.) = $(1 + 0.\mathbf{07365}/2)^2 - 1$ = 7.501% p.a.

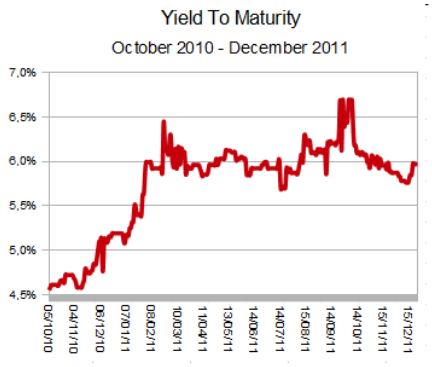
If in addition, the bond sells *at par* at inception –i.e., P=100–, then,

$\mathbf{C_{ST}}$ = **YTM** (p.a.) = **7.50%**.

• **Bonds: YTM and Prices Move A Lot (Like any other financial asset)**

Example: 4.5% October 2020 Morocco EUR Eurobond





• As expected, there is an inverse relation.

Pricing a New Eurobond Issue

Situation: Issuing house needs to price a new bond issue.

• Same domestic pricing techniques and models.

◊ **Pricing mistakes** are common:

- Tight competition
- Issues are too complex.
- Poor distribution.
- Weak market conditions.

◊ Pricing process involves:

(1) Collection of information

(2) Evaluation of information

• **Information**

Borrowing Requirements

– **Amount to be raised** over a certain period.
– **Currency** of exposure.
– **Maturity range**
– Call options
– Target cost of funds.

Preliminary Analysis of the Issue

Guide to pricing a new issue:

(1) Assessment of the borrower's outstanding issues.
(2) Benchmark issues.

Market Conditions

Place an issue in relation to relevant markets:

– Bond Markets (International and Domestic)
– Derivative Markets
– Swap Markets

Perception of the Issuer

For issuers with outstanding issues: Check **YTM** on secondary market.

Caution: An issue maybe trading poorly because of bad design; not negative perception.

For first-time issuer: More analysis needed:

– Perception of the borrower by its competitors.
– Relative perception of the issuer within its domestic market
– Perception of the borrower, if any, in the Euromarkets.

Evaluation

• Sometimes, pricing looks like informed guesswork.

• In established markets, however, pricing proposals tend to **converge**.

• **Benchmarking** is the key.

• Setting the YTM -i.e., the price- of a (Euro)bond

After gathering information and evaluating information, an investment banker has to set the YTM for a bond. There are three different main cases:

(1) Established company with a good borrowing history (Apple, IBM);

(2) Established company with no borrowing history (until 2010: MSFT)

(3) New company.

1. Established company

Example: IBM wants to borrow **USD 100M** for 5-years in 10 days. Given the quick need for cash the Eurobond market is the best alternative.

We need to set $\mathbf{YTM_{IBM}}$ or Spread_{IBM} (one implies the other)

Benchmarks: - Look at competitors.
- Look at secondary market (the best way).

IBM has outstanding bonds trading in the secondary market:

$\mathit{Spread}_{IBM\text{-}outstanding}$ = **45 bps** over Treasuries (Base Rate, k_f).

We get the 5-yr Treasury = k_f = **5% (s.a)**

$\Rightarrow \text{YTM}_{\text{IBM-new}}$ = **5%** + **0.45%** = **5.45% (s.a.)**

Given that Eurobonds pay annual coupons, we reset the YTM in p.a. basis:

$\mathbf{YTM_{IBM\text{-}new}}$ (p.a.) = $(1 + 0.\mathbf{0545}/2)^2 - 1$ = **5.5524%**

Suppose bond is sold at par at issue. Then,

$\Rightarrow \mathbf{Coupon_{IBM\text{-}new}}$ = **5.55%**. ¶

2. Established company with no history of borrowing

- Analyze the company.
- Benchmarking: Look at competitors and industry benchmarks

$\Rightarrow$ set a range, say ***Spread*** $\in$ [0.55%, 2.10%] over U.S. Treasuries (k_f).

Based on your analysis, pick a spread in the range. Then, set **YTM**:

$$\textbf{YTM} = k_f + \textit{Spread} = \textbf{5\% (s.a.)} + \textit{Spread}$$

Conservative YTM: 710 bps ($\Rightarrow$ risk of overselling bond issue –i.e., underpricing risk!).

Aggressive YTM: 555bps ($\Rightarrow$ risk of not selling enough bonds)

You believe this is a great company. You decide to be on the aggressive side, setting the YTM = **5.69% (s.a.)** (or 63 bps over Treasuries). Now, proceed with the p.a. adjustment to set the Coupon of the bond (if issued at par, P=100):

$$\textbf{YTM (p.a.)} = (1 + \textbf{0.0569}/2)^2 - 1 = \textbf{5.5771\%}$$

$\Rightarrow$ **Coupon** = **5.58%**. ¶

3. New company

If MNC is new to Eurobond markets, setting the YTM is more difficult:

- Analyze the firm.
- Benchmarking: Look at competitors & industry.
- Determine potential demand. Book building for the new bond (phone calls, lots of research.)

Example: Space Tourism (or an internet company in 1996)

New company, no similar borrower in the market.

The investment banker determines that the YTM spread is in the range 340 bps to 510 bps over U.S. Treasuries (k_f).

The investment banker decides on setting the spread at **425 bps**.

$$\Rightarrow \textbf{YTM}_{\textbf{SpaceT}} = k_f + \textit{Spread}_{\textit{SpaceT}} = \textbf{5\% (s.a.)} + \textbf{425 bps} = \textbf{9.25\%}.$$

$$\textbf{YTM}_{\textbf{SpaceT}} \text{ (p.a.)} = (1 + 0.\textbf{0925}/2)^2 - 1 = \textbf{9.4639\%}$$

$\Rightarrow$ $\textbf{Coupon}_{\textbf{SpaceT}}$ = **9.46%**. ¶

Case Study: Merotex

Pricing a New Straight Bond: Merotex

The Borrower

- Leading construction firm, based in Gorizia, Italy.
- Recently bought two U.S. construction companies.
- Financed by bank loans: USD 250 million

Borrowing requirements

- Amount: **USD 250 million**
- Currency of exposure: **USD**
- Maturity: *Medium-term* (**5 to 7 years, preferred 7 years**) USD debt.
- Preference: *Simple straight bond* with no early call options.

• **Information**

Market conditions:

- **Good** for a USD Eurobond issue.
- U.S. economic conditions are above expectations
- USD is currently very strong.
- **Recent successful placement** of 10-year Euro-USD issue by Fica, a competitor.

Merotex's Perception:

– Merotex has issued **GBP Eurobonds**: obtained *best terms*.

– Merotex has **no outstanding Euro-USD issues**.

• Perception of similar international borrowers ("Benchmarking")

(1) Comenti: **Italian construction company**

- Several Eurodollar issues.
- Last issue has 6 years of remaining life.
- Currently trading at **140 bps** over 6-yr U.S. Treasuries.
- Excellent reputation in Euromarkets

(2) Fix Constructions (FC): **major U.S. competitor** in Florida.

- Launched a 10-yr Eurodollar issue five years ago.
- It has a *call option* two years from now.
- Currently trading at a **165 bps** over 5-year U.S. Treasuries.
- Well-regarded but *performance* has been *just average*.

(3) **Other large Italian companies**:

- Many Euro-USD bonds with 5-year maturity
- Currently trading within a range of ***140-170 bps.***

Evaluation

• Merotex's track record is limited but **very good**.

– Merotex's GBP bonds have been **well received** in the market.

– Merotex plans to include one **UK** house in management group.

⇒ **Size:** sufficient to promote liquidity; but not so much as to make the placement process difficult. Proposed size: **USD 200 million**.

⇒ **Maturity:** Merotex is a first-timer on USD-Eurobond segment: For first timers shorter maturities are better: ***5 years***.

• Concern: The FC issue is trading at a **relative high spread**. But,

– Issue might suffer from poor design.

– Deterioration of FC's perception

– Call provision.

⇒ **Yield:** Lead manager suggests setting **spread** on the low-end of range ("aggressive spread"): ***140-170 bps.***

Proposed Issue

Amount:

– Proposed size: **USD 200 million**, with a possible increase.

Maturity:

– Shorter maturity than preferred: ***5 years***.

Yield spread:

– Aggressive spread = **140 bps** over 5-yr U.S. Treasuries.

– First-time issue: Add a small premium: ***Spread = 145 bps***.

The lead manager is able to formulate a pricing scheme:

U.S. Treasury: 5.7323% s.a. (semiannual)

Merotex spread: **1.45% s.a.**

Merotex yield (**YTM**): **7.1823% s.a.**, or **7.3113% p.a.** (annual)

⇒ Terms for investors: a 5-year Eurobond at a price to yield **7.3113% p.a.**

Fees

Total fees: **1¾%** (= **USD 3.5M)**

Final terms:

Bond is sold at par (P=100), then YTM = Coupon

⇒ **C = 7.3113%.**

Rounding up, the coupon rate is set at **7 (5/16)**.

Total coupon payment = (7 + 5/16) * **200 M** = **USD 14.625 M**

Expenses

1.- Paying Agency:	**100,000 bonds** in **USD 1,000 denominations**
	10,000 bonds in **USD 10,000 denominations.**
Total number of bonds:	**110,000**.
Coupon charge p.a.:	USD .07 per coupon payment (USD 7,700)
Redemption charge:	USD .70 **per bond** or USD 77,000
Authentication:	USD 4,000 on delivery of bonds.
Administration:	USD 2,000 (p.a.).
2.- Listing:	USD 20,000 payable in advance.
3.- Trustee:	USD 8,000 (p.a.) payable in advance.
4.- Other expenses:	USD 80,000.

Pro Forma of the Issue

Borrower:	Merotex C.A.
Guarantor:	None
Amount:	**USD 200 million**
Maturity:	**5 years**
Coupon:	**7 (5/16)** (= **7.3125%**)
Issue price:	100%
Amortization:	Bullet repayment on final maturity date
Issuer's call option:	None
Listing:	London
Denominations:	**USD 1,000** and **USD 10,000**
Form:	Bearer securities
.....	
Commissions:	**1¾% flat**
Yield:	**7.3125%**

Cash Flows of Merotex C.A. (in USD million):

Year	**0**	**1**	**2**	**3**	**4**	**5**
Principal	**200**	-	-	-	-	**-200**
Interest	-	**-14.625**	**-14.625**	**-14.625**	**-14.625**	**-14.625**
Commissions	**-3.500**	-	-	-	-	-
Paying Agency	-	-0.0077	-0.0077	-0.0077	-0.0077	-0.0847
Auth. & Adm.	-0.004	-0.002	-0.002	-0.002	-0.002	-0.002
Listing	-0.020	-	-	-	-	-
Trustee	-0.008	-0.008	-0.008	-0.008	-0.008	-0.008
Reimburs. exp.	-0.080	-	-	-	-	-
Cash Flow	**196.39**	**-14.6427**	**-14.6427**	**-14.6427**	**-14.6427**	**-214.7117**

⇒ Cost of funds (IRR) = **7.7778% p.a.**

Note: Sometimes, IRR is calculated by *excluding* annual & minor expenses (listing, trustee, authentication, etc.). Under this method,

IRR = **7.7580%**.

Cost of Funds Exclusive Annual and Minor Expenses: Details

• This figure takes account:

- Coupon payments (**USD 14.625 M**)
- Commissions of **1¾%** flat on the issue amount (**USD 3.5 M**)
- Reimbursable managers' expenses (USD 80,000)

The issuer receives the net proceeds of:

USD 200,000,000 - USD 3,580,000 = **USD 196,420,000** (or 98.21%)

• All-in cost: IRR of a 5-year project:

- Positive cash flow of **USD 196.42 M** in year zero.
- Negative cash flows of **USD 14.625 M** every year.
- Negative cash flow of **USD 200 M** in year 5.

IRR = **7.7580%**. (Merotex obtains financing at a cost of 7.7580% p.a.)

⇒ Small difference between both IRRs.

Cost of Funds Inclusive Annual and Minor Expenses: Details

This figure takes account:

- Coupon payments
- Commissions of **1¾%** flat on the issue amount
- Reimbursable managers' expenses
- Commissions and Expenses

⇒ IRR = **7.7778% p.a.** (Merotex obtains financing at an annual cost of 7.7778%.)