FN 211

Bond Market

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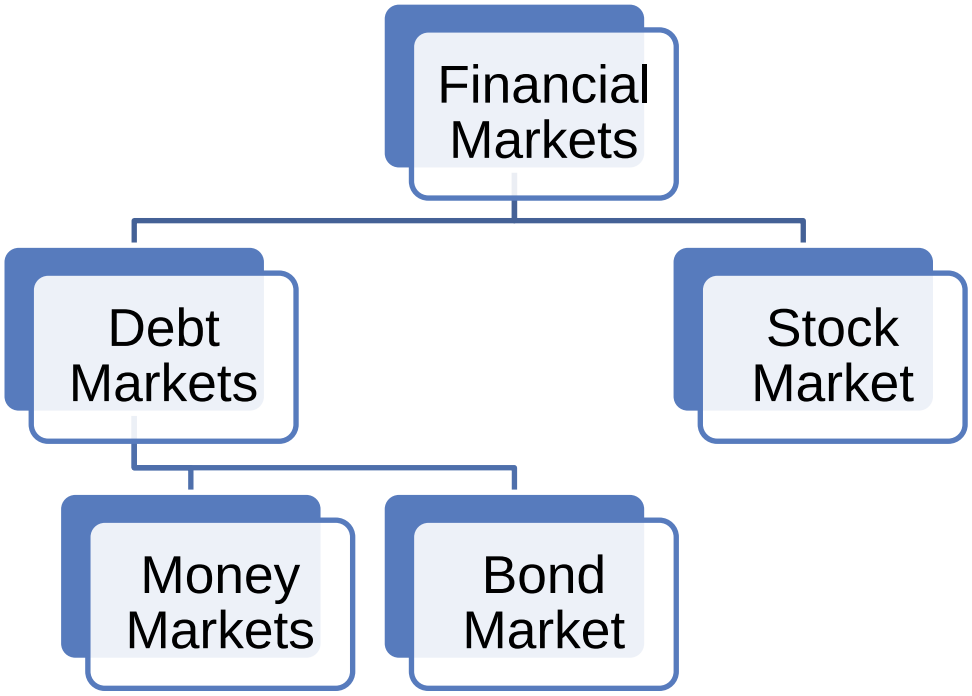
Outline

I. The Bond Market

- Characteristics
- Participants
- Primary vs Secondary Bond Market
- Types of Bonds

II. The Global Bond Markets

Types of Financial Markets



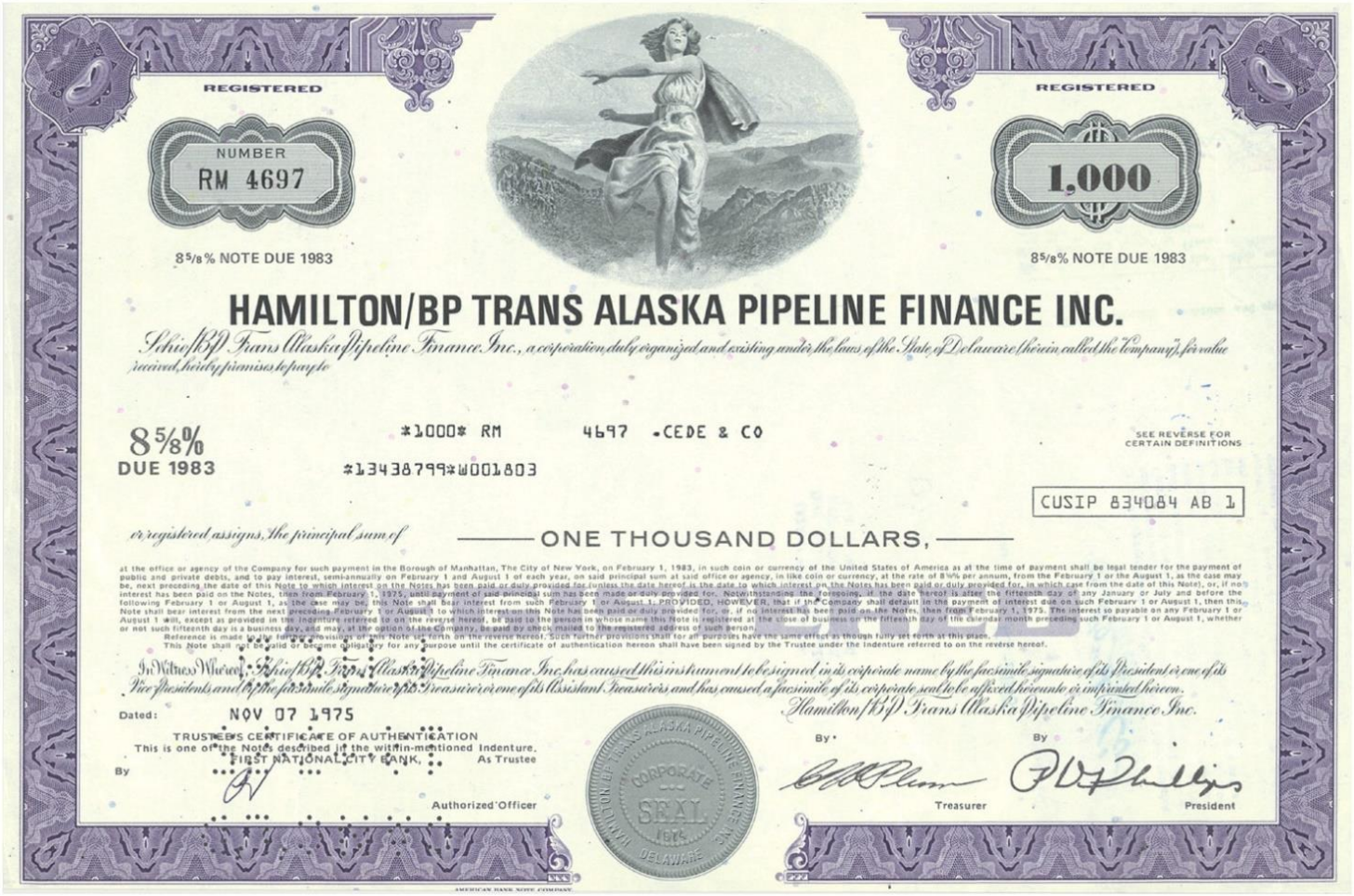
- Capital markets are for securities with an original maturity that is *greater* than one year.
- Best known capital market securities: Stocks and bonds.
- Firms and individuals use the capital markets for long-term financing or investments

Why do firms choose to borrow long-term?

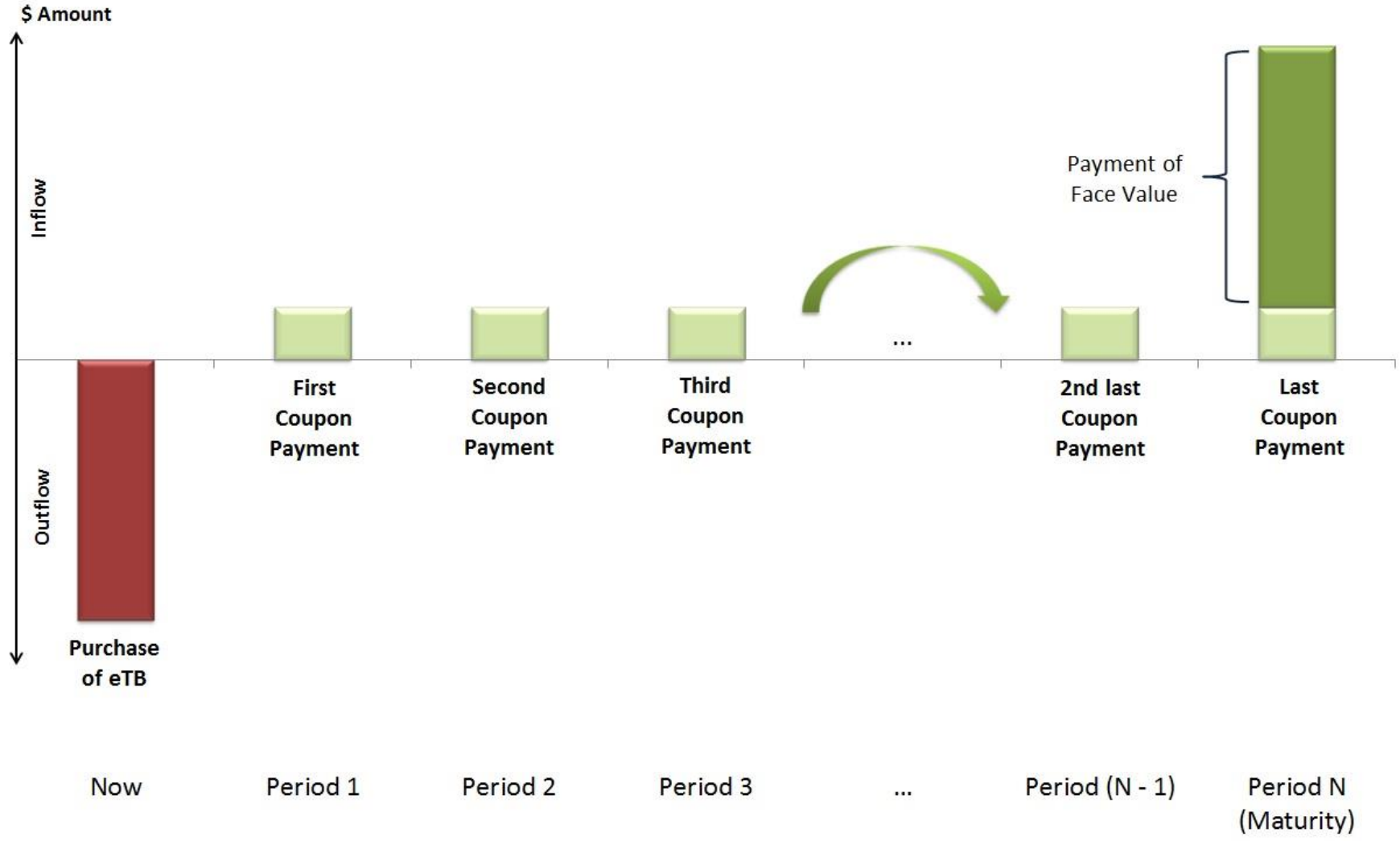
Why do investors choose to invest long-term?

What's bond?

Bonds are securities that represent *debt* owed by the issuer to the investor, and typically have specified payments on specific dates. They are known as "Fixed Income" security.



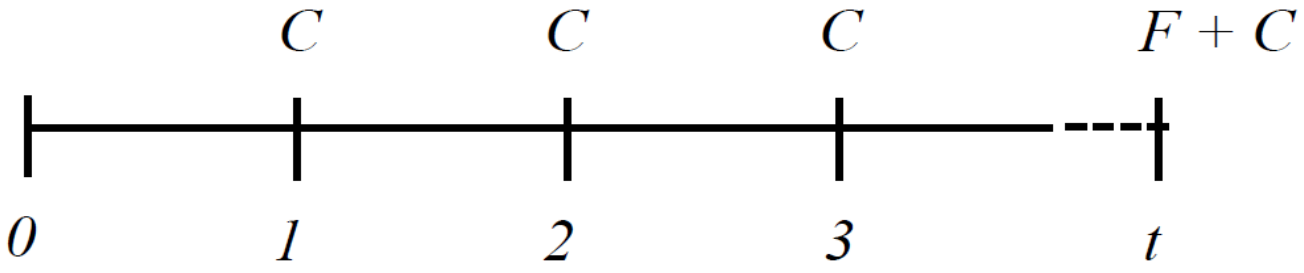
Bond's Cash Flows: Fixed Coupon Payments



Some Bond Terminology

- **Maturity:** The number of years or periods until the bond matures and the holder is paid the face amount.
- **Face amount/ Par value :** The maturity value of the bond. The holder of the bond will receive the face amount from the issuer when the bond matures.
- **Coupon interest rate:** The stated annual interest rate on the bond. It is *usually fixed* for the life of the bond.
  - *Example: A bond with a par value of $1000 and a coupon rate of 3% pays an annual coupon of $30.*

Some Bond Terminology



$$P = \frac{CF_1}{(1+YTM)^1} + \frac{CF_2}{(1+YTM)^2} + \cdots + \frac{CF_n}{(1+YTM)^n}$$

- **Yield to maturity (YTM):** The yield (rate of return) an investor will earn *if* the bond is purchased at the current market price and *held until maturity*.
- It is the rate that equates the purchase price (P) with the present value of all the expected annual net cash flows (CF) from the bond.
- 'YTM' or 'Yield' represents **market interest rate** for bonds.

Some Bond Terminology

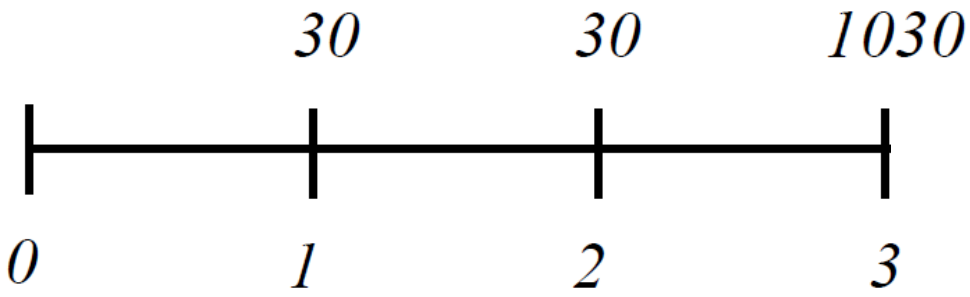
$$P = \frac{CF_1}{(1+YTM)^1} + \frac{CF_2}{(1+YTM)^2} + \cdots + \frac{CF_n}{(1+YTM)^n}$$

- A bond trades *at par*
  - if its price equals its par value,
  - i.e. if the current YTM *equals* its coupon rate.
- A bond trades at a *discount from par*
  - if its price is less than its par value,
  - i.e. if its current YTM is *higher* than its coupon rate.
- A bond trades at a *premium over par*
  - if its price is more than its par value,
  - i.e. if its current YTM is *lower* than its coupon rate.

Basic Coupon Bond Pricing

- Suppose there is a 3-year, $1,000 par value, 3% annual-pay coupon bond.

  What is the bond value, given YTM is 4%?



$$P = \frac{CF_1}{(1+YTM)^1} + \frac{CF_2}{(1+YTM)^2} + \cdots + \frac{CF_n}{(1+YTM)^n}$$

Characteristics: Money Markets vs Bond Market

	Money Markets Instruments	Government Bonds	Corporate Bonds
Original Maturity	≤ 1 year	> 1 year	
Denomination	Large	Large	Large, except for public offering
Default Risk	Low	Low	*Higher* *depend on credit rating*
Interest Rate Risk *or* Price Risk	Low	Medium – High	
Coupon	Zero coupon, usually sold at discount	Mostly Semi-annually	

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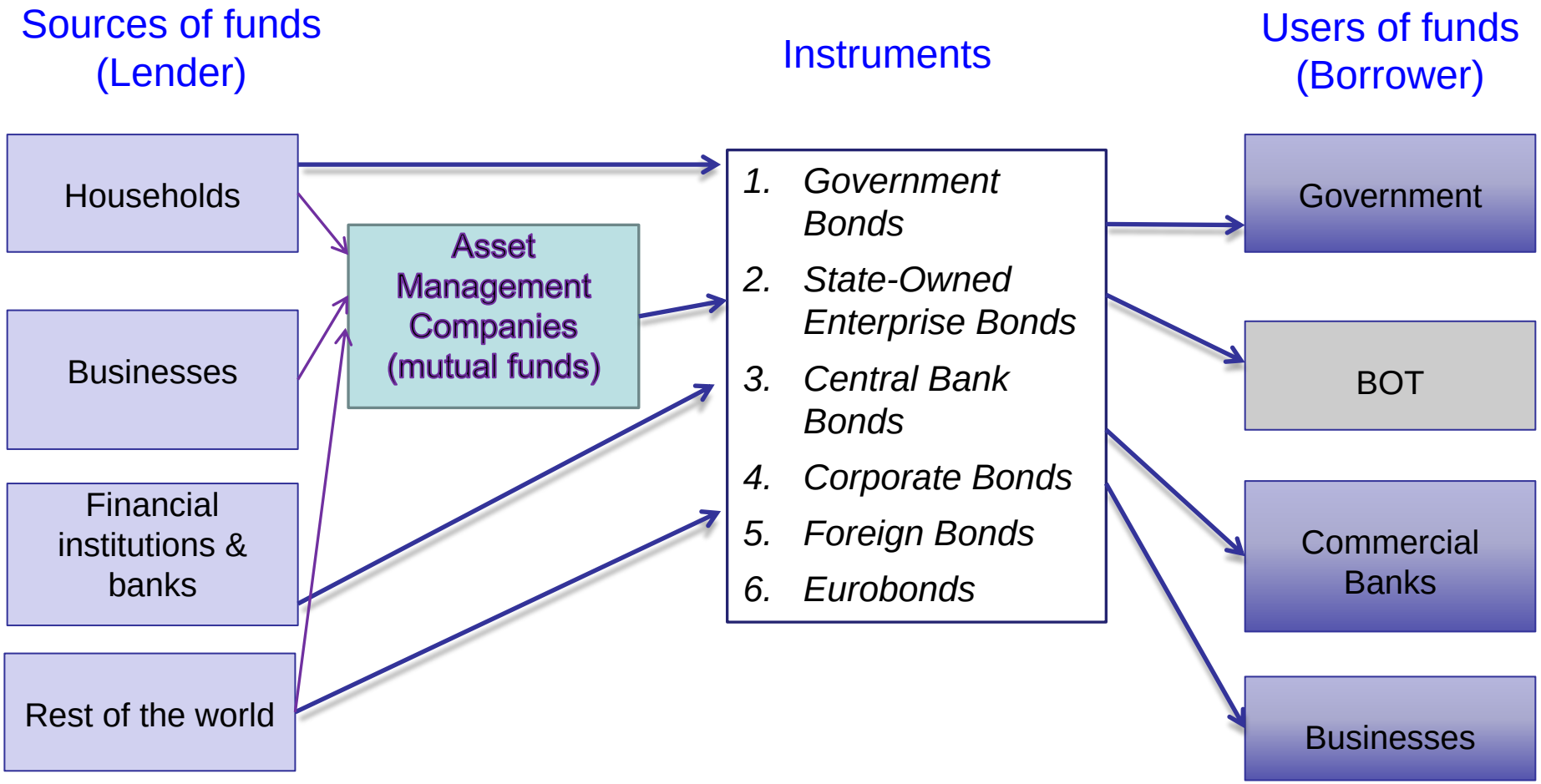
Main players in the bond markets



Who's the largest issuer of bonds?
Who's the largest purchaser of bonds?
Why do individuals indirectly invest through mutual funds?

Participants in the Bond Markets

Participant	Lender/ Borrower	Role
Ministry of Finance	Borrower	Issue Government Bonds (LB and SB) to finance capital projects and fund national debt
Bank of Thailand	Borrower	• Issue Bank of Thailand Bonds (BOT) which are used primarily to conduct monetary policy. • Act as an agent of the MOF to distribute Government Bonds using e-auction
Commercial Banks	Both	• Act as dealers in both the primary and secondary markets • Issue Corporate Bonds to borrow money • Invest in all types of bonds
Businesses	Both	• Issue Corporate Bonds to borrow money • Invest in all types of bonds

Participants in the Bond Markets

Participant	Lender/ Borrower	Role
Foreigners	Both	• Issue Corporate Bonds to borrow money • Invest in all types of bonds
Pension Funds/ Insurance Companies	Lenders	• Invest in all types of bonds, mostly in *long-term bonds*
Asset Management Companies	Lenders	• Invest in all types of bonds for their Mutual Funds
Individuals	Lenders	• Invest *directly* in Government Savings Bonds (SB) and some Corporate Bonds • Invest *indirectly* in Government and Corporate Bonds through Mutual Funds

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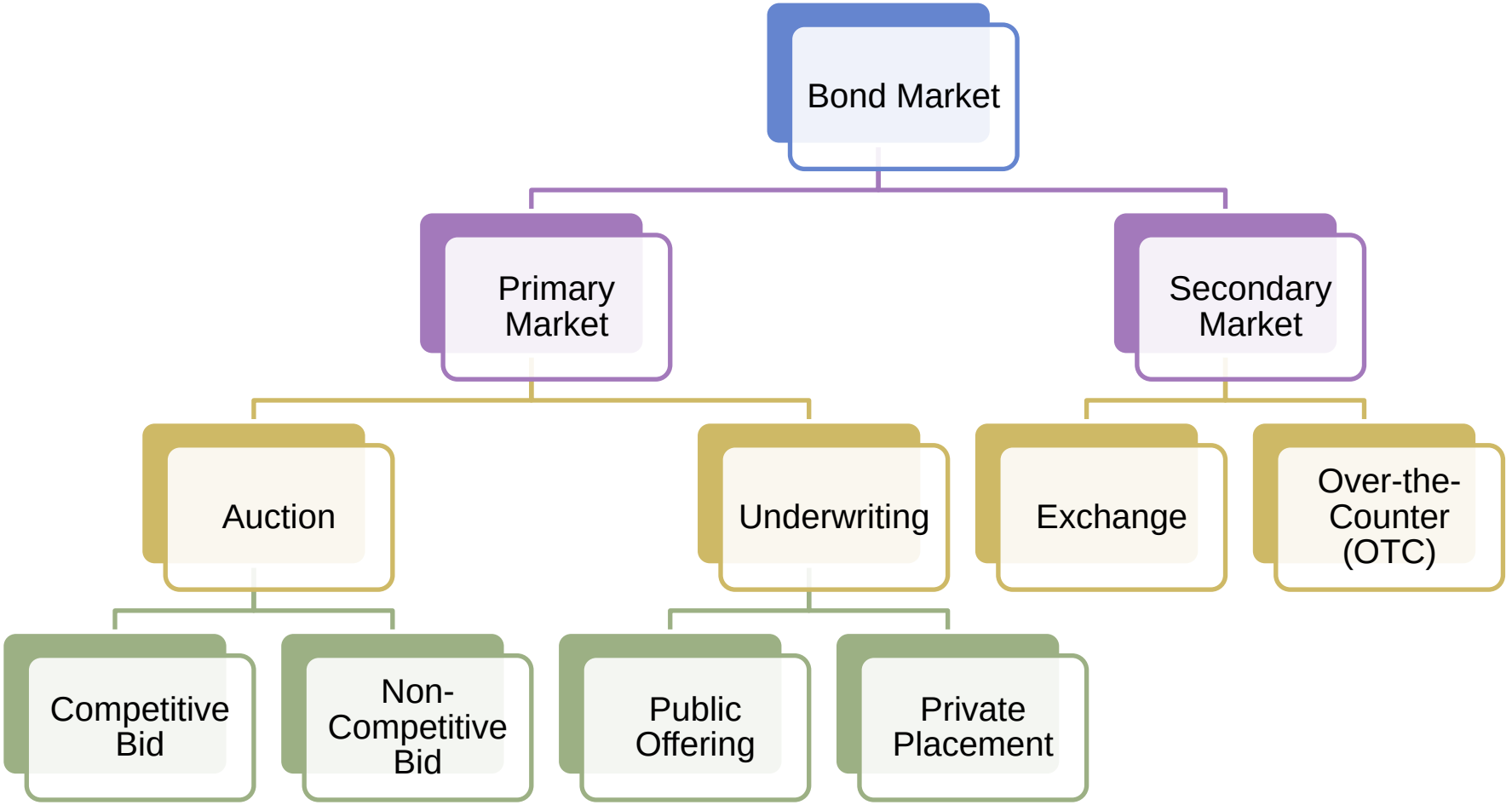
Primary vs Secondary Bond Markets

- **Primary Market**: New security issues sold to initial buyers
- **Secondary Market***:* Securities previously issued are bought and sold



Primary Market: Bond Auction

- Government Bonds are issued through auction process in the *primary market*
- **Competitive Bid (CB)**:
  - Competitive bidders indicate *both quantity and price.*
  - Usually have minimum but no maximum limit
  - **Single-Price Auction**
    - All bidders *pay the same price* for the securities which is the lowest price of the competitive bids accepted.
    - Used by the US Treasury since 1998
  - **Multiple-Price Auction**
    - Different bidders *pay different prices* which are their bid prices.
    - The bidder who offers the lowest yield (the highest price) will have the first priority to be allocated the bonds
    - The rest of the bonds will be allocated consecutively to the next bidders who offer a higher yield.
    - Used by the Bank of Thailand

Primary Market: Bond Auction

- **Non-competitive bid (NCB):**
  - Non-competitive bidders indicate *only quantity* desired
  - Usually have minimum and maximum limit.
  - The maximum allocated amount cannot exceed 20% of auction amount
  - Non-competitive bidders get preferential allocation and pay at a weighted-average accepted yield on winning competitive bids.

- **Bid Coverage Ratio (BCR)**
  = The number of bids *received* divided by the number of bids *offered*

Example of Government Bond Auction Result

Debt Securities Auction Results
Auction Date : 25 February 2015

Issuer has approved the auction result as follow(s)

ThaiBMA	LB21DA
ISIN	TH0623031C01
Payment Date	27/02/2015
Maturity Date	17/12/2021
Coupon Rate (%)	3.65
Coupon Fixing (FRB/LBF) as of - (%)	-
Index Ratio (ILB) as of Payment Date (time(s))	-
Auction Amount (Mil. Baht)	20,000.00
Accepted Amount of CB (Mil. Baht)	20,000.00
Accepted Yield (%)	2.623 - 2.637
Weighted Average Accepted Yield (%)	2.6302
Bid Coverage Ratio	2.06
Accepted Amount of NCB (Mil. Baht)	-
Accepted Amount of Greenshoe Option (Mil. Baht)	3,803.00
Accepted Amount of Over Allotment (Mil. Baht)	-
Grand Total (Mil. Baht)	23,803.00

Secondary Market: Bond Trading

1. **Bond Electronic Exchange (BEX):** Bonds can be bought and sold by *any investors*.

2. **Over-the-Counter (OTC):**
   - Bond is negotiated between counterparties and trade off the Exchange floor.
   - Dealers perform an intermediary role between seller and buyer by quoting the price and executing the trade.
   - Unlike stock trading, dealers earn no commission but the difference between bidding and asking price.

- 98% of bond trading is in the OTC market.
- Most corporate bonds seldom trade. Why?

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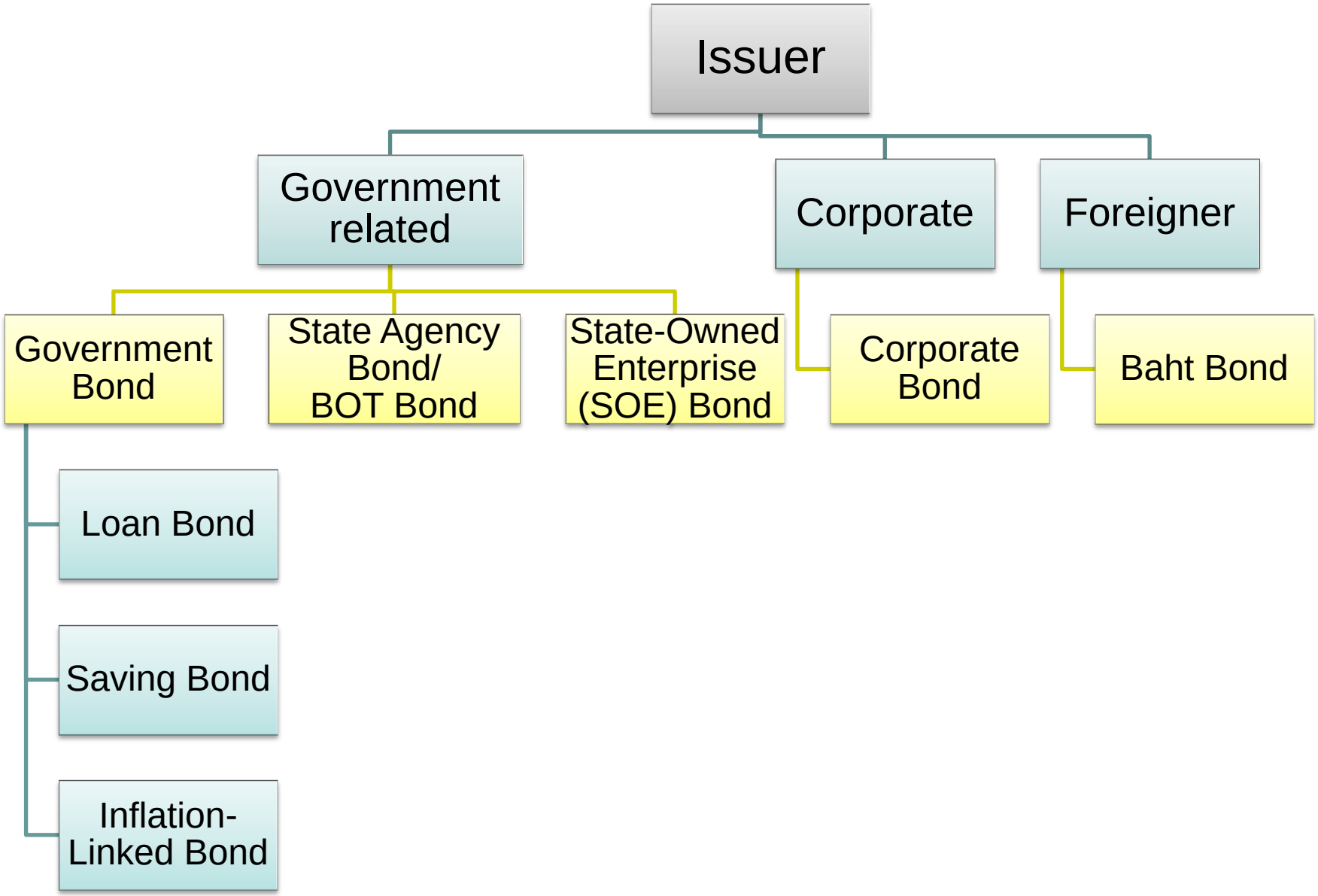
Types of Bond: Classified by *type of issuer*



Types of Bonds: Government Bonds

- *Medium to long-term* debt instruments issued by the Ministry of Finance.
- Characteristics of government bonds
  - Very low default risk
  - Very low interest rate risk
- The debt has an "implicit" guarantee that the government will not let the debt default.

- Have any government ever defaulted?

Types of Bonds: Government Bonds

- **Types of government bonds**:
  - **Loan bonds (LB)** capture the majority of the market as they are issued for financing budget deficit.
  - **Saving bonds (SB)** are issued to provide *households* with alternative source of saving.
    - During the life of the bond, investors get paid *fixed* interest payment i.e. fixed nominal interest rate/ coupon rate on fixed principal amount
    - At maturity, the bond is redeemed at par

Types of Bonds: Government Bonds

- **Types of government bonds**:
  - **Inflation-linked bond (ILB):** the principal amount is tied to the current rate of inflation to protect investor purchasing power.
    - During the life of the bond, investors get paid *variable* interest payment.
      - The *interest rate does not change* throughout the term of security.
      - However, *the principal amount used to compute the interest payment does change* based on the consumer price index (CPI).
    - At maturity, the bond is redeemed at the greater of their inflation-adjusted principal or par amount at original issue.
    - *Refer to Fisher equation*

Types of Bonds: State Agency Bonds

- **BOT Bonds (BOT)** are issued by the Bank of Thailand.
  - The BOT bonds have maturity of 2 and 3 years with *fixed and floating* rates
  - BOT bonds are used primarily to conduct monetary policy i.e. absorb excess liquidity in the banking system
  - BOT Bonds have low default risk.
  - Eligible bidders for LB and BOT in the primary market:
    - ✓ Commercial banks
    - ✓ State-own financial institutions
    - ✓ Other institutions who have a current account at the BOT

Example of Bond Auction Result

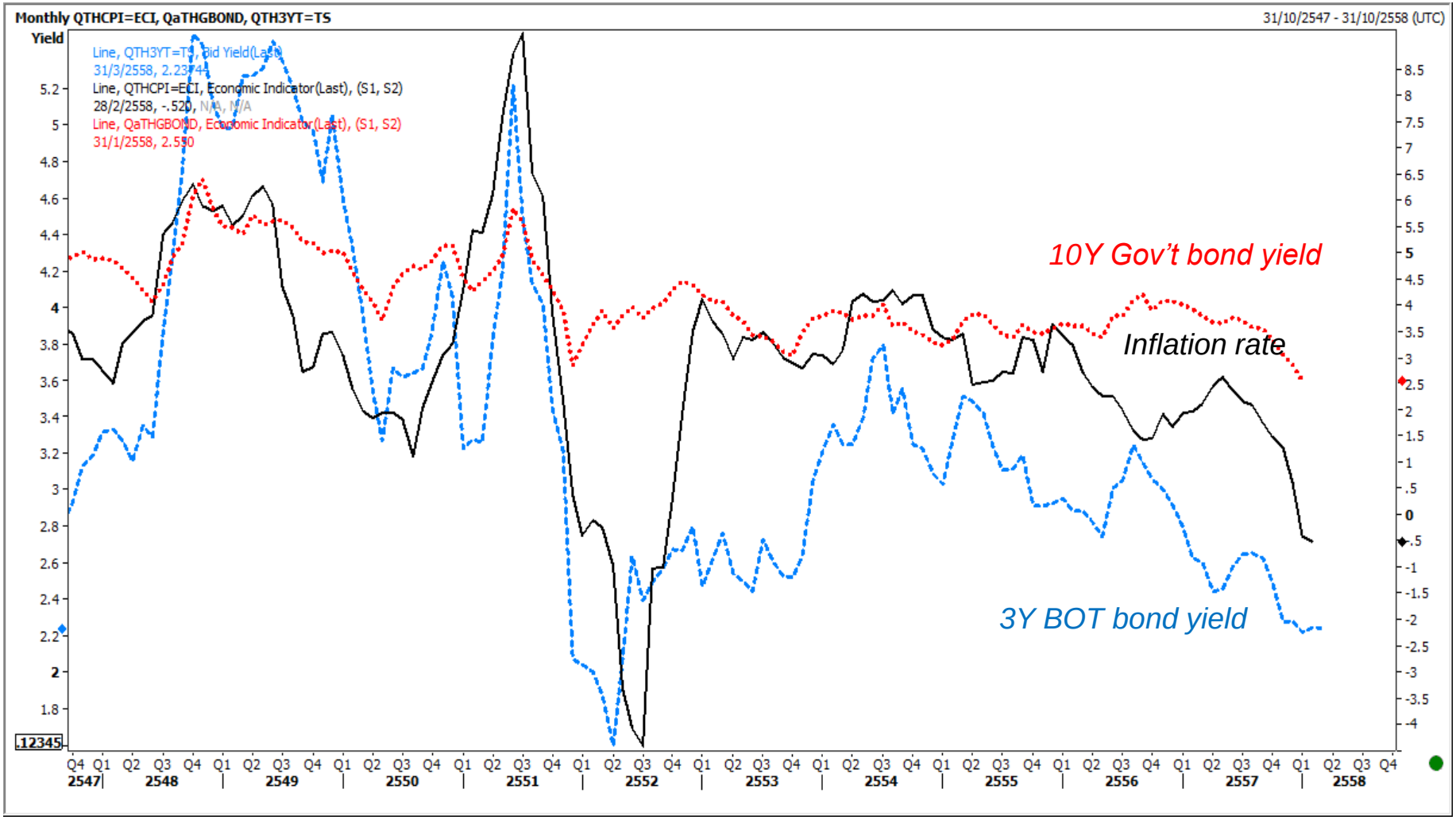
Debt Securities Auction Results

Auction Date : 19 February 2015

Issuer has approved the auction result as follow(s)

ThaiBMA	BOT172A
ISIN	TH065503R209
Payment Date	23/02/2015
Maturity Date	23/02/2017
Coupon Rate (%)	2.05
Coupon Fixing (FRB/LBF) as of - (%)	-
Index Ratio (ILB) as of Payment Date (time(s))	-
Auction Amount (Mil. Baht)	40,000.00
Accepted Amount of CB (Mil. Baht)	40,000.00
Accepted Yield (%)	2.088 - 2.098
Weighted Average Accepted Yield (%)	2.0969
Bid Coverage Ratio	2.80
Accepted Amount of NCB (Mil. Baht)	-
Accepted Amount of Greenshoe Option (Mil. Baht)	-
Accepted Amount of Over Allotment (Mil. Baht)	-
Grand Total (Mil. Baht)	40,000.00

Bond yields and Inflation rate



Types of Bonds: SOE Bonds

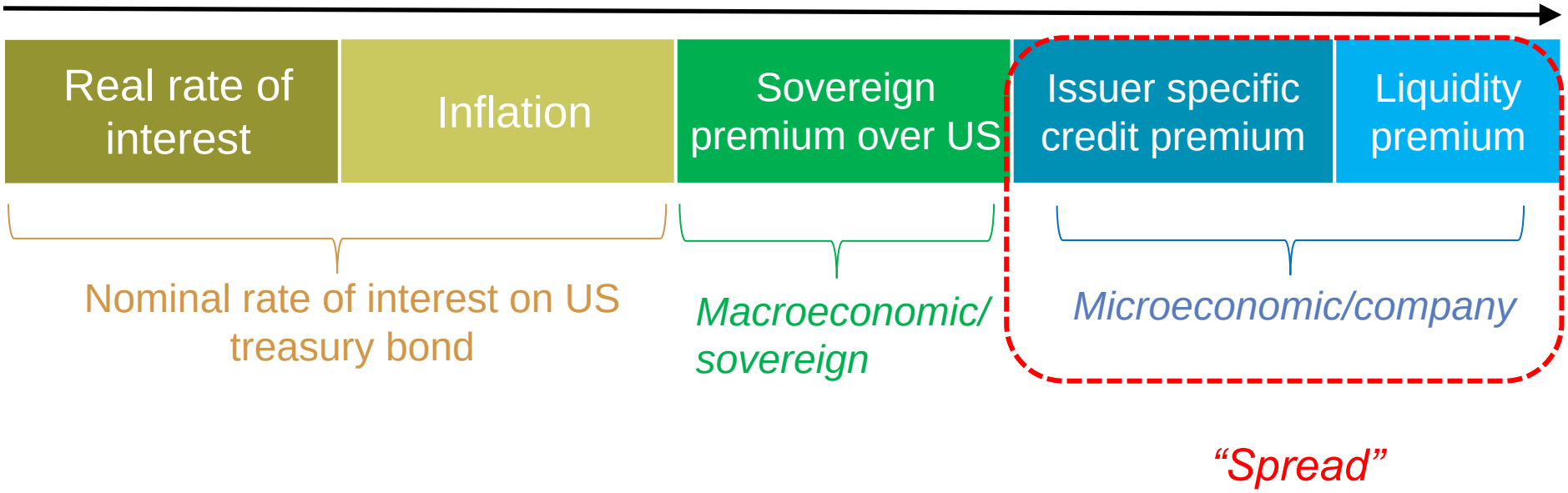
- *Medium to long-term* debt instruments issued by state owned enterprises.
  - Examples are EGAT, GHB, BAAC
- This can be categorized into 2 types; guaranteed and non-guaranteed by the Ministry of Finance
  - of which the guaranteed bonds account for 86% of total.
  - However, there are restrictions on the government to provide debt guarantee for not exceeding 10 % of total budget expenditure.
- The auctions are made through single-price auction where the entire issues are awarded to bidders (underwriters) who offer the *lowest cost* of funding.

Types of Bonds: Corporate Bonds

- Corporate bonds are mostly issued by large and well-known or investment-grade corporations.
  - Examples are AIS, CPF, LH, PTT, SCC, etc.
- They normally offer higher yield to compensate for higher default or credit risk.
- Corporate bonds are normally issued and traded with **spread** over return on government bonds with the same maturity.
- Since corporate bonds carry credit risk, credit ratings are required for all bond offerings.

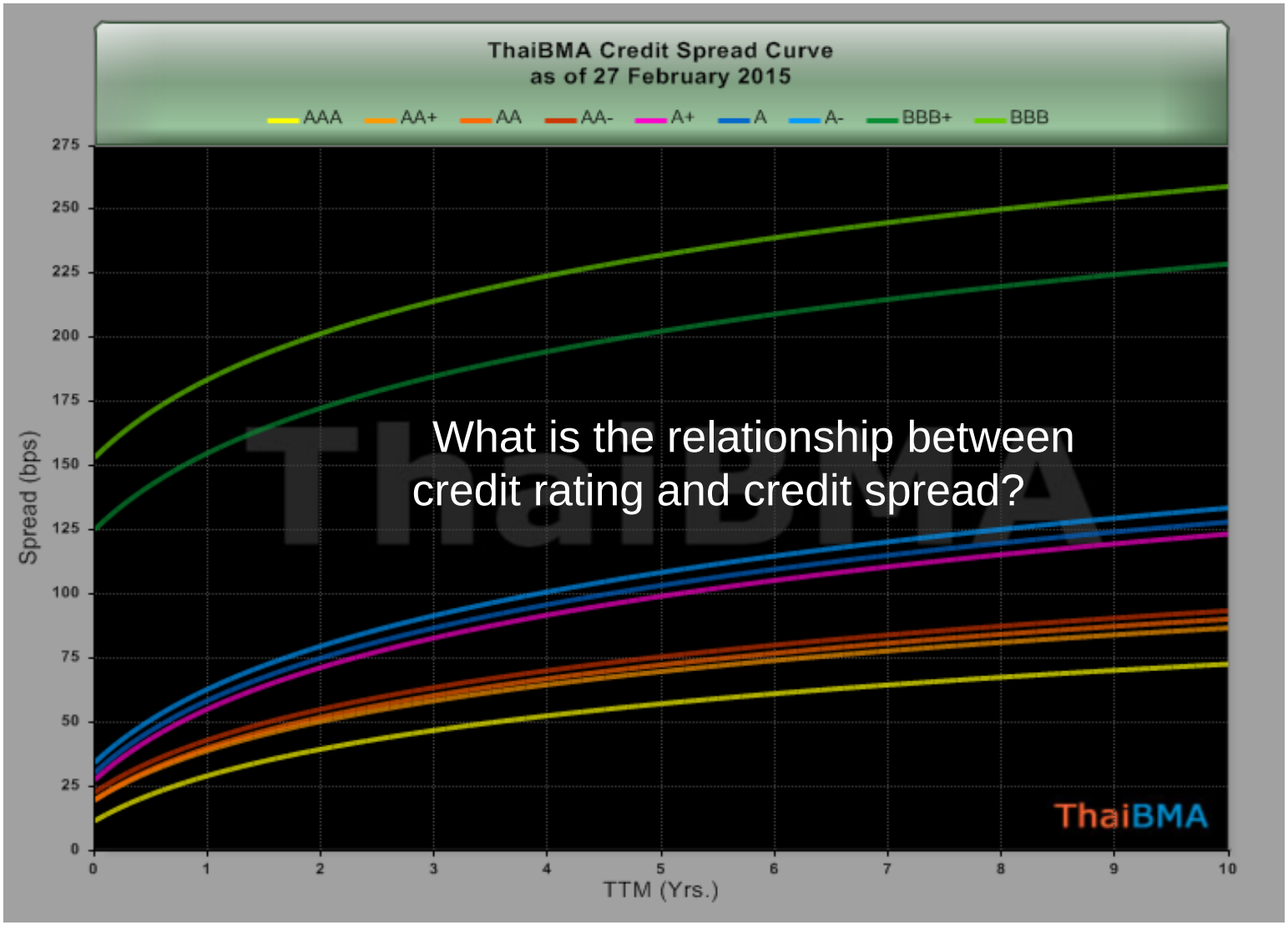
Decomposing the Discount Rate

Overall interest rate for discounting bond cash flows :



Credit Spread Curve

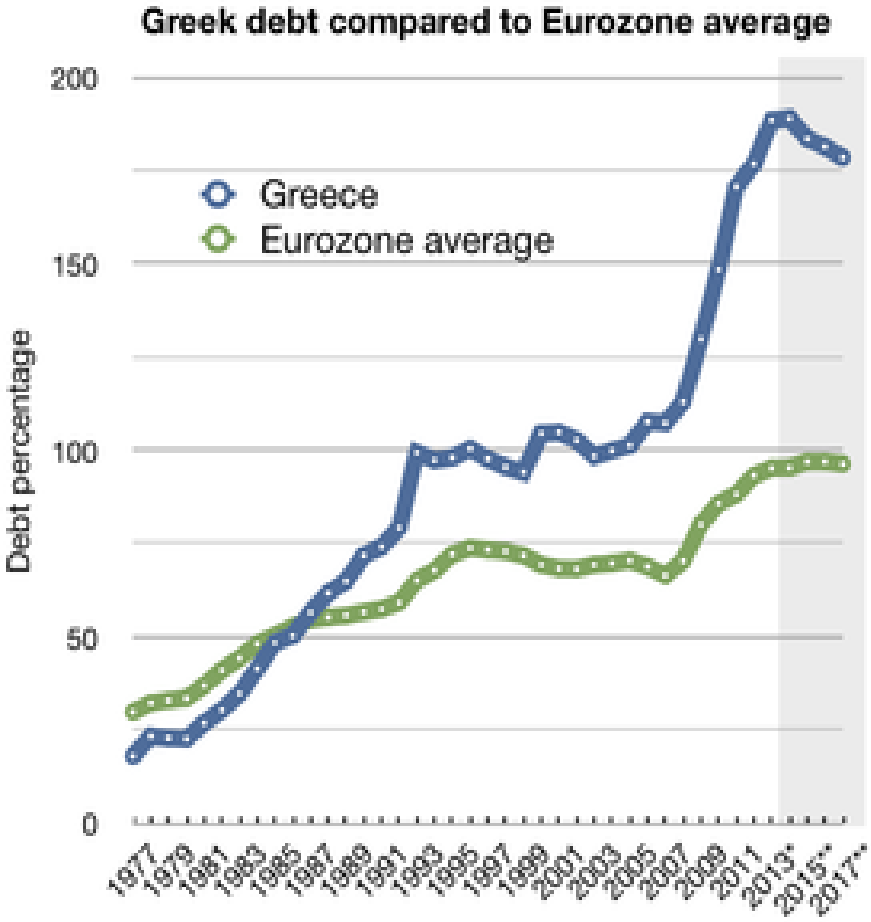
Total spread = credit spread + liquidity spread



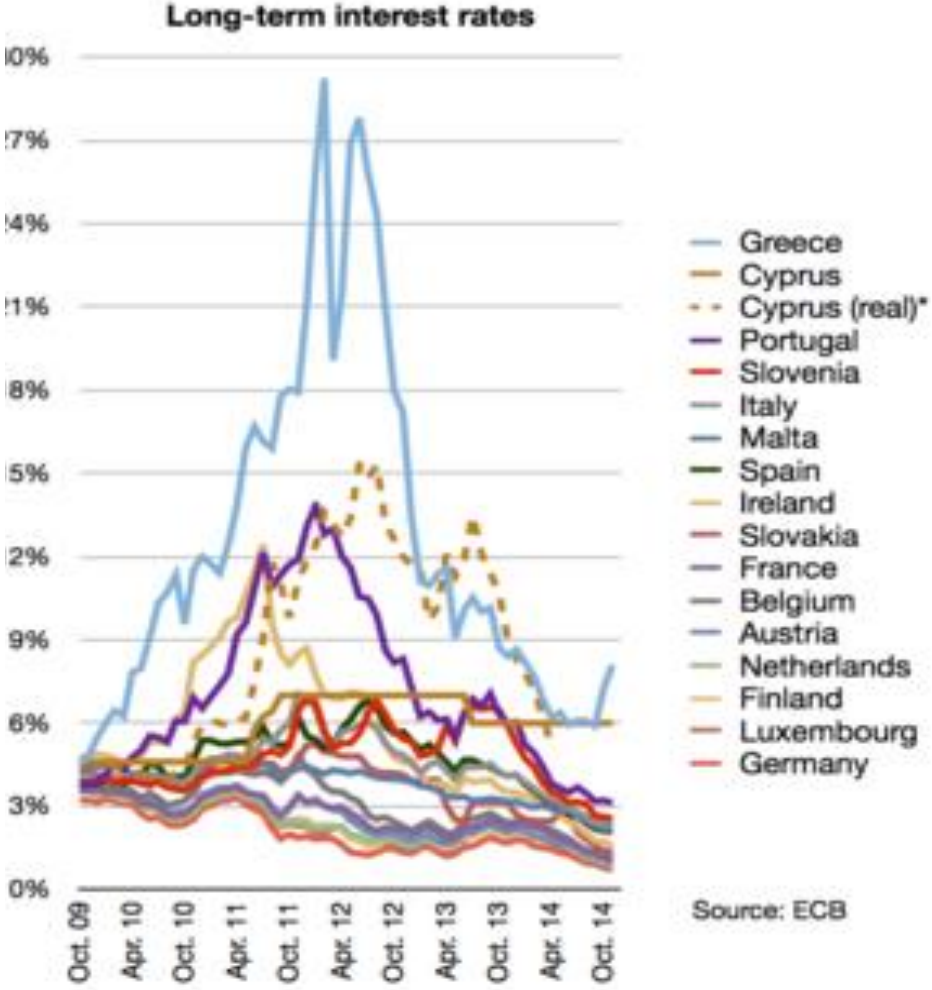
Historical Credit Spread in the US

Key	Axis	Name	Last	Minimum		Maximum		Mean	SD	SD Change
	Left	U.S. Corporate Investment Grade	198.792	75.757	03/11/2005	617.958	12/03/2008	175.966	110.700	2.930

The Greek Debt Crisis



Source: Eurostat (1/2013)
*estimates
**estimates from Ernst & Young using data from Oxford Economics (3/2013)



Source: ECB

* actual market trade values without cut-off yield for Cyprus government bond maturing 3 February 2020

Corporate Bond

- Investors use various techniques to analyze information on companies and bond issues in order to estimate the ability of the issuer to live up to its future contractual obligations.
  - This activity is known as credit analysis.
- Individual investors and institutional bond investors rely primarily on nationally recognized rating companies that perform credit analysis and issue their conclusions in the form of ratings.
  - The three commercial rating companies are *Moody's Investors Service, Standard & Poor's Corporation, and Fitch Ratings.*

Credit Rating System

- In all rating systems the term *high grade* means low credit risk, or conversely, high probability of future payment.
  - Bond issues that are assigned a rating in the top four categories are referred to as investment-grade bonds.
  - Issues that carry a rating below the top four categories are referred to as noninvestment-grade bonds, or more popularly as high-yield bonds or junk bonds.
- Thus, the corporate bond market can be divided into two sectors:
  - Investment-grade market
  - Noninvestment-grade market

Credit Rating System

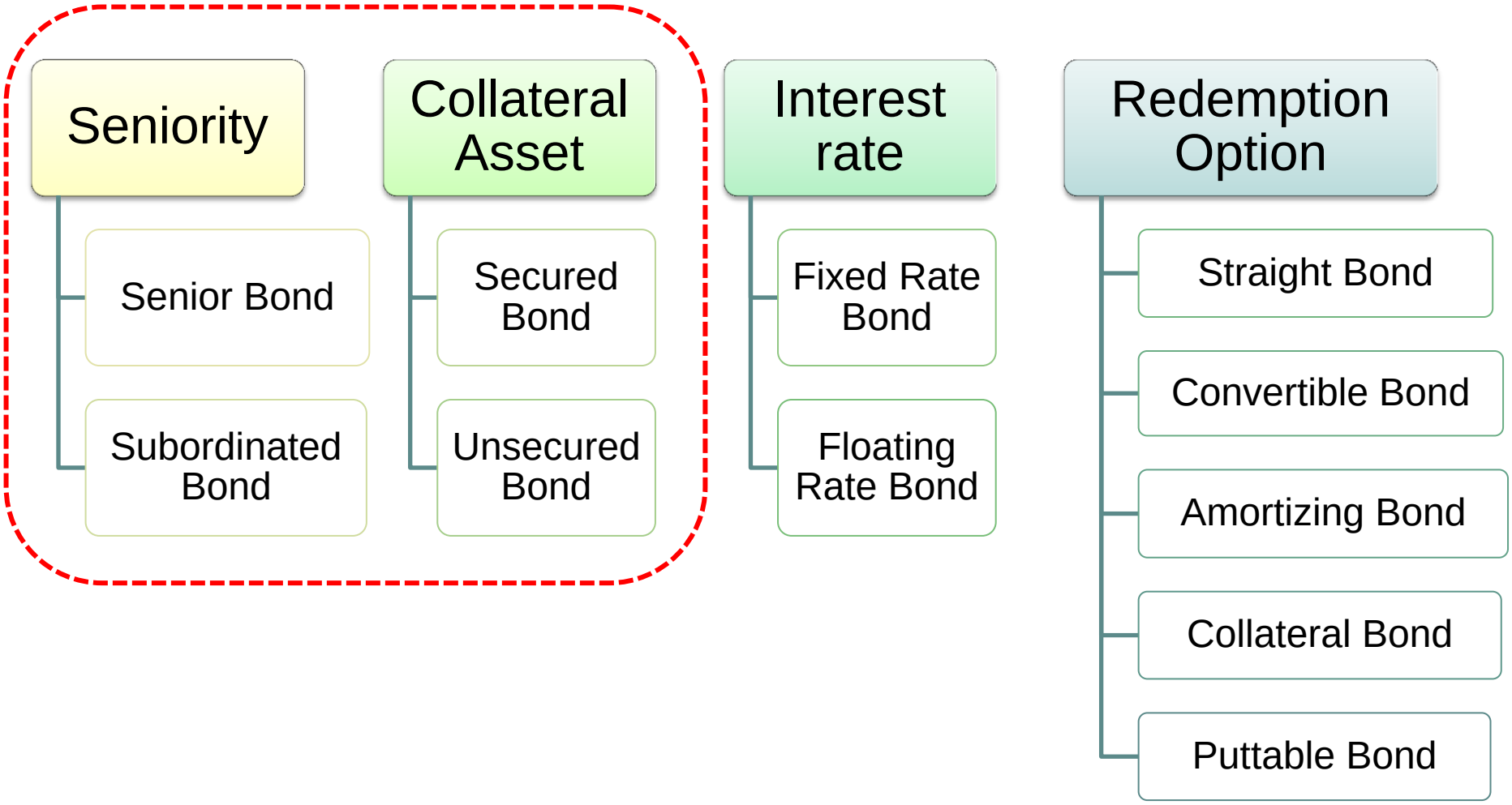
Rating	Definition
AAA	Highest rating. Issuer's capacity to repay interest and principal is excellent.
AA	Very strong capacity to repay principal and interest.
A	Strong capacity to repay principal and interest. May be susceptible to adverse changes in economic conditions.
BBB	Adequate capacity to repay principal and interest. Adverse economic conditions will likely lead to erosion in ability to pay.
BB	Little near-term weakness but faces major ongoing uncertainties or exposure to adverse business, financial, or economic conditions that could lead to inadequate capacity to repay principal and interest.
B	Currently has the ability to pay principal and interest. Poor economic or business conditions would likely impair the ability to repay principal and interest.
C	This rating is applied to debt that is subordinated to senior debt that has been assigned a CCC rating.
D	Debt is currently in default.

Issuer Rating vs. Issue Rating

	Company Rating (Issuer Rating)	Bond Rating (Issue Rating)
Bangkok Dusit Medical Services (BGH)	BGH => A+	BGH153A => A+ BGH166A => A+
True Corp	TRUE => BBB	TRUE174A => BBB- TRUE177A => BBB
Sansiri	SIRI => BBB+	SIRI16OA => BBB SIRI188A => BBB
DAD SPV	DAD => No Rating	DAD20NA => AAA DAD25NA => AAA
Toyota Leasing (Thailand)	TLT => No Rating	TLT165A => AAA TLT168A => AAA

- Issuer rating is not always the same as issue rating
- Degree of risk varies with each bond, even from the same issuer. Why?

Types of Bond: Classified by *other characteristics*



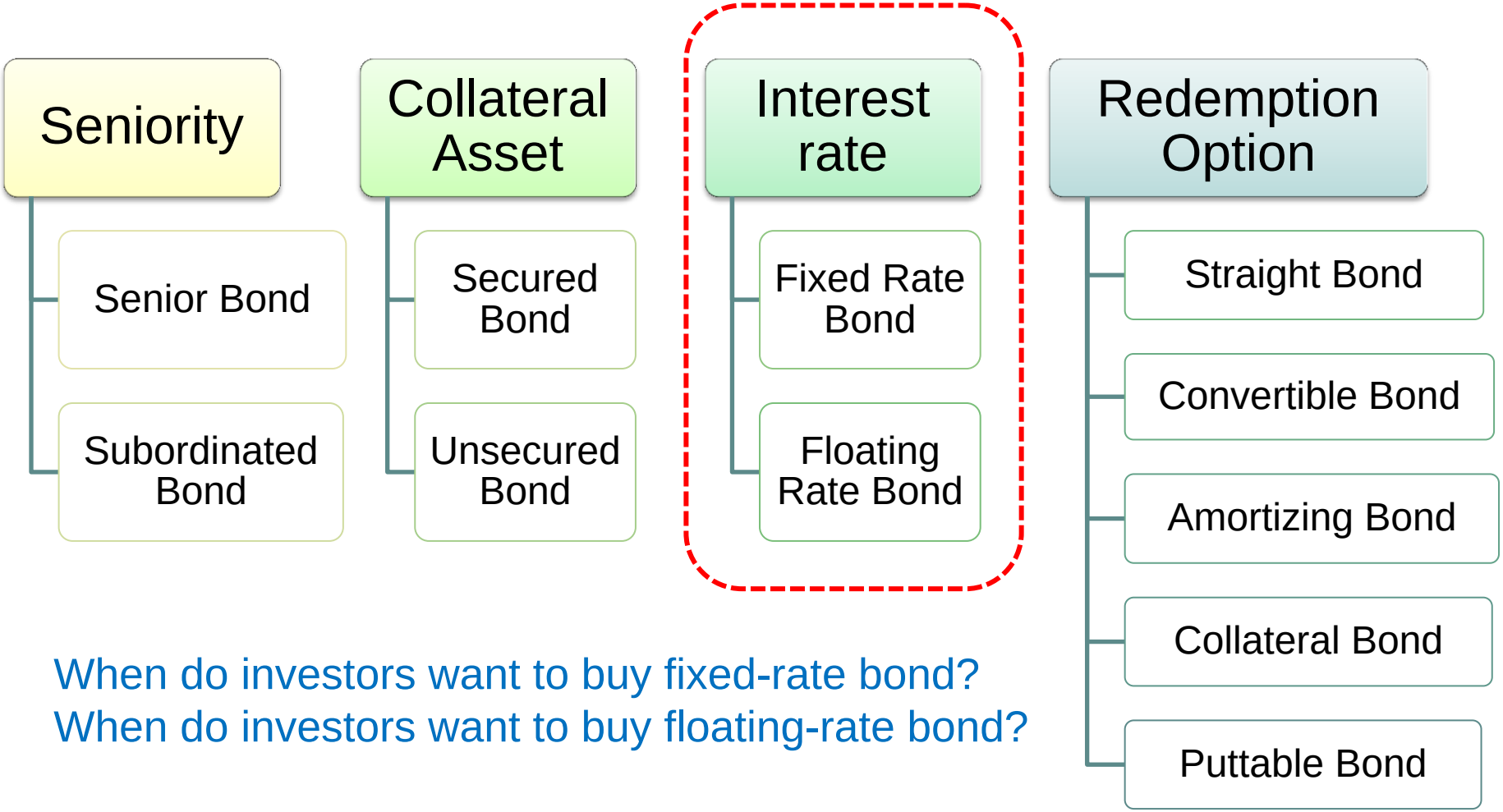
Corporate Bond

- **Secured Bonds** – are bonds with *collateral* (such as a building or a factory) attached.
  - In the event that the firm fails to make payments as promised, the bondholders have the right to liquidate the assets in order to be paid.
  - Because these bonds have specific assets pledged as collateral, they are *less risky* and tend to have *lower interest rate*.
  - Example:
    - Mortgage bonds - long-term secured debt containing a claim against a specific *building or property*
    - Asset-backed securities - the sale of cash flows derived directly from a specific *set of bundled assets*, typically, a group of small and illiquid assets (such as *credit cards or auto loans*) that are unable to be sold individually.

Corporate Bond

- **Unsecured Bonds** (also called Debentures) – are bonds backed only by the general *creditworthiness* of the issuer.
  - No specific collateral is pledged to repay the debt. In the event of default, the bondholders must go to court to seize assets.
  - Collateral that has been pledged to other debtors is not available to the holders of debentures.
  - **Subordinated debentures** are similar to debentures except that they have a lower priority claim. In the event of default, holders of these bonds are paid only after more senior bondholders are paid in full.
- **Seniority:** Where does the bond stand in the pecking order in the event of corporate distress?

Types of Bond: Classified by *other characteristics*



When do investors want to buy fixed-rate bond?

When do investors want to buy floating-rate bond?

Corporate Bond

- Normally, bonds cannot be redeemed anytime the issuer wishes, unless a specific clause states this.
- **Redemption options**:
  - **Callable** – company can repay the bonds when it wants
  - When will the issuer exercise the callable option?
    i.e. When does the issuer expect the market interest rate to increase or decrease?

  - **Puttable** – investors can require repayment of the debt back to company for early repayment
  - When will the bondholder exercise the puttable option?

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Types of Bonds: Foreign Bonds

- Foreign bonds are issued in a country different from that of the issuer:
  - Dollar-denominated bonds issued by non-US entities but are traded in the US are nicknamed Yankee Bonds.
  - In Japan, Yen-denominated bonds issued by non-Japanese entities are nicknamed Samurai Bonds

- What's about Matador bond? Baht bond?

Foreign Bond Markets

- For bonds issued *outside* the jurisdiction of any single country, they are parts of the Eurobond Market (*Euro* = *Global*).
  - Arose from attempts to avoid interest restrictions and regulation by US authorities in the 1960s
- Eurobonds can be denominated in any currency, though dollar originally dominated
  - Generally used by borrowers issuing in currency other than their own
- The Eurobond market is divided into sectors depending on the currency in which the issue is denominated.
  - Eurobonds denominated in U.S. dollars are called Eurodollar bonds.
  - Eurobonds denominated in Japanese yen are called Euroyen bonds.
- The market can also be classified in terms of trading blocs
  - Dollar bloc (US, Canada, Australia and New Zealand)
  - European bloc, Yen bloc Emerging markets bloc

Sovereign Bonds

- Are bonds issued by national governments, which can be in local or in foreign currency.
- The two largest non-U.S. government bond markets are those in Japan and Germany.
  - Japanese government securities are referred to as JGBs
  - The German government bonds are called Bunds.
- Euro government bond market becoming the largest government bond market in the world in terms of size and number of issues
  - Due to The creation of the European Monetary Union (EMU), combined with the decline in the U.S. Treasury issuance of securities

Sovereign Bonds

- These bonds are *rated* as well, by international rating agencies such as S&P or Moody's.
- The ratings are based on political risk, economic risk, monetary and fiscal policy, etc.
- Sovereign governments default more frequently on foreign currency debt than on local currency debt.
  - *In the past 25 years, sovereign foreign currency default rates have exceeded sovereign local currency default rates by at least 3 times.*
  - *This is why foreign currency ratings tend to be equal or lower than local currency ratings.*

Sovereign Bonds:

Example of Sovereign Credit Ratings by S&P

Rating	Local Currency	Foreign Currency
AAA	Singapore, Hong Kong	Singapore, Hong Kong
AA+	USA	USA
AA		
AA-	Japan, Taiwan China, Korea	Japan, Taiwan China
A+		Korea
A	Malaysia	
A-		Malaysia
BBB+	**Thailand**	
BBB		**Thailand**
BBB-	India, Philippines	India, Philippines
BB+	Indonesia	Indonesia
BB-	Vietnam	Vietnam

Sovereign Bonds:
Selected Past Defaults by S&P

Year	Foreign Currency Defaults	Local Currency Defaults
2010	Jamaica	Jamaica
2008	Ecuador, Seychelles	Ecuador
2006	Belize	
2005	Venezuela, Dominican Republic	Grenada
2004	Grenada	Cameroon
2003	Paraguay, Uruguay	
2002	Indonesia	
2001	Argentina	Argentina
2000	Indonesia	
1999	Russia, Pakistan	Dominican Republic

Can Sovereign Bond Yield be Negative?