Bachelor of Economics
THAMMASAT UNIVERSITY

FN 211 Financial Markets

Class 6: Money Markets

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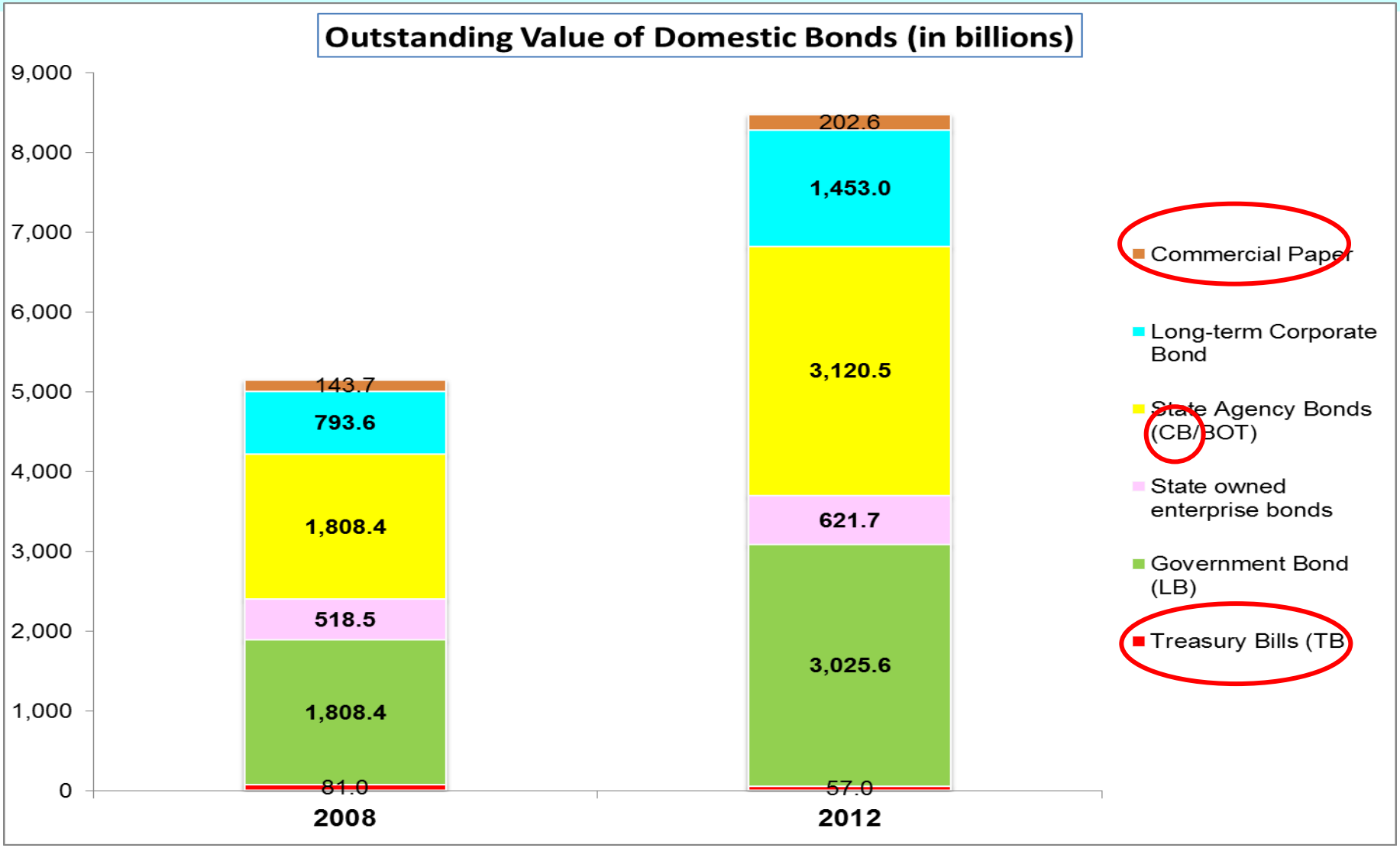
Overview of Thai Bond Markets



Today's Outline

The Thai Money Markets

1. Characteristics and Participants
2. Instruments
   - Government Type
   - Corporate Type
   - Interbank Loan
   - Repurchase Agreement

The Global Money Markets

- Federal Funds in the US
- Eurodollars

Characteristics of the Money Markets

- *Money market* is the market for short-term (one year or less) borrowing.
- The money market is the mechanism through which holders of temporary cash surpluses meet holders of temporary cash deficits.
- Money Markets exist because
  - Short-term investors get returns *higher* than those of bank deposits.
  - Short-term borrowers get borrowing rates *lower* than those of bank loans.

Characteristics of the Money Markets

Characteristics of the Money Markets

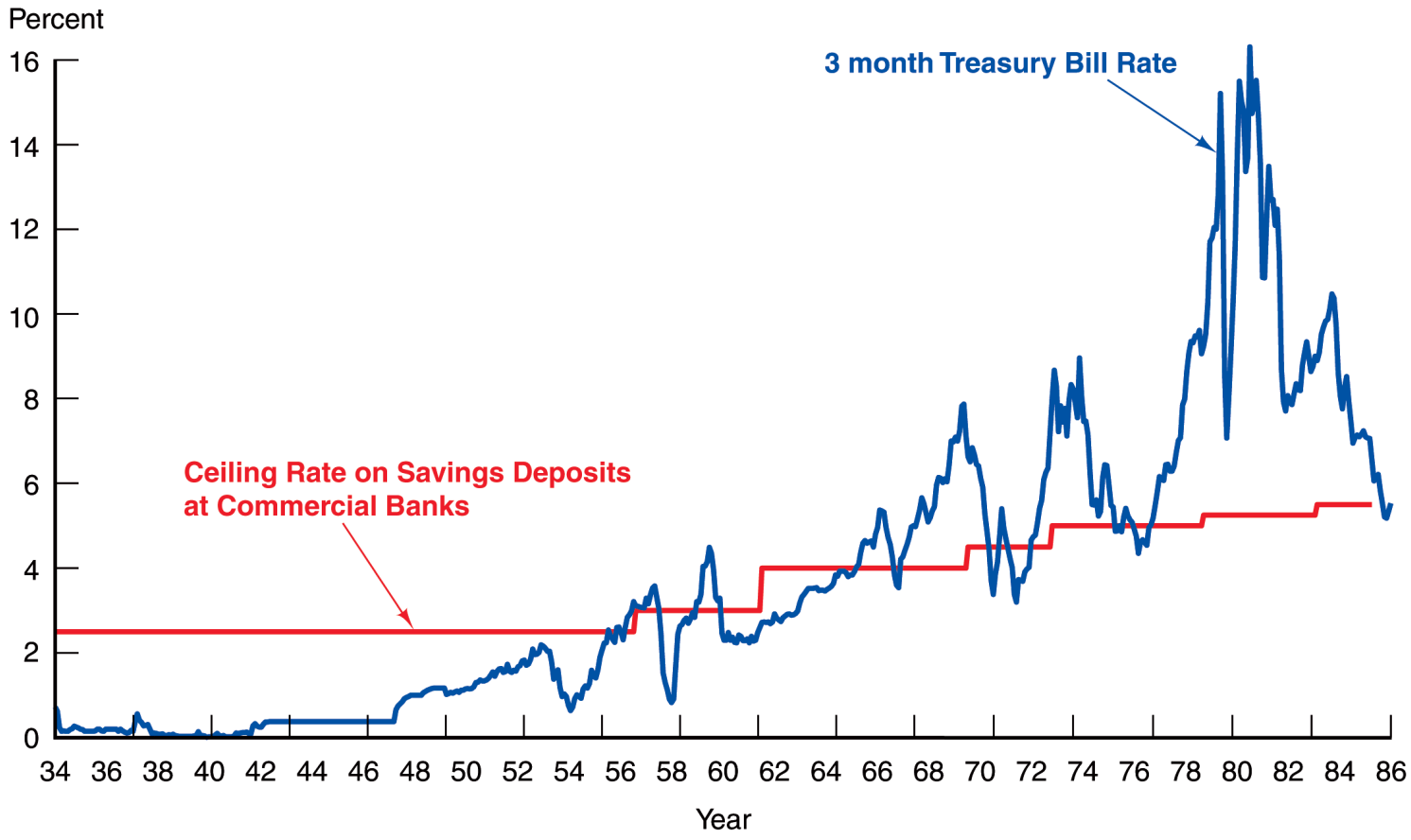


Figure 9.1 3-Month Treasury Bill Rate and Ceiling Rate on Savings Deposits at Commercial Banks

Source: http://www.stlouisfed.org/default.cfm.

Characteristics of the Money Markets

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

Participants in the Money Markets

Participant	Lender/ Borrower	Role
Ministry of Finance	Borrower	Issue Treasury Bills (TB) to borrow money
Bank of Thailand	Both	• Act as an agent of the MOF to distribute TBs using e-auction • Issue Central Bank Bills (CB) which are used primarily to conduct Monetary Policy. • Buy and Sell ST instruments to conduct Monetary Policy
Commercial Banks	Both	• Issue NCD and Commercial Papers (B/E, P/N, ST Debentures) to borrow money • Buy and Sell ST instruments to manage liquidity • Borrow and Lend in the Interbank Market • Borrow and Lend in the Repurchase Market
Finance Companies	Both	• Issue P/N to borrow money • Buy and Sell ST instruments to manage liquidity

Participants in the Money Markets

Participant	Lender/ Borrower	Role
Businesses	Both	• Issue Commercial Papers to borrow money • Invest in ST instruments to warehouse surplus funds • Borrow and Lend in the Repurchase Market
Pension Funds/Insurance Companies	Lenders	• Invest in ST instruments mainly for liquidity purpose • Borrow and Lend in the Repurchase Market
Asset Management Companies	Lenders	• Invest in ST instruments mainly for Money Market Funds
Individuals	Lenders	• Invest through Money Market Funds

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Instruments: Government Type

1. **Treasury Bills (TB)** , issued by the *Ministry of Finance*, are treasury securities sold in the primary market by auction at a discount from face value. Upon maturity the face value will be paid to the holder. TBs typically have *28-day, 91-day, and 182-day* maturity period
2. **Central Bank Bills (CB)** , issued by the *Bank of Thailand*, are treasury securities sold in the primary market by auction at a discount from face value. Upon maturity the face value will be paid to the holder. CBs typically have *3 to 364 days* maturity period. They are used primarily for conducting monetary policy, managing liquidity and interest rate in financial market in order to stabilize economic growth.

Instruments: Government Type

Example of Treasury Bills

- Code : TB13N06A
- Issuer : Ministry of Finance
- Initial Par : THB 1,000
- Issue Size : THB 25,000 million
- Issue Date : 9 October 2013
- Maturity Date : 6 November 2013
- Issue Term : 28 Days
- Yield: 2.44 – 2.489%

Example of Central Bank Bills

- Code : CB14703A
- Issuer : Bank of Thailand
- Initial Par : THB 1,000
- Issue Size : THB 77,370 million
- Auction Date : 4 July 2013
- Maturity Date : 3 July 2014
- Issue Term : 1.0 year
- Yield: 2.53 – 2.65%

Cracking the Codes!

CB	14	7	03	C
(1)	*(2)*	*(3)*	*(4)*	*(5)*

1) Type of instrument (in case of government securities) or name of issuer (in case of corporate securities)
   - *TB = Treasury Bill, CB = Central Bank Bill, etc.*
2) Year of Maturity
   - *14 = 2014*
3) Month of Maturity
   - *7 = July*
4) Date of Maturity (used only for Money Market instruments)
5) Series of instrument (*A, B, C, ..*), used to indicate in case of more than one instruments have the same maturity

Treasury Bill and Central Bank Bills

- TBs and CBs are auctioned by the Bank of Thailand. (*www.bot.or.th*)
- The auction process is called competitive bidding in which bidder who offers the lowest yield will have the first priority to be allocated the bills and the rest of the bills will be allocated consecutively to next bidders who offer a higher yield.

CB Auction Schedule

Auction Date	ThaiBMA Symbol	Coupon Rate (%p.a.)	Issue Size (Mil. Baht)	Time to Maturity	Payment Date	Maturity Date
30 Oct 2012	CB12N29C	Discount	30,000	28 Days	01 Nov 2012	29 Nov 2012
30 Oct 2012	CB13131B	Discount	30,000	91 Days	01 Nov 2012	31 Jan 2013
30 Oct 2012	CB13502B	Discount	25,000	182 Days	01 Nov 2012	02 May 2013
30 Oct 2012	CB13O31A	Discount	50,000	364 Days	01 Nov 2012	31 Oct 2013
26 Oct 2012	BOT152B	6M BIBOR-0.20	5,000	2.29 Yrs	30 Oct 2012	13 Feb 2015
22 Oct 2012	CB12N22C	Discount	30,000	28 Days	25 Oct 2012	22 Nov 2012
22 Oct 2012	CB13124B	Discount	30,000	91 Days	25 Oct 2012	24 Jan 2013
22 Oct 2012	CB13425A	Discount	25,000	182 Days	25 Oct 2012	25 Apr 2013
18 Oct 2012	BOT14OA	Announced on Tuesday 16 October	40,000	2 Yrs	22 Oct 2012	22 Oct 2014
16 Oct 2012	CB12N15C	Discount	30,000	28 Days	18 Oct 2012	15 Nov 2012
16 Oct 2012	CB13117B	Discount	30,000	91 Days	18 Oct 2012	17 Jan 2013
16 Oct 2012	CB13418A	Discount	25,000	182 Days	18 Oct 2012	18 Apr 2013
12 Oct 2012	CB12O30A	Discount	45,000	14 Days	16 Oct 2012	30 Oct 2012
09 Oct 2012	CB12N08C	Discount	30,000	28 Days	11 Oct 2012	08 Nov 2012
09 Oct 2012	CB13110C	Discount	30,000	91 Days	11 Oct 2012	10 Jan 2013
09 Oct 2012	CB13411A	Discount	25,000	182 Days	11 Oct 2012	11 Apr 2013

CB Auction Result

Debt Securities Auction Results

Auction Date : 9 October 2012

The Bank of Thailand has approved the auction result as follow(s)

Bank of Thailand Bond	40/28/55	40/91/55	40/182/55
ThaiBMA Symbol	CB12N08C	CB13110C	CB13411A
Payment Date	11/10/2012	11/10/2012	11/10/2012
Maturity Date	8/11/2012	10/1/2013	11/4/2013
Coupon Rate (percent per annum)	-	-	-
Auction Amount (million baht)	30,000.00	30,000.00	25,000.00
Amount of accepted CB (million baht)	30,000.00	30,000.00	25,000.00
Accepted Yield (%)	2.9310 - 2.9650	3.0170 - 3.0380	3.0600 - 3.0880
Weighted Average Accepted Yield (%)	2.94534	3.02811	3.07704
Bid Coverage Ratio	1.05	1.27	1.69
Amount of accepted NCB (million baht)	-	-	-

CB Price Calculation

Suppose today is 9 October 2012 and you bid for CB13411A, the 6-month central bank bill which matures in 182 days, at the auction and you were allocated the bill at the yield of 3.07%. The payment date is 11 October 2012. Calculate the price per unit to be paid on the settlement date, given that face value is 1,000 Baht.

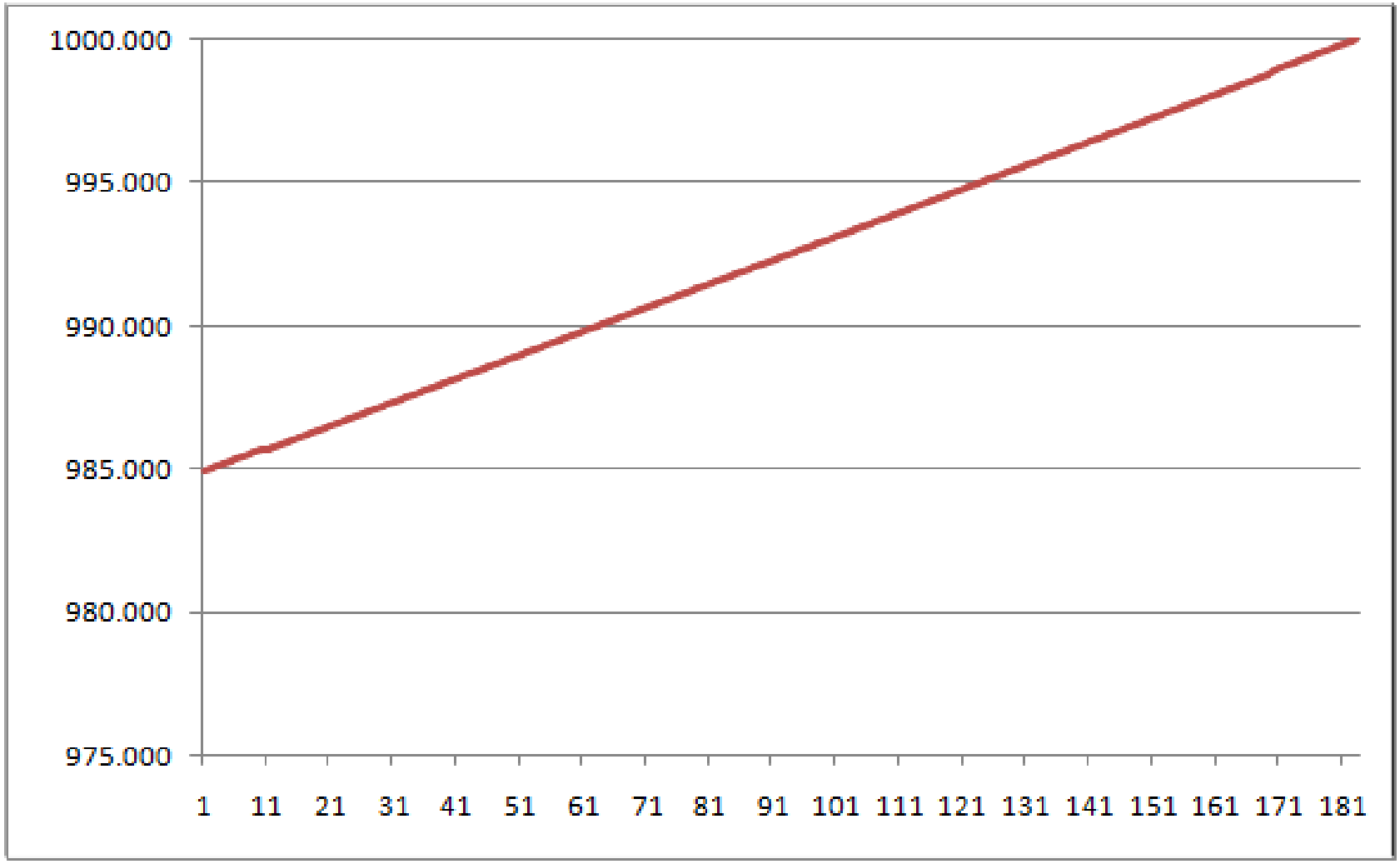
$$\text{Price} = \frac{\text{Face Value}}{\left(1+\left(\frac{r}{100} x \frac{d}{365}\right)\right)}$$

$$= \frac{1{,}000}{\left(1+\left(\frac{3.07}{100} x \frac{182}{365}\right)\right)}$$

$$= \frac{1{,}000}{1.01531}$$

$$= 984.92$$

CB Price Calculation



Instruments: Corporate Type

3. **Commercial Papers** are unsecured, short-term debt instruments with fixed maturity of *1 to 270 days*.
   - They are issued (sold) by large banks and corporations to get money to meet short term debt obligations (for example, payroll), and are only backed by issuing bank or corporation's promise to pay the face amount on the maturity date specified on the note.
   - Since it is not backed by collateral, *only firms with good credit ratings* from a recognized rating agency will be able to sell their commercial paper at a reasonable price.
   - Commercial paper is usually sold at a discount from face value, and carries shorter repayment dates than bonds.
   - Two methods of distribution
     - Public Offering – to the general public
     - Private Placement – to a small number of institutional investors
   - Examples are *Promissory Note (P/N), Bill of Exchange (B/E) and Short Term Debenture*

Instruments: Corporate Type

Example of Commercial Papers

- Code : PF13506A
- Issuer : Property Perfect Plc.
- Issuer Rating : BBB- by TRIS
- Initial Par : THB 1,000
- Issue Size : THB 1,000 million
- Issue Date : 9 August 2012
- Maturity Date : 6 May 2013
- Issue Term : 0.7 Yrs.
- Yield : 4.85%
- Distribution : Public Offering

Instruments: Corporate Type

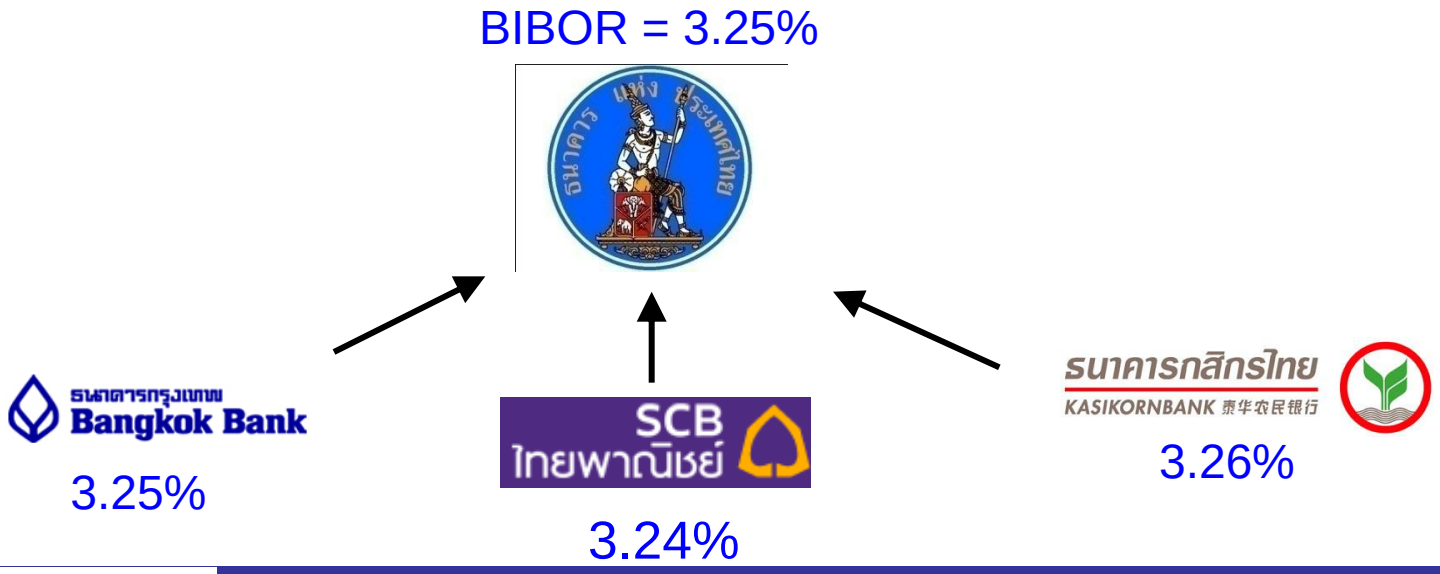
4. **Negotiable Certificate of Deposit (NCD)** is a bank-issued security that documents a deposit and specifies the interest rate and the maturity date.
   - Because a maturity date is specified, NCD is a *Term Security*, as opposed to Savings Deposit which can be withdrawn at any time.
   - NCD is also called a *Bearer Instrument*, which means that whoever holds the instrument at maturity receives the principal and interest.
   - NCD is *Negotiable*, so it can be bought and sold until maturity.
   - NCD is usually sold in large denomination.

Instruments: Interbank Loan

5. **Interbank Loan** is short-term loan (usually for a period of *one day* or *overnight*) between commercial banks.
   - The Bank of Thailand (BOT) has set *minimum reserve requirements* that all banks must maintain.
   - To meet these reserve requirements, banks must keep a certain percentage of their total deposits with the BOT.
   - The main purpose is to provide banks with an immediate infusion of reserves should they be short.
   - In theory, banks can borrow directly from the BOT.
   - In practice, the BOT encourages banks to borrow from each other.

Instruments: Interbank Loan (Cont.)

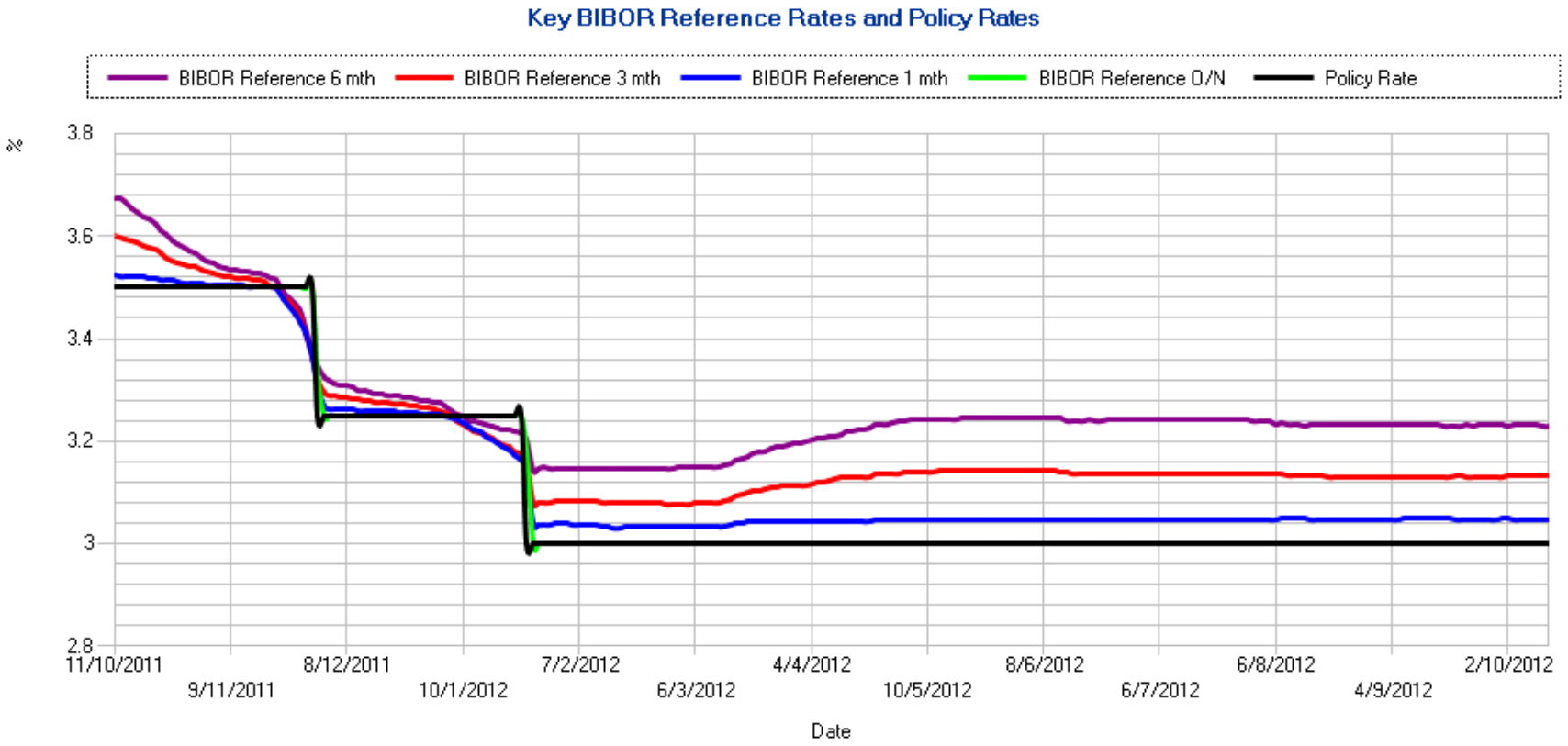
- Since excess reserves earn no interests, banks with excess reserves are willing to lend to those with deficit.
  - *In 2012, the average volume is about 30 – 40 billion baht/day!*
- Participating banks will quote there own interbank rates.
- The BOT then calculates the average quoted rates among banks everyday and publish a set of fixed rates called *BIBOR* (Bangkok Interbank Offered Rate) to be used by all banks as reference.



Instruments: Interbank Loan (Cont.)

Summary of BIBOR Design and Methodology	
Subject	**Description**
1.Current number of rate contributors	14 banks
2.Quote time	10.45-11.00 AM (Bangkok time)
3.Tenors	O/N,1 week, 1, 2, 3, 6, 9, and 12-month
4. Distribution time	11.15 AM onwards (the rates are specified as of 11.00 AM)
5.Settlement date	T+2 for all maturities except O/N
6.Day count convention	Actual/365
7.Calculation method	Eliminate the top and bottom quartiles of the quoted rates and arithmetically average the remaining rates
8.Calculation result	BIBOR rates with 5 decimals (rounding up the sixth decimal place when it is 5 or more)

Instruments: Interbank Loan (Cont.)



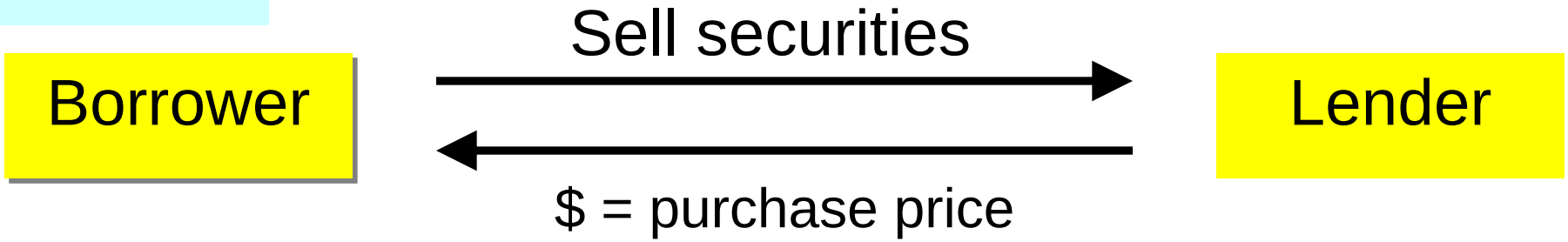
Instruments: Repurchase Agreement

6. **Repurchase Agreement (Repo)** is an agreement in which securities are exchanged for cash with an agreement to repurchase the securities at a future date. The maturity of RP transactions range from *overnight to one-year*.
   - Repo is simply a short-term loan, *collateralized* by (mostly) short-term government securities.
   - Repo allows one party (the lender) to temporarily exchange cash for securities and the other (the borrower) to temporarily exchange securities for cash.
   - This legal transfer of ownership for the duration of the contract provides protection against credit risk. Repos become low-risk investments and have lower interest rates than interbank loan.
   - Similar to the interbank market, banks use repo market to park their excess liquidity.

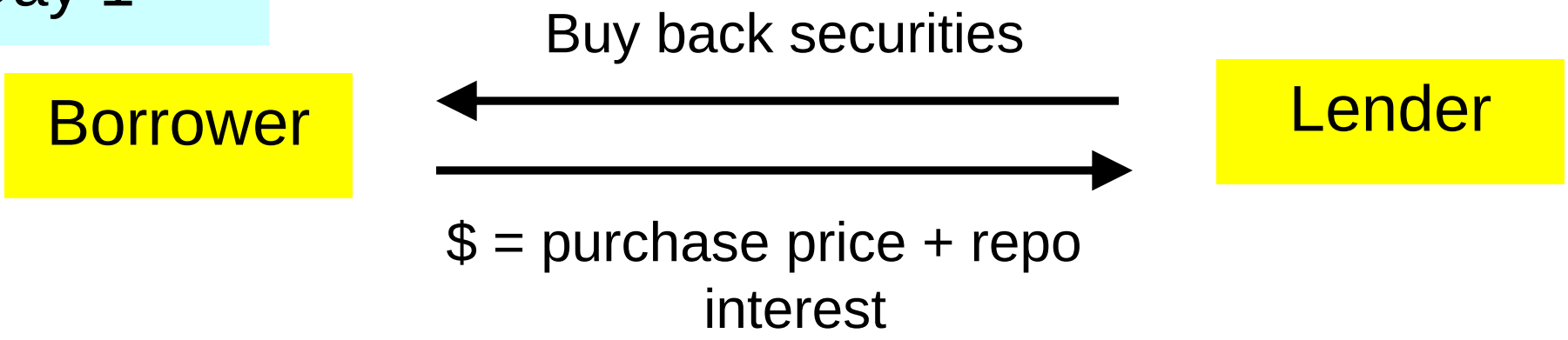
Instruments: Repurchase Agreement

Example of 1-day Repurchase Contract

Day 0

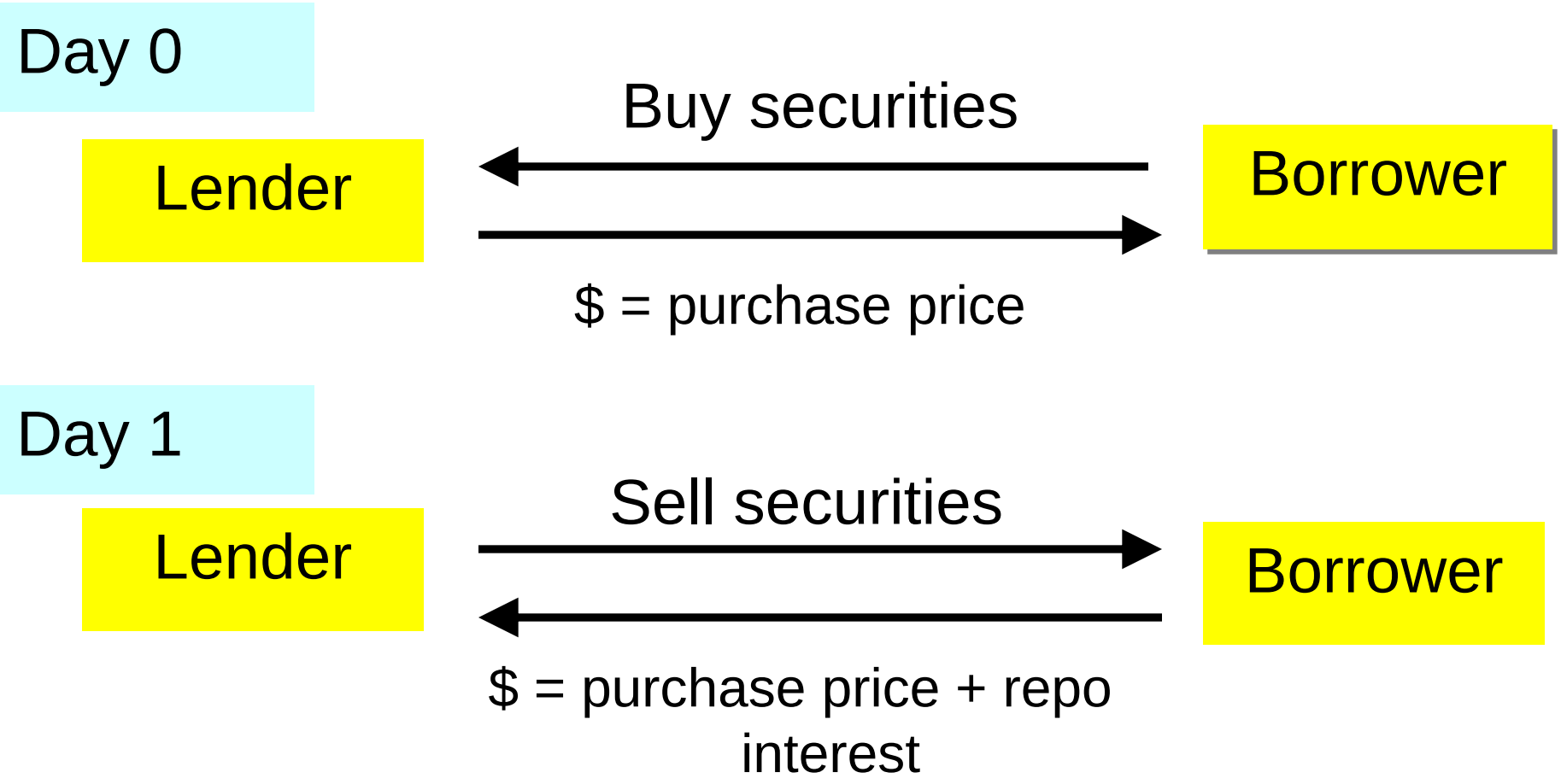


Day 1



Instruments: Repurchase Agreement

Example of 1-day Reverse Repurchase Contract



Instruments: Repurchase Agreement

Suppose you have entered a repurchase agreement to borrow 100 million baht for 1 day at the repo rate of 3.25%. Calculate the interest payment of this contract.

$$\text{Interest Payment} = \text{Principal x repo rate x } \frac{d}{365}$$

$$= 100{,}000{,}000 \text{ x } 3.25\% \text{ x } \frac{1}{365}$$

$$= 8{,}904.11$$

Instruments: Repurchase Agreement

There are 2 types of repo transactions

1. Bilateral Repo - banks borrow and lend with the Bank of Thailand. So the BOT always act as a counterparty.
   - *This is a large market, with volume up to 0.5 trillion baht/day*
   - *Standard maturities are 1-day, 7-day, and 14-day.*
2. Private Repo – banks borrow from each other. Non-bank businesses and investors can participate as well.
   - *Volume is still small, largely because players are not willing to take credit risk when the counterparty is a private company.*

- Note that the BOT can use *repurchase* and reverse repurchase transactions to temporarily add or *drain* reserves available to the banking system. This is through the Open Market Operations (OMOs)
- The Monetary Policy Committee (MPC), under the BOT, set *1-day repurchase rate* as the key policy rate to be used for conducting monetary policy.

Instruments: Repurchase Agreement

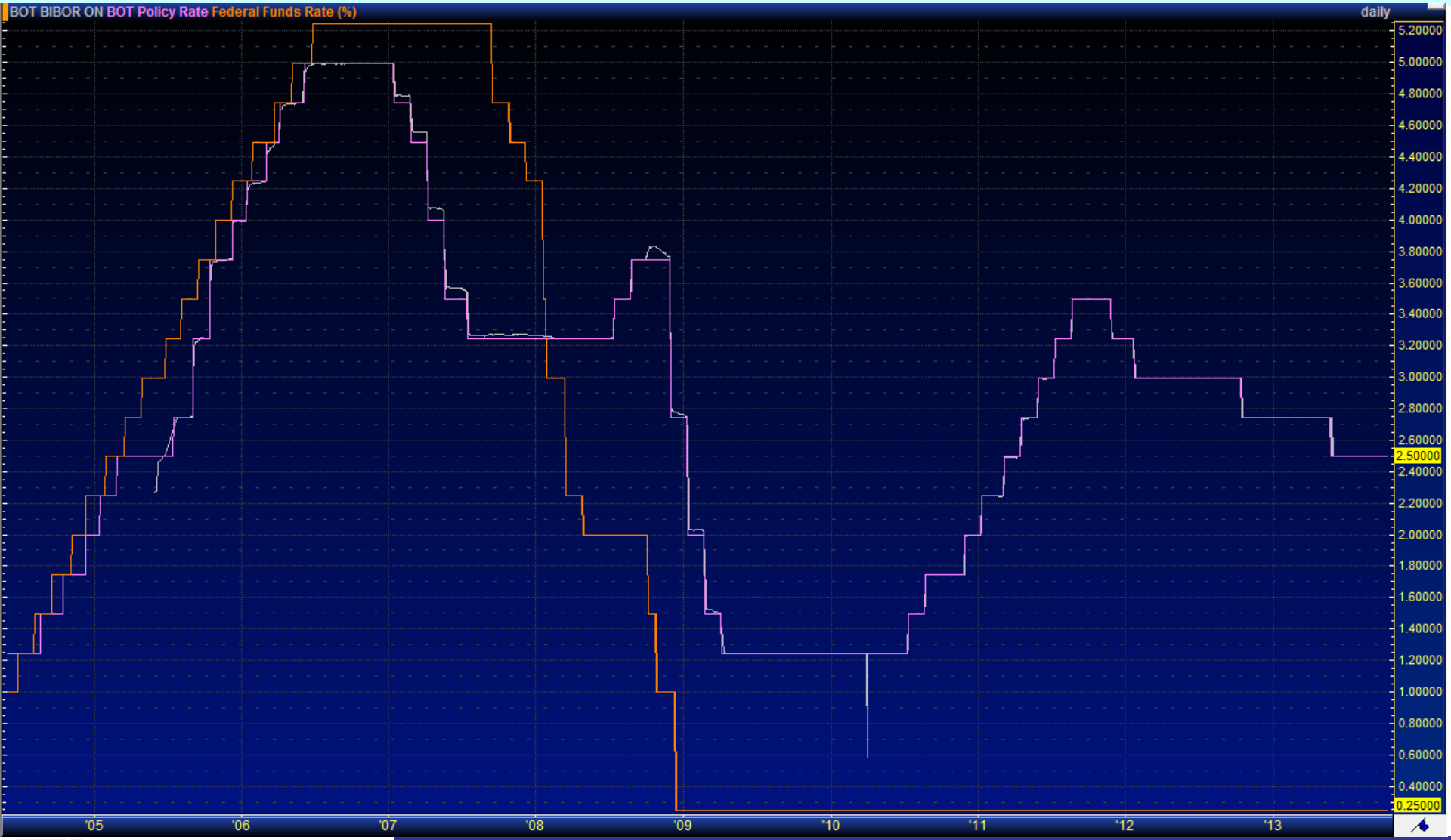
Thailand's policy interest rate unchanged at 2.5%

16 October 2013

Thailand's **Money Policy Committee (MPC)** voted unanimously today to maintain the policy interest rate at 2.5 per cent, a senior central bank official announced. Paiboon Kittisrikangwan, Bank of Thailand (BoT) assistant governor, said the decision was based on the fact that the Thai economy grew more slowly than previously assessed, but began to stabilise and showed signs of improvement in some sectors.

Though exports started to pick up in accord with the global demand, private consumption and investment have stabilised, leading to an expectation that the Thai economy would slowly strengthen. The relaxed monetary policy would continue to support economic restoration, he added.

US Fed Fund Rate vs. Thai Repo Rate



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Federal Funds

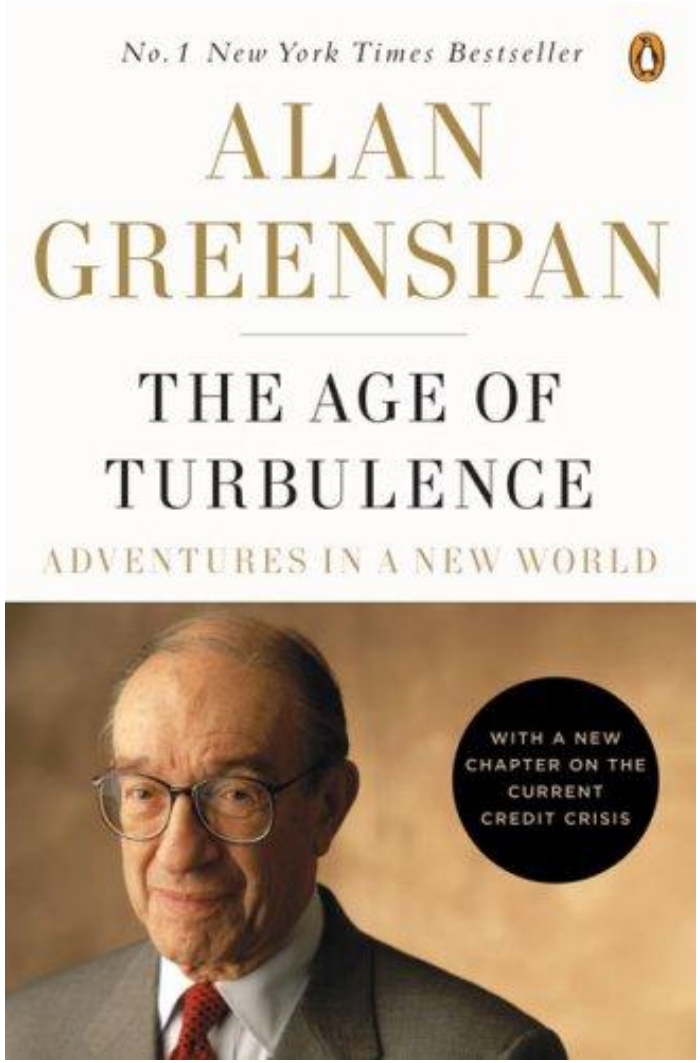
- **Federal funds** are short-term funds transferred (loaned or borrowed) between financial institutions, usually for a period of *one day or overnight*.
  - The law requires banks to keep a certain percentage of their customer's money on reserve, where the banks earn no interest on it.
  - Consequently, banks try to stay as close to the reserve limit as possible without going under it, lending money back and forth to maintain the proper level.

- *Notice that the transactions of Federal Funds in the US is equivalent to the Thai interbank*

Federal Funds

- Participating banks will quote there own fed fund rates. So the rates are determined by market forces.
- **Federal Open Market Committee (FOMC)**, under the Federal Reserve, set the target fed funds rate as the key policy rate. It is used to control the supply of available funds and hence, inflation and other interest rates.
  - *Raising the rate makes it more expensive to borrow. That lowers the supply of available money, which increases the short-term interest rates and helps keep inflation in check.*
  - *Lowering the rate has the opposite effect, bringing short-term interest rates down*

Suggested Reading



If you want to learn more about the Federal Reserve, this book is recommended.

It is about Greenspan's experiences working in the command room of the global economy for more than 18-years as Chairman of the Federal Reserve Board, from 1987 to 2006.

Eurodollars

- **Eurodollars** represent Dollar denominated deposits held in foreign banks.
  - The market is essential since many foreign contracts call for payment is U.S. dollars due to the stability of the dollar, relative to other currencies.
  - The market has continued to grow rapidly because depositors receive a higher rate of return on a dollar deposit in the Eurodollar market than in the domestic market.
  - Multinational banks are not subject to the same regulations restricting U.S. banks and because they are willing to accept narrower spreads between the interest paid on deposits and the interest earned on loans.

Eurodollars

- Some large London banks act as brokers in the interbank Eurodollar market. Banks around the world park their excess liquidity in this market.
- Essentially, Eurodollars = global interbank market.
- Eurodollars Rates:
  - London interbank bid rate (LIBID)
    - The rate paid by banks buying funds (= borrowing)
  - London interbank offer rate (LIBOR)
    - The rate offered for sale of the funds (= lending)
  - Time deposits with fixed maturities
    - Largest short term security in the world

The Birth of the Eurodollar

- *The Eurodollar market is one of the most important financial markets, but oddly enough, it was fathered by the Soviet Union.*
- *In the 1950s, the USSR had accumulated large dollar deposits, but all were in US banks. They feared the US might seize them, but still wanted dollars. So, the USSR transferred the dollars to European banks, creating the Eurodollar market.*