Bachelor of Economics
THAMMASAT UNIVERSITY

FN 211 Financial Markets

Class 4:
Interest Rates and Term Structure

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Term Structure of Interest Rates

- One important factor causing interest rates to differ from one another is differences in the *maturity* (or term) of securities and loans.
- The relationship between the rates of return on financial instruments and their maturity at one moment in time is called the *term structure of interest rates*.
- This term structure may be represented visually by drawing a *yield curve* for all securities having the same credit quality.

Movements of the Actual Interest Rates

www.thaibma.or.th/PriceYield.html

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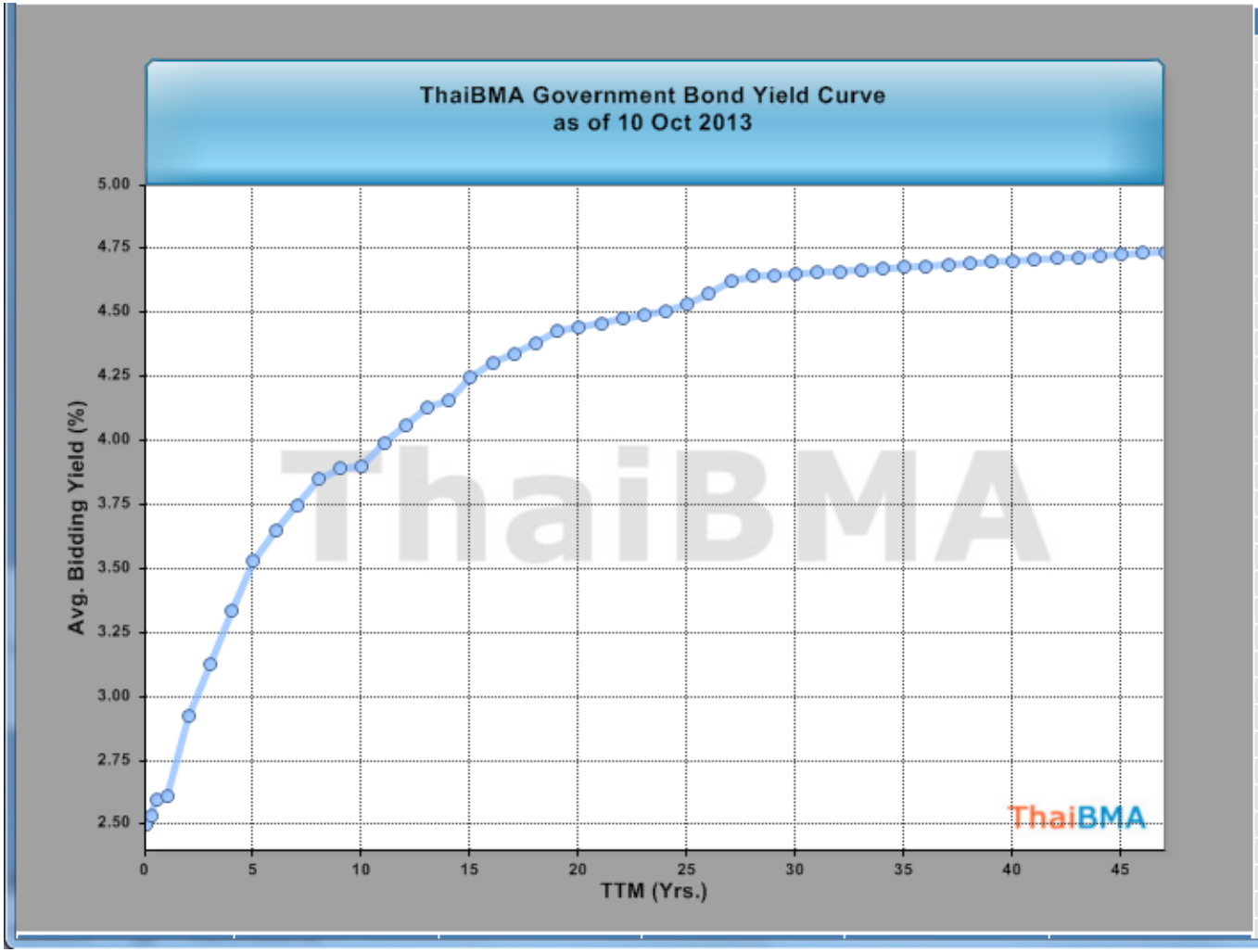
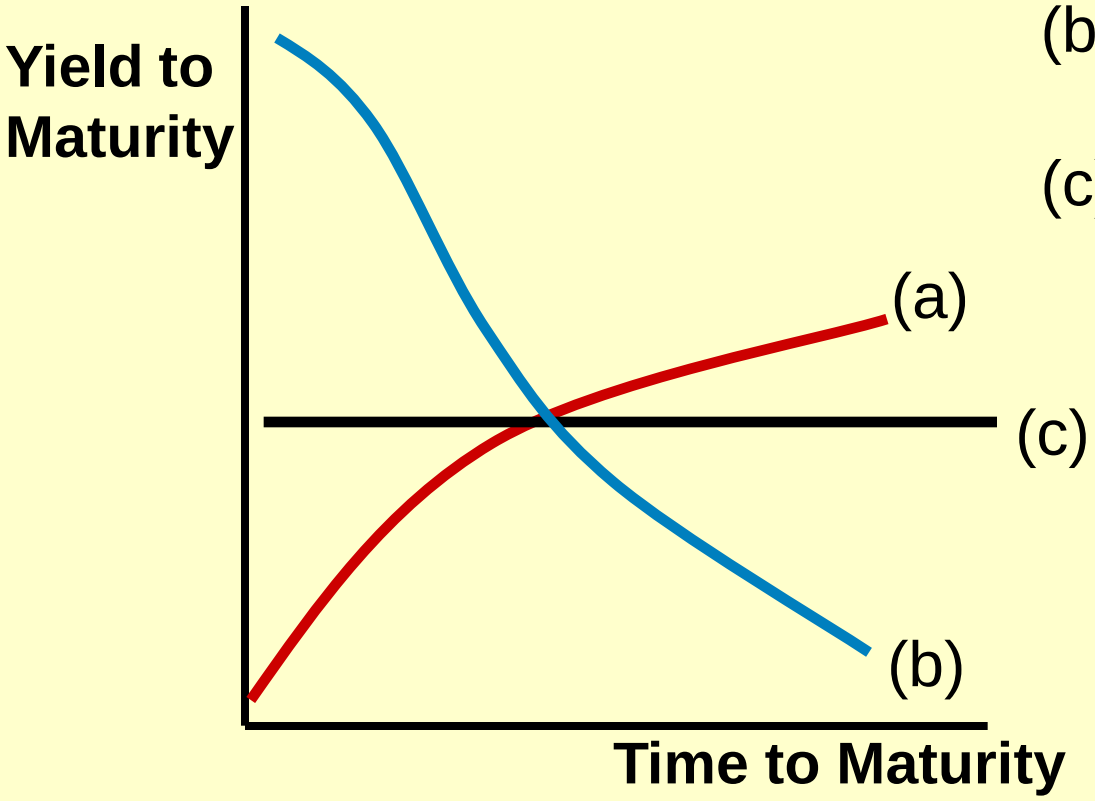


TTM (Yrs.)	Yield (%)
0.08	2.50
0.25	2.54
0.50	2.60
1	2.61
2	2.93
3	3.13
4	3.34
5	3.53
6	3.65
7	3.75
8	3.85
9	3.89
10	3.90
11	3.99
12	4.06
13	4.13
14	4.16
15	4.25
16	4.31
17	4.34
18	4.39
19	4.43
20	4.45
21	4.46
22	4.48
23	4.49
24	4.51
25	4.54
26	4.58
27	4.63
28	4.65
29	4.65
30	4.66
31	4.66

Term Structure of Interest Rates



(a) Upward sloping
(b) Inverted or downward sloping
(c) Flat

Term Structure of Interest Rates

Besides explaining the shape of the yield curve, we need theories to explain why:

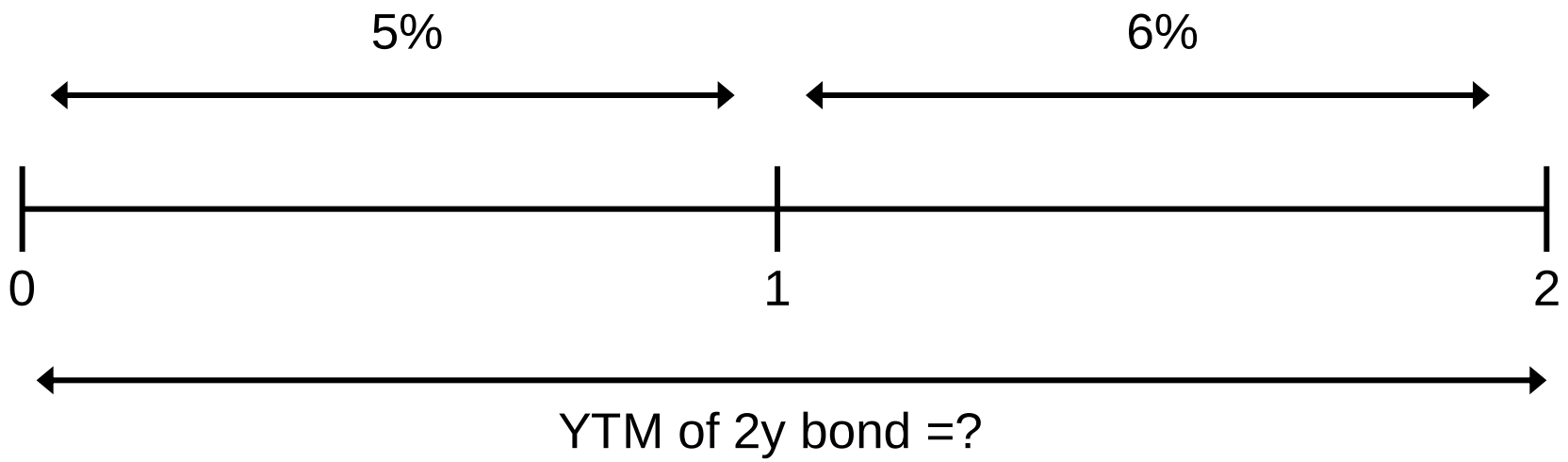
- Interest rates for different maturities move together.
- Yield curves tend to have steep upward slope when short rates are low and downward slope when short rates are high.
- Yield curve is typically upward sloping.

Term Structure of Interest Rates

- The *unbiased expectations hypothesis* argues that investor expectations regarding future changes in short-term interest rates determine the shape of the curve.
- So, an upward-sloping yield curve indicates that investors expect short-term interest rates to rise above the current rates in the future.
- This hypothesis assumes that long-term interest rate is a geometric average of a series of current and future short-term interest rates.

Term Structure of Interest Rates

- For example, if YTM of a 1-year bond today is 5% and investors believe that YTM of 1-year bond will be 6% one year from now. What should be YTM of a 2-year bond today?



Term Structure of Interest Rates

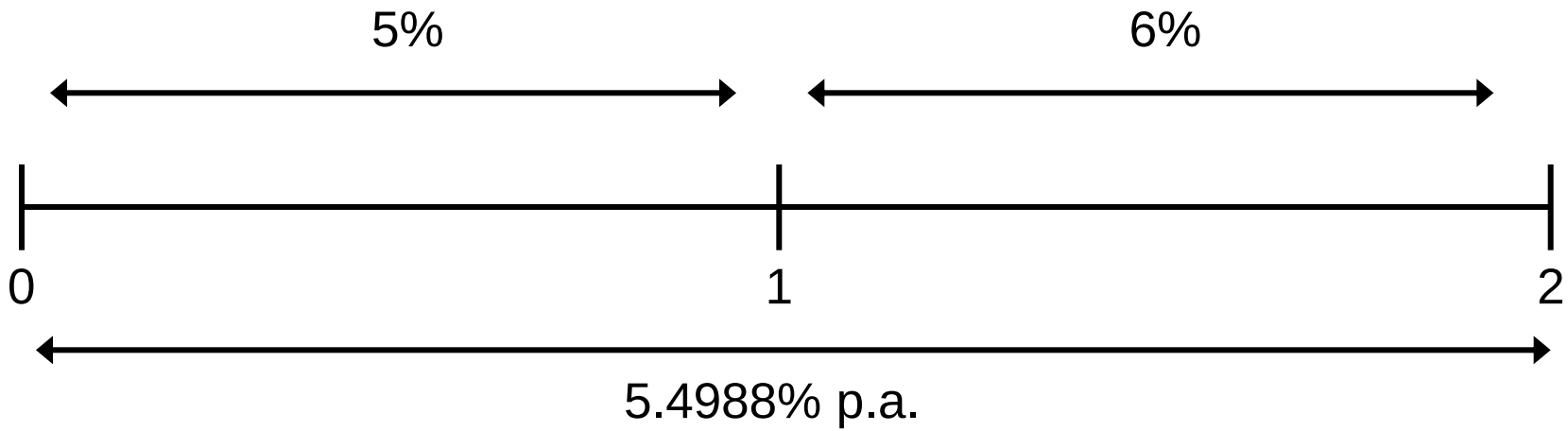
$(1+x)^2 = (1+0.05)(1+0.06)$

$= 1.113$

$x = 5.4988\%$

So, investors should be indifferent b/w two alternatives

- Buy 2-year bond today, or
- Buy 1-year bond today, and when it matures buy another 1-year bond

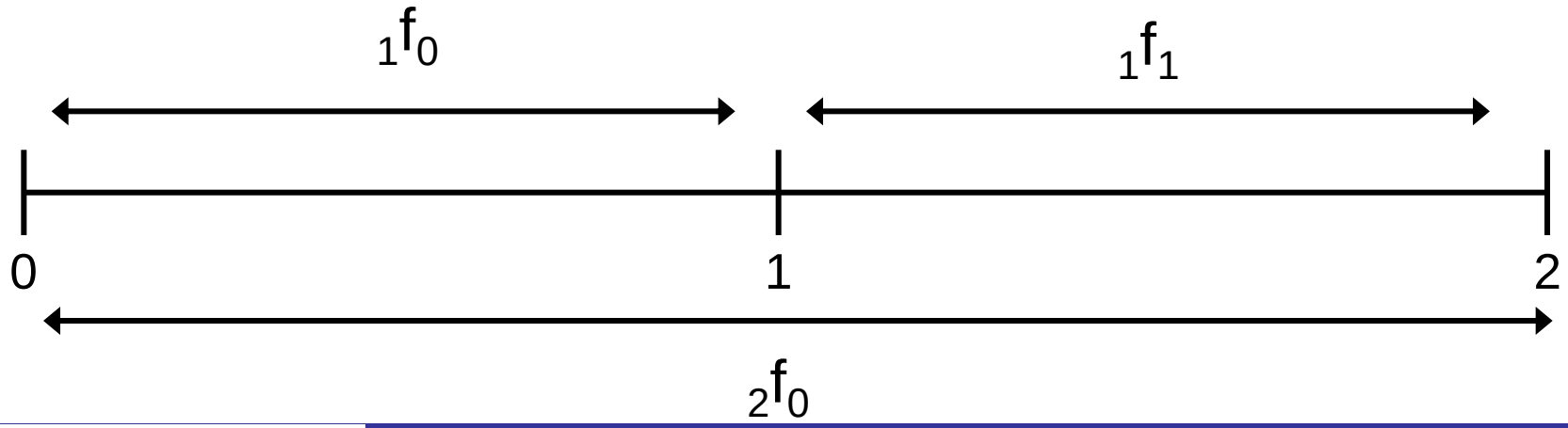


Term Structure of Interest Rates

The expected 6% rate, one year from today, is called a forward rate. It can be viewed as the market's consensus of future interest rate.

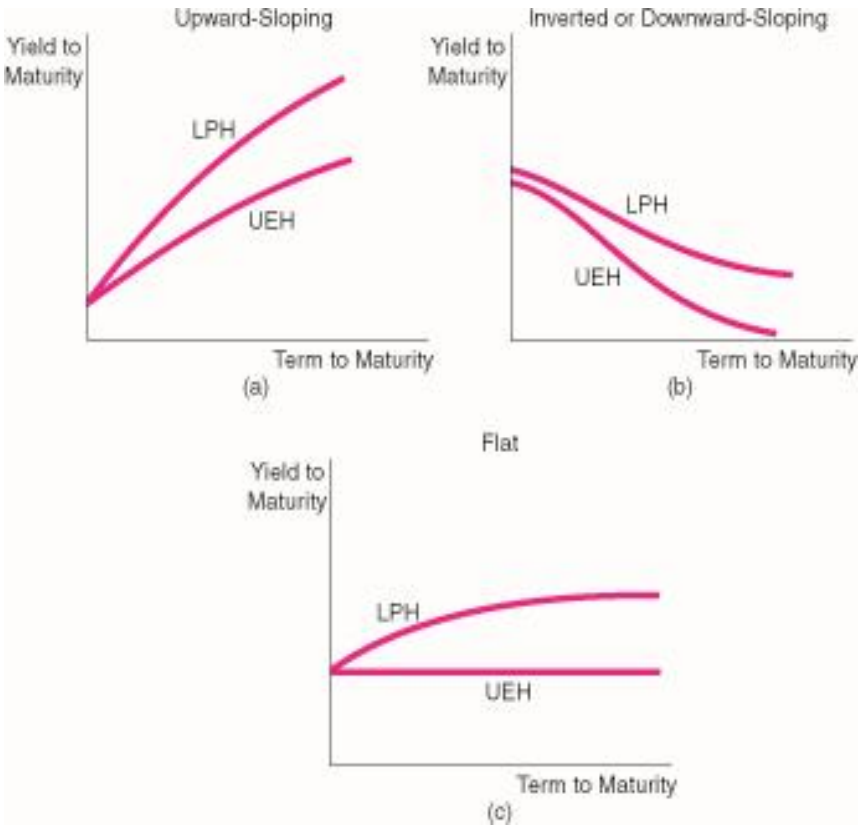
Define ${}_1f_m$ = 1-period forward rate beginning m periods from now, then

- ${}_1f_1$ indicates 1-year forward rate beginning 1 year from now
- ${}_1f_2$ indicates 1-year forward rate beginning 2 years from now
- ${}_1f_3$ indicates 1-year forward rate beginning 3 years from now
- …
- ${}_1f_0$ indicates 1-year rate today, also called spot rate
- ${}_2f_0$ indicates 2-year rate today, also called spot rate



Term Structure of Interest Rates

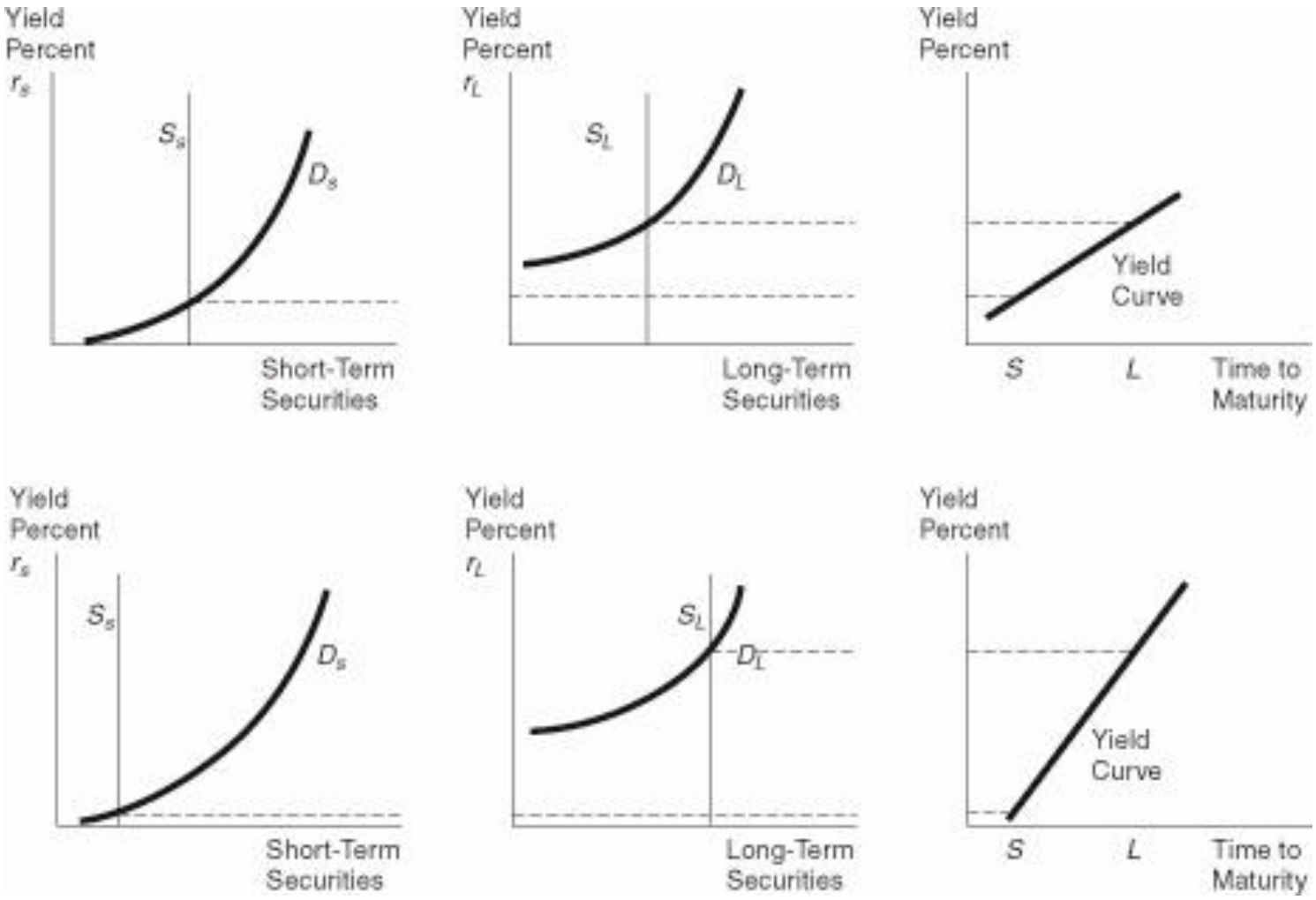
- The *liquidity premium theory* of the yield curve suggests that there is a bias toward positively-sloped yield curves.
- This is because longer-term securities tend to have more volatile market prices and hence, greater risk of capital loss.
- So, investors must be paid an interest rate premium (the liquidity premium) to encourage them to purchase long-term securities.



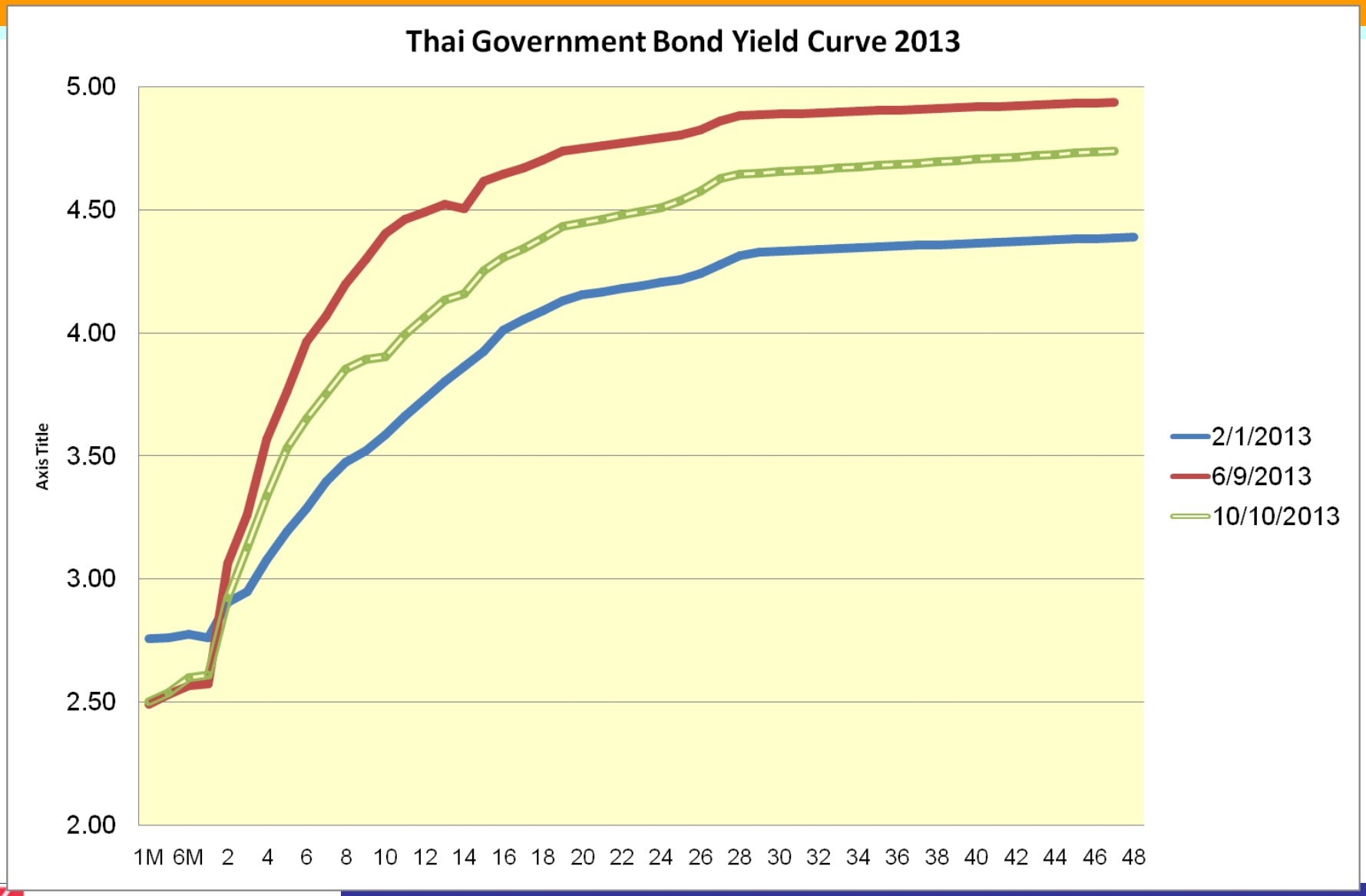
Term Structure of Interest Rates

- The market segmentation argument of the yield curve separates the financial markets into several distinct markets according to the maturity preferences of the investors.
- It assumes that all financial assets are not perfect substitutes in the minds of investors. Maturity preference exist among some investor groups and they will not stray from their desired maturity range unless induced to do so by higher yields or other favorable terms.
  - *For example, pension funds prefer long-term bonds.*
- The implication is that governments can alter the shape of the yield curve by shifting the available supplies of securities relative to the demand for those securities in each distinct market.

Term Structure of Interest Rates

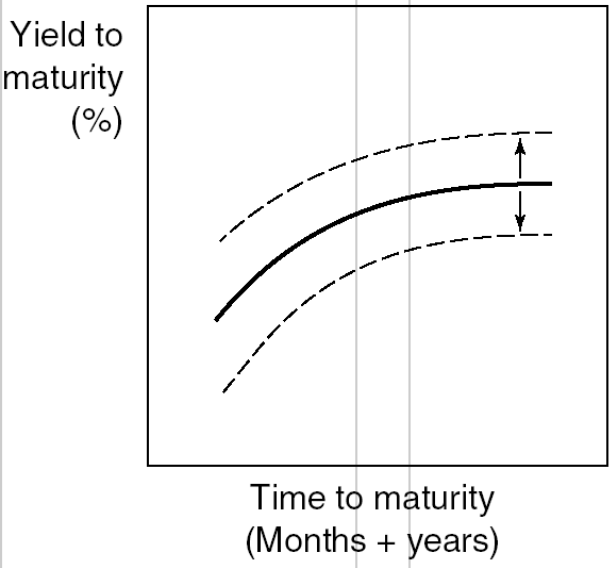


Thailand's Government Bond Yield Curves

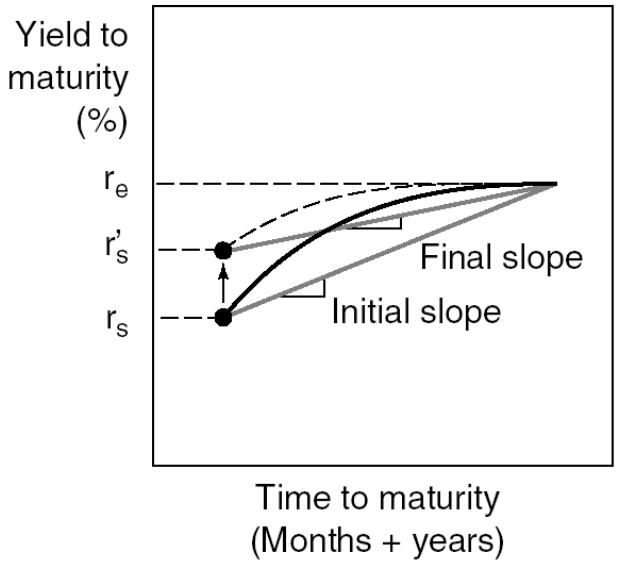


Changes in Yield Curves

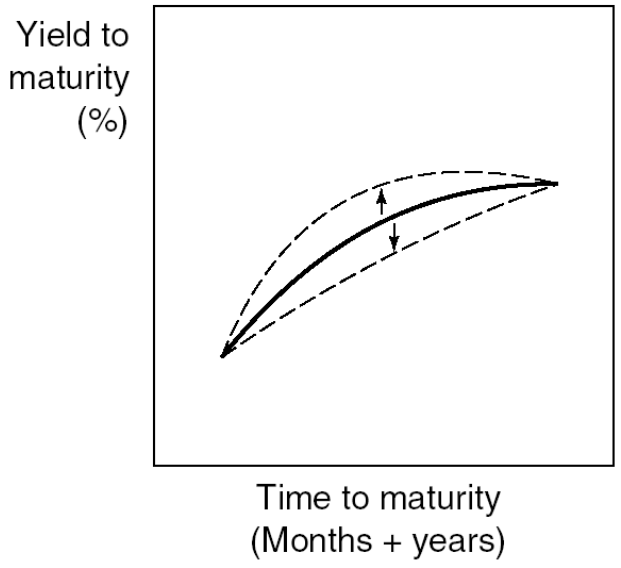
A. Shifts in the *level* of the yield curve



B. Changes in *slope* of the yield curve



B. Changes in *yield* curve's curvature



The Uses of Yield Curves

- The yield curve is a useful tool for …
  - forecasting interest rates – a downward-sloping yield curve suggests near-term declines in short-term interest rates
  - identifying portfolio management strategies – a rising yield curve favors short-term borrowing and long-term lending
  - detecting over- and under-priced financial assets
  - indicating trade-offs between maturity and yield
  - “riding” the yield curve – active investors may gain by timely portfolio switching