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# 투자론

- *R*과 Excel을 통한 금융데이터 분석 -

## 11주차
## 이자율 기간구조 및 채권펀드 위험관리

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Unit 01

# Term Structure of Interest Rates

# Overview

- Theories of the Term Structure
  - The Expectation Hypothesis
  - Liquidity Preference
- Interpreting the Term Structure
- Forward Rates and Contracts

# Theories of Term Structure

## The Expectations Hypothesis Theory

- Observed long-term rate is a function of today's short-term rate and expected future short-term rates
- $f_n = E(r_n)$ and liquidity premiums are zero (pure expectations)

# Theories of Term Structure

## Liquidity Preference Theory

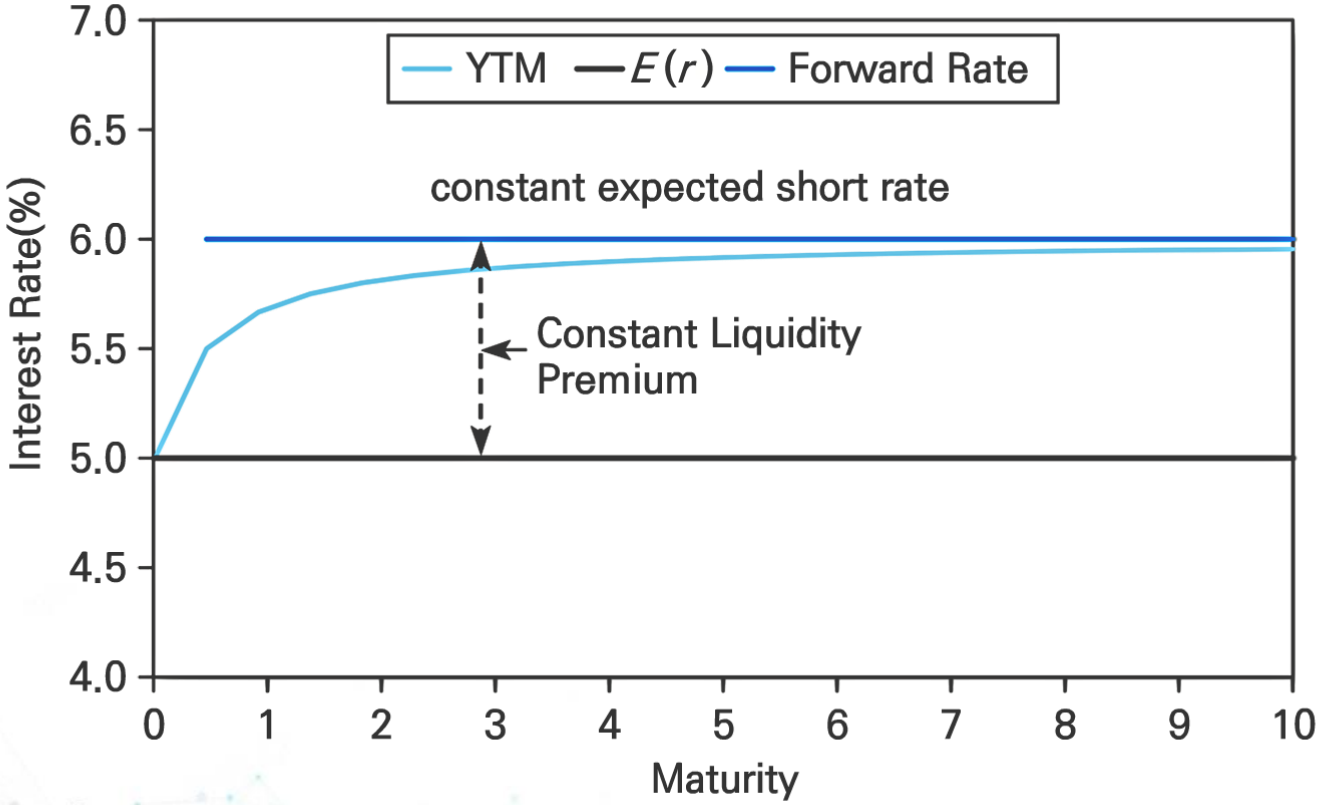
- Long-term bonds are more risky → $f_n > E(r_n)$
- The excess of $f_n$ over $E(r_n)$ is the liquidity premium
- The yield curve has an upward bias built into the long-term rates because of the liquidity premium

## Yield Curve Examples

- **constant expected short rate**

  **constant liquidity premium**

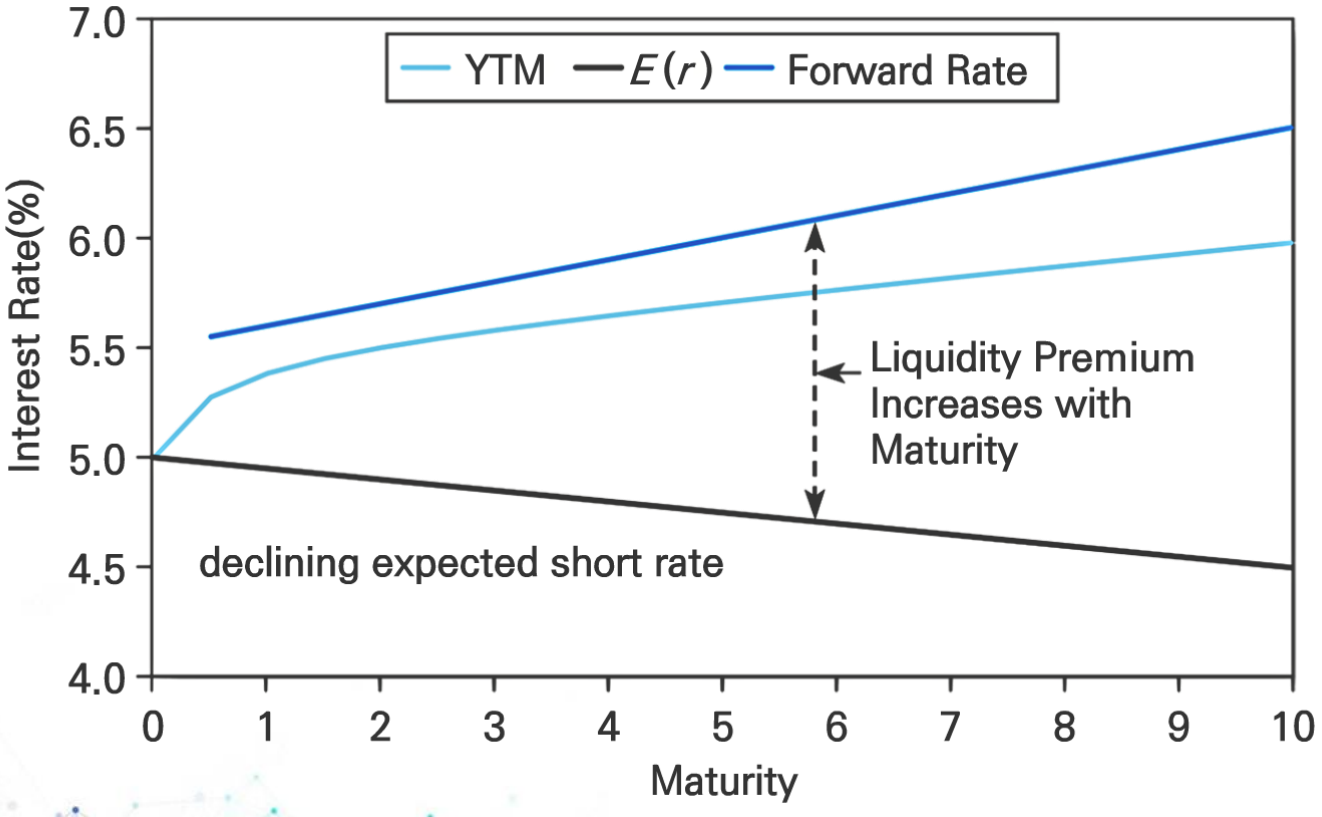
A



## Yield Curve Examples

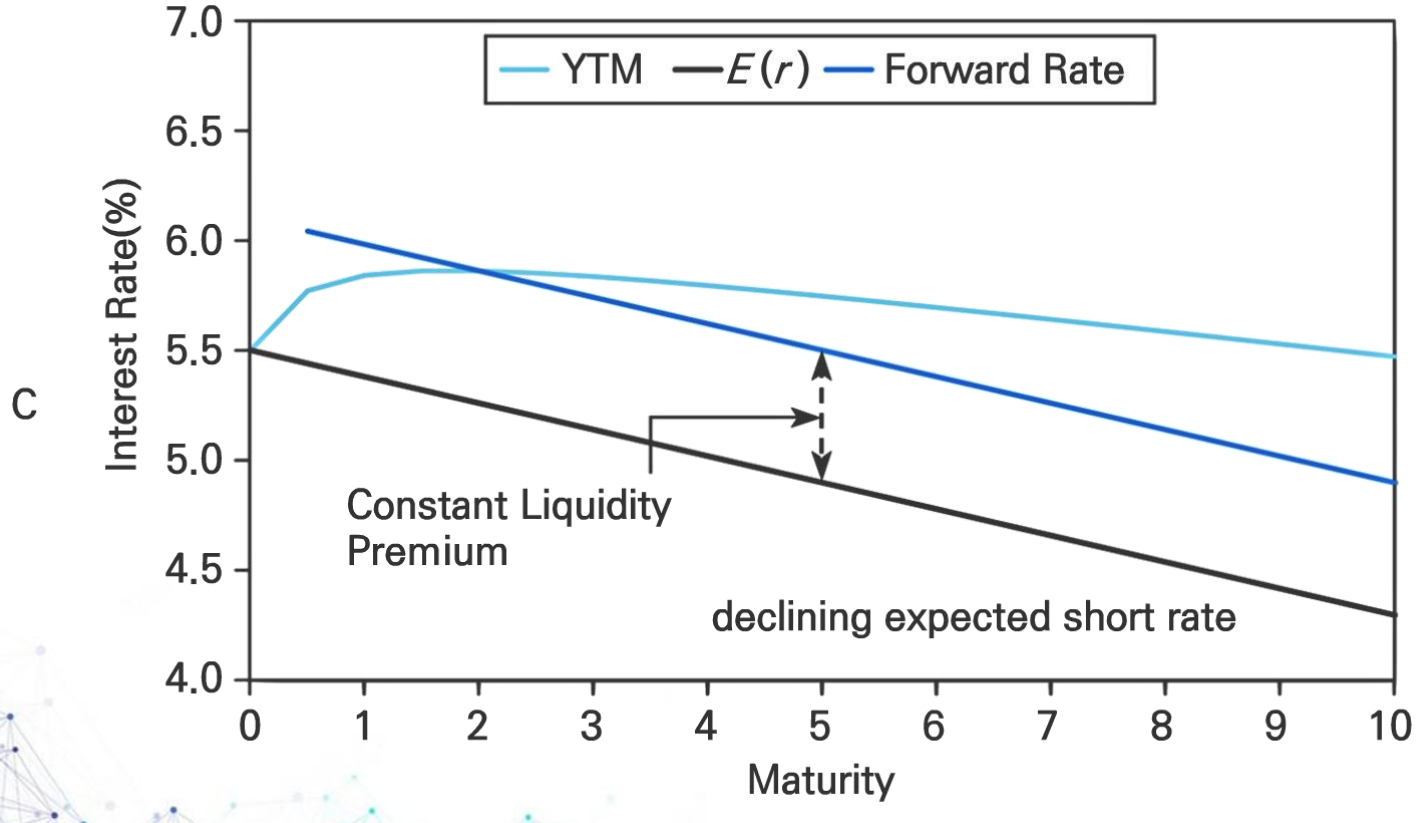
- **decreasing expected short rate, increasing liquidity premium**

B



## Yield Curve Examples

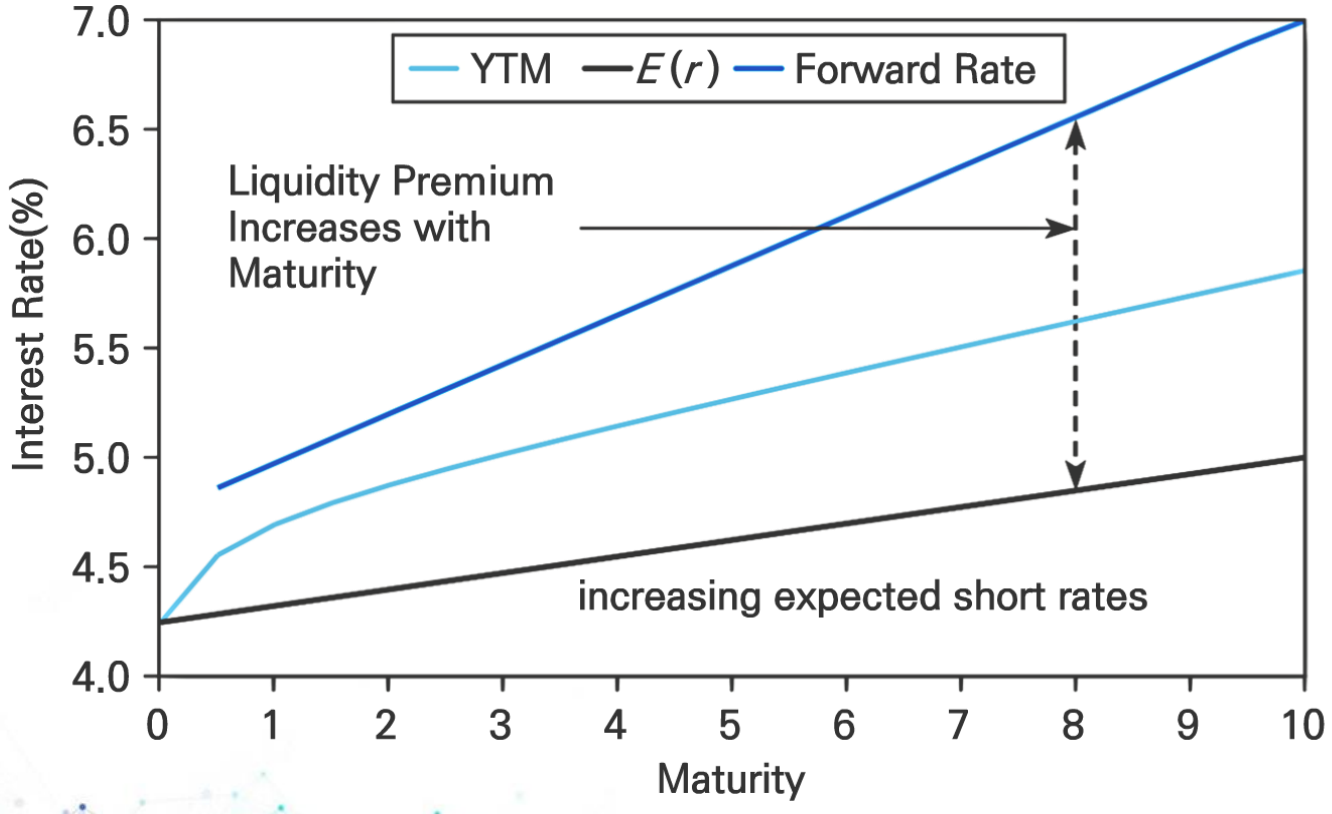
- **declining expected short rate, constant liquidity premium**



## Yield Curve Examples

- **increasing expected short rate, increasing liquidity premium**

D



## Interpreting the Term Structure

- **The yield curve reflects expectations of future interest rates**
- **The forecasts are clouded by liquidity premiums**
- **An upward sloping curve could indicate:**
  - Rates are expected to rise

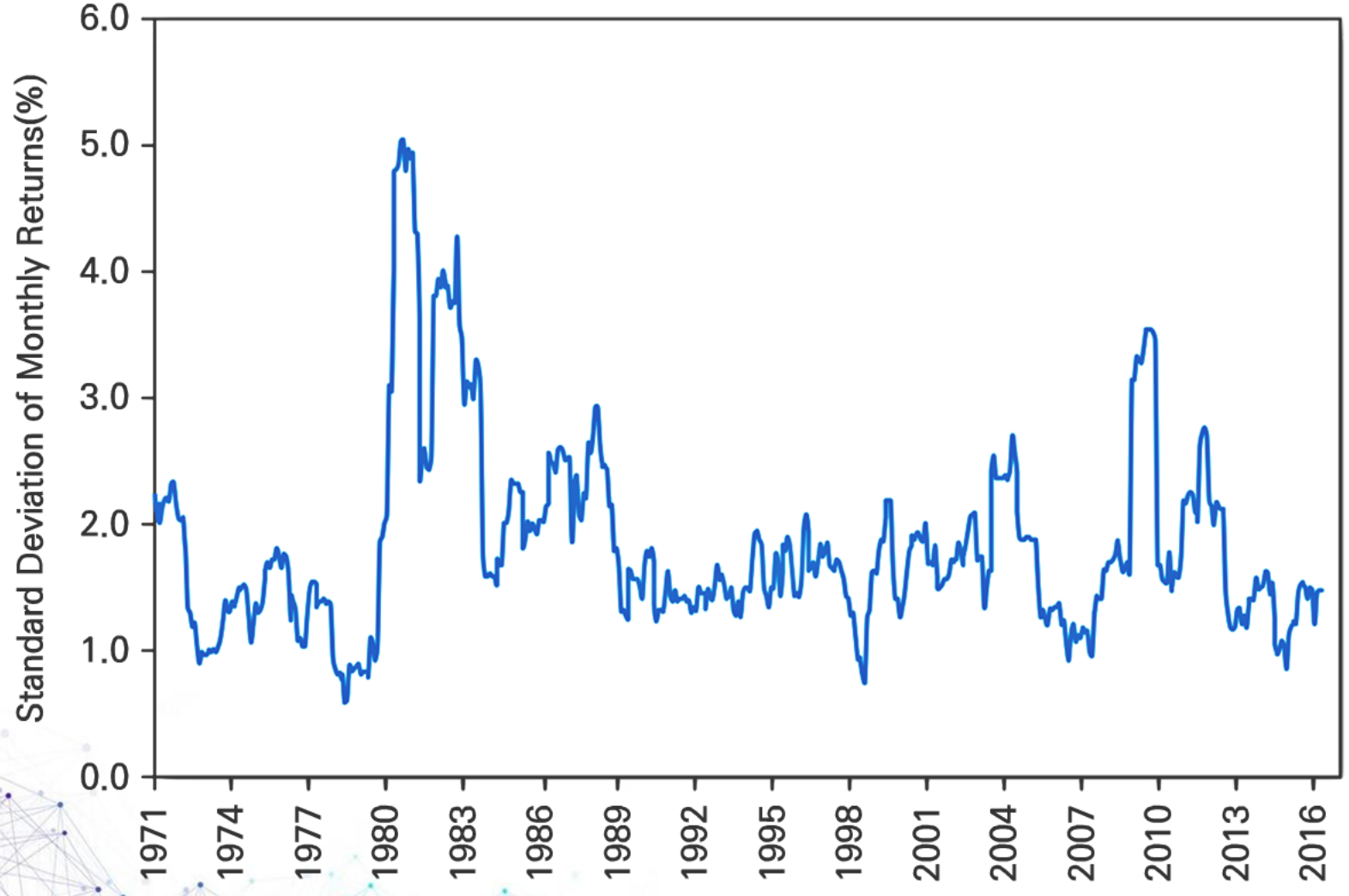
    and/or
  - Investors require liquidity premiums to hold long term bonds

## Interpreting the Term Structure

### The yield curve is a good predictor of the business cycle

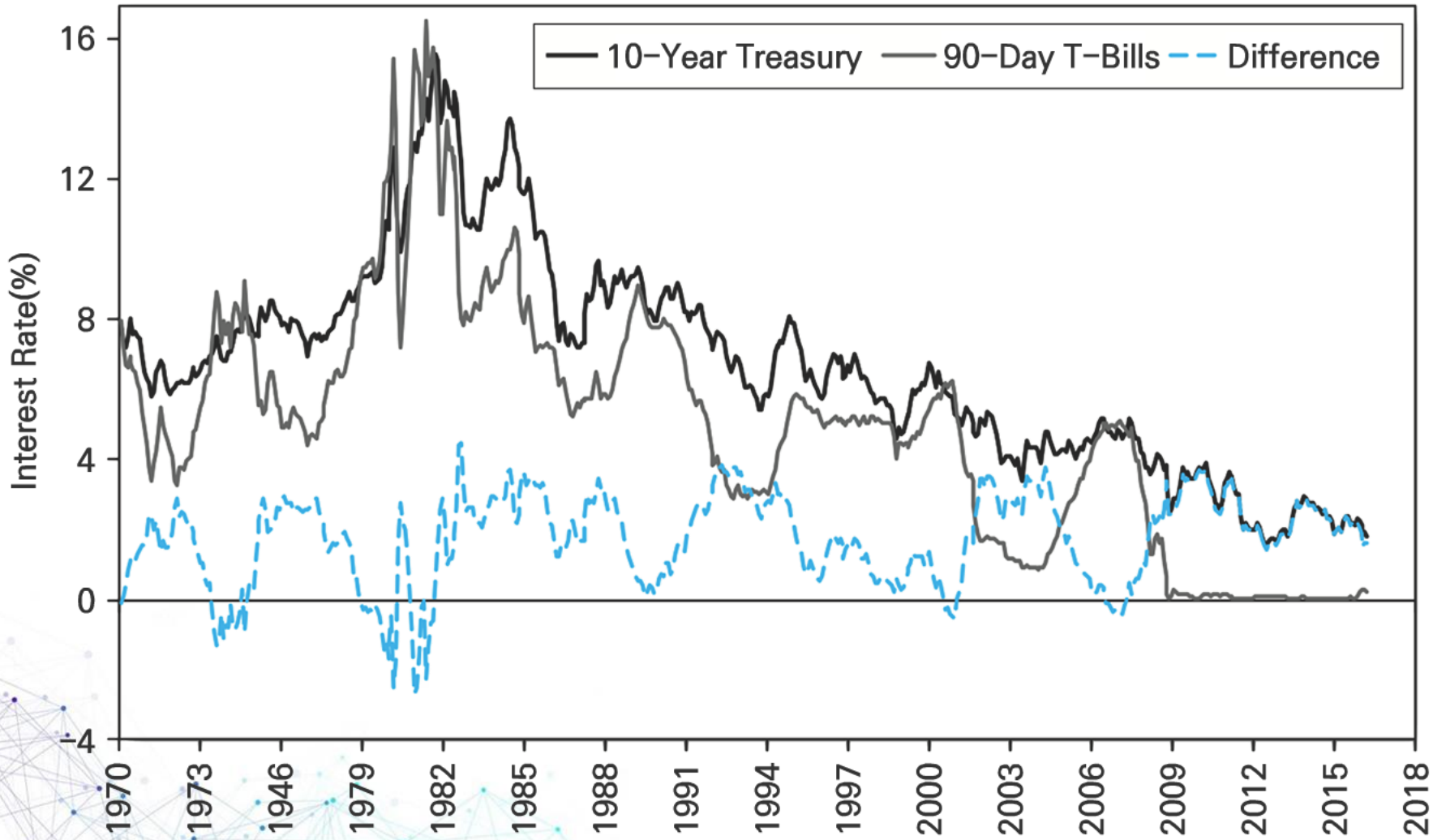
- Long term rates tend to rise in anticipation of economic expansion
- Inverted yield curve may indicate that interest rates are expected to fall and signal a recession

## Price Volatility of Long-Term T-Bonds



# Term Spread

## Yield on 10-Year vs. 90-Day Treasury Securities

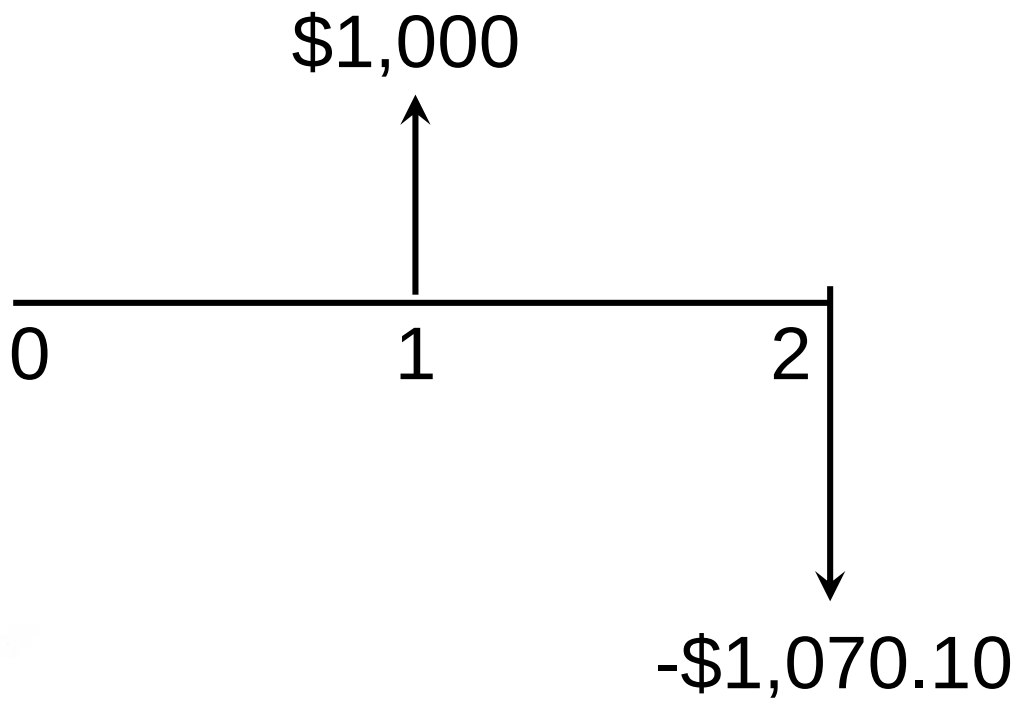


## Forward Rates as Forward Contracts

- **In general, forward rates will not equal the eventually realized short rate**
  - Still an important consideration when trying to make decisions
    - Locking in loan rates

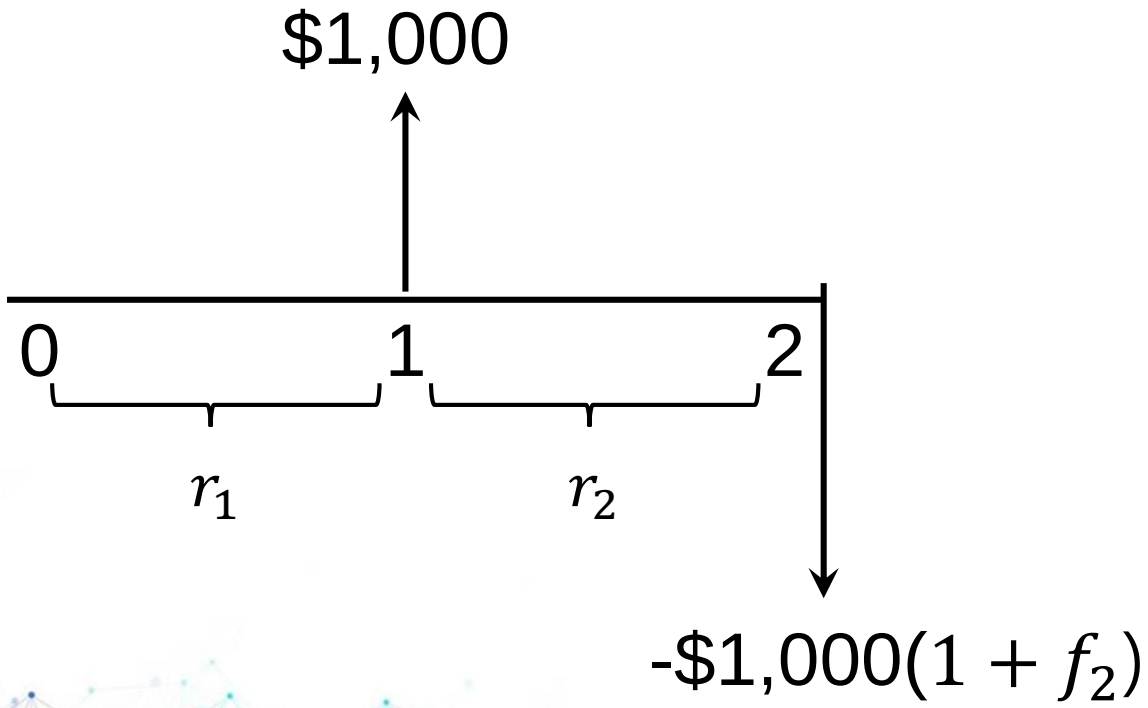
## Engineering a Synthetic Forward Loan

- **A: Forward Rate = 7.01%**



## Engineering a Synthetic Forward Loan

- **B: For a General Forward Rate. The short rates in the two periods are $r_1$ (which is observable today) and $r_2$ (which is not). The rate that can be locked in for a one-period-ahead loan is $f_2$**



## Exercise Problem 1

Suppose that a 1-year zero-coupon bond with face value $100 currently sells at $94.34, while a 2-year zero sells at $84.99. You are considering the purchase of a 2-year-maturity bond making annual coupon payments. The face value of the bond is $100, and the coupon rate is 12% per year.

a. What is the yield to maturity of the 2-year zero?
b. What is the yield to maturity of the 2-year coupon bond?
c. What is the forward rate for the second year?
d. According to the expectations hypothesis, what are (i) the expected price of the coupon bond at the end of the first year and (ii) the expected holding-period return on the coupon bond over the first year?
e. Will the expected rate of return be higher or lower if you accept the liquidity preference hypothesis?

## Exercise Problem 2

Suppose that the prices of zero-coupon bonds with various maturities are given in the following table. The face value of each bond is $1,000.

| Maturitiy (years) | Price of Bond |
|---|---|
| 1 | $925.93 |
| 2 | $853.39 |
| 3 | $782.92 |
| 4 | $715.00 |
| 5 | $650.00 |

a. Calculate the forward rate of interest for each year.

b. How could you construct a 1-year forward loan beginning in year 3? Confirm that the rate on that loan equals the forward rate.

c. Repeat part (b) for a 1-year forward loan beginning in year 4.