

ECON UN3265 ▪ MONEY AND BANKING ▪ SUMMER 2026 ▪ SESSION 3

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## CHAPTER 6

# The Risk and Term Structure of Interest Rates

Ritsu Kitagawa

Columbia Business School

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# Outline

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**Risk Structure — Default Risk**

**Risk Structure — Liquidity and Taxes**

**Term Structure — The Yield Curve**

**Three Theories of the Term Structure**

**The Yield Curve as a Forecast**

**Application — The 2007–09 Crisis**

**Wrap-up**

## Reading and objectives

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- ▶ Mishkin, *The Economics of Money, Banking, and Financial Markets*, 13th ed.
- ▶ This deck: **Chapter 6** — The Risk and Term Structure of Interest Rates.
- ▶ Builds directly on Chapter 5: we now allow bonds to *differ* from one another.

### Learning objectives

- 6.1 Identify and explain the three factors driving the risk structure of interest rates.
- 6.2 List the three empirical facts about the term structure.
- 6.3 Compare and contrast the three theories of the term structure.
- 6.4 Use the liquidity-premium theory to read the yield curve as a forecast.
- 6.5 Apply the framework to the 2007–09 financial crisis.

PART 1

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# Risk Structure — Default Risk

## Two structures, one chapter

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Within the same economy at the same date there are *many* interest rates. Two organizing dimensions:

- ▶ **Risk structure** — bonds of the *same maturity* but different issuers / characteristics: corporates vs. Treasuries vs. municipals.
- ▶ **Term structure** — bonds of the *same issuer* but different maturities: 3-month vs. 2-year vs. 10-year Treasuries.

We tackle risk structure first.

*Mishkin Ch. 6, Section 6.1.*

# Default risk

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## Default

A bond issuer fails to make promised interest or principal payments.

- ▶ U.S. Treasuries: typically treated as *default-free*.
- ▶ Corporate bonds: positive probability of default — depends on issuer's financial health.
- ▶ Ratings agencies (Moody's, S&P, Fitch) provide ratings:
  - **Investment grade**: AAA, AA, A, BBB.
  - **Speculative (“junk”)**: BB and below.

## Risk premium — definition

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### Risk premium

The spread between the interest rate on a risky bond and the rate on a default-free bond of the same maturity.

- ▶ Always non-negative for risk-averse investors.
- ▶ Larger for lower-rated bonds (BBB > AA > Treasury).
- ▶ Widens in bad times, narrows in good times.

*Mishkin Ch. 6, Section 6.1.*

## Why does the risk premium arise?

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Use the bond-market model. Compare two markets at the same maturity:

- ▶ Suppose initially Treasury and corporate yields are equal.
- ▶ Default risk on corporates rises (e.g. recession looms).
- ▶ In the **corporate** market:  $B^d$  shifts *left* (riskier  $\Rightarrow$  less demand)  $\Rightarrow$  price falls, yield rises.
- ▶ In the **Treasury** market: relative riskiness of Treasuries falls  $\Rightarrow B^d$  shifts *right*  $\Rightarrow$  price rises, yield falls.
- ▶ Gap widens: a positive risk premium emerges.

*Mishkin Ch. 6, Figure 1.*

## Application — the Great Depression

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- ▶ In the late 1920s, Baa corporate spreads over Treasuries were modest (around 2–3 pp).
- ▶ 1930–33: bank failures, deflation, mass corporate distress  $\Rightarrow$  default risk soared.
- ▶ Baa–Treasury spread peaked above **7 percentage points**.
- ▶ After WWII and into the 1960s, with stable growth, the spread collapsed back to roughly 1 pp.

*Mishkin Ch. 6, Figure 2.*

PART 2

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# Risk Structure — Liquidity and Taxes

# Liquidity

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- ▶ Treasury market: extremely deep, narrow bid–ask, low transaction costs.
- ▶ Corporate market: shallower, wider spreads, slower to trade.
- ▶ Less-liquid asset is less attractive  $\Rightarrow$  lower demand at any yield  $\Rightarrow$  higher equilibrium yield.

## Liquidity premium

Part of the corporate–Treasury spread compensates for *lower liquidity*, not default risk alone.

In practice, “risk premium” as measured in the data lumps default and liquidity premia together.

## Income tax considerations — munis

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**Puzzle:** municipal bonds carry *positive* default risk, yet often yield *less* than Treasuries. Why?

- ▶ Interest on most U.S. municipal bonds is **exempt from federal income tax**.
- ▶ For a high-bracket investor, after-tax muni yield can beat after-tax Treasury yield even if pre-tax muni yield is lower.

### Example

35% bracket. Treasury at 5%: after-tax 3.25%. Muni at 4%: after-tax 4%. The muni dominates even though its pre-tax yield is lower.

*Mishkin Ch. 6, Section 6.1.*

## Risk structure — summary

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Three factors drive the spread of a bond's yield over the Treasury yield of equal maturity:

1. **Default risk** — higher  $\Rightarrow$  higher spread.
2. **Liquidity** — lower  $\Rightarrow$  higher spread.
3. **Income tax treatment** — tax-exempt  $\Rightarrow$  *lower* spread (can be negative vs. Treasuries).

We have explained why two bonds of *the same maturity* can have very different yields. Now: why do yields differ *across maturities*?

PART 3

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# Term Structure — The Yield Curve

# The yield curve

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## Yield curve

A plot of yields on bonds of *identical* risk, liquidity, and tax characteristics, but *different maturities*.

- ▶ Typically drawn for U.S. Treasuries (default-free).
- ▶ Shape varies over time:
  - *Upward-sloping* (most common): long rates  $>$  short rates.
  - *Flat*: roughly equal across maturities.
  - *Inverted (downward-sloping)*: short rates  $>$  long rates.

*Mishkin Ch. 6, Section 6.2.*

## Three empirical facts

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Any theory of the term structure should explain three facts:

1. **Fact 1.** Rates on bonds of different maturities *move together over time*.
2. **Fact 2.** When short-term rates are *low*, the yield curve is more likely to slope *upward*. When short-term rates are *high*, the curve is more likely to be *inverted*.
3. **Fact 3.** The yield curve is *usually upward-sloping*.

We will judge three theories by how many of these three they can explain.

*Mishkin Ch. 6, Section 6.2.*

PART 4

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# Three Theories of the Term Structure

## Three competing theories

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1. **Expectations theory** — bonds of different maturities are perfect substitutes.
2. **Segmented markets theory** — bonds of different maturities are *not* substitutes at all.
3. **Liquidity-premium / preferred-habitat theory** — substitutes, but *imperfect*; investors prefer short bonds.

Same logic each time: ask what equilibrium implies for the relation between long and short yields.

## Expectations theory — the key idea

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**Assumption:** investors view a long bond and a sequence of short bonds as *perfect substitutes*.

- ▶ Then, in equilibrium, expected returns over the holding period must be equal:

$$i_{nt} = \frac{i_t + i_{t+1}^e + i_{t+2}^e + \cdots + i_{t+n-1}^e}{n}.$$

- ▶ The  $n$ -period yield is the *average* of the current and expected future one-period yields.

*Mishkin Ch. 6, Section 6.2.*

## Expectations theory — numerical example

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Suppose today's 1-year rate is 5% and the market expects 1-year rates of 6%, 7%, 8%, 9% in years 2–5.

- ▶ 1-year yield today: 5%.
- ▶ 2-year yield:  $(5 + 6)/2 = 5.5\%$ .
- ▶ 3-year yield:  $(5 + 6 + 7)/3 = 6.0\%$ .
- ▶ 5-year yield:  $(5 + 6 + 7 + 8 + 9)/5 = 7.0\%$ .

Yield curve slopes upward — because expected future short rates are *rising*.

## Expectations theory — scorecard

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- ▶ **Fact 1 (rates move together):** Explained. A change in current short rates feeds into all longer-maturity averages.
- ▶ **Fact 2 (inversion when short rates are high):** Explained. When short rates are high, the market expects them to *fall* back to normal  $\Rightarrow$  long yields below current short yields.
- ▶ **Fact 3 (usually upward-sloping): NOT explained.** Theory implies the curve should slope up only half the time (whenever future short rates are expected to rise).

Score: explains Facts 1–2 but *not* Fact 3.

## Segmented markets theory

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**Assumption:** bonds of different maturities are *not substitutes at all*. Each maturity has its own demand and supply.

- ▶ Investors have strong preferences for particular maturities (e.g. pension funds want long; banks want short).
- ▶ Long-bond yield set in the long-bond market only.

### Scorecard:

- ▶ Fact 3 (usually upward-sloping): *can* be explained — if demand is typically weaker for long bonds, long yields are higher.
- ▶ Facts 1 and 2 (co-movement, slope depending on level of short rates): **cannot** be explained. With segmented markets there is no link across maturities.

## Liquidity-premium / preferred-habitat theory

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**Assumption:** different-maturity bonds are substitutes, but *imperfect*. Investors *prefer* short bonds (less interest-rate risk) and demand a premium to hold long ones.

$$i_{nt} = \frac{i_t + i_{t+1}^e + \cdots + i_{t+n-1}^e}{n} + \ell_{nt},$$

where  $\ell_{nt} \geq 0$  is the **liquidity (term) premium**, increasing in  $n$ .

- ▶ Long yield = expectations average + a positive term premium.
- ▶ “Preferred habitat” variant: investors have a preferred maturity and must be paid to move away from it.

*Mishkin Ch. 6, Section 6.2.*

## Liquidity-premium — numerical example

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Same expected 1-year rates as before: 5, 6, 7, 8, 9%. Add term premia  $l_n = 0, 0.25, 0.5, 0.75, 1.0\%$ .

- ▶ 1-year:  $5 + 0 = 5\%$ .
- ▶ 2-year:  $5.5 + 0.25 = 5.75\%$ .
- ▶ 3-year:  $6.0 + 0.5 = 6.5\%$ .
- ▶ 5-year:  $7.0 + 1.0 = 8.0\%$ .

Steeper curve than pure expectations theory — because of the rising term premium.

## Liquidity-premium — scorecard

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- ▶ **Fact 1:** Explained (same averaging logic as expectations).
- ▶ **Fact 2:** Explained (when short rates are high, expected to fall; the term premium is not large enough to keep the curve from inverting).
- ▶ **Fact 3: Explained.** Even if expected future short rates are flat, the positive term premium tilts the curve upward.

### Winner

The liquidity-premium / preferred-habitat theory is the *only* theory that explains all three empirical facts. It is the workhorse model in this course.

PART 5

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# The Yield Curve as a Forecast

## Reading the yield curve

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Under the liquidity-premium theory, the slope of the yield curve tells us *what the market expects* about future short rates:

- ▶ Steeply *upward*-sloping curve  $\Rightarrow$  market expects short rates to rise.
- ▶ *Mildly* upward  $\Rightarrow$  short rates expected roughly unchanged (slope is just the term premium).
- ▶ *Flat*  $\Rightarrow$  short rates expected to fall a bit.
- ▶ *Inverted*  $\Rightarrow$  short rates expected to fall sharply.

*Mishkin Ch. 6, Section 6.2, FYI box.*

## Inverted curves and recessions

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- ▶ Short rates fall sharply only when the Fed *cuts*.
- ▶ The Fed cuts mainly when the economy is weakening.
- ▶ Therefore: **an inverted yield curve is a strong signal of an upcoming recession.**
- ▶ Track record in the U.S.: every recession since the 1960s has been preceded by an inversion of the Treasury 10y–3m spread.
- ▶ False positives are rare.

*Mishkin Ch. 6, Figure 5.*

## Yield curves and inflation expectations

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- ▶ If long rates rise much more than short rates  $\Rightarrow$  the market expects *higher* future short rates, often via higher inflation.
- ▶ A flattening curve at high short-rate levels  $\Rightarrow$  market expects the Fed's tight policy to bring inflation down.
- ▶ In short: the slope encodes the market's joint forecast of **growth + inflation + policy**.

PART 6

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## **Application — The 2007–09 Crisis**

## Risk structure during 2007–09

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- ▶ Pre-2007: Baa–Treasury spread roughly 2 pp; AAA–Treasury spread under 1 pp. Tight, stable.
- ▶ Aug 2007–Sept 2008: subprime mortgage defaults; spreads widen modestly.
- ▶ Sept 2008 (Lehman): default risk on corporates jumps; investors flee to safety.
- ▶ Late 2008: Baa–Treasury spread peaks above **6 percentage points**.
- ▶ By 2010, with bailouts and stimulus in place, spreads narrowed — but did not return to pre-crisis levels for years.

*Mishkin Ch. 6, Application box.*

## Two channels: default risk and flight to liquidity

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### Default-risk channel.

- ▶ Default probabilities on corporates rose sharply  $\Rightarrow B^d$  for corporates shifted left  $\Rightarrow$  corporate yields rose.

### Liquidity / flight-to-safety channel.

- ▶ Treasuries became *relatively* more liquid as corporate bond markets froze.
- ▶  $B^d$  for Treasuries shifted right  $\Rightarrow$  Treasury yields fell.

Both channels push the spread up in the same direction.

## Lessons from the crisis

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- ▶ The risk-structure framework gives a clean account of an extraordinary event using only the four asset-demand determinants from Ch. 5.
- ▶ Spreads are a *real-time* measure of financial stress: bond markets price stress before macro data confirm it.
- ▶ The Fed and Treasury watched these spreads closely in designing the TARP and emergency lending facilities.

PART 7

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## Wrap-up

## Key terms from Chapter 6

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- ▶ risk structure of interest rates
- ▶ default, default-free bond
- ▶ investment-grade / junk bonds
- ▶ risk premium
- ▶ liquidity premium
- ▶ tax-exempt municipal bonds
- ▶ term structure
- ▶ yield curve
- ▶ expectations theory
- ▶ segmented markets theory
- ▶ liquidity-premium theory
- ▶ preferred-habitat theory
- ▶ term premium
- ▶ inverted yield curve
- ▶ flight to quality / safety

## Looking ahead

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- ▶ Today wrapped up Part II of the course (financial markets and interest rates).
- ▶ Next session begins **Part III**: financial institutions — starting with the economic analysis of financial structure (Mishkin Ch. 8).
- ▶ *Quiz 1* returns next class; the term-structure picture is fair game.