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

CHAPTER 5

The Behavior of Interest Rates

Ritsu Kitagawa

Columbia Business School

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Outline

Reading and objectives

- Mishkin, *The Economics of Money, Banking, and Financial Markets*, 13th ed.
- This deck: **Chapter 5** — The Behavior of Interest Rates.
- Chapter 6 (Risk and Term Structure) follows in a second deck for this session.

Learning objectives

5.1 Identify the factors that determine the demand for assets.

5.2 Draw the demand and supply curves for the bond market and explain how equilibrium interest rates are determined.

5.3 List and describe the factors that affect equilibrium interest rates.

5.4 Apply the bond-market model to changes in expected inflation and to the business cycle.

5.5 Trace how changes in money growth affect the interest rate through the liquidity, income, price-level, and expected-inflation effects.

PART 1

Determinants of Asset Demand

What is an asset?

Asset

A piece of property that is a store of value — e.g. money, bonds, stocks, real estate, fine art.

- Wealth is held in many forms. How does a household decide *how much* of each asset to hold?
- The answer is the **theory of portfolio choice** — four factors drive the quantity demanded of any asset.

Mishkin Ch. 5, Section 5.1.

The four determinants of asset demand

Holding everything else constant, the quantity demanded of an asset rises with:

1. **Wealth** — total resources owned by the individual.
2. **Expected return** on the asset, *relative to* expected returns on alternative assets.
3. **Risk** (uncertainty of return) on the asset, *relative to* that of alternatives — with the sign *reversed*: higher risk lowers demand for risk-averse investors.
4. **Liquidity** — the ease and speed of converting the asset into cash — *relative to* other assets.

Mishkin Ch. 5, Section 5.1, Table 1.

Wealth

- When wealth rises, you have more resources to allocate.
- Quantity demanded of (almost) every asset rises.
- **Wealth elasticity of demand** measures *how much* demand for an asset responds to a 1% rise in wealth.
  - Elasticity > 1: a *luxury* asset (e.g. stocks, municipal bonds).
  - Elasticity < 1: a *necessity* asset (e.g. checkable deposits, currency).

Expected return

- *Return* on an asset can be uncertain ex ante — only the **expected return** is known.

$$R^e = \sum_{i=1}^{n} p_i \, R_i$$

- R^e rises $\Rightarrow$ quantity demanded rises, holding all else fixed.
- What really matters is the expected return *relative to* alternatives. If bond returns rise while stock returns are unchanged, demand for bonds rises.

Risk

- Risk: the degree of uncertainty associated with the return.
- Measured by the *standard deviation* of returns.
- Most investors are **risk-averse**: at the same expected return, they prefer the safer asset.
- Higher risk on an asset (relative to alternatives) $\Rightarrow$ lower quantity demanded.

Example

Asset A pays 10% for sure. Asset B pays 5% or 15% with equal probability. Both have $R^e = 10\%$, but a risk-averse investor prefers A.

Liquidity

- Liquidity: how quickly and cheaply you can convert the asset into cash.
- More liquid asset $\Rightarrow$ higher quantity demanded, all else equal.
- A house is illiquid: selling takes weeks and costs thousands.
- A Treasury bill is highly liquid: deep market, low spread, sells in seconds.

Summary — theory of portfolio choice

Variable	Change	Quantity demanded of the asset
Wealth	↑	↑
Expected return (relative)	↑	↑
Risk (relative)	↑	↓
Liquidity (relative)	↑	↑

Keep this table in mind — every shift of the bond demand curve traces back to one of these four.

Mishkin Ch. 5, Section 5.1, Table 1.

PART 2

Supply and Demand in the Bond Market

Setting up the bond market

- Take a one-year discount bond with face value \$1,000.
- Let P = current price, i = yield to maturity.

$$i = \frac{F - P}{P} = \frac{1000 - P}{P}$$

- Lower $P \Leftrightarrow$ higher i. The two are mechanically linked.

Two equivalent diagrams

We can draw the market with *price* on the vertical axis (bond market) or with the *interest rate* on the vertical axis (loanable funds). They describe the same equilibrium.

Mishkin Ch. 5, Section 5.2.

The bond demand curve

Buyer's perspective: when P falls, the expected return i rises $\Rightarrow$ the bond is more attractive.

- Demand curve B^d slopes **downward** in (B, P) space: lower price, higher quantity demanded.
- Numerical example: \$1,000 face value
  - $P = \$950 \Rightarrow i \approx 5.3\%$
  - $P = \$900 \Rightarrow i \approx 11.1\%$
  - $P = \$850 \Rightarrow i \approx 17.6\%$
- As P falls, i rises, and more buyers step in.

The bond supply curve

Issuer's perspective: when P is high (interest rate low), borrowing is cheap $\Rightarrow$ more firms / governments want to issue.

- Supply curve B^s slopes **upward** in (B, P) space.
- Higher price $=$ lower yield $=$ cheaper financing for issuers.

Equilibrium

At P^*, $B^d = B^s$. Equivalently, at i^* the quantity of bonds demanded equals the quantity supplied.

Picturing the bond market

Sketch in (B, P) space:

- Vertical axis: *bond price* P (rising up). Equivalent: i *falls* as we move up.
- Horizontal axis: quantity of bonds B.
- B^d slopes down; B^s slopes up; they intersect at (B^*, P^*) with implied i^*.

If $P > P^*$: excess supply $\Rightarrow$ $P \downarrow$, $i \uparrow$.
If $P < P^*$: excess demand $\Rightarrow$ $P \uparrow$, $i \downarrow$.

Mishkin Ch. 5, Figure 1.

Loanable funds — the same picture in i

Flip the perspective: think of bonds as *loans*.

- Demand for bonds = **supply of loanable funds** (lending).
- Supply of bonds = **demand for loanable funds** (borrowing).
- Plot in (L, i) space: vertical axis i.
  - Supply of funds: upward sloping in i.
  - Demand for funds: downward sloping in i.

Same equilibrium (B^*, i^*) — just relabeled axes. We will use whichever is more convenient.

Mishkin Ch. 5, Section 5.2, Box on loanable funds.

PART 3

Shifts in Bond Demand

What *shifts* the bond demand curve?

A change in any determinant other than the bond's own price.

1. Wealth
2. Expected return on bonds, relative to alternatives
3. Expected inflation
4. Riskiness of bonds, relative to alternatives
5. Liquidity of bonds, relative to alternatives

Mishkin Ch. 5, Section 5.3, Table 2.

Wealth

- Business-cycle expansion $\Rightarrow$ wealth $\uparrow$ $\Rightarrow$ households want more of all assets, including bonds.
- B^d shifts **right**.
- Recession: wealth $\downarrow$ $\Rightarrow$ B^d shifts **left**.

Expected interest rates / bond prices

The expected return on a bond depends on what you think *future* interest rates will be.

- Expect future i to rise $\Rightarrow$ expect future bond prices to fall $\Rightarrow$ expect capital losses $\Rightarrow$ expected return on bonds $\downarrow$.
- B^d shifts **left**.
- Especially important for *long-term* bonds, where capital gains/losses dominate the return.

Expected inflation

Inflation lowers the *real* return on a nominal bond.

- Higher expected inflation $\Rightarrow$ real return on bonds $\downarrow$ *relative to* real assets (housing, gold, equities).
- B^d shifts **left**.
- This is one half of the Fisher effect we will use shortly.

Riskiness and liquidity of bonds

Risk

- Bond returns become more volatile (e.g. rising interest-rate uncertainty) $\Rightarrow$ B^d shifts **left**.
- Stocks become *more* volatile $\Rightarrow$ bonds look safer in comparison $\Rightarrow$ B^d shifts **right**.

Liquidity

- Bond market becomes deeper / cheaper to trade $\Rightarrow$ B^d shifts **right**.
- Other markets (e.g. stocks) become more liquid by comparison $\Rightarrow$ B^d shifts **left**.

Bond demand — summary table

Variable	Change	Shift in B^d
Wealth	↑	right
Expected return on bonds (relative)	↑	right
Expected interest rates	↑	left
Expected inflation	↑	left
Riskiness of bonds (relative)	↑	left
Liquidity of bonds (relative)	↑	right

Mishkin Ch. 5, Table 2.

PART 4

Shifts in Bond Supply

What *shifts* the bond supply curve?

1. Expected profitability of investment opportunities
2. Expected inflation
3. Government budget deficits

Mishkin Ch. 5, Section 5.3, Table 3.

Expected profitability of investment

- Boom: firms see profitable projects $\Rightarrow$ want to issue more bonds to fund them.
- B^s shifts **right**.
- Recession: profitable projects scarce $\Rightarrow$ B^s shifts **left**.

This is the supply-side counterpart to the wealth effect on demand: both push the bond market in the same direction over the business cycle.

Expected inflation (supply side)

- Higher expected inflation lowers the *real* cost of borrowing for issuers (they repay in cheaper future dollars).
- Borrowing looks cheaper $\Rightarrow$ firms / governments issue more bonds.
- B^s shifts **right**.

Note: expected inflation shifts *both* curves — B^d left and B^s right — and both effects push the equilibrium interest rate *up*.

Government budget

- Larger federal deficit $\Rightarrow$ Treasury issues more bonds.
- B^s shifts **right**.
- Surplus / smaller deficit $\Rightarrow$ B^s shifts **left**.

This is one channel of "crowding out": fiscal expansion pushes equilibrium interest rates up.

Bond supply — summary table

Variable	Change	Shift in B^s
Profitability of investment	↑	right
Expected inflation	↑	right
Government deficit	↑	right

Mishkin Ch. 5, Table 3.

PART 5

Applications — Changes in Equilibrium i

Application 1 — The Fisher effect

Question: What happens to i when expected inflation π^e rises?

- B^d shifts **left** (real return on bonds falls).
- B^s shifts **right** (real cost of borrowing falls).
- Equilibrium price P^* falls $\Rightarrow$ equilibrium interest rate i^* **rises**.

Fisher effect

When expected inflation rises, nominal interest rates rise (roughly one-for-one in the long run): $i \approx r + \pi^e$.

Mishkin Ch. 5, Section 5.4, Application.

Evidence on the Fisher effect

- Mishkin's Figure 4: U.S. 3-month Treasury yield and expected inflation, 1953–2020.
- The two series rise together in the 1970s, fall together after Volcker, and remain low together post-2009.
- Co-movement is far from perfect at high frequency, but the long-run pattern strongly supports Fisher.

Mishkin Ch. 5, Figure 4.

Application 2 — Business-cycle expansion

Question: What happens to i during an economic expansion?

- Wealth $\uparrow \Rightarrow B^d$ shifts **right**.
- Profitable investment opportunities $\uparrow \Rightarrow B^s$ shifts **right**.
- Both curves shift right. Effect on P^* (and i^*) depends on *which shifts more*.

Empirically (Mishkin Figure 5): in U.S. expansions, supply tends to shift more $\Rightarrow P^*$ falls, i^* rises. Interest rates are *procyclical*.

Mishkin Ch. 5, Figure 5.

Worked example — expansion in (B, P) space

- Start: (B_0^*, P_0^*).
- Expansion: both B^d and B^s shift right.
- Quantity of bonds traded *definitely* rises: $B_1^* > B_0^*$.
- Price falls because supply shift dominates: $P_1^* < P_0^*$.
- Therefore $i_1^* > i_0^*$ — interest rates rise in booms.

The model gives an *unambiguous* prediction on quantity but only a *conditional* prediction on price. Theory plus data pin it down.

PART 6

Money Supply Growth and Interest Rates

Does more money mean lower i? Four effects

A higher rate of *money growth* sets off four separate channels:

1. **Liquidity effect** — more money lowers i in the short run.
2. **Income effect** — more money $\Rightarrow$ higher income $\Rightarrow$ raises i.
3. **Price-level effect** — more money $\Rightarrow$ higher price level $\Rightarrow$ raises i.
4. **Expected-inflation effect** — persistently higher money growth $\Rightarrow$ higher π^e $\Rightarrow$ raises i (Fisher).

Mishkin Ch. 5, Section 5.5.

Liquidity effect

- Hold prices and income fixed. The Fed buys bonds $\Rightarrow$ money supply rises.
- At the existing i, people are now holding "too much" money.
- They buy bonds $\Rightarrow$ bond prices rise $\Rightarrow$ i falls.

This is the channel most students think of first. But it is only one of four.

Income and price-level effects

Income effect

- More money $\Rightarrow$ stimulates spending $\Rightarrow$ output and income rise.
- Higher income shifts bond demand and money demand — and on net raises i.

Price-level effect

- More money eventually raises the price level P.
- Higher P raises money demand at any nominal $i \Rightarrow i$ rises.
- Note: this is a *one-time* level adjustment, not continuous inflation.

Expected-inflation effect

- If higher money growth is expected to *persist*, expected inflation π^e rises.
- By the Fisher effect, nominal i rises one-for-one with π^e in the long run.
- This effect operates with a long lag — it depends on *expectations*, which adjust slowly.

Putting the four effects together

- Liquidity effect alone: i *falls*.
- Three other effects: i *rises*.
- Net effect on i depends on *which dominates and when*.

Three scenarios

(a) Liquidity effect dominates throughout — i falls and stays low.
(b) Liquidity short-run, others long-run — i falls initially, then rises; final level may be above or below initial.
(c) Expected-inflation dominates quickly — i *rises immediately* on the policy announcement.

Mishkin Ch. 5, Figure 6.

Evidence — money growth and interest rates

- Mishkin Figure 7: U.S. M2 growth and the 3-month Treasury yield, 1950–2020.
- In the 1970s, accelerating money growth coincided with *rising* interest rates — expected-inflation effect dominated.
- In the 1980s–90s, falling money growth and falling inflation expectations brought i down.
- **Policy lesson:** "easy money $\Rightarrow$ low rates" is naive. In an environment where inflation expectations respond, easy money can *raise* nominal rates.

Mishkin Ch. 5, Figure 7.

PART 7

Wrap-up

Key terms from Chapter 5

- theory of portfolio choice
- expected return, risk, liquidity
- wealth elasticity of demand
- risk-averse / risk-loving
- demand curve, supply curve
- market equilibrium
- excess supply, excess demand
- loanable funds framework
- Fisher effect
- business-cycle expansion
- liquidity effect
- income effect
- price-level effect
- expected-inflation effect

Looking ahead

- Next deck this session: **Chapter 6** — The Risk and Term Structure of Interest Rates.
- We move from a *single* interest rate to the *structure* of rates across borrowers and maturities.
- Quiz 1 returns next class — expect a question on shifts of B^d and B^s.