

# Lecture 24: Interest Rates and Unconventional Monetary Policy

ECON 30020: Intermediate Macroeconomics

Prof. Eric Sims

University of Notre Dame

Spring 2026

# Readings

GLS Ch. 34

# Interest Rates

We have spent the semester talking about “the” interest rate

In reality, there are many interest rates

The interest rate is the price of borrowing money (nominal) [or goods, real] expressed as a percentage per unit of time

For example:

- I lend you \$10 and you promise to pay me back \$11 a year from now (10 percent interest)
- I save one fruit today in exchange for 1.05 fruits tomorrow (5 percent real interest)
- I borrow \$100 today and agree to pay back \$120 three years from now
  - Interest rate satisfies  $(1 + i)^3 = 1.2$ , so  $i = 6.27$  percent

# Bonds and Interest Rates

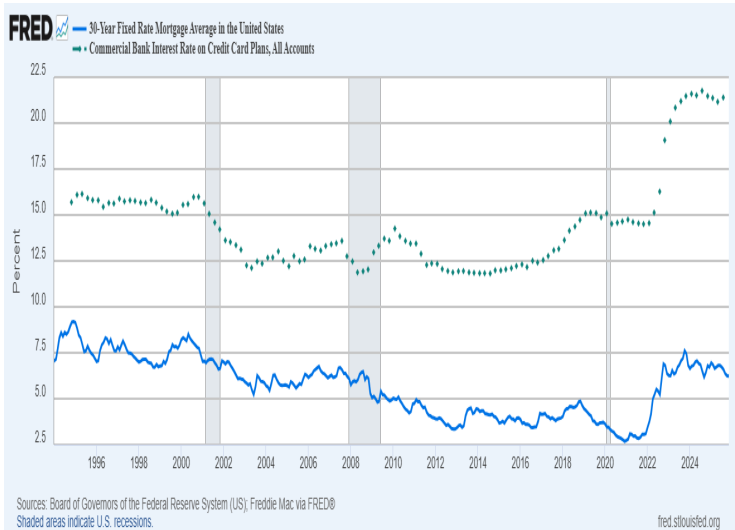
Interest rates are ways of expressing the price of debt instruments (bonds)

These debt instruments transfer resources from lender to borrower in exchange for pre-specified future cash flows

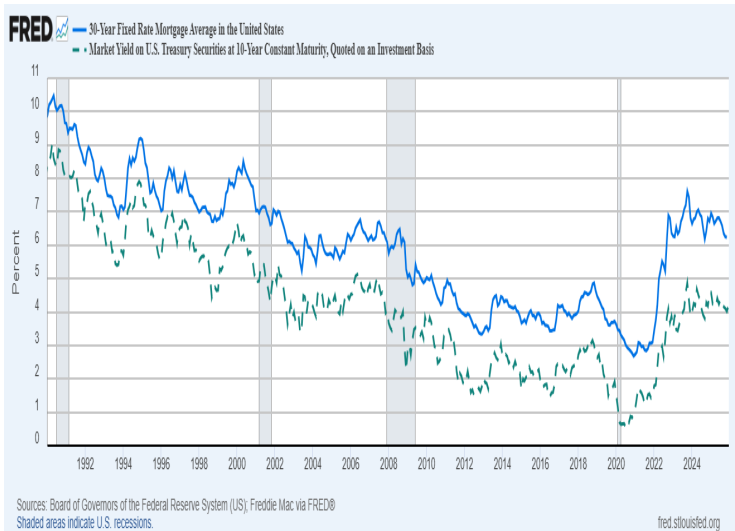
Interest rates on different kinds of bonds differ, principally according to:

- Perceived riskiness
- Time to maturity

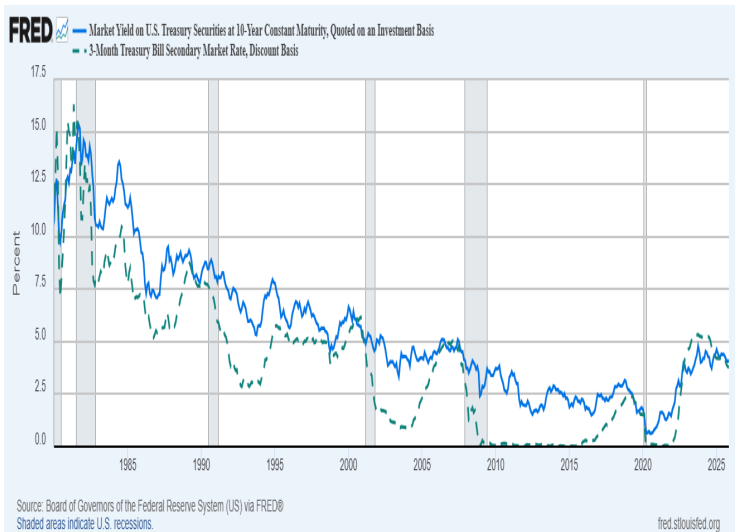
# Mortgage Rates and Credit Card Rates



# Mortgage Rates and 10-Year Treasury Yield



# 10-Year Treasury and Three-Month Treasury Bill



# Observations

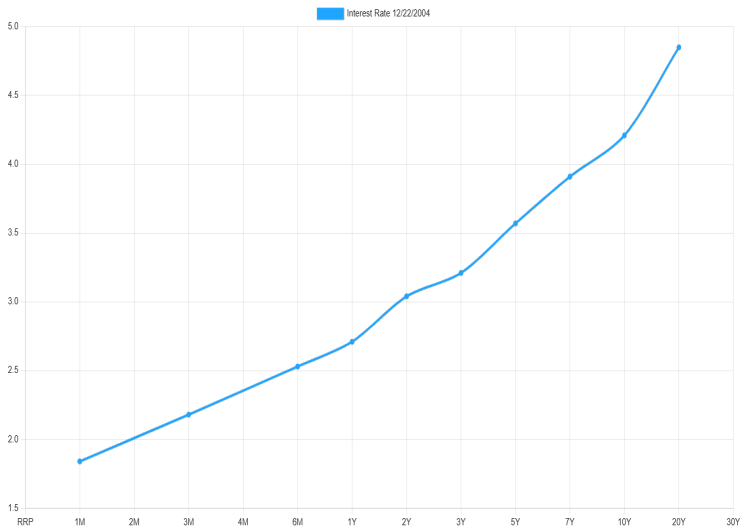
Different types of interest rates tend to move together over time

Gaps are typically bigger the riskier are the underlying cash flows and the longer is the term of the debt instrument (time to maturity)

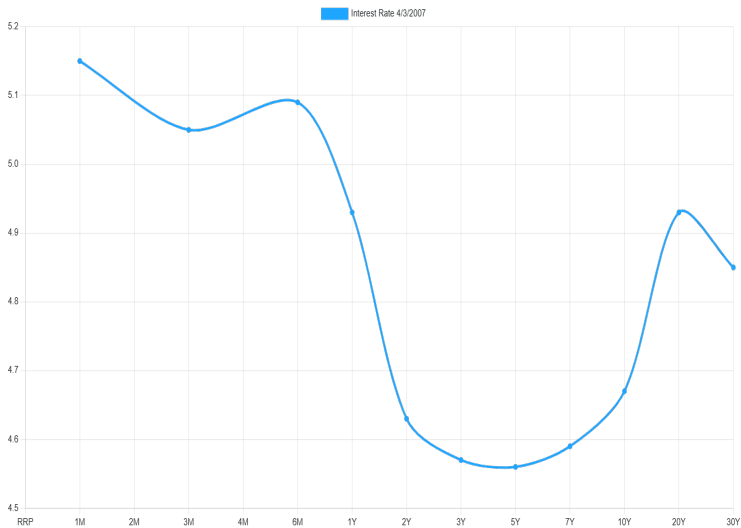
Yield curve: plots interest rates for different maturities of government bonds against time the maturity at a particular point in time

Yield curves usually (but not always) upward-sloping

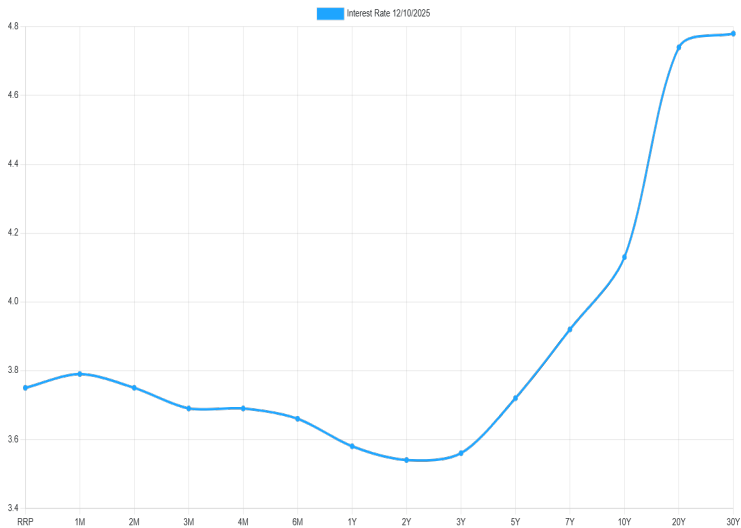
# Treasury Yield Curve: December 2004



# Treasury Yield Curve: April 2007



# Treasury Yield Curve: December 2025



# Bond

A bond is a fixed-income security

- A bond has a face value and has a known maturity date
- Maturity date: “life” of bond, date at which the bond pays face value
- Face value: issuer pays this amount to the holder at the maturity date
- Coupon payments: periodic, predetermined cash flows between date of issuance and maturity date

While bond promises known cash flows at date of issuance, borrower can (fully or partially) default – not make good on all promised cash flows

Bonds are tradeable in secondary markets

# Discount Bond and Yield to Maturity

Easiest kind of bond to think about is a discount bond: pays no coupon payments

The yield to maturity (YTM, or yield) is the interest rate that equates price of bond to the present discounted value of cash flows. It measures the expected return from holding the bond until maturity

- One-period:

$$P_{t,t+1} = \frac{FV_{t+1}}{1 + i_t}$$

- Ten-period:

$$P_{t,t+10} = \frac{FV_{t+10}}{(1 + i_{t,t+10})^{10}}$$

# Bond Prices and Yields

Bond price and yield convey the same information

Prices and yields move opposite one another

- The return on holding a one-period discount bond is face value minus price, divided by price
- If you demand a higher return (i.e., use a higher yield), price must fall

We quote bond prices in terms of yields because yields are scale-invariant and therefore easier to interpret

## Term and Risk Structure of Interest Rates

Aside from cash-flow details, bonds differ according to: (i) time to maturity and (ii) perceived risk of future cash flows

Term Structure: how do yields (interest rates) vary according to time to maturity?

Risk Structure: how do yields (interest rates) vary according to default risk?

Think about the central bank as controlling the short-term (one-period), riskless interest rate

Economically relevant interest rates (mortgage rates, credit card rates, corporate borrowing rates) are typically long-term and carry some default risk

What is the relationship between short-term, riskless rates and long-term, risky rates?

# Risk Structure

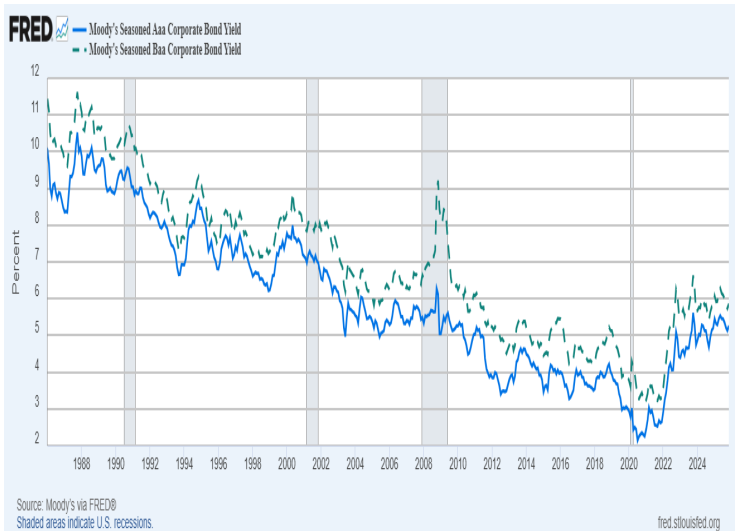
Basic idea: if there is default risk, investors demand a higher expected return to hold those cash flows

Equivalently, will pay less in present for a claim on future cash flows if those cash flows are uncertain

We would therefore expect the yield (interest rate) to positively relate to the riskiness of the security

- e.g., the credit card rate is higher than a mortgage rate

# Aaa and Baa Corporate Bond Yields



# Term Structure of Interest Rates

How do yields on bonds of different maturities (with the same default risk, e.g., Treasury securities) vary with one another?

Expectations Hypothesis: bonds of different maturities are perfect substitutes

- Suppose you can buy a one-year bond yielding 4 percent and you expect a one-year bond next year to yield 6 percent
- Total return from this would be  $(1 + 0.04) \times (1 + 0.06) = 1.1024$
- Return from holding a two-year bond to maturity is  $(1 + i_2)^2$
- Therefore,  $i_2 \approx \frac{1}{2} (0.04 + 0.06) = 0.05$

Long-term yield: approximately the average of expected short-term yields

# Term Premium

Yield curves are normally upward-sloping

Inconsistent with logic of expectations hypothesis (would expect typical yield curve to be flat)

But unless investors are risk neutral, short- and long-term bonds are not perfectly substitutable. Long-term bonds (even without default risk) may be riskier

- If future short-term interest rates rise, bond prices must fall
- If you hold a long-term bond and need to liquidate prior to maturity, this is bad – you will sell at a lower price, and therefore receive a lower return than you expected
- We call this interest rate risk, generating a positive term premium

# Inverted Yield Curves and Recessions

While yield curves are normally upward-sloping, sometimes they invert (i.e., are downward-sloping)

Inverted yield curves often (but not always!) predict recessions (declines in output, increases in unemployment)

Why?

- In a typical recession, central banks cut short-term rates (i.e., recessions are demand-driven, with inflation and rates falling)
- Lower expected short-term rates: puts downward pressure on current long-term rates via logic of Expectations Hypothesis

# From Policy Rate to Economically Relevant Rates

Monetary policy rate (e.g., FFR): short-term, riskless

Economically relevant rates (e.g., mortgage): long-term, risky

Long-term, risky rates ( $i_{t,t+T}^R$ ) “priced off” long-term Treasuries ( $i_{t,t+T}^{TR}$ ), which are based on the expectations hypothesis ( $EH_t$ ), which is based on short-term rates ( $i_t$ )

$$i_{t,t+T}^R = i_{t,t+T}^{TR} + rp_t$$

$$i_{t,t+T}^{TR} = EH_t + tp_t$$

$$EH_t = \frac{1}{T} (i_t + i_{t+1}^e + i_{t+2}^e + \dots i_{t+T-1}^e)$$

$$\Rightarrow$$

$$i_{t,t+T}^R = \frac{1}{T} (i_t + i_{t+1}^e + i_{t+2}^e + \dots i_{t+T-1}^e) + tp_t + rp_t$$

# Conventional Monetary Policy

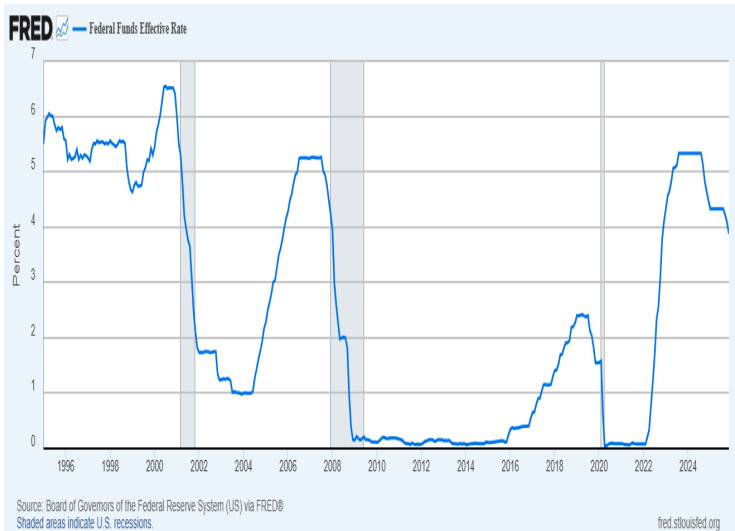
In standard macro model, we ignore the risk and term structures of interest rates for the most part

We just have one, short-term interest rate ( $i_t$ )

We fold everything else into “credit spread” ( $f_t$ ), which we take to be exogenous

Most of the time, this is fine. Lowering (raising) short-term rate lowers (raises) economically relevant rates, holding other stuff fixed

# Federal Funds Rate and the ZLB



# Unconventional Monetary Policy

At the ZLB, conventional policy isn't available

Try to influence economically relevant rates without adjusting short-term rates. Basically, try to influence  $f_t$ !

## Unconventional Monetary Policy:

- Forward Guidance (FG): announce intention to keep short-term rates low in the future. If credible, should lower expectations hypothesis component and lower relevant rates
- Quantitative Easing (QE): central bank creates reserves to buy long-term bonds
  - Logic is to increase demand for these bonds to raise price and lower yields
  - Has to impact term and/or risk premia to work