Principles of Macroeconomics: The Market for Loanable Funds

Class 8

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Overview

- Announcements:
  - LC 10, GH 10 due Friday at 11:59pm
- Topics:
  - The market for loanable funds
  - Inflation and interest rates
- Readings:
  - Chapters 10.2-10.3, chapters 8.1-8.2

Accounting Recap

$$
\begin{aligned}
Y &= C + I + G + (x - im) \\
S &= I + (x - im) \\
S + NCI &= I \\
S_{private} + S_{gov} + NCI &= I \\
S_{private} + NCI &= I - S_{gov}
\end{aligned}
$$

Investment Demand

- Investment depends negatively on the interest rate: $\frac{\partial I}{\partial r} < 0$
  - Basically, as the interest rate increases, the amount of investment demanded falls

(1) Borrowing
  - If a firm borrows to create investment, loan repayment depends on the interest rate r
  - High r makes it less likely a firm will want to borrow

(2) Discounting of the future
  - We could invest money today and get a future return in a project
  - But, there's a time value of money – \$1 today is worth more than \$1 tomorrow
  - To calculate how valuable that investment is, we calculate the present discounted value (PDV)
  - PDV is lower when the outside interest rate, r, is high

(3) Opportunity Cost
  - Related to (2), funds used for investment could be used in another way – stock market, bonds, etc.
  - High r increases opportunity cost of investment

Savings Supply

$$S = S_{private} + S_{gov}$$

- Private savings decisions reflect a trade-off between consumption today and saving
  - We like consumption today
  - We want a return for giving up consumption today – a return on our savings
  - The interest rate is that return
  - We would give up \$1 of consumption today to get $\$1 \times (1 + r)$ of consumption tomorrow
- Government savings decisions we usually take as exogenous – that is, determined by factors outside the model

Market for Loanable Funds

$$\underbrace{S_{private}(r) + NCI}_{\text{Supply}} = \underbrace{I(r) - S_{gov}}_{\text{Demand}}$$

- Supply consists of private savings, $S_{private}(r)$, and foreign capital inflows (NCI)
- Demand consists of investment $I(r)$ and government savings (S_{gov})
  - S_{gov} is subtracted because if the government demands savings, it is *borrowing*, and its savings is thus negative
- For the reasons on the previous slides supply slopes up, demand slopes down
- As usual, we set supply equal to demand to solve for equilibrium

The Market

Equilibrium

- Supply equals demand at equilibrium
  - Changes in r move us along the demand/supply curves
  - The interest rate adjusts to "clear the market"
- Changes in supply or demand for a given r shift the curves
  (1) Shocks to capital inflows (NCI) $\longrightarrow$ change supply of loanable funds
  (2) Shocks to S_{gov} $\longrightarrow$ demand for borrowing
  (3) Shocks to private savings $\longrightarrow$ supply of loanable funds
  (4) Shocks to investment demand $\longrightarrow$ demand for borrowing

Demand Shock

Supply Shock

The Financial System

- The financial system matches savers with borrowers (we call this "plumbing")
  - Banking
    - Banks take deposits and make loans
    - Liquid deposits vs illiquid loans $\longrightarrow$ fragile banks
    - Think Silicon Valley Bank
  - Securities
    - Bonds are essentially loans and are tradable on a secondary market
    - Stocks are equity claims – ownership of a public company
    - Bonds specify fixed repayment terms, equity gives owner share in profits
- The financial system has three goals
  (1) Reduce transaction costs
  (2) Reduce risk
  (3) Provide liquidity

Transaction Costs

- Transaction costs are the costs of actually executing a deal
  - Imagine you want to give me a loan
  - You have to figure out:
    - how much money you're willing to lend
    - how long the terms of the loan will be
    - whether I can pay
    - whether I will pay
    - how to legally make this deal bind
  - Now imagine I want $1 billion in a loan. I'd have to:
    - Find 1 person willing to loan that much
    - Find a large group willing to loan that much together
    - Negotiate with that 1 person or large group on an individual basis
  - Banks and bond markets mitigate these issues

Reducing Risk

- Risk is uncertainty about future outcomes
  - Suppose I want to save up to buy a large ranch in Montana – many millions of dollars
  - I save by investing in, say, Nvidia
    - Investing in Nvidia at the beginning of April 2025 would have been great! Large returns!
    - Investing in Nvidia in January 2025 and wanting to buy my ranch in March – not so great
  - Most people approach risk asymmetrically – we tend to shy away from the risk of losing more than the risk of gaining
    - Put another way – we feel losses more intensely than we feel gains
  - The financial market helps risk-averse people through diversification
    - I can buy multiple stocks to insure against large drops
    - Simultaneously, Nvidia is sharing risk by financing some of their spending through profit sharing instead of taking out large loans against their property

Liquidity

- Liquidity is defined as the ability to convert an asset to cash easily
  - Suppose I own a cupcake shop and put all of my cash into capital – ovens, a storefront, etc.
  - Now suppose my enormous cupcake shop neon sign goes out and nobody even knows my shop exists
  - My assets are not liquid – it's hard to sell ovens quickly for cash. I'm now stuck without a cupcake sign and my business is in trouble
- Banks can provide liquidity through loans. Stocks and bonds provide liquidity for corporations and governments

Failure

- Because those three goals of the financial system are so important, bad things happen when financial systems fail:
  (1) Growth slows: we can't accumulate capital
  (2) Budgets bind tighter: consumption falls
  (3) Systemic collapse: financial crises can lead to chains of business failures
- See chapter 10.3 for more info

Thinking Real

- We've talked about the nominal interest rate
- But remember:
  - Nominal $\longrightarrow$ specified in current money units
  - Real $\longrightarrow$ specified in terms of goods
- Examples:
  - iPhone Air
    - Nominal: \$999
    - Real: Maybe 30 hours of labor
  - Pound of apples
    - Nominal: \$1.38 at Walmart
    - Real: pound of oranges

- Apply this logic to interest rates
  - Nominal: dollars today vs. tomorrow
  - Real: *purchasing power* today vs. tomorrow
    - How much "stuff" the dollar can buy changes due to changes in the price level
    - $\uparrow$ Inflation $\longrightarrow$ $\uparrow$ future prices
    - $\uparrow$ future prices $\longrightarrow$ $\downarrow$ future value of the dollar
- Loan repayment terms are typically nominal:
  - Suppose you loan me \$1 and I agree to pay you back \$2 tomorrow. Then:

$$i = \frac{2-1}{1} = 100\% \text{ is the nominal rate}$$

The Real Rate

- Let P_t be the price level today, P_{t+1} the price level tomorrow
- You give up $\$1/P_t$ goods today to loan the \$1 to me
- But tomorrow you get $\$2/P_{t+1}$ goods when I pay you back
- What's the return for you in terms of goods?

$$r = \frac{\$2/P_{t+1}}{\$1/P_t} - 1$$

$$r = \frac{1+i}{1+\pi} - 1$$

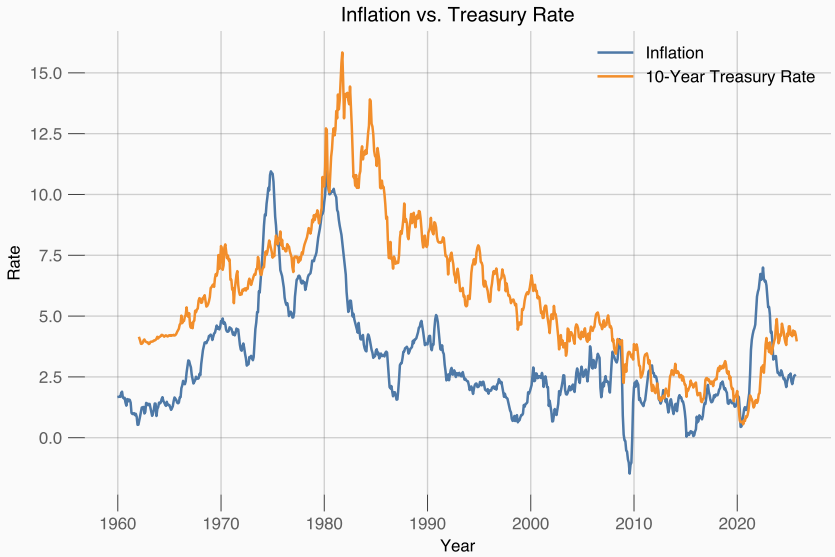
- In real terms, you loan me 1 good today, I repay you $(1+r)$ goods tomorrow

The Real Rate, continued

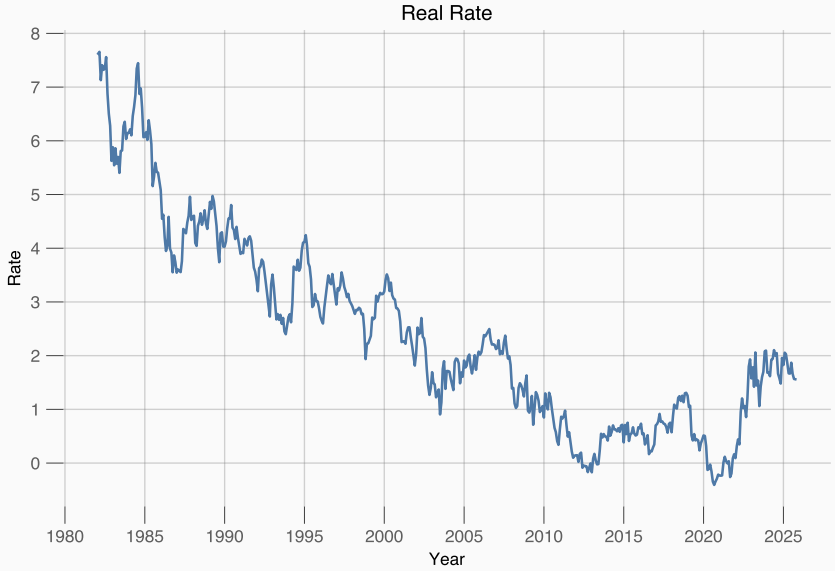
$$r \approx i - \pi$$

- Given i, an increase in π reduced r
- Suppose we are looking to agree on some nominal i for our loan. What happens if we both expect higher inflation?
  - You want higher i because you want the same real return
  - I'm willing to pay higher i because I know that I will still only have to give up $(1 + r)$ goods tomorrow
  - Real rate remains the same
- But what if there is even more inflation than expected?
  - r decreases, so I get to pay you less goods tomorrow!

US Interest Rates and Inflation



US Real Rate


Real Rate
Rate
Year
8
7
6
5
4
3
2
1
0
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025

Summary

- Market for loanable funds
- The financial system is important for economic performance
- Real rate falling

- Remember: homework due Friday night
- Read chapters 8.1-8.2