Econ 70, Personal Finance:

Making Better Decisions and Building a Better Financial System

Section 2:

The Financial System – why and how

Section Outline

- Why do we have financial institutions and financial markets?
  - From an individual's perspective
  - From society's perspective
- Aggregating up - the market for credit
- Modern financial institutions and their role
  - Banks
  - Bonds
  - Stock Exchange

Why Lend and Borrow

- Borrower: **You** need the money **now** – to make an investment or buy something large
  - From society's perspective: Who needs this money the most now?

- Lender: You don't need the money now
  - From society's perspective: When will you need this money?
- From an economist's perspective
  - move money **between** people in the **present**
  - move money **across time**

- Why charge interest?
  - Compensate for risk
  - Compensate for lack of access to funds
  - Compensate for inflation
  - Incentivize lending

How Does Credit Help?

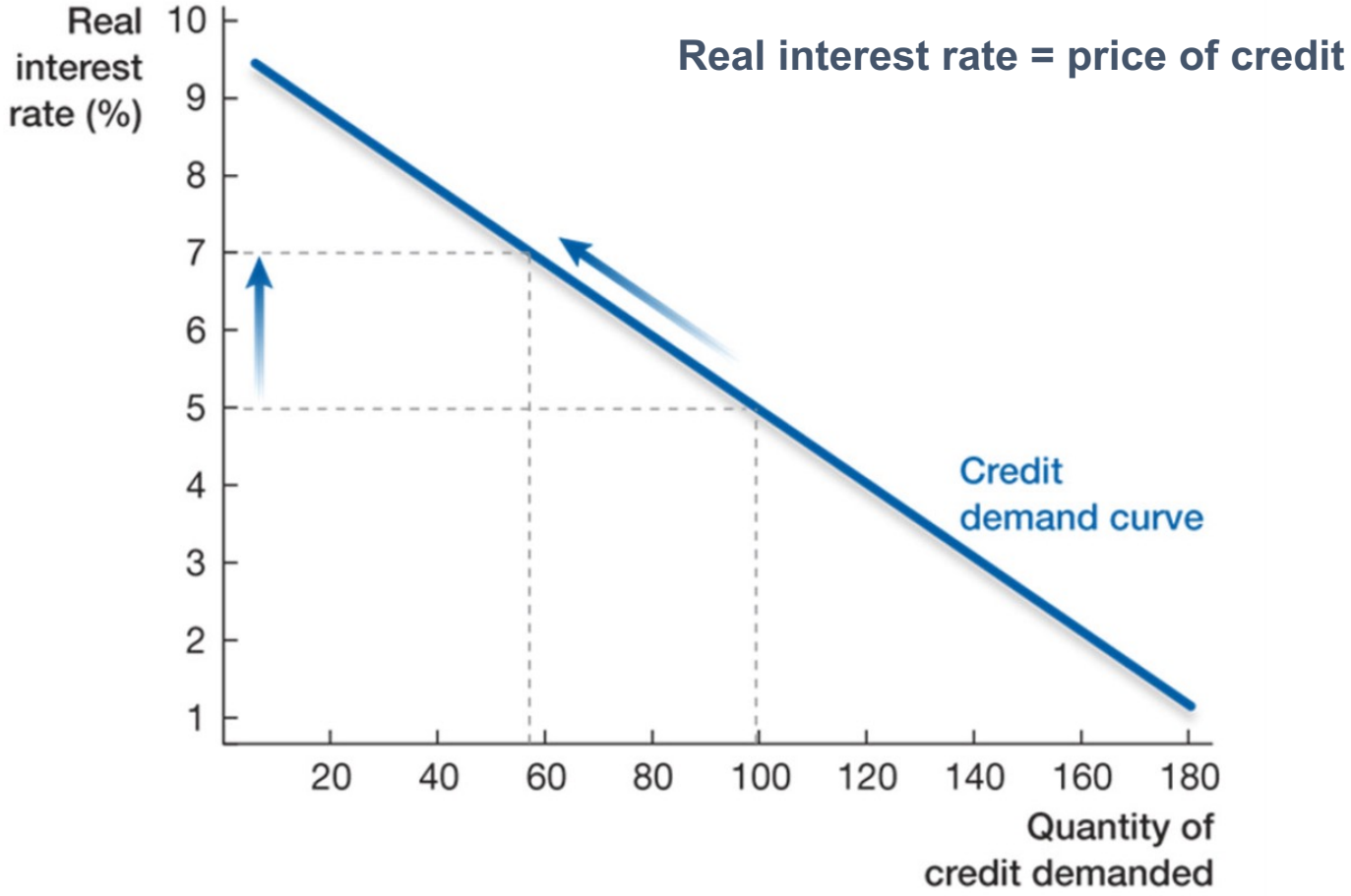
- Credit markets can facilitate this process
- They do this by matching lenders and borrowers and arranging for payments across time. But they also suffer from important drawbacks
- Two key variables in credit markets – loan quantities and interest
- We will demonstrate how this happens for three pillars of the financial industry – banks, bonds, and stocks.

The Credit Market

Credit Market

- Economists find it helpful to aggregate the behavior of buyers and sellers into *demand* and *supply.*
  - Demanders are borrowers – individuals and companies who require money now
  - Suppliers are lenders – individuals and companies who are willing to forgo access to their money, for a fee
- The quantity “sold” is total credit loaned/borrowed
- The price of the credit is the interest rate

Credit Market - Demand



Real interest rate = price of credit

Credit Market - Demand

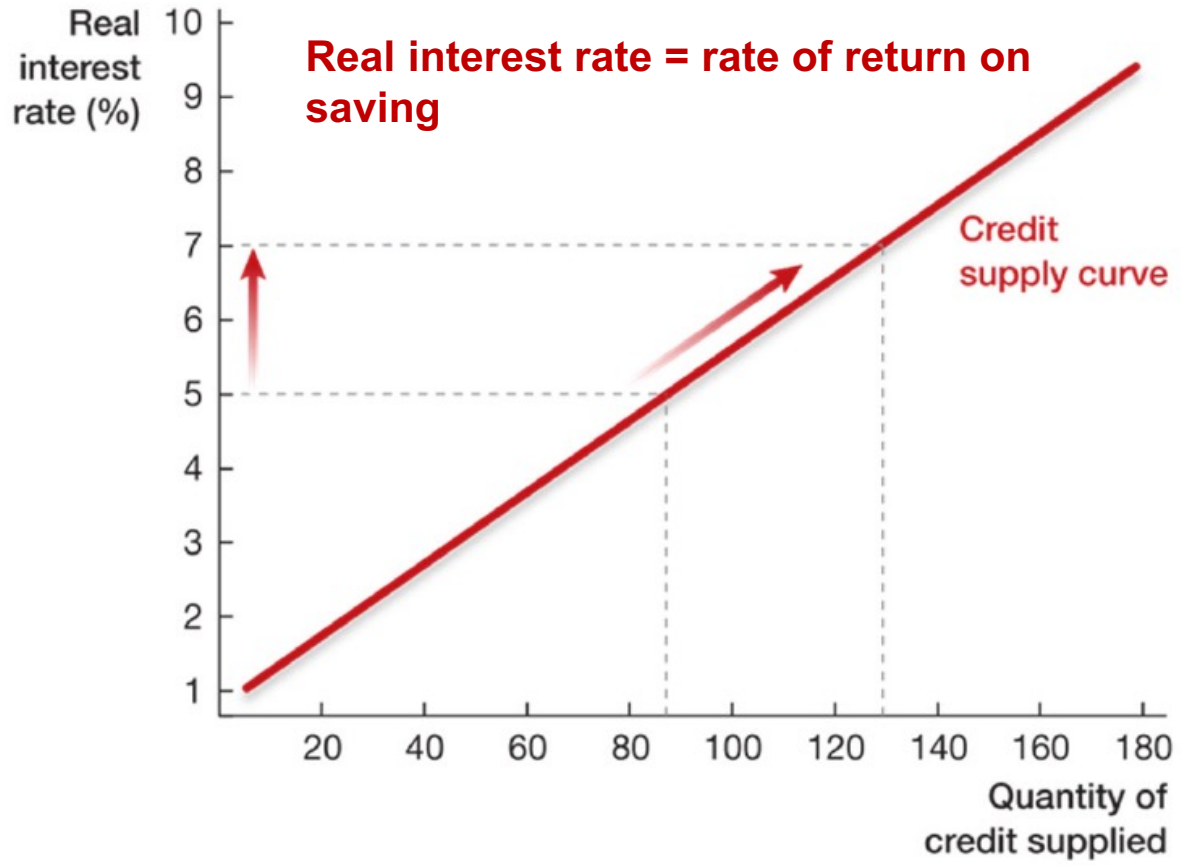
- Who demands credit?

1. Firms:
   a. Investment in new buildings, machines, tech development, etc.
   b. Day-to-day operations

2. Households:
   a. To make large purchases, such as a home or a car
   b. To cover a sudden shortfall in income

3. Government:
   a. Investment
   b. Budget shortfalls
   c. Stimulus

Credit Market - Supply



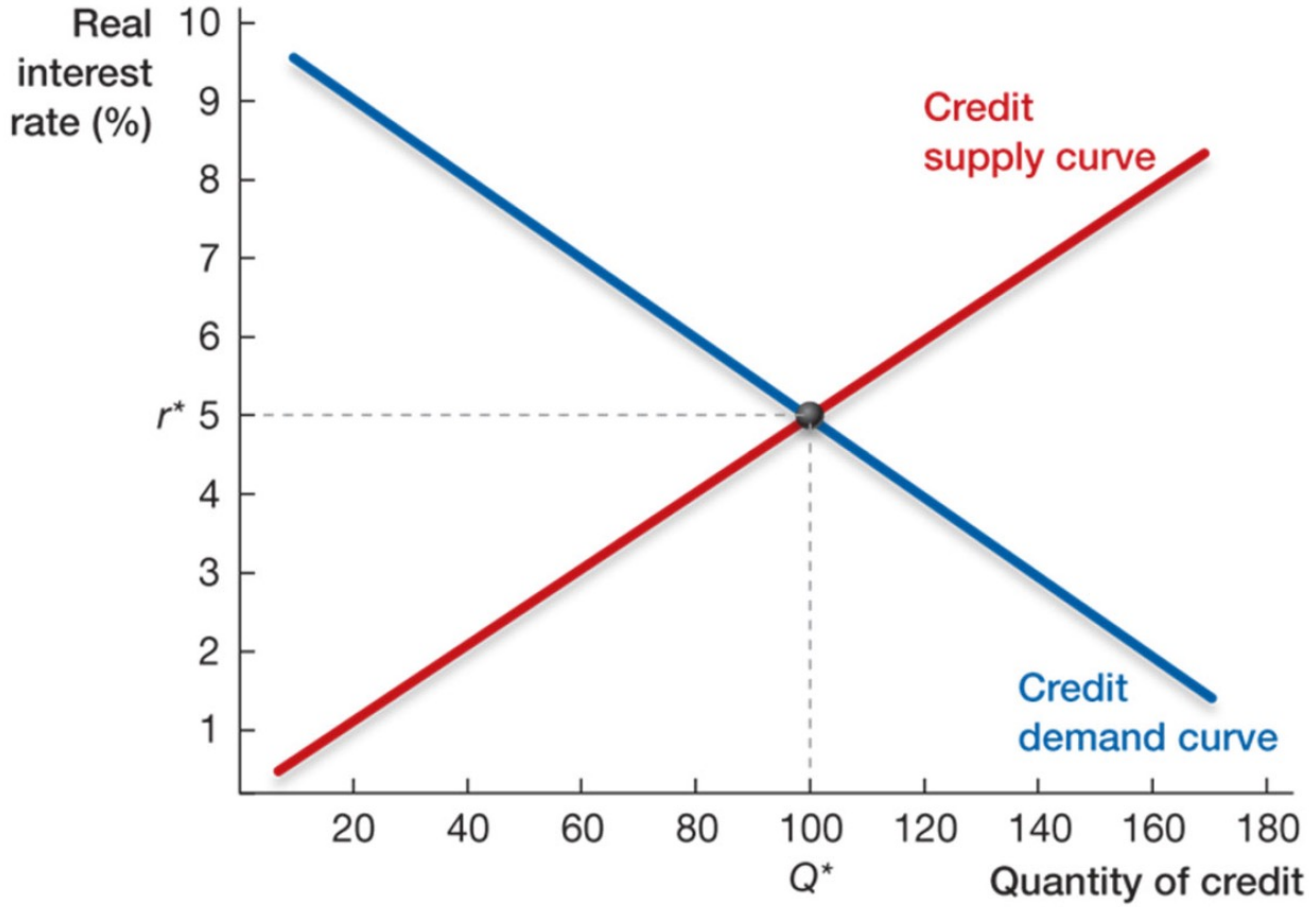
Credit Market - Supply

- Who supplies credit?

1. Households:
   a. Long term saving – retirement savings, college funds, stock portfolios
   b. Short term saving – checking and saving accounts, CD's

2. Firms:
   a. Retained profits
   b. Inter-firm investment

Credit Market - Equilibrium



The Social Role of Credit Markets

1. Individuals can save
   - No need to physically store cash
   - Provides a return to savers – compensates for risk and shares the creation of wealth

2. Firms and individuals can make big purchases and investments
   - Savers are incentivized to provide credit through interest rates

3. Facilitate efficient allocation of resources
   - Projects that get credit are those with higher returns: those that can afford the cost of credit
4. However, society may find this allocation unfair or unequitable from a normative perspective

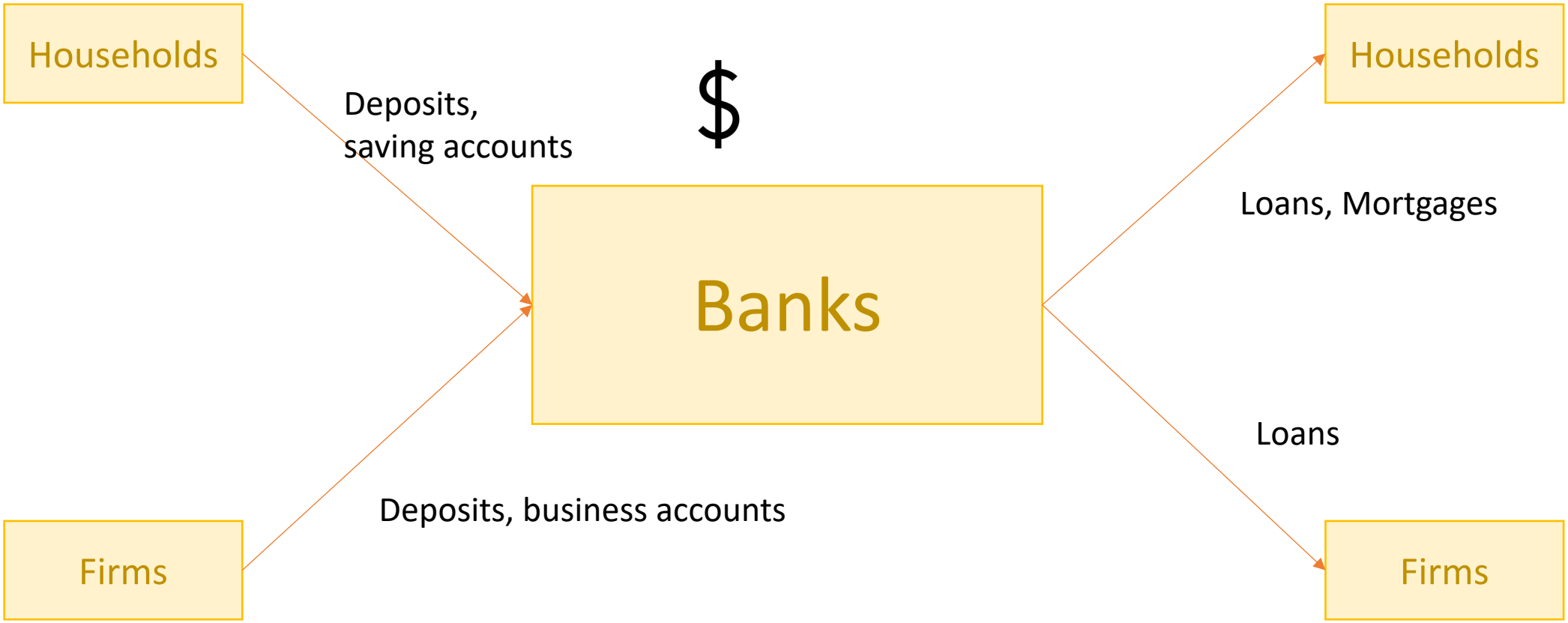
Credit Market - Recap

- Allow borrowers access to resources *now*
- Allow lenders to save for *later*, while compensating them for risk, inflation, and delayed consumption
- Both borrowers and lenders are heterogenous:
  - Some borrowers really want/need credit, and some less so.
  - Some lenders have no problem parting with their money for a long time, some less so
- The price of credit is the interest rate – it incentivizes more supply, while rationing demand
- In equilibrium credit is efficiently allocated – from lenders who are more willing to lend, to borrowers who really want to borrow.
- But society might view this allocation as unfair

Banks

- Banks match savers and borrowers by pooling small and large savings from many savers, and loaning it out (ideally, carefully)
- When you deposit money at a bank – you are *loaning* it to the bank. What do you get in return?
  - A safe place to store money
  - Interest rate (not really for the past decade – but changing)
  - Account management and transfer options (check book, budget analysis)
- Bank loans depositors' money out to borrowers for interest rates:
  - overdraft loans, mortgages, loans to small businesses, lines of credit to larger businesses, and, importantly, to the government
- The bank pockets the difference in interest rates, and charges fees for various services

Banks


Households
Deposits,
saving accounts
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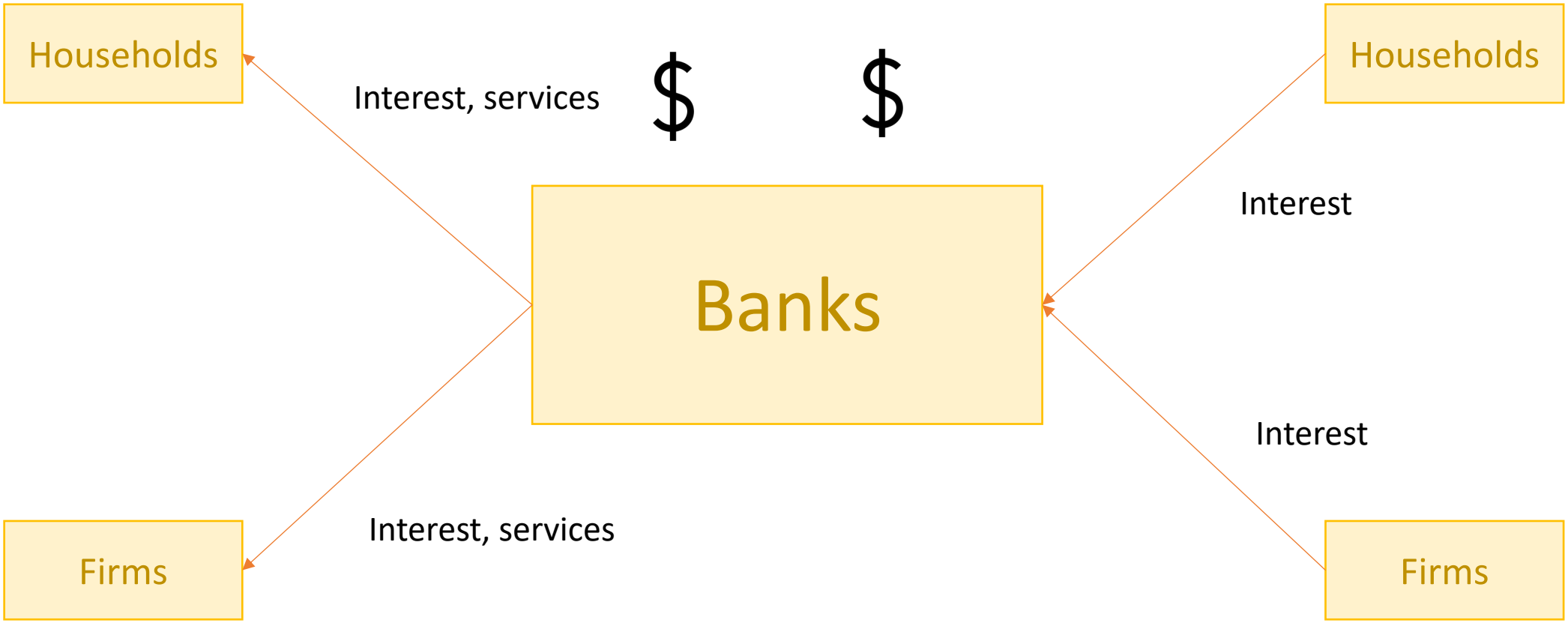
Banks
Households
Loans, Mortgages
Loans
Deposits, business accounts
Firms
Firms

Banks


Households
Interest, services
$
$
Households
Interest
Banks
Interest
Interest, services
Firms
Firms

The Social Role of Banks

- Allow easy storage of money and a (small, mostly risk-free) return for savers
- Pools and diversifies savings, so that no saver's money depends on one loan

- Provide credit to household and businesses through loans such as mortgages and small business loans

- Other services:
  - Allow easier facilitation of money transfers
  - Provide money managing services

Bank Runs

- Suppose you deposited $100 at the bank, and it loaned it out as part of a mortgage, and now you'd like to withdraw that $100. How would the bank pay you?
- What if all of us want our money back, at once?

- This is what is call a bank run – and it's the inherent tension in banking:
  - Bank take out highly liquid loans – deposits – that can be recalled at any time
  - Bank makes out illiquid loans – that get paid back slowly
- If more loans are called back than the bank has available liquidity – it will have *failed* and gone bankrupt.

- In the 1800's bank failure was common. Today banks are much safer because the gov' insures deposits through a program called the Federal Deposit Insurance Corporation (FDIC)

- Excessive risk-taking can lead to bank failure or a freeze-up of loans (2008 financial crisis)

Stocks and Bonds

Stocks and Bonds

- Stocks and Bonds are two additional key parts of the financial markets – that don't operate through banks
- They are financial securities: *Contracts that have value because they promise payment in the future*
- Securities can be bought and sold – the stock market, and the bond market
- Buying a security is equivalent to *lending*. Issuing a security is equivalent to borrowing.

Bonds

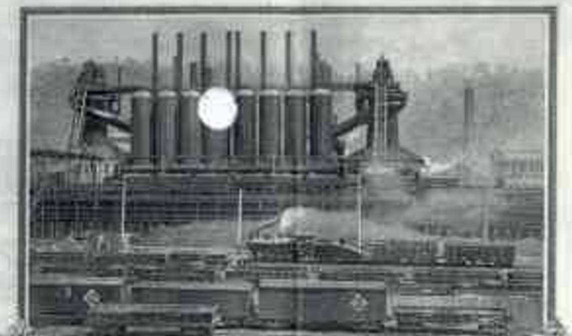
- Bonds are promises to make a *fixed schedule of* payments in the future. Owning a bond is thus owning a claim to this schedule of payments

- Usually include two types of payment:
  - Face value – a sum to be paid at the end (maturity)
  - Coupon payments – small payment 'along the way'

- The issuer sells these promises for future payments, in exchange for money *now.*

- How much the bond will fetch depends on the risk, on the maturity, on the coupons, and on the alternatives that are out there

STATE OF NEW JERSEY



5000 | 5000

UNITED STATES STEEL CORPORATION

SERIES B | № 147 | REGISTERED FIFTY YEAR FIVE PER CENT. GOLD BOND. | № 147 | SERIES B

United States Steel Corporation, a corporation created and existing under the laws of the State of New Jersey, and hereinafter termed the "Steel Company," for value received, promises to pay to ANDREW CARNEGIE or registered assigns on the first day of April A.D. 1951 at the office or agency of the Steel Company in the City of New York, the sum of —— FIVE THOUSAND DOLLARS —— in gold coin of the United States [illegible] at the rate of Five per cent per annum [illegible] February and August in each year. [illegible]

[illegible]

JUN 15 1901

UNITED STATES STEEL CORPORATION

By [signature]

[signature] SECRETARY

VICE PRESIDENT

CANCELLED FEB 19 1920 J. P. M. & CO.

Trading Bonds

Primary Market: firms or governments issue bonds, sell them to bondholders

Secondary Market: bondholders sell existing bonds to new bondholders – who will then get all subsequent payments

In the secondary market prices fluctuate – based on expectation for repayment and probability of default, as well as the alternative.

The secondary market is *much larger.*

Bond Prices and Yields

Bonds reflect a stream of future payments, from which we can derive the **present value** of the stock

Bonds also have a **market price**

A bond's **yield** links the two – it is the implicit interest rate that equates the price to the present value.

$$NPV = Price = \frac{Coupon_1}{(1+y)} + \frac{Coupon_2}{(1+y)^2} + \cdots + \frac{Principle}{(1+y)^T}$$

Social Role of Bonds and Bond Markets

- Bonds allow governments and large corporations to raise massive amounts of money
  - Potentially much more than a bank would be willing to provide – many lenders
- Bond markets allow bondholders to easily sell and buy bonds, providing flexibility and reducing risk for individual borrowers.
- Bond prices and yields offer us significant insight into the market's expectations of future economic conditions, inflation, interest rates, and default risk

Stocks

- Stocks, also known as shares, are pieces of a company
- If a company has 1,000 shares then each share represents ownership of 1/1,000 of the company
- Owning stocks of a company provides two benefits:
  - A claim on future earnings – paid through dividends
  - A voice in strategic decisions of the company (1 vote - 1 stock)

LESS THAN 100 SHARES

COMMON STOCK
PAR VALUE $5. PER SHARE

NUMBER
CG70-520

SHARES
—5—

INCORPORATED UNDER THE LAWS OF THE STATE OF DELAWARE

GENERAL MOTORS CORPORATION

THIS CERTIFICATE IS TRANSFERABLE IN NEW YORK, CHICAGO, DETROIT, WILMINGTON, DEL., TORONTO OR MONTREAL

REGISTERED:
THE NORTHERN TRUST COMPANY
(CHICAGO)
REGISTRAR
By _____
AUTHORIZED OFFICER

This is to Certify that JAMES D. HART, TRUSTEE U/W
AGNES BRANDENSTEIN

is the owner of —FIVE— fully paid and non-assessable shares OF THE PAR VALUE OF $5. EACH OF THE COMMON STOCK OF GENERAL MOTORS CORPORATION (HEREINAFTER CALLED THE "CORPORATION"), transferable in person or by duly authorized attorney upon surrender of this Certificate properly endorsed. A statement of the rights, privileges, preferences, restrictions and voting powers of the several classes of stock of the Corporation is printed on the reverse side hereof, and this Certificate and the shares represented hereby are subject to all the terms, conditions and limitations of the Certificate of Incorporation and all Amendments thereto and Supplements thereof (copies whereof are on file with the Transfer Agent).
This Certificate is not valid until countersigned by the Transfer Agent and registered by the Registrar.

Witness the signatures of its duly authorized officers MAR - 1 1955

G. A. Brooks
SECRETARY

[illegible] Curtice
PRESIDENT

By _____
AUTHORIZED OFFICER

COUNTERSIGNED:
CONTINENTAL ILLINOIS NATIONAL BANK AND TRUST COMPANY OF CHICAGO
(CHICAGO)
TRANSFER AGENT

LESS THAN 100 SHARES

TENS	UNIT
1	1
2	2
3	3
4	4
5	
6	6
7	7
8	8
9	9
	0

SPECIMEN

E. A. WRIGHT BANK NOTE CO., PHILA.

Trading Stocks

- Initial Public Offerings (IPOs): When a company first goes public it sells parts of itself to the public.
  - The proceeds go to the company, and the issued stock (=% ownership) belong to the buyers
- IPOs are usually used to finance investment
- In 2021 a total of $286 Billion were raised through IPOs

- Existing public stock can also be traded on the secondary market – one member of the public sells their stock to another, an exchange which determines the current price of the stock.
- 5-10 Billion shares are traded daily on the NY stock exchanges.
- The total value of stocks on US exchanges is roughly 20 trillion dollars. About the GDP of the US.

Stock Prices

- Stock prices also reflect a net present value of payments
  - Recall: stock payments are *uncertain*, but can potentially go on forever

- Stocks don't have yields – instead, they have inferred discount rates, which are the rate of return and are similar in principle to interest rates.

$$NPV = Price = \frac{Dividend_1}{(1 + discount)} + \frac{Dividend_2}{(1 + discount)^2} + \cdots = \sum_{t=1}^{\infty} \frac{E[Dividend_t]}{(1 + discount)^t}$$

- Generally stock discount rates will be higher than bond yields, since they are riskier.

- Stock returns are can be thought of as an equivalent **bond's return** + **risk premium**

Stock Prices

Stock prices can change according to three things:

1. Expectation over future earnings – investors get good news about the overall economy, or about particular sectors or even companies
   - Inflation is falling, improving economic outlook
   - Transition to renewable energy improves outlook for mining, dims prospects for oil
   - Tesla reports high demand for new model

2. Changes to risk premium – investors believe there is less risk in the market or in a particular stock

3. Changes to returns on alternative assets – yields for bonds went up, and now investors need extra incentive to holder riskier stocks.

The Efficient Market Hypothesis

- If investors expect future profits to be higher, they will push up the price today.
- Any existing information in the market pushes demand for a stock up and down, recalibrating its price.
- If true, prices already reflect the aggregate knowledge, then you cannot consistently beat the market unless you have information the market does not.

"It is virtually impossible for individuals to day trade for a living. […] We find that 97% of all individuals who persisted [day trading] for more than 300 days lost money. Only […] 0.5% earned more than the initial salary of a bank teller — all with great risk."

Fernando Chague, Rodrigo De-Losso, Bruno Giovannetti (2020)

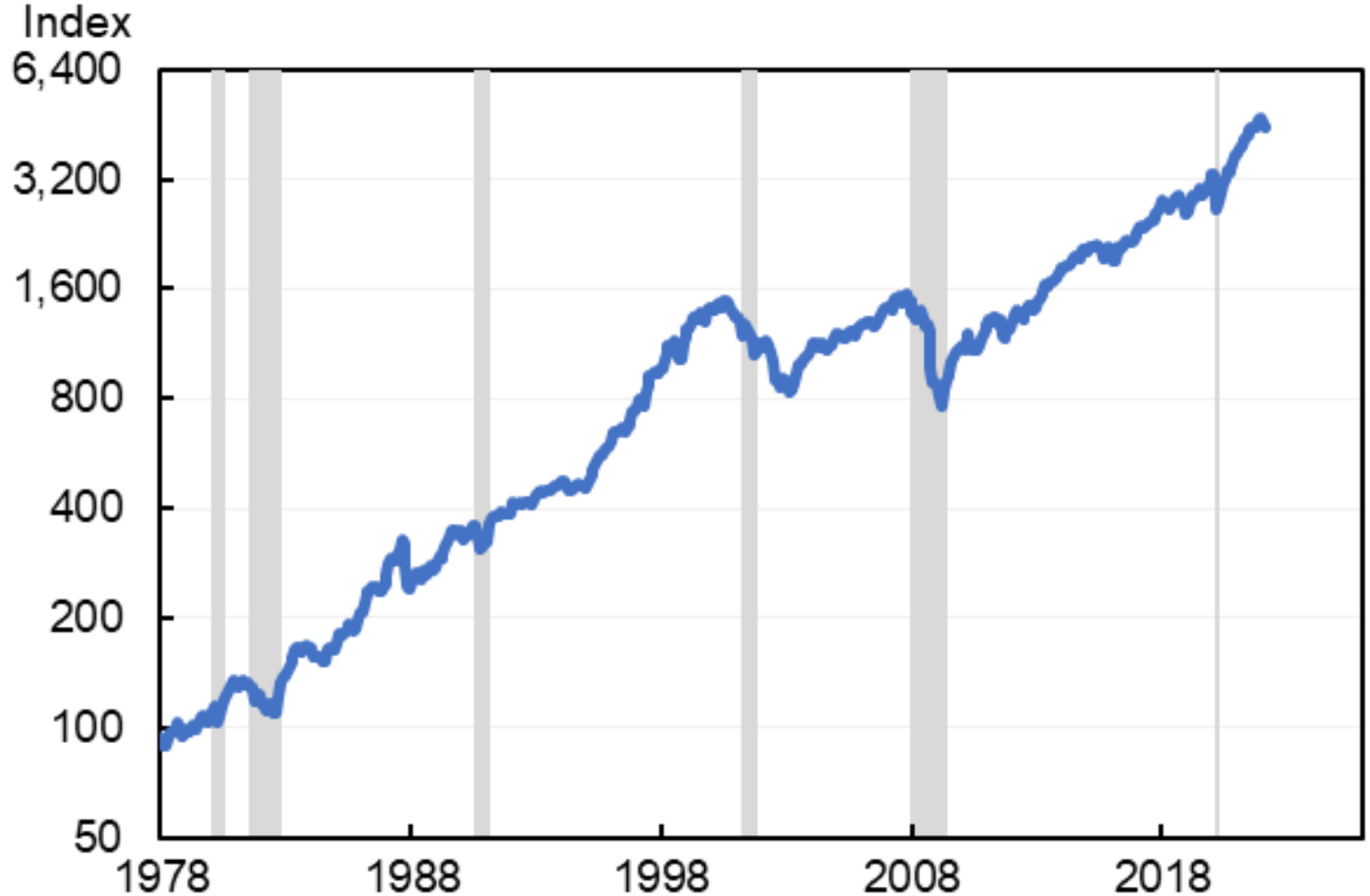
Stocks vs Bonds

Stocks	Bonds
Flow of dividend payments, based on **profits**, at discretion of company's management	Flow of **fixed** coupon payments scheduled in advance
Payments continue until company goes bankrupt (or stock is sold)	Payments continue until maturity, then face value repaid (or bond is sold)
If bankrupt, stockholders paid last (and probably nothing)	If bankrupt, bondholders paid before stockholders (Lehman unsecured creditors received ~40 cents on the dollar)
Returns subject to greater uncertainty	Returns subject to less uncertainty

Stocks vs Bonds

- Stocks are riskier than bonds!
  - Stock holders get all the upside of the company. Apple's share cost $0.51 in 1980. It is now $163.5. But Apple's lenders in 1980 did not enjoy this meteoric success.
  - Stock holders also get most of the downside. If a company goes bankrupt they are the last to be paid. Bondholders will get whatever is left after liquidation, and only after they have been paid in full will stockholders get anything. Lehman Brothers went bankrupt in 2008. Most bondholders got about 50% of their money back. Shareholders got nothing.
- More risk implies more volatility – stocks go up and down more, though historically up over long horizons

S&P 500 Index (Price Return)



Note: Shading denotes recession.
Source: S&P Dow Jones Indices; Macrobond.

Social Role of Stocks and Stock Markets

- Companies can raise money without taking debt
  - very important for risky companies
- Members of the public can own and claim a share of firms' profits, and have a voice in their management. (i.e. 'own the means of production.')
- Can construct diversified investment portfolios which reduce risk
- Price discovery – stock prices offer insight into overall expectations over the health of the economy, particular sectors, and individual companies
- However, many individuals do not participate in stock markets

Section Recap

- Financial markets facilitate efficient movement of resources *across time* and *between users* by matching borrowers with a high willingness to pay with lenders who are willing to part with their money.

- Modern financial markets offer a myriad of tools to save and invest, each with different risks and time horizons and hence different costs (to borrowers) and returns (to lenders).

- In the process they redistribute resources and offer us significant insight into the economy.

- Three big concerns:
  - Credit markets can also catalyze or worsen economic crises – through bank runs or excessive risk taking
  - Many households are not sufficiently informed, and often make costly mistakes
  - Society might find the efficient, market-driven, allocation unfair