

## Principles of Macroeconomics

Prof. Dr. Dennis A. V. Dittrich

Touro College Berlin

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3. What do you think creates the good institutions that exist in rich countries? Why don't these institutions—property rights, markets, a society where you can usually trust strangers—exist everywhere on the planet?

4. Many people say that “the rich grow richer and the poor grow poorer.” Is this what Figure 26.11 says about the countries in that graph? Did the rich countries grow more quickly or more slowly than the poor countries?

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6. If the government of a poor catch-up country is trying to decide whether to encourage investment or encourage research and development, which of the two should it favor?

7. Consider the following three countries that produce GDP this way:  $Y = 5\sqrt{K}$

Ilia:  $K = 100$  machines

Caplania:  $K = 10,000$  machines

Hansonia:  $K = 1,000,000$  machines

What will GDP ( $Y$ ) be in these three countries? Hansonia has 10,000 times more machines than Ilia, so why isn't it 10,000 times more productive?

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1. If a country starts off as rich as the United States, with a GDP per capita of \$46,000, and if GDP per capita grows 3% per year, then how many years will it take before GDP per capita is \$1,000,000 per year?

2. If a country with a GDP per capita of \$4000 at its start grows at 8% per year, how many years will it take before GDP per capita is \$46,000?

5. Let's keep track of a nation's capital stock for five years. Mordor starts off with 1,000 machines, and every year, 5% of the machines depreciate or wear out. The people in this land produce 75 machines per year, every year. Fill in the table.

Year	Capital	Depreciation	Investment
1	1,000	$0.05 \times 1,000$	75
2	1,025		75
3			75
4			75
5			75

$$Y = 5\sqrt{K}$$

Ilia:  $K = 100$  machines

Caplania:  $K = 10,000$  machines

Hansonia:  $K = 1,000,000$  machines

8. Consider the data in the previous question: If 10% of all machines become worthless every year (they depreciate, in other words), then how many machines will become worthless in these three countries this year? Are there any countries where the amount of depreciation is actually greater than GDP?

9. No country makes only investment goods like machines, equipment, and computers. They also make consumer goods. Let's consider a case where the countries in question 7 devote 25% of GDP to making investment goods (so  $\gamma$ , gamma, = 0.25). What is the amount of savings in these three countries? In which countries is Investment < Depreciation? When is Investment > Depreciation?

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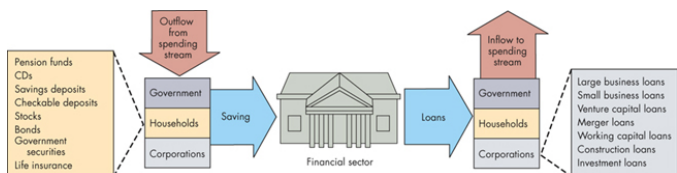
# The Financial Sector and the Economy

- ▶ The financial sector is central to almost all macroeconomic debates
- ▶ The **real sector** is the market for the production and exchange of goods and services
- ▶ The **financial sector** is the market for the creation and exchange of financial assets
- ▶ Financial assets include money, stocks, and bonds
- ▶ Plays a central role in organizing and coordinating our economy

# Why is the Financial Sector Important to Macro?

- ▶ For every real transaction, there is a financial transaction that mirrors it
- ▶ The financial sector channels savings back into spending
- ▶ For every financial asset, there is a corresponding financial liability
- ▶ Financial assets are assets such as stocks or bonds, whose benefit to the owner depends on the issuer of the asset meeting certain obligations
- ▶ Financial liabilities are obligations by the issuer of the financial asset

# The Financial Sector as a Conduit for Savings



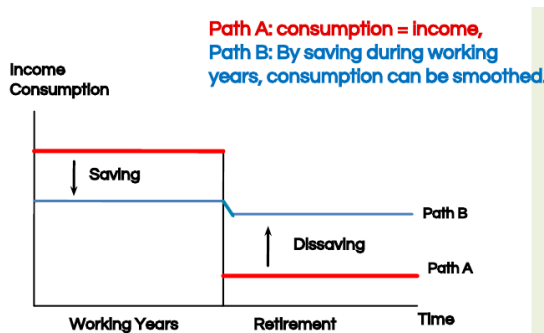
- ▶ Financial institutions channel savings back into the spending stream as loans
- ▶ **Saving** is outflows from the spending stream from government, households, and corporations
  - ▶ Savings deposits, bonds, stocks, life insurance
- ▶ **Loans** are made to government, households, and corporations
  - ▶ Business loans, venture capital loans, construction loans, investment loans

# What Determines the Supply of Savings?

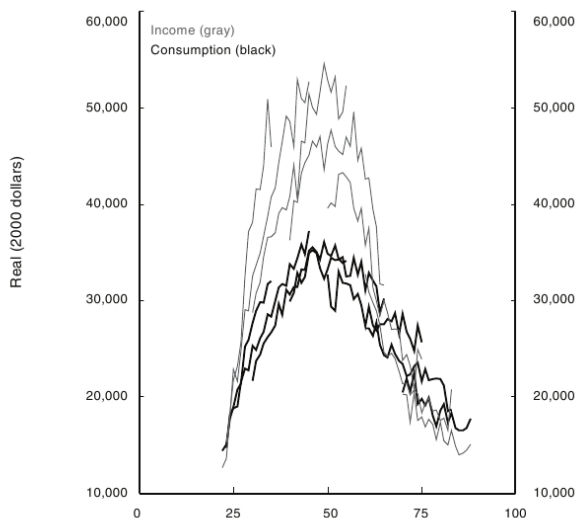
1. Smoothing consumption
2. Impatience
3. Market and psychological factors
4. Interest rates

# Individuals Want to Smooth Consumption

- Save during working years to provide for retirement.
  - ▶ Savings rises as life expectancy rises (or retirement age drops)
- Manage fluctuations in income.
  - ▶ Save during good times in order to ride out the bad times.



# Income & Consumption over the life course



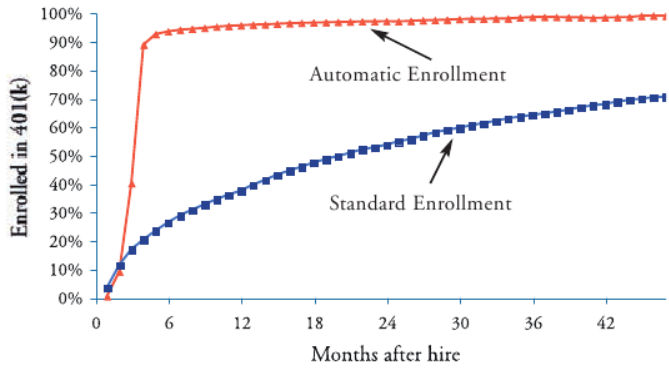
# Individuals Are Impatient

Time preference: the desire to have goods and services sooner rather than later.

- ▶ Anything with immediate costs and future benefits must overcome time preference.
- ▶ People who discount future consumption more will save less now.

# Marketing and Psychological Factors

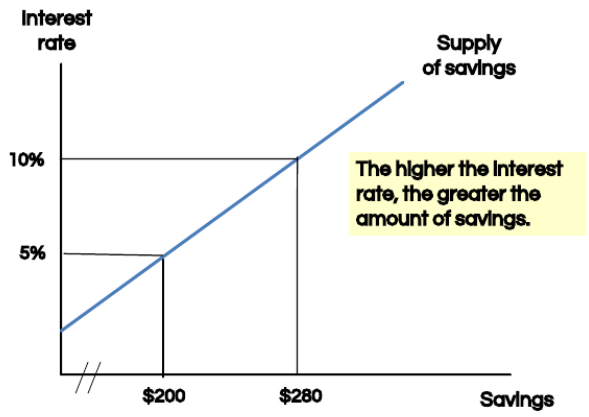
401(k): Longterm Effect of Automatic Enrollment



NBER, 2004, Choi et. al

# The Interest Rate

- ▶ Interest is the reward for savings. It's the "price" of savings.
- ▶ The higher the interest rate, the greater the quantity saved.



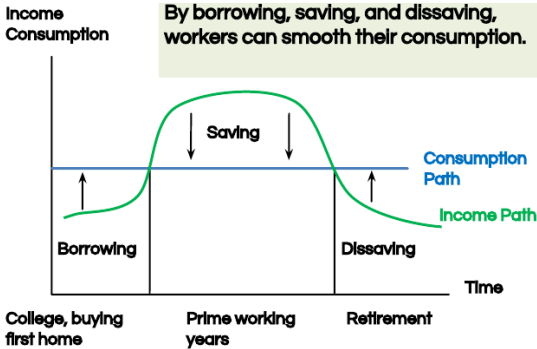
# What determines the demand for borrowing?

1. Smoothing consumption
2. Financing large investments
3. The interest rate

# Smoothing Consumption

Lifecycle Theory of Saving

Nobel laureate Franco Modigliani:  
By borrowing, saving, and dissaving at different times in life, workers can smooth their consumption path, improving their overall satisfaction.

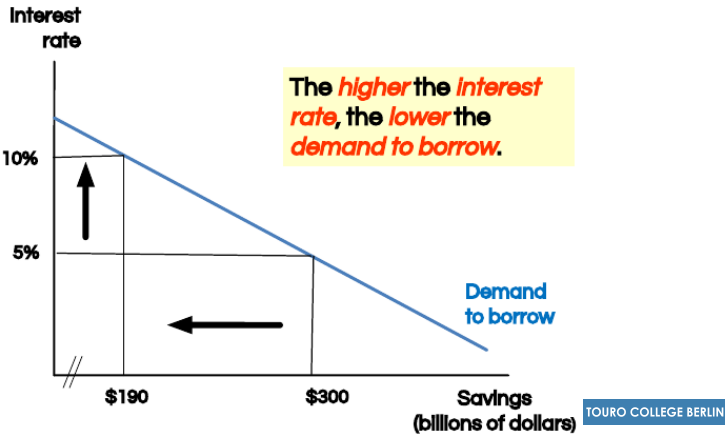


# Borrowing Is Necessary to Finance Large Investments

Without the ability to borrow many profitable investments will not happen.

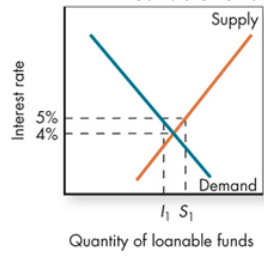
### The Interest Rate

- ▶ Determines the cost of the loan.
- ▶ An investment will be profitable only if its rate of return is greater than the interest rate.



### The Role of Interest Rates in the Financial Sector

- ▶ The **interest rate** is the price paid for use of a financial asset
- ▶ The long-term interest rate is the price paid for financial assets with long maturities,
  - ▶ The market for long-term financial assets is called the **loanable funds market**

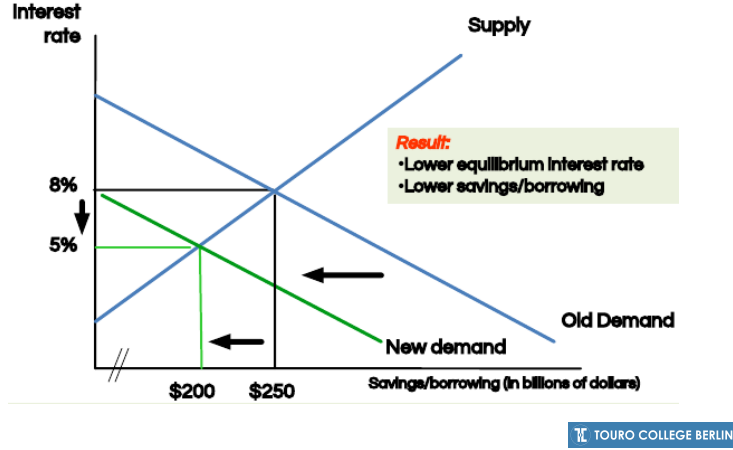
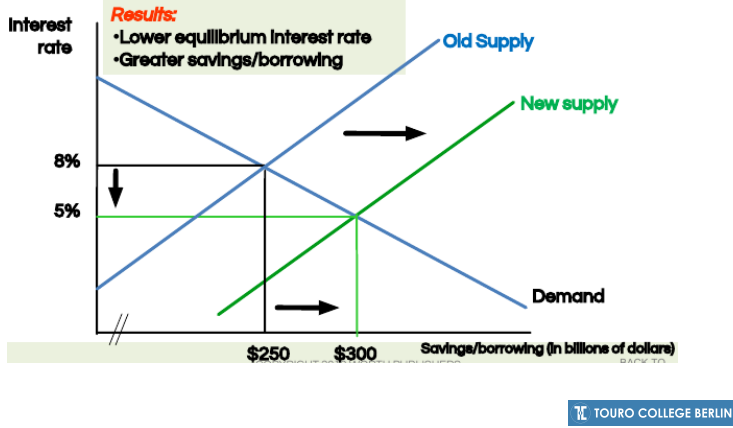


At equilibrium, the quantity of loanable funds supplied (savings) is equal to the quantity of loanable funds demanded (investment)

- ▶ The short-term interest rate is the price paid for financial assets with short maturities,
  - ▶ Short-term financial assets are called **money**

If the stock market crashes, people save more to restore their wealth

If investors become more pessimistic during a recession, they reduce their borrowing.



### The Role of Intermediaries

Banks, Bonds, and Stock Markets

- ▶ Financial Institutions reduce the costs of moving savings from savers to borrowers and investors.
- ▶ Middlemen who help coordinate financial markets.
- ▶ Help move savings to more highly valued uses.
- ▶ Let's examine three financial intermediaries:
  1. Banks
  2. Bond markets
  3. Stock markets

### Banks

- ▶ Gather savings
- ▶ Reduce risk by evaluating ability to pay off loans.
- ▶ Spread risk
- ▶ When a borrower defaults on a loan, the bank spreads the loss among many depositors.
- ▶ Coordinate lenders and borrowers.
- ▶ Minimize information costs.

Conclusion: Banks help gather savings and allocate it to the most productive uses.

Besides decreasing the number of banks, how do bank failures hinder financial intermediation?

## The Bond Market

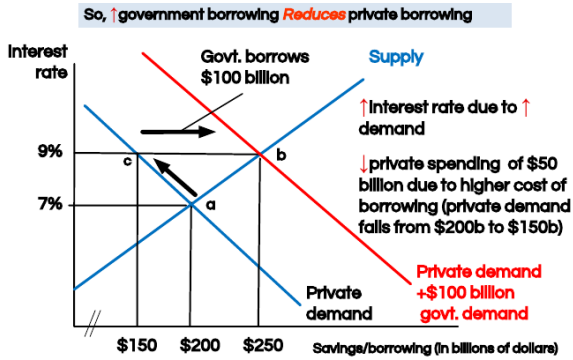
- ▶ A bond is a sophisticated IOU that documents who owns how much and when payment must be paid.
- ▶ Issuing bonds allows borrowing directly from the public.
- ▶ Lender: one who buys a bond
- ▶ Borrower: one who issues a bond
- ▶ Corporations and governments at all levels borrow money by issuing bonds.
- ▶ All bonds involve a risk.
  - ▶ Major issues are graded by rating companies: Standard and Poor's, Moody's
  - ▶ Grades range from lowest risk (AAA) bonds in current default (D)
  - ▶ The higher the risk the greater the interest rate required to get lenders to buy the bonds.

## The Bond Market

- ▶ Collateral: something of value that by agreement becomes the property of the lender if the borrower defaults.
- ▶ The higher the collateral the lower the risk (and therefore interest rate)
- ▶ Other elements of interest rate determination:
  - ▶ Repayment time
  - ▶ Amount of loan
  - ▶ Type of collateral
  - ▶ Risk of borrower default
 the higher the risk the higher will be the rate of return.
  - ▶ Home mortgage rates are lower than vacation loans because mortgage loans are backed by collateral.

## Governments issue bonds to borrow money.

- ▶ Government borrowing can crowd out private spending.
- ▶ Crowding-out: the decrease in private consumption and investment that occurs when government borrows more.



## The Bond Market

- ▶ Equally risky assets must have the same rate of return. If not, there will likely be arbitrage.
- ▶ Rate of Return: the implied interest rate (%) the bond earns.
- ▶ Arbitrage: the buying and selling of equally risky assets (to exploit differences in price).
- ▶ Interest rates and bond prices move in opposite directions. Changing interest rates will change a bond's market value.
- ▶ Bond buyers face interest rate risk along with default risk.

## The Stock Market

- ▶ A stock (or a share) is a certificate of ownership in a corporation.
- ▶ Stocks are traded in organized markets called stock exchanges.
- ▶ New York Stock Exchange (NYSE) is the largest. Tokyo Stock Exchange (TSE) is the second largest.
- ▶ Sales of new shares:
  - ▶ IPO (initial public offering): the first time a corporation sells stock to the public in order to raise capital
  - ▶ Typically used to buy new capital goods.
- ▶ Stock markets encourage investment and growth.

## What Happens When Intermediation Fails?

### Insecure Property Rights

- ▶ Some governments fail to protect property rights. Saved funds can be confiscated, frozen, and otherwise restricted. Result: people are reluctant to put their savings in domestic institutions.
- ▶ Example: Argentina and Brazil. Both have a history of freezing bank accounts. Argentines and Brazilians save less. Result: less investment and lower economic growth.

### Controls on Interest Rates and Inflation

- ▶ Usury Laws: create legal ceilings on interest rates. Result: less saving and investment.

# What Happens When Intermediation Fails?

## Inflation

- ▶ When combined with controls on interest rates, inflation destroys the incentive to save.
- ▶ Nominal interest rate: the named rate; the rate on paper.
- ▶ Real interest rate: the rate of return after adjusting for inflation.
- ▶ Real interest rate = Nominal interest rate – Inflation rate

Country	Years	Real Interest Rate (%)	Per capita growth (%)
Argentina	1975-1976	-69	-2.2
Bolivia	1982-1984	-75	-5.2
Chile	1972-1974	-61	-3.6
Ghana	1976-1983	-35	-2.9
Peru	1976-1984	-19	-1.4
Poland	1981-1982	-33	-8.6
Sierra Leone	1984-1987	-44	-1.9
Turkey	1979-1980	-35	-3.1
Venezuela	1987-1989	-24	-2.7
Zaire	1976-1979	-34	-6.0
Zambia	1985-1988	-24	-1.9

# The Financial Crisis of 2007–2008

- ▶ Many mortgage loans were bundled and sold as if they had very low risk.
- ▶ Some were sold on false terms.
- ▶ Credit rating agencies failed at their job.
- ▶ People expected housing prices to continue to rise.
- ▶ Housing prices fell.
- ▶ Many people defaulted on their mortgages.

# Securitization

- ▶ Loans can be bundled together (“securitized”) and then sliced up and sold on the market as financial assets.
- ▶ This has benefits:
  - Provides safety and liquidity for the bank selling the securitized mortgages
  - Provides a path for others to invest in the American economy
- ▶ And it has costs:
  - Securitization can hide risk and bad loans.

# What Happens When Intermediation Fails?

## Politicized Lending and Government Owned Banks

- ▶ Example: Japan 1990 to 2005: Many banks were bankrupt or propped up by the government (“Zombie banks”). They were not loaning funds for efficient uses. Other banks were pressured to lend money to well- connected political allies.
- Result: economic growth was zero during this period.

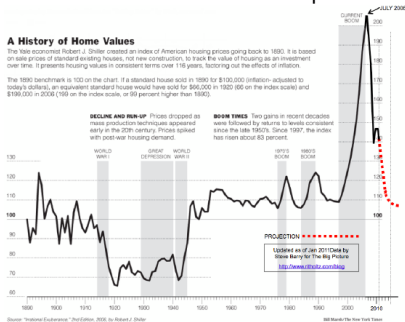
## Bank Failures and Panics

- ▶ Systemic problems usually lead to large-scale economic crises.
- ▶ During the Depression, between 1929-1933: 11,000 banks (almost half of U.S. banks) failed.
- ▶ Ripple effects:
  - ▶ Businesses could not get working capital.
  - ▶ Many people lost their life savings, resulting in lower spending.
  - ▶ Huge amounts of bad loans on the books of financial institutions.
  - ▶ Banks could not get funds to loan.

# Leverage

- ▶ Since everyone assumed real estate values would only climb, both households and banks became much more “leveraged.”
- ▶ Owner equity is the value of the asset minus the debt:  $E = V - D$ .
- ▶ The leverage ratio is the ratio of debt to equity,  $D/E$ .
- ▶ Any insolvent firm has liabilities that exceed its assets.

The problem? None... unless real estate drops.



# The “Shadow Banking System”

- ▶ Alternative banks (hedge funds, money markets and investment banks) have grown up in the shadow of traditional commercial banks.
- ▶ 2008: these “Shadow banks” loaned \$20 trillion (more than traditional banks)
- ▶ Shadow banks are not insured by the Federal Deposit Insurance Corporation (US), nor are they heavily regulated.
- ▶ When investors got worried about Lehman Brothers’ solvency, it set off a wider bank panic and government bailouts.

## The Many Interest Rates in the Economy

- ▶ The economy doesn't have just a single interest rate; it has many
- ▶ Each financial asset will have an implicit interest rate associated with it
- ▶ In a multiple-asset market, the potential for the interest rate in the loanable funds market to differ from the interest rate in the market for a particular asset is large
  - ▶ The result can be what is sometimes called a financial asset market bubble  
An example of a financial asset market bubble:
    - ▶ In the early 2000s prices of houses increased by 10% to 15% per year
    - ▶ Many people bought houses for speculative purposes
    - ▶ In 2007, people lowered their expectations of housing price appreciation
    - ▶ The demand for housing decreased substantially, and the equilibrium price fell