

LECTURE VI

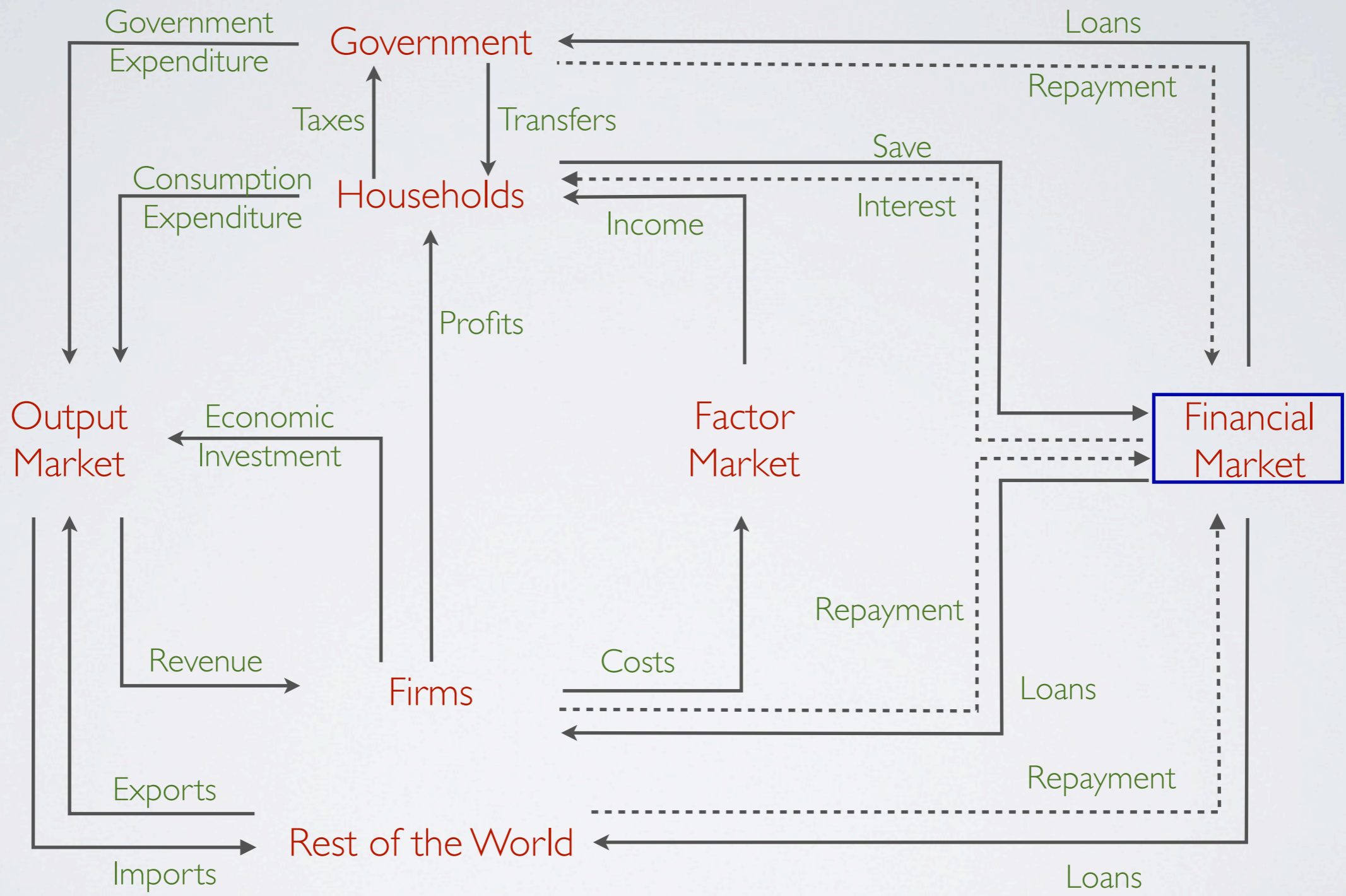
21 February 2012

TOPIC 7

Interest Rates and the Economy

BIG PICTURE

- What are components of the financial markets and what purpose do they serve in the economy?
- What motivates pricing of financial assets? (Hint: time and risk)
- How can we combine financial markets and economic investment to model markets for loanable funds for investment?

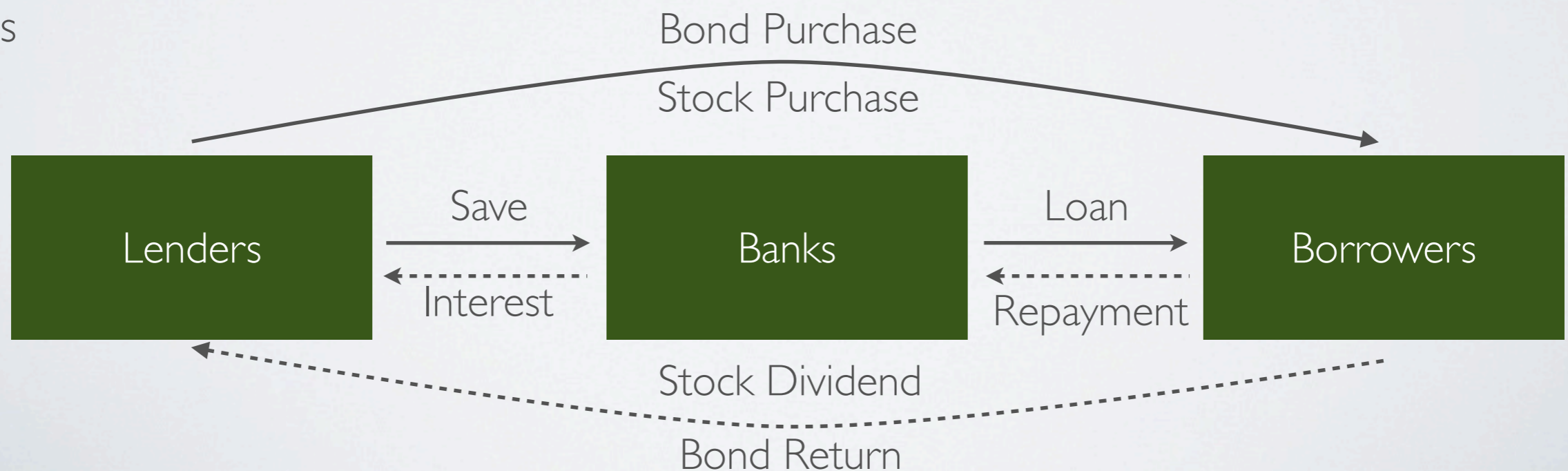


BASICS OF FINANCE

- Financial markets: move money from those that save to those that borrow (here, investment)
 - **Economic investment:** Payments for new additions to public or private capital stock
 - **Financial investment:** Buying or building an asset with expectation of financial gain (broader definition)
- *We are interested in economic investments, unless otherwise specified*

FINANCIAL MARKETS

- Two types:
 - **Bond Markets:** A loan to a company. The bond indicates the quantity and timing of repayment
 - **Stock Markets:** Piece of ownership in a firm. Returns come through share of profits (dividends)
- Financial intermediaries are institutions that make transfer of funds easier: banks and mutual funds



SAVINGS: PRESENT VALUE

- What factors do you consider when saving, spending, or investing?
- Present Value:
 - Would you rather have \$100 today or \$100 10 years from now?
 - How about \$100 today or \$200 5 years from now
- Need **present value**: the amount of money needed today given interest rates to produce a given future amount of money
 - Think about the example. If I could invest \$100 today and get \$300 in 5 years or get \$100 today and get \$150 in 5 years, the attractiveness changes

SAVINGS: PRESENT VALUE

Compound interest is the most powerful force in the universe.
- Einstein

- Need to figure out how interest rates affect financial investments
- **Compound interest:** interest accrues not only on original money but also on previously received interest
- Suppose you invest \$100 at 10% interest a year:
 1. $\$100 + .10 * \$100 = \$110$ (net +\$10)
 2. $\$110 + .10 * \$110 = (1 + .10) * \$110 = (1 + .10) * (1.10) * \$100 = \$121$ (net +\$11)
- So after t years, the investment is worth $(1 + .10)^t * 100$

SAVINGS: PRESENT VALUE

- P - initial investment, i - interest rate, Y - final yield, then $Y = P * (1 + i)^t$
- The **present value of Y is then the money we would need to invest today** or $P = Y / (1 + i)^t$
- Back to: How about \$100 today or \$200 5 years from now with interest rate 5%
 - With interest rate 20%?

SAVINGS: RISK

- Not all returns are certain, think of stocks
- We assume most people are **risk averse**, i.e. would rather have a sure thing with a lower expected value than a gamble that *might* give a better return. Is this assumption valid?
- Recall return on sure investment after 1 period: $\text{Return} = \text{Investment} * (1 + i)$
- On a risky investment: $\text{Return} = \text{Investment} * (1 + i) * \text{Probability}(\text{Event with return (positive) or loss (negative) } i)$
- i changes with the events

SAVINGS: RISK EXAMPLE

- Ex1: A \$100 bond that will default (total loss) with 50% probability or give a 10% return with 50% probability:
 - $Y = .5 * \$100 * (1 + .1) + .5 * \$100 * 0 = \$55$
- Ex2: A \$100 bond that has 0 return with 50% or 5% with 50% probability
 - $Y = .5 * \$100 * (1 + 0) + .5 * \$100 * (1 + .05) = \$102.5$
- Ex3: A bond that defaults with 50% probability or has a 200% return with 50% probability
 - $Y = .5 * \$100 * 0 + .5 * \$100 * (1 + 2) = \$150$
- Which ones might you invest in?

SAVINGS SUMMARY

- We consider present value and risk when buying investments
 - Higher interest rates lower the present value of future assets
 - Higher interest rates are needed to make risky investments attractive
- Efficient market hypothesis: Asset prices reflect all publicly available information about the value of an asset, including riskiness and future value
 - Why was this a problem in the financial crisis with collateralized debt obligations?

RISK-FREE RATE OF RETURN

- Short-term US bonds are considered to be **risk free**. Why?
- Interest rates on these bonds are **risk-free interest rates**
- These bonds still pay a positive return, even though they are risk-free. Why?
 - People still prefer to consume now rather than later
- Riskier assets might use the risk-free rate as a base line
- The Federal Reserve can control the risk-free rate, and thus has an ability to influence the price of all assets

DIVERSIFICATION

- Riskier assets can be appealing because of a higher return (compared to US bonds, for example)
- Diversification of assets in terms of risk is a way to make your overall portfolio “safer.” Why?
- **Diversifiable Risk:** risk that can be reduced by diversification, i.e. what is bad for Microsoft stock might be good for Apple stock
- **Non-diversifiable Risk / Systemic Risk:** Risk that cannot be reduced by diversification (i.e. that caused by a recession since it hurts the value of all assets)
- Riskier assets typically have lower prices (equivalent to higher returns) to compensate for the risk