

Investment Demand and Saving Supply

ECO 120: Global Macroeconomics

Goals

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- Explain how investment and savings are related in equilibrium
- Identify what influences investment demand
- Identify and explain three components of savings supply: private saving, government saving, rest-of-world saving
- Identify what influences private savings, government saving, and rest-of-world saving
- Identify how changes in private saving affect equilibrium outcomes for investment and interest rates
- Identify how changes in government policies affect equilibrium outcomes for investment and interest rates
- Identify how changes in international trade outcomes affect equilibrium outcomes for investment and interest rates

Reading and Exercises

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- Textbook module 43
- Check out the pencasts, as the textbook's other modules are slightly different in modeling strategy
- **Canvas Quiz due Wednesday 11:59 PM.**
Multiple-choice, 10 questions, unlimited attempts allowed, only best score counts
- **Homework/In-class Exercise due Friday 11:59 PM.** We will work together in class on Thursday.

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Relationship Between Saving and Investment

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- Expenditure definition of real GDP: $Y = C + I + G + X - M$
- Consumer budget constraint: $C + S = Y - T$
 - S: Private consumer savings
 - T: Taxes
- Algebra reveals that,

$$I = S + (T - G) + (M - X)$$

- $I \equiv$ Investment demand
 - $S \equiv$ Private savings
 - $T - G \equiv S_g \equiv$ Government savings
 - $M - X \equiv S_{ROW} \equiv$ Rest-of-world savings
- Investment Demand = Saving Supply

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Interest Rate

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Interest Rate: Price of Loanable Funds

- The interest rate is a price received by providing loanable funds (saving money)
- The interest rate is a price paid by borrowers
- Interest rate is the price in the loanable funds market (saving supply, investment demand)

Law of Supply for Savings

- The higher is the interest rate, the greater is the quantity of saving supply
- Higher interest rate → greater private savings
- Higher interest rate → greater rest-of-world saving

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Private Saving Interest Rate

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Private Savings Dependence on Interest Rate

All other things equal, the higher is the interest rate...

- The higher is the income earned from saving money,
- the greater is the incentive to save,
- the greater will be the quantity of private savings

Consumer Borrowing Dependence on Interest Rate

Saving can be negative: More borrowing \equiv Less saving

The higher is the interest rate...

- the more costly it is to borrow,
- the less consumers will borrow,
- or equivalently, the larger will be private savings

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Government Savings and Deficits & Interest Rate

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Government Saving: $S_g = T - G$

- Government Budget Deficit = $G = T$:
When government expenditures exceed tax revenue in a given period
- Government Saving = $-1 \times$ Government Budget Deficit
- \uparrow Government budget deficit $\equiv \downarrow S_g$

Government saving / budget deficits do not automatically respond to interest rates

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Rest-of-World Savings & Interest Rate

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Rest-of-World Saving

- $S_{ROW} \equiv M - X \equiv$ Trade deficit
- $S_{ROW} = -1 \times (X - M) =$ Negative of net exports
- S_{ROW} is net level of borrowing, net financial capital inflows into a country

Dependence on Interest Rate

When interest rate increases...

- Currency appreciates against major trading partners \rightarrow
- Currency more expensive \rightarrow exports more expensive $\rightarrow \downarrow X$
- Currency more expensive \rightarrow imports less expensive $\rightarrow \uparrow M$
- $\uparrow (M - X) \rightarrow \uparrow S_{ROW}$

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Saving Supply Curve

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Saving Supply

- $SS = S + S_g + S_{ROW} = S + (T - G) + (M - X)$
- Law of supply: An increase in interest rate leads to an increase in quantity of savings supplied
- A change in saving supply based on a change in the interest rate leads to a change in quantity saving supplied, which is a *movement* along the saving supply curve.

Saving Supply Curve



Investment Demand

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Investment and Capital

- Investment: businesses' construction or purchases of capital equipment
- Capital: Physically manufactured goods used in the production of other goods and services

Impact of Higher Interest Rate

- Investment typically involves large expenditures
- When investment is financed with borrowing:
Higher interest rate increases the cost to borrow → decrease in investment
- When financed with accumulated savings:
Higher interest rate means more the income earned keeping funds in financial investments → greater is the opportunity cost of investment → decrease in investment
- Law of Demand for Investment: The higher is the interest rate, the lower is the quantity of investment demand

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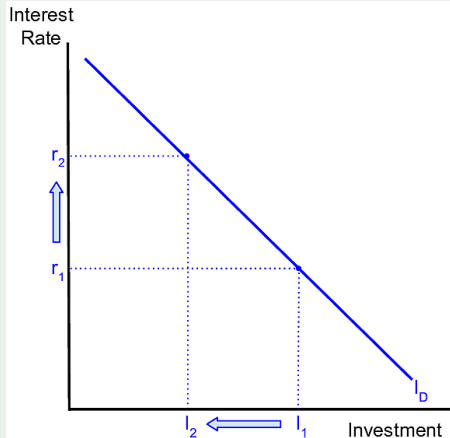
Investment Demand

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Investment Demand

- Law of demand: An increase in interest rate leads to a decrease in quantity of investment demanded.
- A change in investment decisions *based on a change in the interest rate* leads to a *change in quantity demanded*, which is a *movement along the demand curve*.

Investment Demand Curve



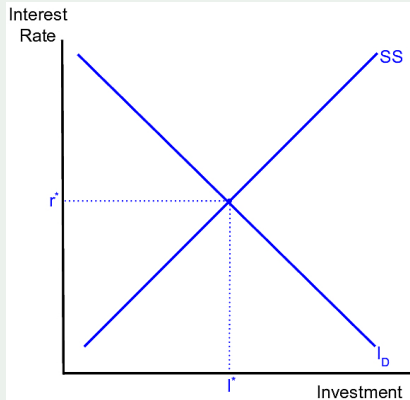
Equilibrium

11 / 23

Equilibrium Definition

- The **equilibrium interest rate** is the interest rate where the quantity of investment demanded is equal to the quantity of saving supply
- The **equilibrium level of investment** is the corresponding quantity of investment = quantity of savings supply

Graphical Equilibrium



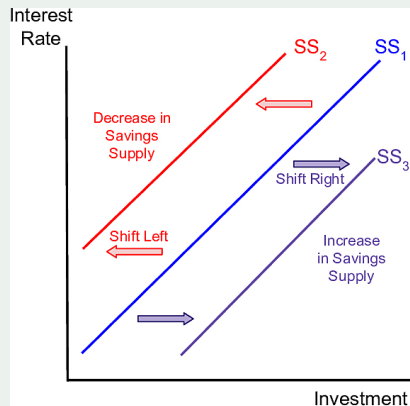
Shifts in Saving Supply

12/ 23

Shifts in Whole Supply Curve

- When something *besides the interest rate* affects saving supply, we say there is a *change or shift in saving supply*.
- Something that **increases** saving supply shifts the saving supply curve to the **right**
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Shifts in Saving Supply



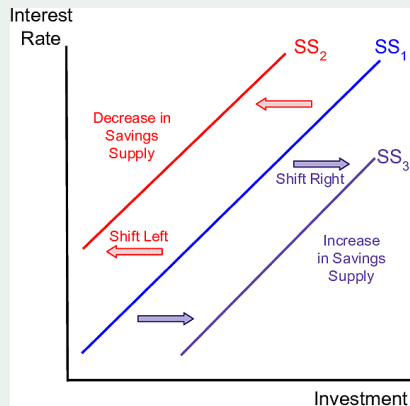
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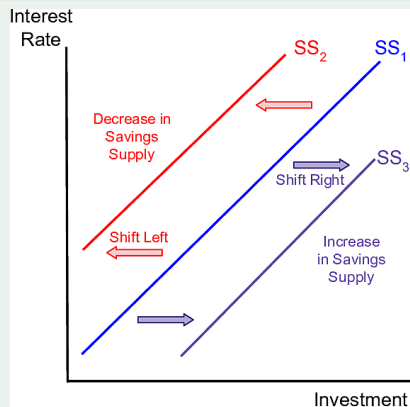
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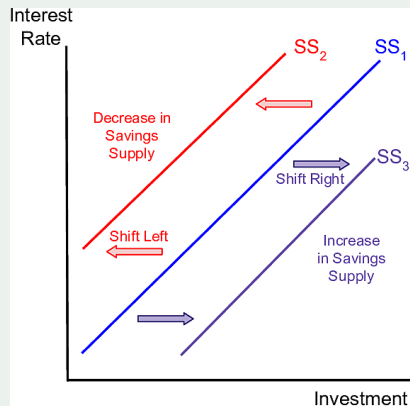
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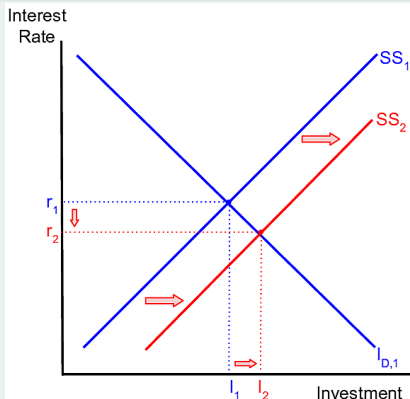
Increase in Private Saving

13 / 23

Mechanism

- Suppose consumers decide it is better for their long-run financial health to increase the fraction of the income they save
- Saving supply shifts to the right
- Equilibrium interest rate decreases
- Equilibrium quantity of investment increases

Graphical Equilibrium



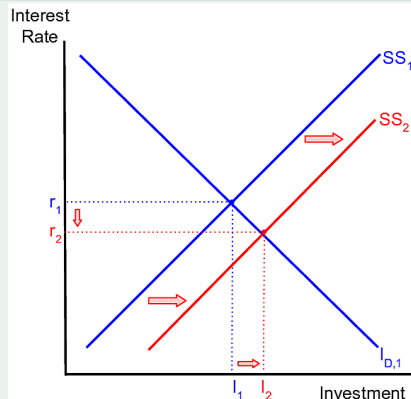
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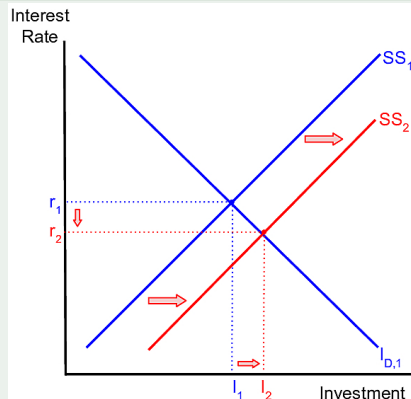
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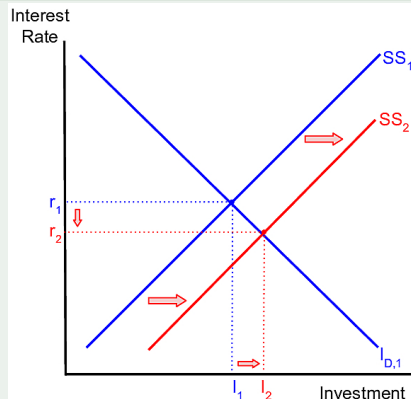
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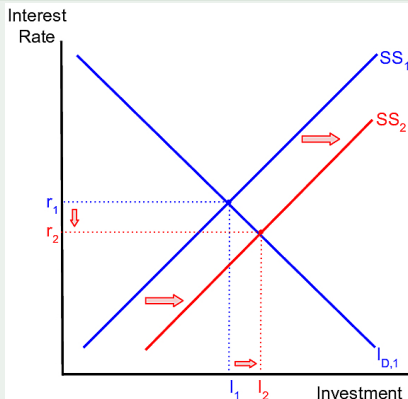
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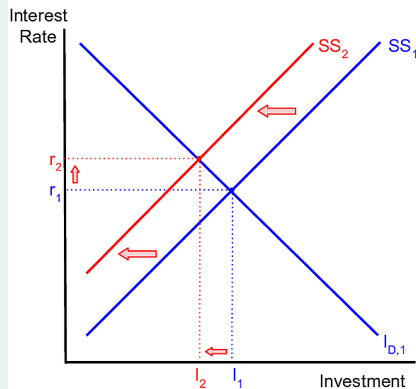
Increase in Government Budget Deficits

14 / 23

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- Suppose government increases expenditures without increasing taxes, leading to more government borrowing \equiv larger government budget deficits
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Graphical Equilibrium



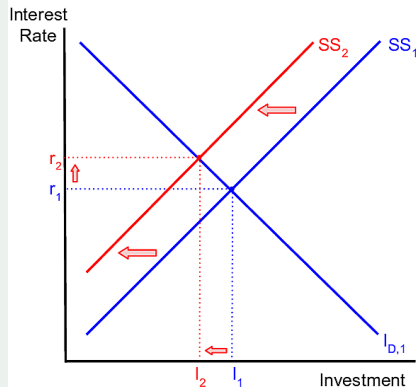
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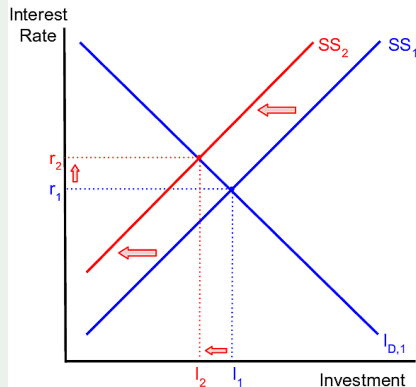
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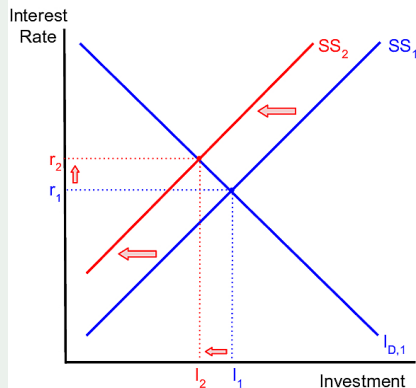
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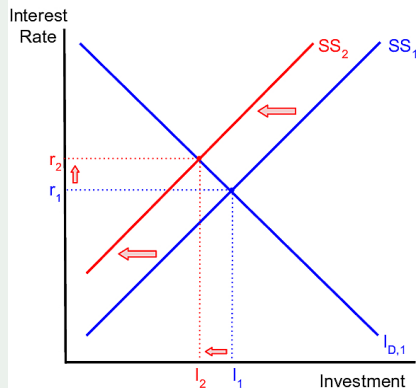
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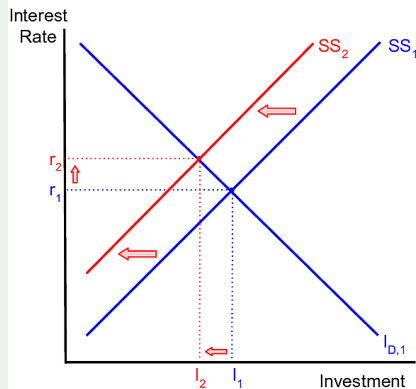
Increase in Trade Deficits: Example 1

15 / 23

Mechanism

- Whenever trade deficits decrease \rightarrow Saving supply decreases
- $S_{ROW} = \text{Trade deficit} = M - X$
- Suppose foreign incomes increase, leading to an increase in exports
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Graphical Equilibrium



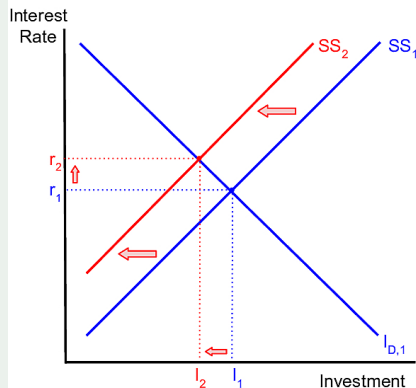
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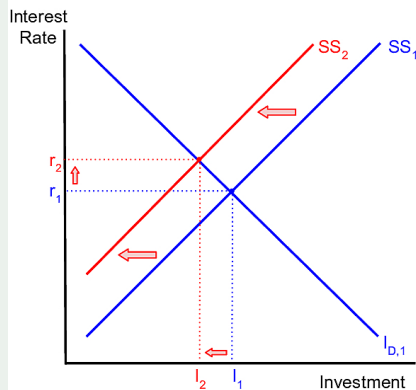
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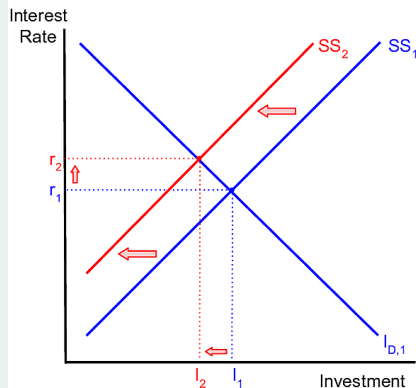
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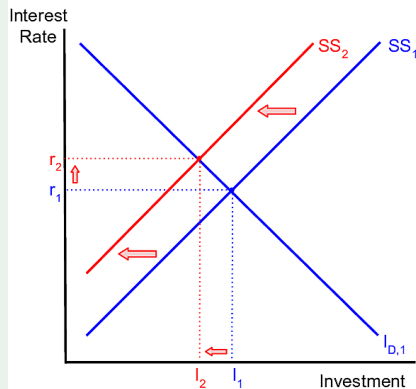
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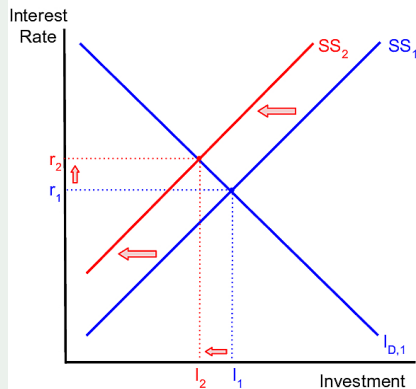
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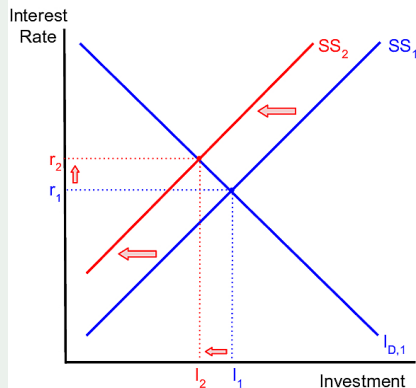
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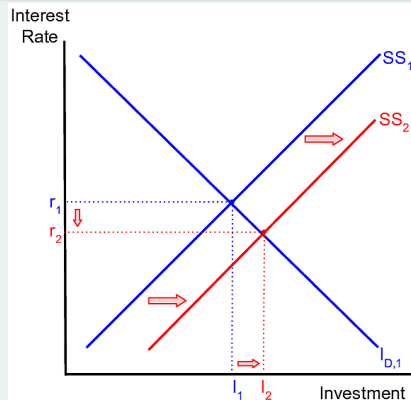
Increase in Trade Deficits: Example 2

16 / 23

Mechanism

- Trade deficit = $S_{ROW} = M - X$
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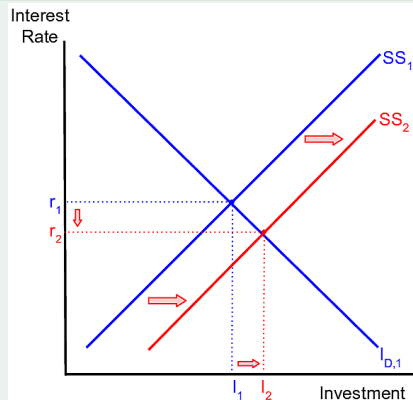
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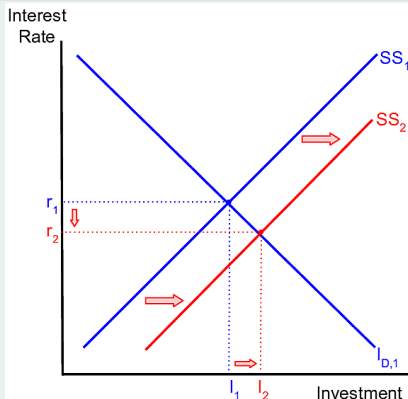
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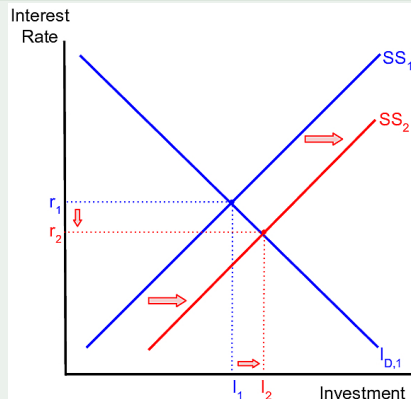
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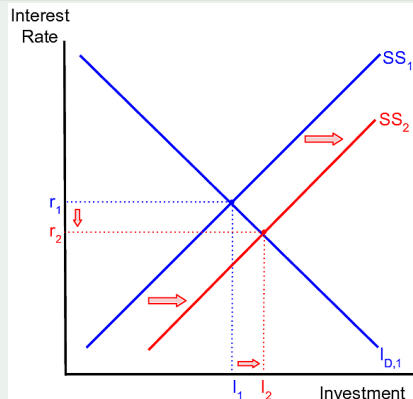
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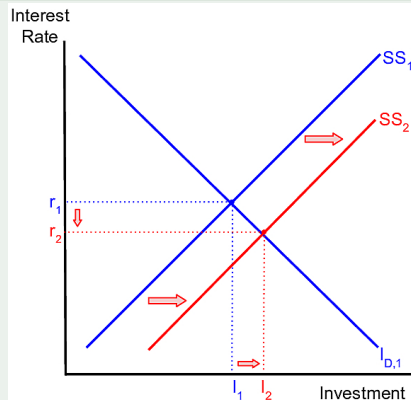
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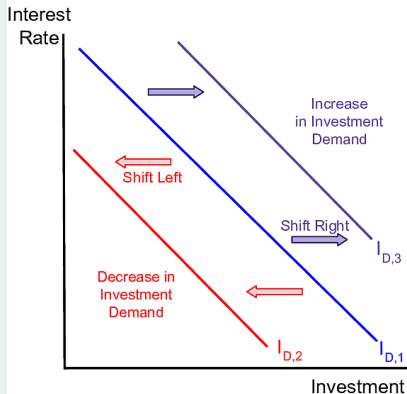
Shifts in Investment Demand

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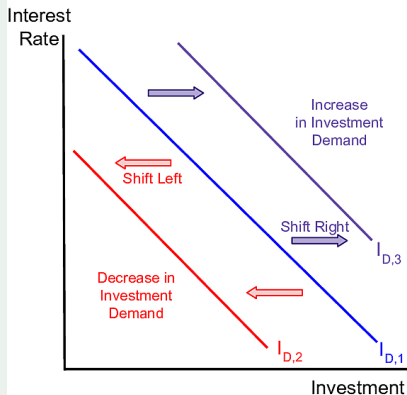
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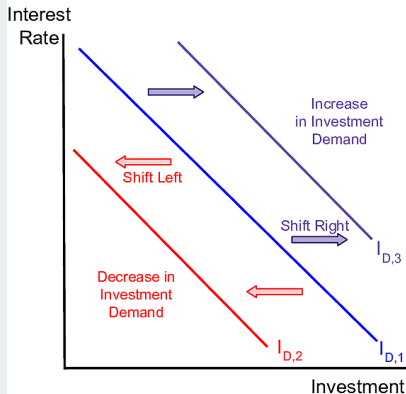
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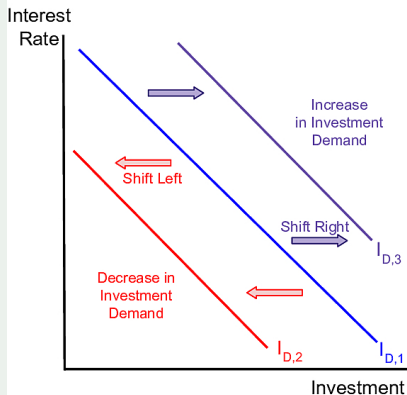
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Investment Demand Factors

18 / 23

Expectations of Future Profitability

- Investment typically involves large purchases of capital that will be used for a long time into the future
- Investment demand depends on *expectations of future sales and future profitability*
- Investment demand may depend on current demand for goods and services, if businesses expect current trends to continue

Marginal Product of Capital

- Investment demand also depends on future marginal product of capital
- **Marginal product of capital:** Additional production possible from one more unit of capital
- **Law of Diminishing Returns:** As capital stock increases, marginal product of capital decreases

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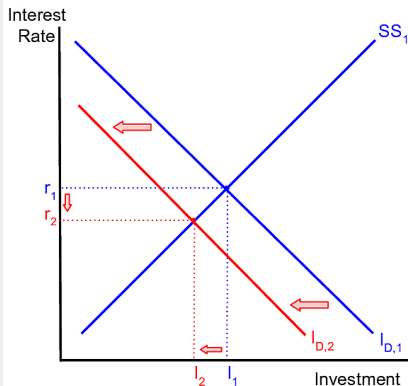
Businesses' Economic Outlook

19 / 23

Mechanism

- Suppose businesses are pessimistic about future sales
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Graphical Equilibrium



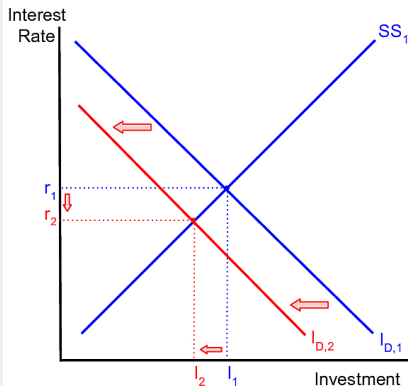
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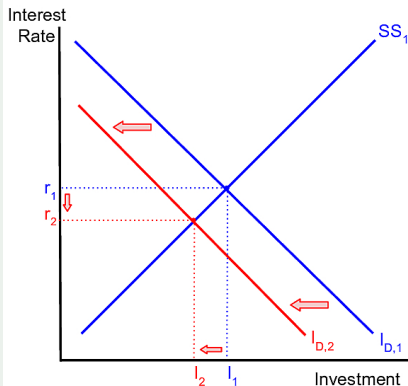
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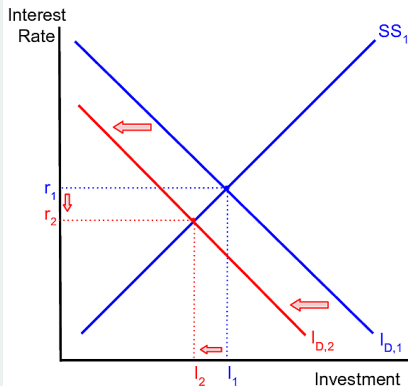
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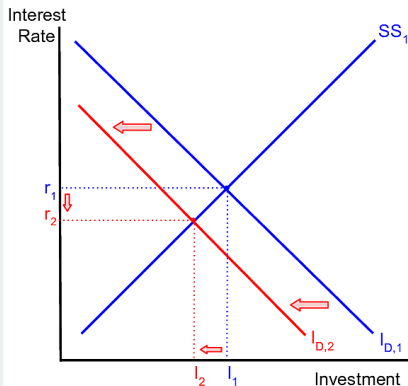
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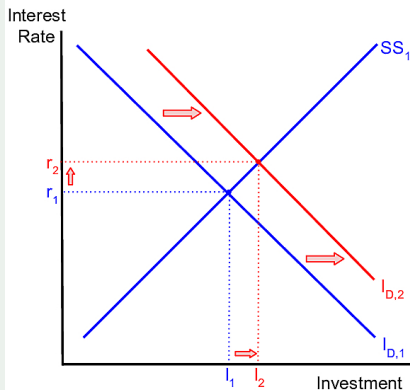
Improvement in Technology

20 / 23

Mechanism

- Suppose improvements in technology make workers and capital more productive
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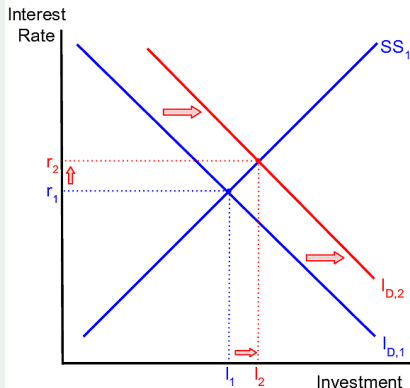
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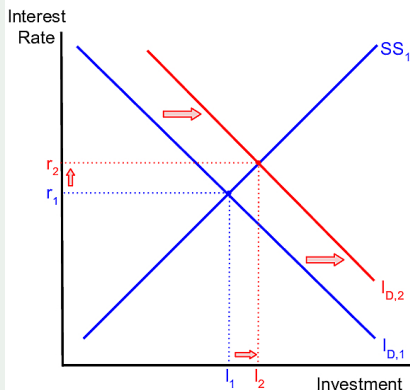
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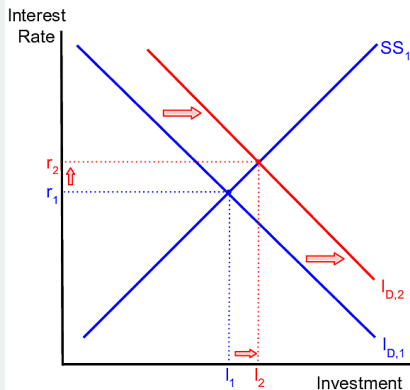
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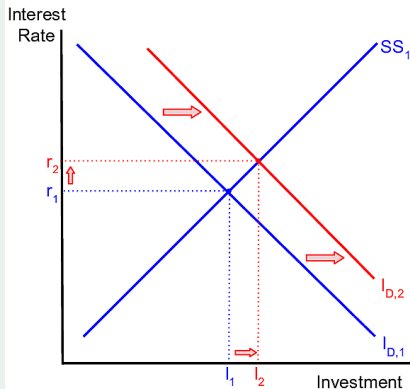
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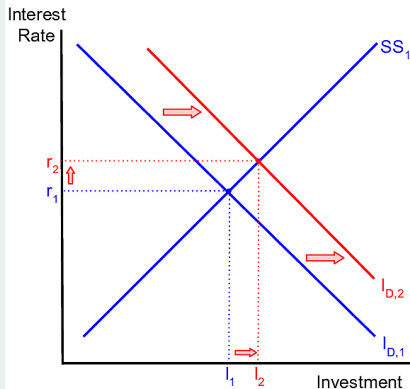
Destruction of Capital Stock

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Mechanism

- Suppose a hurricane destroys capital stock
- Decrease in capital \rightarrow increase in MP_K
- Investment demand shifts to the right
- Equilibrium interest rate increases
- Equilibrium quantity of investment increases

Graphical Equilibrium



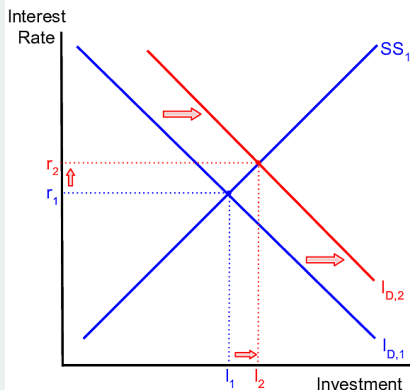
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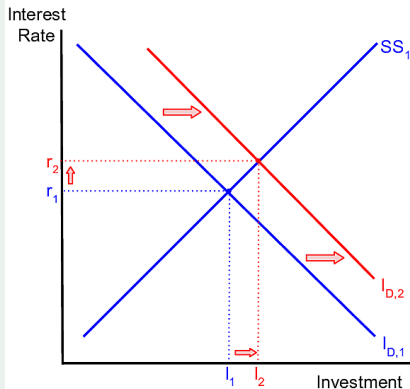
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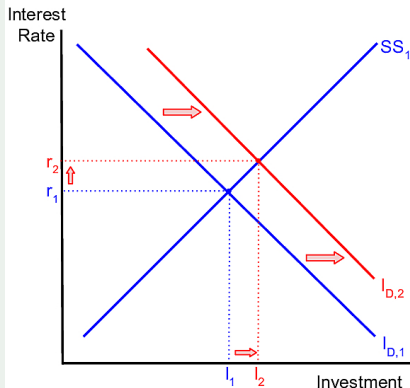
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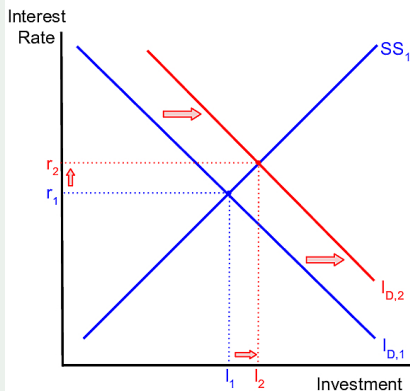
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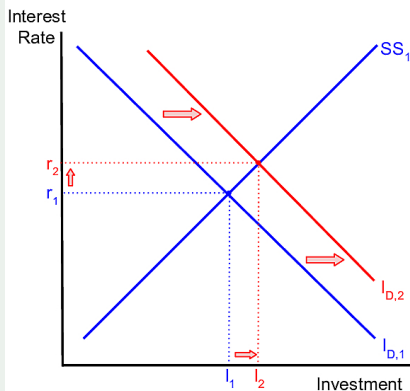
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Scholar Spotlight: Valerie Ramey

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The Macroeconomic Consequences of Infrastructure Investment

Published in *Economic Analysis and Infrastructure Investment*

(Editors E. Glaeser and J. Poterba, 2021)

Benefits and Consequences

- Short-run: Crowds out private investment (leftward SS shift)
- Long-run: Can increase investment if infrastructure complements private capital (rightward I_d shift)
- Short-run and long-run positive impact on employment
- Lack of empirical evidence for positive effects from ARRA road construction expenditures



Dr. Valerie Ramey
Professor of Economics
University of California-San Diego

Reading and Exercises

23 / 23

- Textbook module 43
- Check out the instructional videos, as the textbook's other modules are slightly different in modeling strategy
- **Canvas Quiz due Wednesday 11:59 PM.**
Multiple-choice, 10 questions, unlimited attempts allowed, only best score counts
- **Homework/In-class Exercise due Friday 11:59 PM.** We will work together in class on Thursday.

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