

## OUTLINE — November 1, 2019

- *This is makeup for the lost class due to the outage*
- Multiplier, review
  - Closing an Output Gap
- Investment Spending & Its Determinants

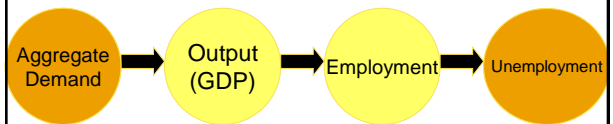
*Midterm 2 on Wed., Nov 6, 7-8:30 pm*  
*Rooms & Review Sessions posted on Piazza*  
*Same rules as MT1*

*Be sure to read yesterday's email*

## Review

**Question:** Unemployment depends on . . . ?

**Answer:** Ultimately, aggregate demand  
 $AD = C + I + G + (EX - IM)$



Multiplier Process      Output Gap      Investment: Definitions      Investment Determinants

## Determinants of Aggregate Demand

- **Consumption spending by households (C)**
  - YD, wealth, credit availability,  $i$ ?, expectations
  - YD changes when TA or TR change
- **Investment spending by businesses (I, today)**
  - Interest rates, expected rates of return, credit availability
- **Government spending (G, Nov. 6)**
  - Direct fiscal policy (G)
- **Net exports (EX & IM, Nov. 4)**
  - Exchange rates, health of world economy

Multiplier Process      Output Gap      Investment: Definitions      Investment Determinants

## Solving for Equilibrium

$$C = 2000 + 0.9 \cdot YD$$

$$TR = 1,000$$

$$TA = 3,000$$

$$Y = C + I + G + EX - IM$$

$$I = 1,000$$

$$G = 400$$

$$EX = 200$$

$$IM = 400$$

Multiplier Process      Output Gap      Investment: Definitions      Investment Determinants

## Macro Equilibrium



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## Closing an Output Gap

- Suppose
  - $Y_{FE} = \$15 \text{ trillion / year}$
  - $Y_E = \$14 \text{ trillion / year}$
 How big is the output gap?
- Closing an output gap requires an increase in AD  
 To close the gap, how big must the initial increase in AD be?

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## Changes in Equilibrium

Any initial  $\Delta$ spending results in a much larger  $\Delta Y_E$

- 1)  $\Delta$ spending  $\rightarrow$   $\Delta$ output
- 2)  $\Delta$ output  $\rightarrow$   $\Delta Y$
- 3)  $\Delta Y \rightarrow \Delta$ spending

- Definition of multiplier is
- What's in the formula for the multiplier?

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## Change of Equilibrium



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## Investment Spending

- Investment is business spending for
  - 
  - 
  -
- “Investment” has **nothing** to do with stocks and bonds

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## GDP report this week

- Source: bea.gov

Line	2016	2017	2018	Seasonally adjusted at annual rates		
				2019		
				Q1	Q2	Q3
<b>Percent change at annual rate:</b>						
1	1.6	2.4	2.9	3.1	2.0	1.9
<b>Percentage points at annual rates:</b>						
2	1.9	1.8	2.1	0.8	3.0	1.9
26	-0.2	0.8	0.9	1.1	-1.2	-0.3
27	0.3	0.7	0.8	0.6	-0.3	-0.2
29	-0.2	0.1	0.1	0.1	-0.4	-0.5
39	0.2	0.1	-0.1	0.0	-0.1	0.2
30	-0.1	0.3	0.4	0.0	0.1	-0.2
35	0.3	0.2	0.3	0.5	0.2	0.3
40	-0.6	0.0	0.1	0.5	-0.9	-0.1
43	-0.3	-0.3	-0.3	0.7	-0.7	-0.1
50	0.3	0.1	0.3	0.5	0.8	0.4

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## A New Frozen Yogurt Machine?

- Machine Cost = \$10,000
  - Expected additional revenue = \$ 22,000
  - Expected additional costs = \$ 21,500 (excluding interest costs)
- Expected new net revenue = \$ 500
- Expected \$ return =
- Expected rate of return ( $rr^e$ ) =



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## Profit-max strategy for buying capital

- Compare
  - Expected rate of return ( $rr^e$ )
  - and** interest rate ( $i$ )
- What's an interest rate?
  - From perspective of a borrower:
  - From perspective of a lender:
- And remember: savers are lenders
  - Sometimes directly. Often indirectly.

Multiplier Process    Output Gap    Investment: Definitions    Investment Determinants

## Profit-max strategy for buying capital

- Compare
  - Expected rate of return ( $rr^e$ )
  - and* interest rate ( $i$ )
- If  $rr^e > i$ , then
- If  $rr^e < i$ , then
- Same strategy regardless of source of money

Multiplier Process    Output Gap    Investment: Definitions    **Investment Determinants**

## Borrowed \$ . . . Saved \$

- Source of money doesn't matter



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## Investment Demand

Project	Cost	$rr^e$
A	\$10,000	14 %
B	\$5,000	10 %
C	\$8,000	4 %

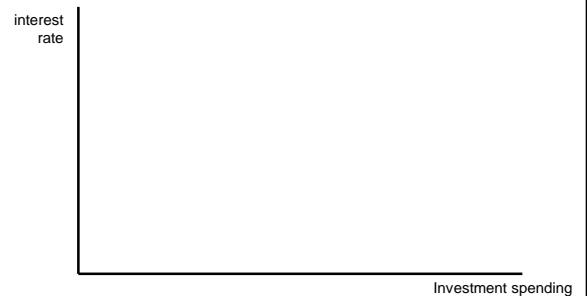
$i = 2 \%$

$i = 8 \%$

$i = 12 \%$

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## Investment Demand Curve



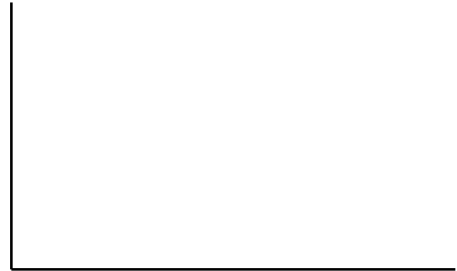
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## Investment depends on Interest Rates

- Interest Rates ( $i$ ) matter
- Expected rates of return matter

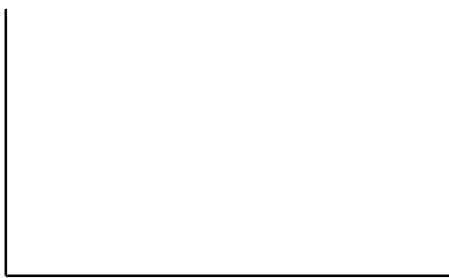
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## Investment Demand Curve



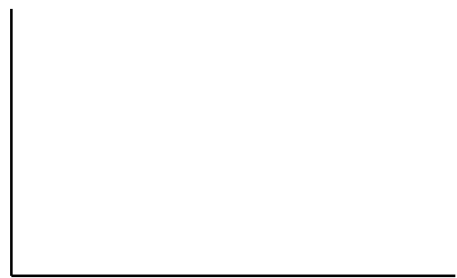
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## Investment Demand Curve



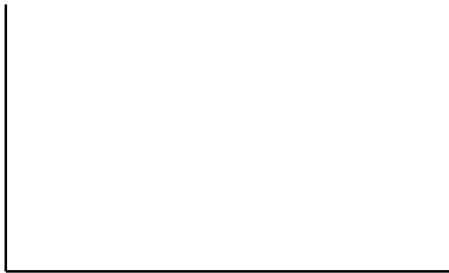
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## Investment Demand Curve



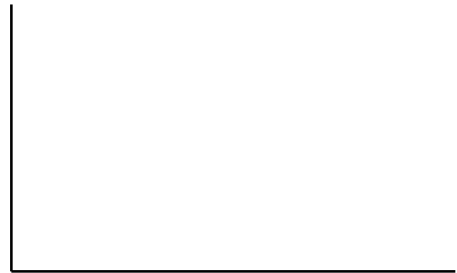
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## Investment Demand Curve



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## Investment Demand Curve



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## Financial Crisis of 2008

- Def of a financial crisis: when “market failure” permeates financial markets
  - Disequilibrium: Lenders won't lend. No interest rate will clear market.
- Asymmetric information problems in financial markets
  - Adverse selection
    - Lenders have difficulty assessing riskiness of potential borrowers
  - Moral hazard
    - After signing contract, borrowers may change behavior, increasing risk of default
- Solutions to asymmetric info problems enable markets to function

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## Investment depends on . . .

- Interest Rates ( $i$ ) matter
  - $\uparrow i \rightarrow \downarrow$  Investment
  - $\downarrow i \rightarrow \uparrow$  Investment
- Expected rates of return ( $rr^e$ ) matter
  - $\uparrow rr^e \rightarrow \uparrow$  Investment
  - $\downarrow rr^e \rightarrow \downarrow$  Investment
- Credit availability – manifestation of a credit (financial) crisis – matters
  - $\uparrow$  Credit availability  $\rightarrow \uparrow$  Investment
  - $\downarrow$  Credit availability  $\rightarrow \downarrow$  Investment

Multiplier Process    Output Gap    Investment: Definitions    **Investment Determinants**