

## OUTLINE — December 5, 2018

- Review of Material
  - Order of file is
    - Micro (pp. 3 - 34)
    - Then macro (pp. 35 – end)
  - More slides here than we can cover in 50 minutes
  - I will pick and choose which slides to cover on 12/5
    - Bring your clickers to help my decision making

## Review

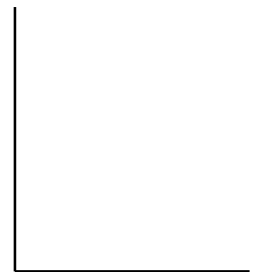
- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>▪ PPF           <ul style="list-style-type: none"> <li>▪ Economic Growth</li> <li>▪ Gains from Trade</li> </ul> </li> <li>▪ Supply &amp; Demand</li> <li>▪ Elasticity</li> <li>▪ Consumer &amp; Producer Surplus</li> <li>▪ Profit-Maximization</li> <li>▪ Market Failure           <ul style="list-style-type: none"> <li>▪ Externalities</li> <li>▪ Monopoly &amp; Monopolistic Competition</li> <li>▪ Asymmetric Information</li> </ul> </li> <li>▪ Distribution</li> </ul> | <ul style="list-style-type: none"> <li>▪ Macro definitions: GDP, Unemployment, Inflation</li> <li>▪ Keynesian Model           <ul style="list-style-type: none"> <li>▪ <math>Y = C + I + G + EX - IM</math></li> <li>▪ Spending Multipliers</li> </ul> </li> <li>▪ Investment</li> <li>▪ Fiscal Policy</li> <li>▪ International finance</li> <li>▪ Phillips Curve</li> <li>▪ Inflation &amp; the Fed           <ul style="list-style-type: none"> <li>▪ Monetary policy</li> </ul> </li> </ul> |
|---|--|

## Overarching Concepts

- Counterfactual
  - To properly evaluate effect of policy, don't compare the policy's results across time because factors other than the policy could have changed, too.
  - Compare the policy's results (eg, today's economy) with what the same time period would have hypothetically have been like without the policy in effect (eg, today without the policy, which is "the counterfactual")

## Production Possibilities Frontier

- General characteristics of possible combinations of output that an economy can produce
- Simplification: 2 types of output
- Key assumption: No deliberate waste
  - Implication: no unemployment when on PPF
- "On PPF" is equivalent to full employment economy
  - Related to "potential output"



## How can we consume beyond PPF?

### [1] Economic Growth

- Sources of growth
  - more resources
  - greater productivity
- Shifts out PPF

### [2] Specialization & Trade

- Comparative advantage
- Allows consumption beyond PPF but doesn't shift PPF

### [3] Aid

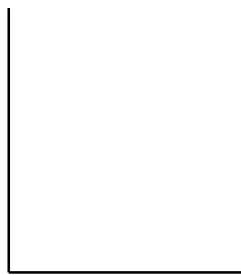
- Allows consumption beyond PPF but doesn't shift PPF

## Long-run economic growth

- Productivity increases with improvements in
  - Education
  - Research and Development
  - Financial Institutions
  - Transportation Networks
  - Political Institutions
  - Property Rights
  - Judicial System

## Demand & Supply Model

- Question: What determines the price & quantity of a product?
- Assumptions:
  - Homogeneous product
  - Lots of buyers & sellers
  - No barriers to entry / exit
  - Full information
  - Everyone is maximizing something:
    - Buyers maximize utility
    - Sellers maximize profit
- Note this model is for *perfect competition* (but results generalize)



## Movements Along vs Shifts

- $\Delta$  price  $\Rightarrow$  *MOVE ALONG* curve
- $\Delta$  anything else  $\Rightarrow$  *SHIFT OF* curve
- **Demand shifters**
  - income of buyers
  - wealth of buyers
  - all other prices
  - buyer preferences
  - buyer expectations
- **Supply shifters**
  - input costs
  - technology
  - prices of related products
  - # of sellers

## Consumer & Producer Surplus

- **Consumer Surplus** compares
  - What we are willing to pay
  - What we actually pay
- **Producer Surplus** compares
  - Minimum price sellers are willing to accept
  - Price sellers actually receive
- When price is determined by the market, surplus is maximized
- Loss of surplus when there's a market intervention called "deadweight loss"
  - Occurs with price ceilings, price floors, excise taxes

## Price Ceilings & Floors

- **Ceiling**
  - max price allowed
  - Binds if  $p^* > p$  ceiling
- **Floor**
  - Min price allowed
  - Binds if  $p^* < p$  floor
- Need non-price mechanism to determine buyers (ceiling) or sellers (floor)

## Burden of a Tax

- Sales or excise tax on an item increases its price
  - But not by the full amount of the tax
- Who "bears the burden" of the tax?
  - Burden =  $(\Delta \text{price paid or retained}) / \text{tax}$
  - Buyers' Burden  $(P_2 - P_1) / T = \% \text{ of tax buyers pay}$
  - Sellers' Burden  $(P_1 - (P_2 - T)) / T = \% \text{ of tax sellers pay}$

## Elasticity

- Elasticity of A with respect to B
  - How much does A change when B changes?
$$\text{elasticity} = \frac{\text{percent change of A}}{\text{percent change of B}}$$
  - Price-Elasticity of Demand
  - Income Elasticity of Demand
  - Cross-Price Elasticity of Demand
  - Price-Elasticity of Supply

## Price Elasticity of Demand

### Determinants

- Availability of Substitutes
- Share of Total Spending
- Time Horizon

### Total Revenue Effect

- What happens to TR when price rises?
  - *Price-Elastic*
  - *Price-Inelastic*
  - *Unitary Price Elasticity*

## Marginal benefit vs marginal cost

- Compare marginal benefit & marginal cost
  - Ignore "sunk costs"

- $MB > MC$ : do it
- $MB < MC$ : don't do it
- $MB = MC$ : that's the best you can do

- **Profit Max: choose  $q$  where  $MR=MC$**

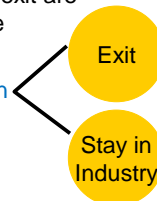
## Profit ( $\pi$ )

- Economic Profit =  
Accounting Profit – Opportunity Cost
- **Accounting Profit** =  
Total Revenue – Total Accounting Costs
- **Opportunity Cost** =  
what owner(s) earn elsewhere with their time plus what could owner(s) earn elsewhere with the assets (\$) they sunk into the company

## Long Run

- Technique can be changed
- Entry & exit are possible

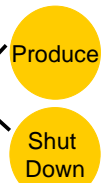
- **Decision**



## Short Run

- Technique is fixed
- Entry & exit are impossible

- **Decision**  
(if planning to exit)



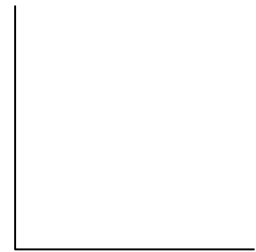
- **Decision** (if planning to stay, or if not shutting down): how much to produce?

## Law of Diminishing Returns

- As quantity of variable input (labor) increases, all else constant, marginal product decreases (=diminishes)
- Implication
  - To increase output by constant amount requires ever more variable input (labor)
- And implication of *that* . . .
  - Marginal cost increases as amount of output increases

## Profit Max: choose q where MR=MC

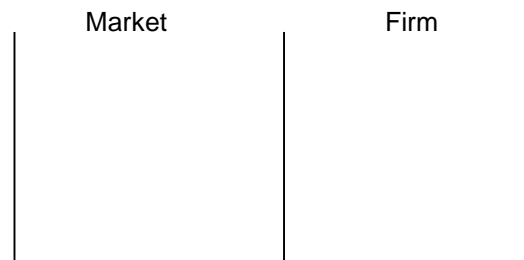
- Rule is always true
- Market structure determines firm's demand and MR curves
- How much profit?
- $\pi = TR - TC$   
 $= p \cdot q - ATC \cdot q$



## Long-run & Short-run & profit

- Short-run  $\pi > 0$  ? Firms enter industry *in the long run*
- Short-run  $\pi < 0$  ? Some firms exit industry *in the long run*
- If  $\pi < 0$  & firm will exit in the long run, what about short run?
  - If **revenue > variable costs**, then produce in SR
    - Firm is covering all its variable costs, and more
  - If **revenue < variable costs**, then shut down in SR
    - Firm loses less by just paying fixed costs
- Supply curve is MC curve above minimum Average Variable Cost

## Free Entry Drives Profit to 0



## Definitions of Wealth & Income

### Wealth (or, Net Worth)

= Assets – Liabilities

- Assets: what you **own**
  - Real Assets
  - Financial Assets
- Liabilities: what you **owe** to others
- Evaluated as of a particular date (e.g., as of today)

### Income

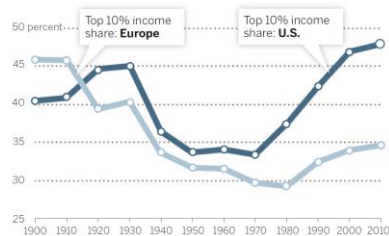
- What you receive
- Evaluated over a period of time (e.g., per year)
- Sources of Income
  - Labor income
  - Property income
  - Transfer payments

## Distribution of Income

- Gini Coefficient: A measure of evenness of distribution
  - Gini = 0 means perfectly **equal** distribution
  - Gini = 1 means perfectly **unequal** distribution
- Income = what we earn annually
  - Includes labor income & property income
- Income inequality is as high (bad) today as in 1920s
  - Somewhat due to property income
  - But largely due to inequality in labor income

### Income inequality in Europe and the United States, 1900–2010

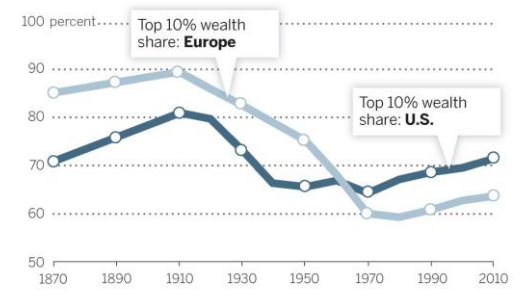
Share of top income decile in total pretax income



**Fig. 1. Income inequality in Europe and the United States, 1900 to 2010.** The share of total income accruing to top decile income holders was higher in Europe than in the United States from 1900 to 1910; it was substantially higher in the United States than in Europe from 2000 to 2010. The series report decennial averages (1900 = 1900 to 1909, etc.) constructed using income tax returns and national accounts. See (24), chapter 9, Fig. 9.8. Series available online at [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c).

### Wealth inequality in Europe and the United States, 1870–2010

Share of top wealth decile in total net wealth



## “Market Failure”

- If any of these assumptions isn't satisfied...
  - perfect competition
  - profit maximization
  - utility maximization
  - private property rights
  - full information
- ...then markets “fail” . . .
  - . . . to produce  $q^*$  where  $p = MC$

## Monopoly

- One firm
- No close substitutes
- Barriers to entry
  - Patents
  - Government franchises
  - Owning scarce resource
  - Economies of scale
  - Illegal means
- Max profit when **choose  $q$  so that  $MR = MC$**
- Long run:  $\pi$  can be  $> 0$

## Monopolistic Competition

- Lots of firms
- No barriers to entry/exit
- *Heterogeneous* product
- Max profit when **choose  $q$  so that  $MR = MC$**
- Long Run: profit = 0

## Comparing Industry Forms

	Short Run	Transition	Long Run
Perfect Competition	$\pi > 0$	Entry ( $\uparrow S$ )	$\pi = 0$
	$\pi = 0$	No change	$\pi = 0$
	$\pi < 0$	Exit ( $\downarrow S$ )	$\pi = 0$
Monopolistic Competition	$\pi > 0$	Entry ( $\downarrow D$ )	$\pi = 0$
	$\pi = 0$	No change	$\pi = 0$
	$\pi < 0$	Exit ( $\uparrow D$ )	$\pi = 0$
Monopoly	$\pi > 0$	No change	$\pi > 0$
	$\pi = 0$	No change	$\pi = 0$
	$\pi < 0$	Exit	

## Externalities

- Your activity affects someone else
- Negative externality
  - Cost borne by someone else
- Positive externality
  - Benefit received by someone else
- Coase Theorem:
  - Government intervention required to move market to social optimum unless
    - Well-defined property rights
    - No costs to bargaining
    - Only a few people
  - Otherwise: government intervention

## Internalizing Externalities

- People have no incentive to take external benefit or cost into account
- So private optimum differs from social optimum
- But if government can change the private costs so that they include the external cost (or benefit), then the private optimum can become equal to the social optimum

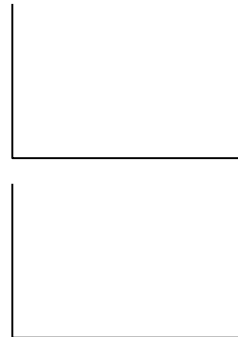
**If** government implements a tax **equal** to marginal damage cost, **then** private market produces socially optimal quantity  
 Tax too **small** → market equilibrium quantity > socially optimal quantity  
 Tax too **big** → market equilibrium quantity < socially optimal quantity

(Pos externality): If government implements a **subsidy** equal to **marginal external benefit**, then private market produces socially optimal quantity

## Negative Externality: A Tax



## Positive Externality: A Subsidy





## Asymmetric Info

- When one party to a transaction has relevant info but doesn't share it with the other party
- Effect: markets fail (to produce the quantity where  $p = MC = \text{minimum ATC}$ )
- **Adverse Selection** (before transaction)
  - When the selection of goods offered for sale is not a random selection but is instead an "adverse" (unfavorable) selection
  - Can be addressed with screening
- **Moral Hazard** (during contract)
  - When one party to a contract changes behavior after the contract is signed, typically due to incentives contained in the contract itself
  - Can be addressed with monitoring

## Behavioral Concepts

- Risk aversion
  - People (which includes businesspeople) consider not just the mean of a distribution but also its variance
  - Risk averse people dislike wide variance
  - Might make "irrational" (not profit maximizing) decisions in order to avoid or reduce risk
- Loss aversion
  - People consider not just the mean of a distribution but also whether its range includes possible losses
  - Loss averse people dislike incurring losses
  - Might make "irrational" (not profit maximizing) decisions in order to avoid incurring a possible loss

## Macroeconomics

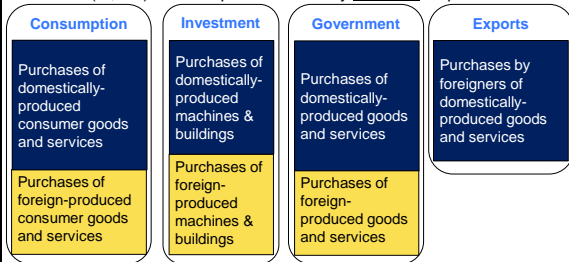
- Three main topics
  - Unemployment
    - Out of work & looking for work; current rate = 3.7 %
  - Inflation
    - Annual rate of increase of CPI; current rate = +2.5 %;
    - Core rate (all items less food & energy) = +2.1%
  - (Long-run) Economic Growth (This was PPF)
    - Rate of growth of real GDP ; current ~ 3.5 %
- *Unemployment* is determined by *employment* which is determined by *output produced* which is determined by *aggregate demand* for output

## Gross Domestic Product (GDP)

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>▪ GDP           <ul style="list-style-type: none"> <li>▪ Total annual economic output in a nation</li> </ul> </li> <li>▪ Omissions from GDP           <ul style="list-style-type: none"> <li>▪ Non-market activities</li> <li>▪ Unreported cash income</li> <li>▪ Illegal activities</li> </ul> </li> <li>▪ Measurement system: National Income &amp; Product Accounts</li> </ul> | <p><b>Expenditure Side of NIPA</b></p> <ul style="list-style-type: none"> <li>▪ Consumption spending C</li> <li>▪ Investment spending I</li> <li>▪ Government spending G</li> <li>▪ Export spending EX</li> <li>▪ Import spending IM</li> </ul> |
|  | <ul style="list-style-type: none"> <li>▪ <math>mpc</math> = how households respond to a <u>change</u> in disposable income           <ul style="list-style-type: none"> <li>▪ <math>mpc &lt; 1</math> usually</li> </ul> </li> </ul>            |

## Aggregate Expenditure

- Aggregate Expenditure =  $C + I + G + EX - IM$
- Why subtract imports?
  - Because C, I, G include both domestic & foreign output
  - AE (or, AD) = total expenditure for only domestic output



## Equilibrium

$Y_E$  (equilibrium output) may not equal  $Y_{FE}$  (full employment output)

“Unemployment Equilibrium” exists when  $Y_E < Y_{FE}$

$Y_{FE} - Y_E \equiv$  output gap

## Consumption Spending

- C depends upon
  - ▶ YD
  - ▶ interest rates (i)
  - ▶ expectations
  - ▶ wealth
  - ▶ credit availability
- mpc = how households respond to a change in disposable income
  - mpc < 1 usually
  - Simplest models assume mpc constant across groups and over time, but is it?
    - Bunker (#17): mpc decreases as household wealth increases
    - Auerbach & Gorodnichenko (#21): multiplier differs between recession & expansion

## Investment Spending

- Business spending for
  - construction
  - new equipment
  - $\Delta$  value of inventory holdings
- Profit maximizing decision
  - Compare expected rate of return (exclusive of interest rate costs) on investment project ( $rr^e$ ) *with* interest rate on financial assets or loans (i)
  - Assumes no risk aversion, no loss aversion
- 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
- In a credit crisis, credit availability matters
  - $\uparrow$  Credit availability  $\rightarrow \uparrow$  Investment
  - $\downarrow$  Credit availability  $\rightarrow \downarrow$  Investment

## Government Spending

- Fiscal Policy Tools
  - G: Government spending -- direct fiscal policy
  - TR: Transfer payments -- indirect fiscal policy
  - TA: Taxes -- indirect fiscal policy
- Budget Deficit =  $(G + TR) - TA$ ; measured annually
- **Expansionary** fiscal policy
  - Shifts AD up → increase GDP
  - ↑G or ↑TR or ↓TA
  - Increases deficit
- **Contractionary** fiscal policy
  - Shifts AD down → decrease GDP
  - ↓G or ↓TR or ↑TA
  - Decreases deficit

## How gov't spends money matters!

$$\Delta Y_E = (\text{spending multiplier}) * (\text{initial } \Delta \text{ spending})$$

### Direct Policy Action: $\Delta G$

So, initial  $\Delta \text{ spending} = \Delta G$   
and  $\Delta Y_E = \Delta G * \text{multiplier}$

### Indirect Policy Action: $\Delta TR$ or $\Delta TA$

So, initial  $\Delta \text{ spending} = mpc * \Delta TR$   
(or  $-mpc * \Delta TA$ )  
and  $\Delta Y_E = \Delta TR * mpc * \text{multiplier}$

Government spending has a greater effect on GDP than do changes in taxes or transfer payments (if initial  $\Delta C < \Delta YD$ )  
*assuming same mpc relevant to  $\Delta Y$  and  $\Delta TR$  or  $\Delta TA$*

## Deficits and Debt

- Government outlays =  $G + TR$
- Government receipts = TA
  - If, in one year,  $G + TR > TA$ : **budget deficit**
  - If, in one year,  $TA > G + TR$ : **budget surplus**
- **Structural deficit**
  - *How big the deficit would be if the economy were at full employment*
- **Cyclical deficit**
  - *How much larger the deficit is because unemployment is above 5 %*
- Issues related to deficit & debt
  - Decreasing structural deficit is contractionary
  - But concern is sustainability of structural deficit

## Demand & Supply of Foreign Currency (FX)

### $D_{FX}$

- Those with \$ who want FX
- Depends on **U.S. demand** for
  - ... **foreign** goods & services
  - ... **foreign** financial assets

### $S_{FX}$

- Those with FX who want \$
- Depends on **foreign demand** for
  - ... **U.S.** goods & services
  - ... **U.S.** financial assets

## Interest rates affect exchange rates

- If interest rates  $\uparrow$  in U.S.
  - $\uparrow$ foreign demand for U.S. financial assets
    - Which  $\uparrow S_{FX}$  offered in exchange for dollars
  - $\downarrow$ U.S. demand for foreign assets
    - Which  $\downarrow D_{FX}$  by people & institutions that hold dollars
  - $\uparrow$ supply &  $\downarrow$ demand have same price effect:
    - $P_{FX} \downarrow$  (dollar stronger)
- If interest rates  $\downarrow$  in U.S.
  - $\downarrow$ foreign demand for U.S. financial assets:  $\downarrow S_{FX}$
  - $\uparrow$ U.S. demand for foreign assets:  $\uparrow D_{FX}$
  - $\downarrow S$  &  $\uparrow D$  have same price effect:  $P_{FX} \uparrow$  (dollar weaker)

## From $P_{FX}$ to Imports & Exports

- If  $P_{FX}$  falls (dollar stronger)  $\rightarrow$  fewer \$ per FX
  - $\rightarrow$  imports less expensive, so IM rise
  - and exports more expensive, so EX fall
- If  $P_{FX}$  rises (dollar weaker)  $\rightarrow$  more \$ per FX
  - $\rightarrow$  imports more expensive, so IM fall
  - and exports less expensive, so EX rise

## Multiplier Process

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

- 1)  $\Delta$ spending  $\rightarrow \Delta$ output
- 2)  $\Delta$ output  $\rightarrow \Delta Y$
- 3)  $\Delta Y \rightarrow \Delta YD \rightarrow \Delta C$   
and  $\Delta Y \rightarrow \Delta IM$

Definition  $multiplier = \frac{total \Delta Y}{initial \Delta planned AE}$

& one possible formula:

$$\frac{1}{1 - [mpc - mpm]}$$

## What about Inflation?

- Expectations-augmented Phillips Curve
  - Tradeoff between unemployment & inflation
    - Due to effect of labor market slack on wage inflation
  - Terms of trade-off shift with changes in ...
    - ... Inflationary expectations
    - ... Productivity growth rate
    - ... Cost shocks due to supply or non-US demand shifts
- Fed bases its policy on this relationship
  - Tries to avoid shifts of the Phillips Curve
  - Exploits trade-offs through its policy decisions
  - Offers "forward guidance" as effort to stabilize inflationary expectations

## Phillips Curve



## Monetary Policy

- Fed does **expansionary** policy if they want to . . .
  - Increase GDP growth
    - & decrease unemployment
  - Increase inflation rate
- **Expansionary** policy: target a lower interest rate
  - Traditional method: increase reserves through FOMO
  - New method: pay banks a lower rate on their excess reserves
- Fed does **contractionary** policy if they want to . . .
  - Decrease GDP growth
    - & increase unemployment
  - Decrease inflation rate
- **Contractionary** policy: target a higher interest rate
  - Traditional method: decrease reserves through FOMO
  - New method: pay banks a higher rate on their excess reserves

## Fed has only one tool: interest rates

- If goals are consistent, strategy straightforward
  - Consistent Goal: Increase GDP growth (lower unemployment) and increase inflation rate → target lower interest rate
  - Consistent Goal: Decrease GDP growth (higher unemployment) & decrease inflation rate → target higher interest rate
- But if goals are inconsistent, choice required
  - Inconsistent Goals: Increase GDP growth (lower unemployment) and decrease inflation rate → can't do both at once
  - Inconsistent Goals : Decrease GDP growth (higher unemployment) and increase inflation rate → can't do both at once
  - Choice depends on how FOMC members rank unemployment vs inflation as problems (doves vs. hawks)

## Inflation Hawks And Doves

- Taylor Rule
  - Fed reacts to inflation and unemployment
  - Target value of interest rate =
    - neutral value of interest rate
    - +  $A$ \*(actual – goal inflation rate)
    - $\beta$ \*(actual – goal unemployment rate)
- Inflation hawk
  - very focused on inflation. Value of  $A$  very large relative to value of  $\beta$
- Inflation dove
  - focused on unemployment as well as inflation. Value of  $A$  smaller for doves than for hawks.

## 2008-2015 Issues in Fed Policy

- Fed lowered FFR to essentially 0 in December 2008
  - “zero lower bound”
- Yield Curve: LT rates didn’t follow ST rates in 2008-9
  - Fed implemented “QE” starting in 2009
  - Bought LT Treasuries & MBS to lower LT rates
- Fed entered “normalization” period Dec 2015, gradually returning FFR target to neutral rate
  - What is value of neutral rate? Perhaps 4% ?? But Powell speech on 11/28 implied could be lower than 4, “just above” 2.25%)

## Challenges today

- Source: Janet Yellen speech, Oct. 2016  
<https://www.federalreserve.gov/newsevents/speech/yellen20161014a.htm>
- 1. Should we disaggregate “C” (or “I”)?
- 2. What’s role of finance in determining AD?
- 3. What determines inflation?
- 4. How are different economies connected?