Macroeconomic Principles

Summary Lecture

December 6th, 2019

Final Exam Period: Revised R.J. Barbera Office Hour Schedule:

Tuesday:	**1:30-3:30 p.m.**
Wednesday:	**1:30-3:30 p.m.**

The November jobs report:

		MONTHLY	
total	non-farm	payroll	gains:
	3-month	6-month	12-month
	average	average	average
AS OF:			
Nov-19	205	196	184
Nov-18	194	217	219
Nov-17	166	186	183
Nov-16	189	220	199

			hourly
	U3	LFPR	wages (YOY)
AS OF:	3-mo.avg.	3-mo.avg.	3-mo.avg.
Nov-19	3.5%	63.2%	3.10%
Nov-18	3.7%	62.8%	3.20%
Nov-17	4.2%	62.9%	2.50%
Nov-16	4.9%	62.8%	2.60%

		MONTHLY	
factory	non-farm	payroll	gains:
	3-month	6-month	12-month
	average	average	average
AS OF:			
Nov-19	4	5	6
Nov-18	25	22	23
Nov-17	19	19	15
Nov-16	-2	1	-1

Key Ideas:

- Scarcity vs. Choice
- Micro vs. Macro
- Long Run vs. Short Run
- Rational decisions made at the margin
- Confronting Trade-offs: Opportunity Costs
- Adam Smith's **Invisible Hand=Desirable Outcome**
- Great Depression/**Market Failures**/J. M. Keynes
- Soviet Collapse/Communal System Dysfunction
- Conclusion? **Invisible Hand**, Not **Infallible Hand**

Output, Income, Prices, Jobs

- GDP vs. GNP vs. NI GDP = C + I + G + NX
- Final Expenditure=factor income=value added
- Nominal vs. real
- Flow vs. Stock
- Inflation rate (%) ≡ $\left(\left(\frac{\text{Price index } t}{\text{Price index } t_{-1}}\right)-1\right) \times 100$
- Unemployment rate (%) ≡ $\left(\frac{(\#\ of\ jobless)}{(\#\ in\ labor\ force)}\right) \times 100$

Microeconomic Fundamentals

- Absolute Advantage/Comparative Advantage
- Gains From Trade: Opportunity Cost falls for each
- Downward sloping Demand: From Slide Rules to PCs
- Upward sloping Supply: oil wells, deep water drilling, fracking
- Movement along the curve vs. shifts of the curve
- Substitutes: Treasury bonds vs. Corp bonds
- Complements: Pizza and Coke

GDP: Real World Sizes and Approximations

- Quarterly: three month flow multiplied by 4
- S.A. seasonally adjusted
- Annualized growth rate = $((Q4/Q3)^4 - 1) \times 100)$
- Consumption, 70%
- Investment, 18%
- Government, 18% (excludes transfers)
- Net exports, -5% (X=13%, M=18%)

Inflation: the Details

CPI: A BASKET OF GOODS

CORE CPI: Roughly equals 80%

Food: Roughly 12% Energy: Roughly 8%

Uses of Price indexes:

separate output changes vs price changes

AVOID HYPERINFLATION (soaring prices)

Avoid DEFLATION (prices and wages falling)

Why Fear Violent Price Changes?

Hyperinflation: If all prices are rising rapidly, say a 50%/year average, WE LOSE THE POWER OF THE INVISIBLE HAND

Deflation: Capitalist economies are financed with DEBT. **Businesses/consumers borrow**. If wages and prices are falling rapidly, **bankruptcies soar**—as companies and individuals cannot pay there debts.

U.S. Jobs, Unemployment, Participation, Wage Gains:

(All 4.6% Jobless rates are not created equal)

	Nov-97	Nov-16
Unemployment rate (U3)	4.6%	4.6%
U6 Unemployment rate	8.3%	9.3%
L.F.P.R. (25-54 yr. olds)	84.0%	81.4%
real wage increases (YOY)	3.0%	1.0%

Labor Productivity and Long Term Sustainable Growth

- Labor Productivity growth $\equiv \dfrac{\%\Delta Y}{\%\Delta \text{hours}}$
- Capital deepening (more machines)
- Efficiency of capital (smarter machines)
- Efficiency of labor (smarter workforce)

Key Laws and Equations

- $\boldsymbol{LTSG} =$ growth in Labor Force+ growth in labor productivity
- Okun's Law: $\%\Delta \boldsymbol{Y} = \boldsymbol{LTSG} - \boldsymbol{2}(\Delta \boldsymbol{U\ Rate})$
- ***Fisher Equation:*** $i = r + \pi$
- The Phillips Curve: $\pi_t = \pi_e + \alpha(U^* - U_t)$
- Quantity Equation: $\%\Delta M + \%\Delta V = \%\Delta P + \%\Delta Y$
- Real exchange rate = (nominal Exchange rate) X $\left(\frac{\boldsymbol{Domestic\ Price\ Level}}{\boldsymbol{Foreign\ Price\ Level}}\right)$
- Unit labor costs = $\frac{\boldsymbol{hourly\ wage\ rates}}{\boldsymbol{labor\ productivity}}$

Some Key Phrases

- Malthusian Dilemma
- Schumpeter/Creative destruction
- Keynes/deflationary destruction
- Solow growth model
- Ex-ante vs ex-post real rates
- Natural Unemployment rate or

  NAIRU: non-accelerating π rate of U

GROWTH RATES AND THE POWER OF COMPOUNDING

- A rough rule for growth rates:

Divide the growth rate into 70

2% growth 70/2 = 35 years $(1.02)^{35} = 2$

3.5% growth 70/3.5 = 20 years $(1.035)^{20} = 1.99$

5% growth 70/5 = 14 years $(1.05)^{14} = 1.98$

Macroeconomic Models

- Aggregate Expenditure Model:

  Output vs spending: inventories swing, prices steady

- Aggregate Demand/Aggregate Supply Model:

  Demand vs supply: Prices and quantities shift

- Expanded Loanable Funds Model

  T-bills vs t-bonds vs. corporate bonds

  Households: supply funds,

  gov't & corporations: demand funds

  FRB: buys and sells t-bills to target short term interest rates

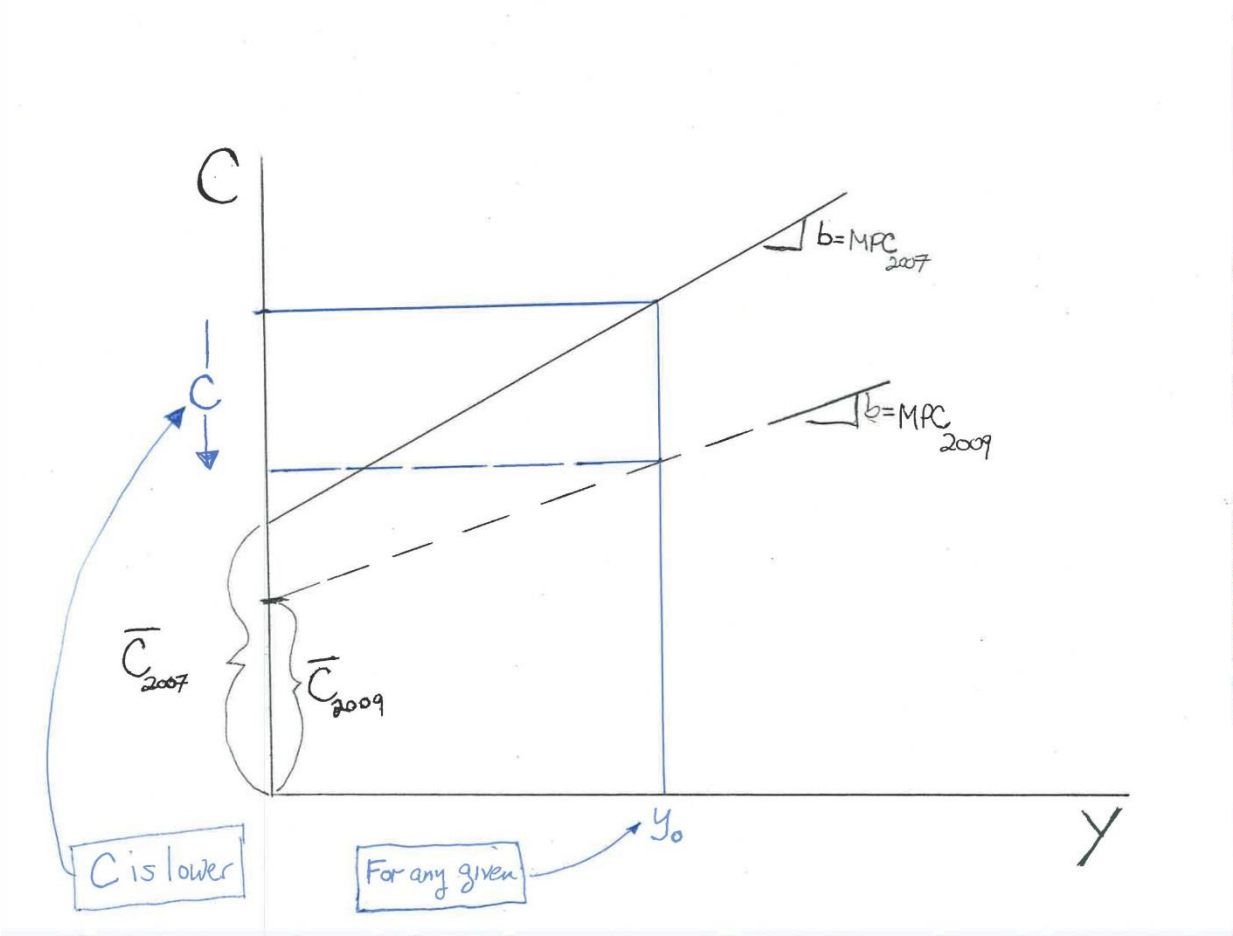
The Aggregate Expenditure Model

- Expectations drive decisions.
- The future is uncertain.
- Inventory swings balance production/demand mismatches in the short run.
- When actual inventory changes deviate from intended inventory changes, companies change future production plans.
- Thus swings in inventories, in the AE model, over time drive the economy back toward equilibrium.

More on the AE Model:

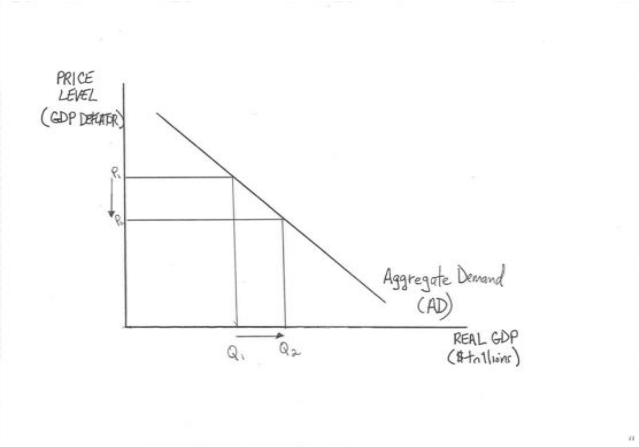
- Our AE model is expectations based.
- A **consumption function** is the driver.
- Unplanned inventory changes can create a boom/bust cycle.
- Responses to inventory changes drive the economy back toward equilibrium.

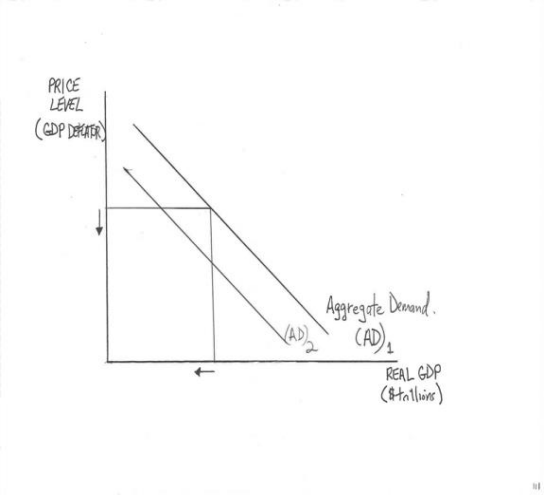
In 2009, falling sentiment drove autonomous spending down.
In 2009, plunging wealth drove the MPC down.



Aggregate Demand and Aggregate Supply Model

- Downward slope: wealth/interest effects
- Movements along: Shifts of:





Aggregate Demand Curve Shifts

- M policy/interest rates
- Fiscal policy/Gov’t purchases or tax cuts
- Household income expectations
- Company profits expectations
- U.S. vs. rest-of-world growth rates
- U.S. exchange value of the dollar

Long-run aggregate supply curve

LRAS = output determined by the number of workers, the level of technology, and the *capital stock*.

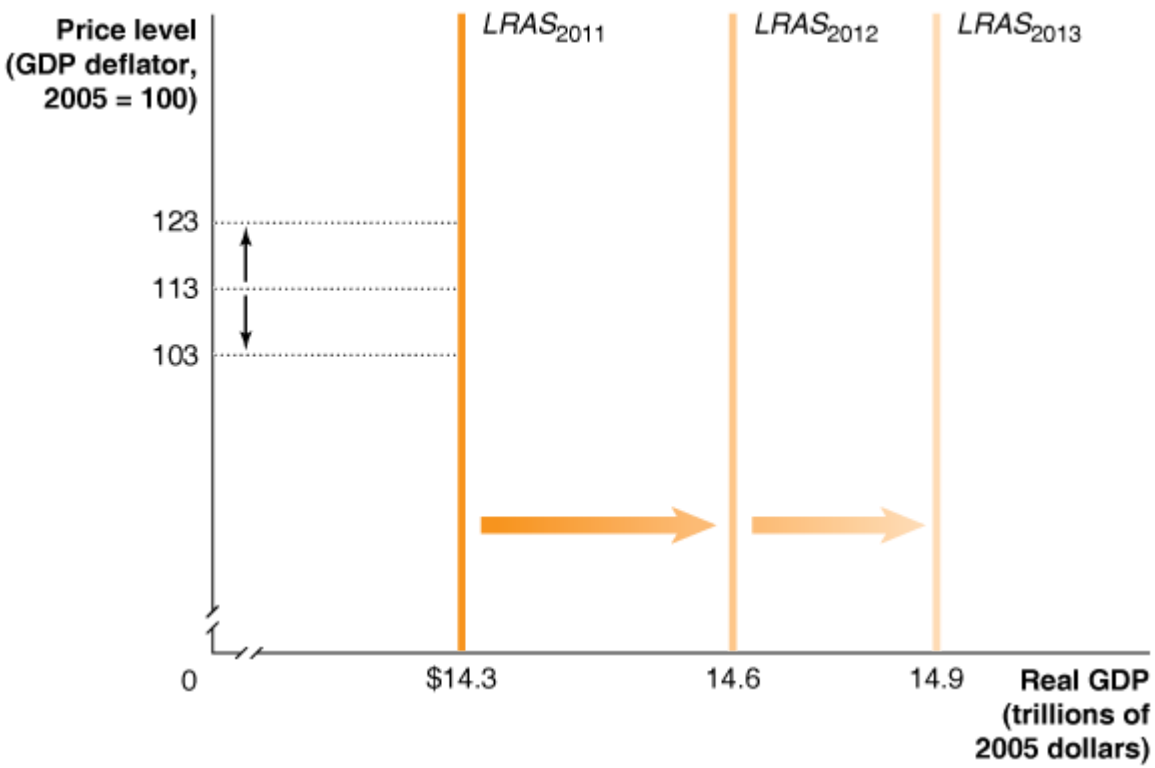
Not affected by the price level.

LRAS:

A vertical line, at the level of *potential* or *full-employment GDP*.

When an economy rests at its LRAS, U=U*

Figure 13.2



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Short Run Aggregate Supply: The slope and shifts

- Upward slope reflects sticky wages

  I raise my prices, don’t pay higher wages, and I can produce more output at a profit.

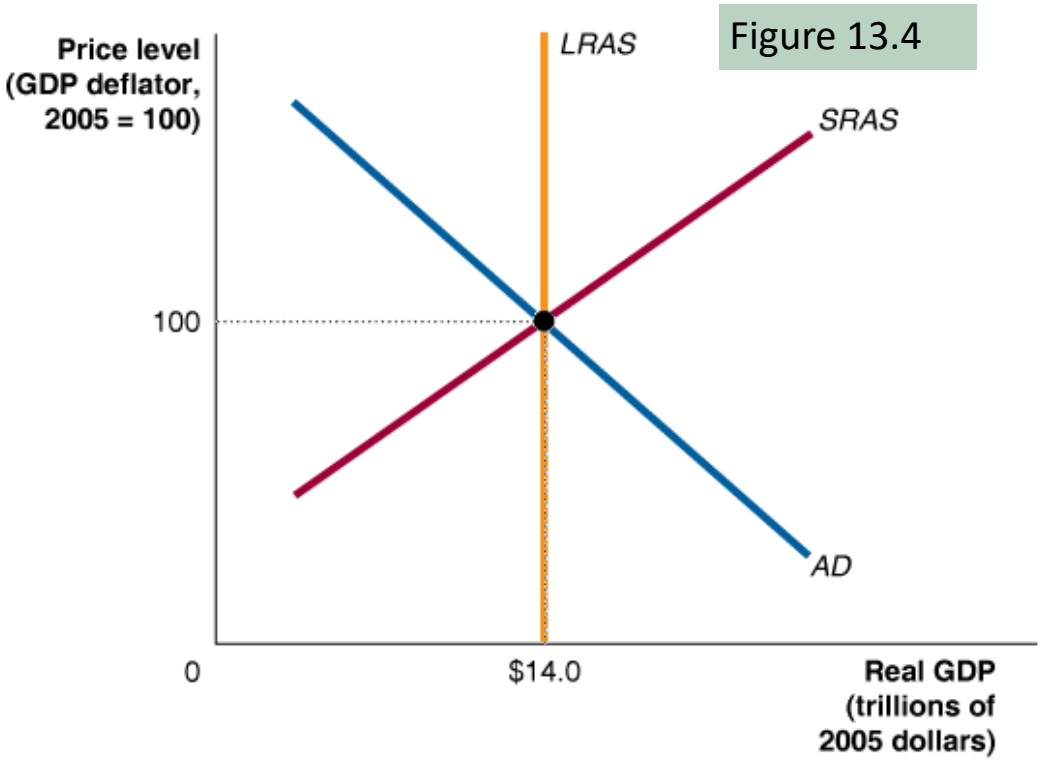
- SRAS shifts:

  Nominal wages shift

  Labor productivity shifts

  Commodity prices shift

Long-run macroeconomic equilibrium



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Dynamic Equilibrium: How policymakers and business people think about AD-AS

- We don't have a stable price level.

  P = 100

- We have a stable inflation rate.

  π = 2%

- We don't have a stable output level

  Y = $16 trillion real

- We have a sustainable growth rate.

  $$\frac{\%\Delta Y}{year} = 2\%$$

Conclusion #1

- Adverse supply shocks are the worst of both worlds:

  Inflation accelerates AND Output falls

- Positive supply shocks are the best of all possible worlds:

  Inflation rates fall AND Real GDP growth accelerates

Conclusion #2

- Adverse demand shocks have good and bad elements:

  Inflation decelerates AS Output falls

  (assuming you are not in or near a DEFLATION)

- Positive demand shocks have good and bad elements:

  Inflation rates accelerate AS Real GDP growth accelerates

Capital Markets

- S = I SAVING = INVESTMENT
- Loanable funds model , assumes S=I & EMH
- Efficient market hypothesis (EMH)

  Efficient markets arbitrage away risk-free returns

  Duration vs default

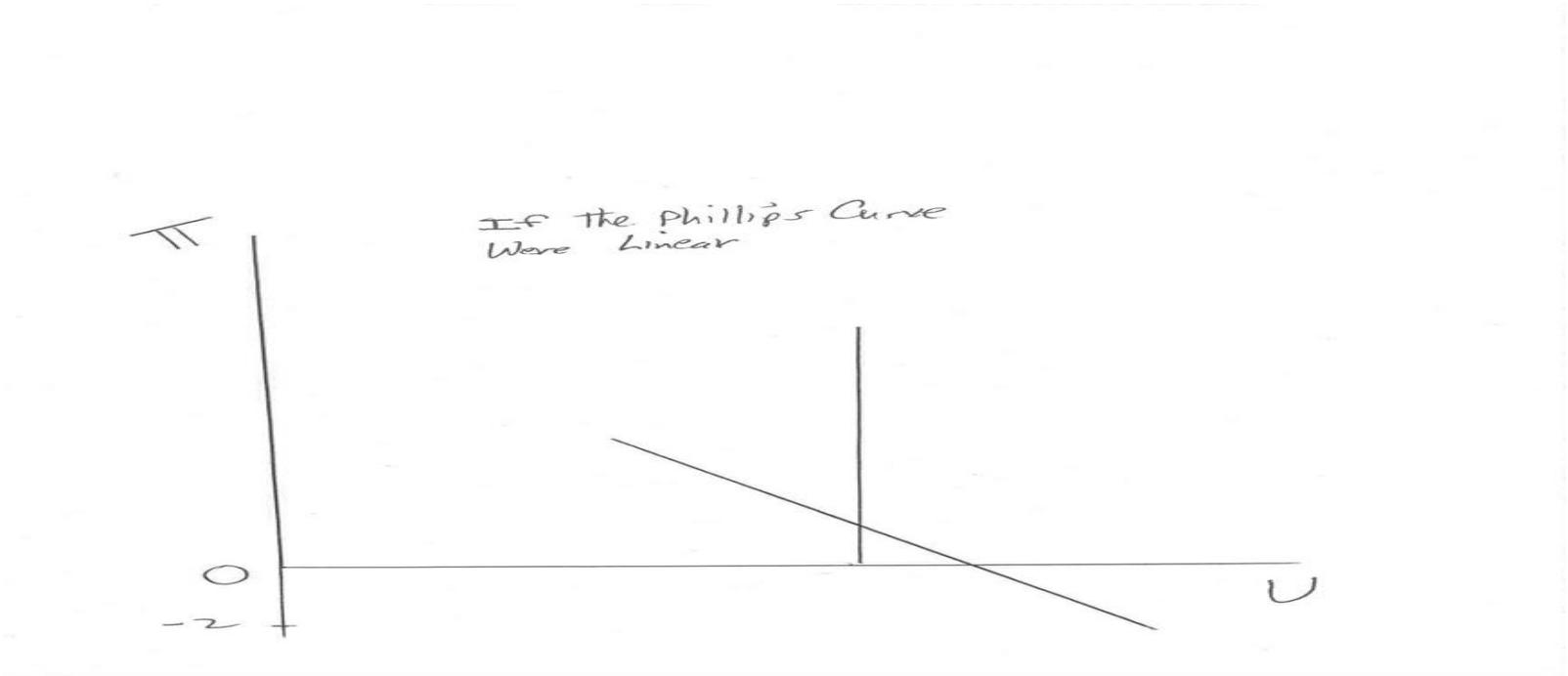
  Neo's vision

- Adaptive Expectations

  Bubbles in financial markets

The Phillips Curve

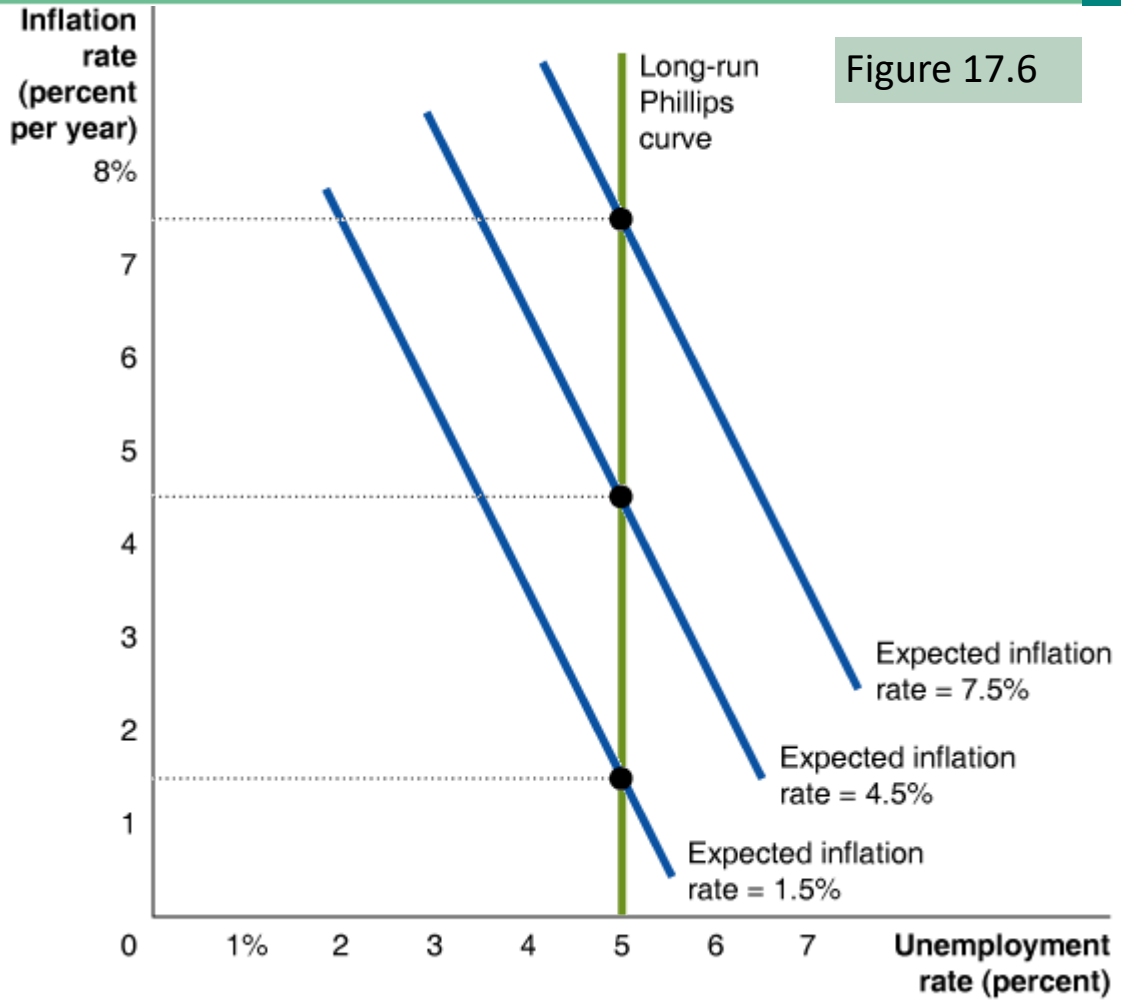
- The trade-off between inflation and unemployment



A short-run Phillips curve for every inflation rate

Each expected inflation rate generates a different short-run Phillips curve.

$$\pi_t = \pi_e + \alpha(U^* - U_t)$$



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The long-run Phillips curve

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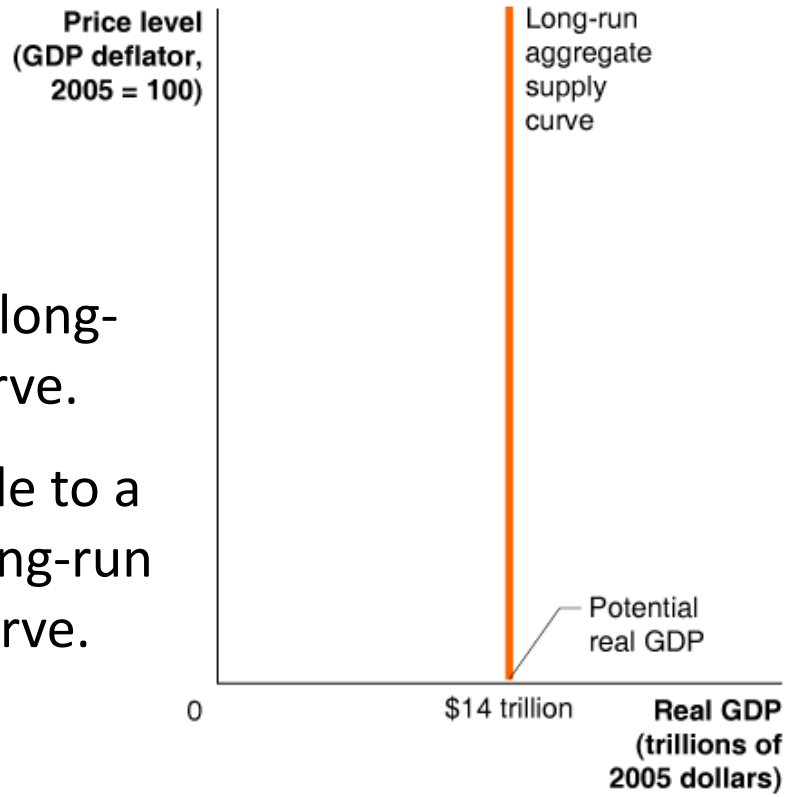
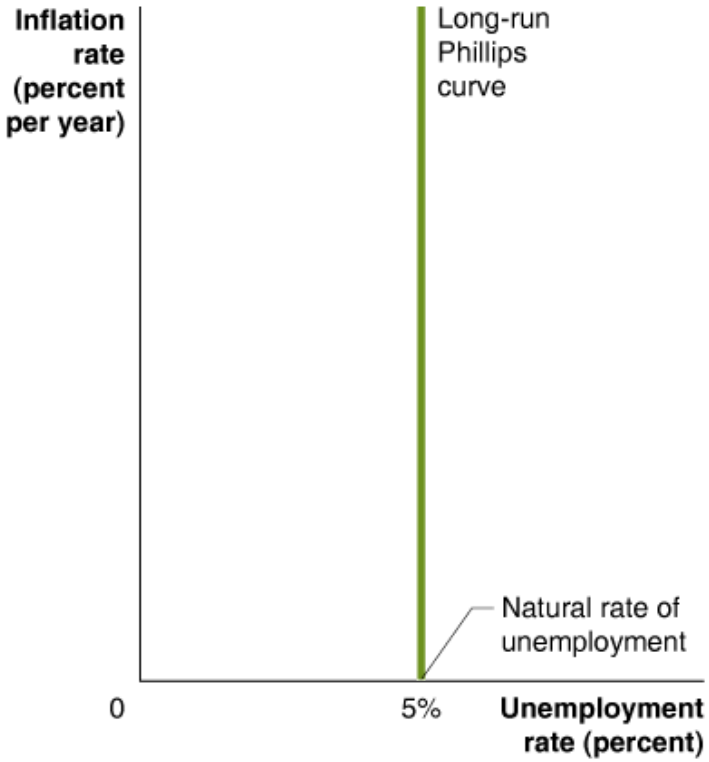
A vertical long-run AS curve.

Compatible to a vertical long-run Phillips curve.





In the long run, employment is determined by output, which in the long run does not depend on the price level.

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The Zero Bound: Inflation declines are much smaller as you approach zero.

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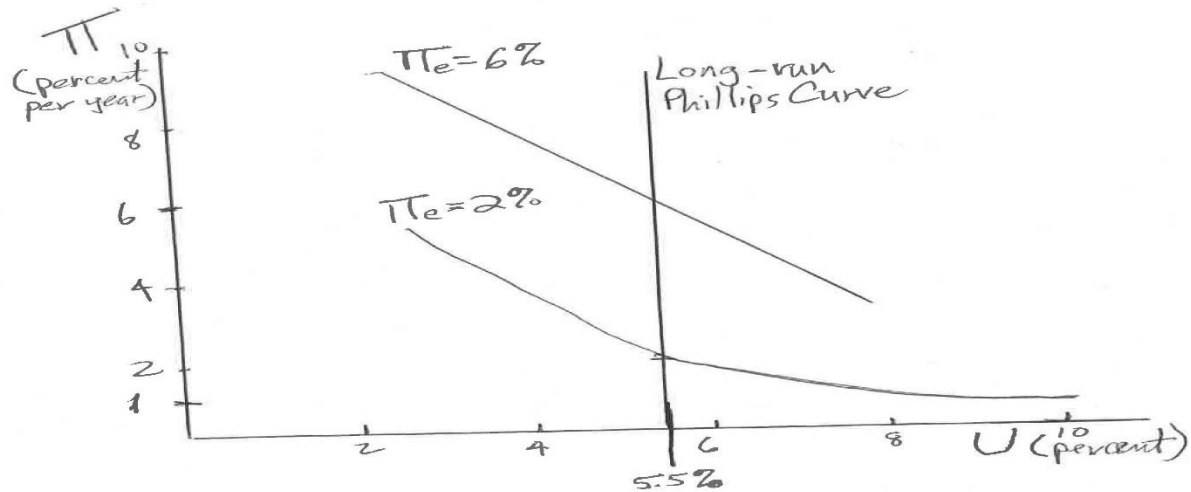


There is no divine coincidence

- PLOGs can exist without producing outright deflation.
- Therefore, a central bank focused just on inflation, will not ease as much as a dual mandate central bank

Monetary Policy:

- The central bank is driving the bus:

1)They want to keep inflation LOW.

2)They want to keep real growth strong.

3)They MUST protect the financial system, as it pumps out the life blood of the economy.

Monetary Policy: open market operations

- The Fed buys and sells treasury bills and thereby establishes the level for the fed funds rate.
- The federal funds rate: the rate banks charge one another as they lend and borrow reserves they hold at Federal Reserve banks.
- KEY POINT: the t-bill interest rate roughly equals the federal funds rate, even though they are interest rates in different markets:

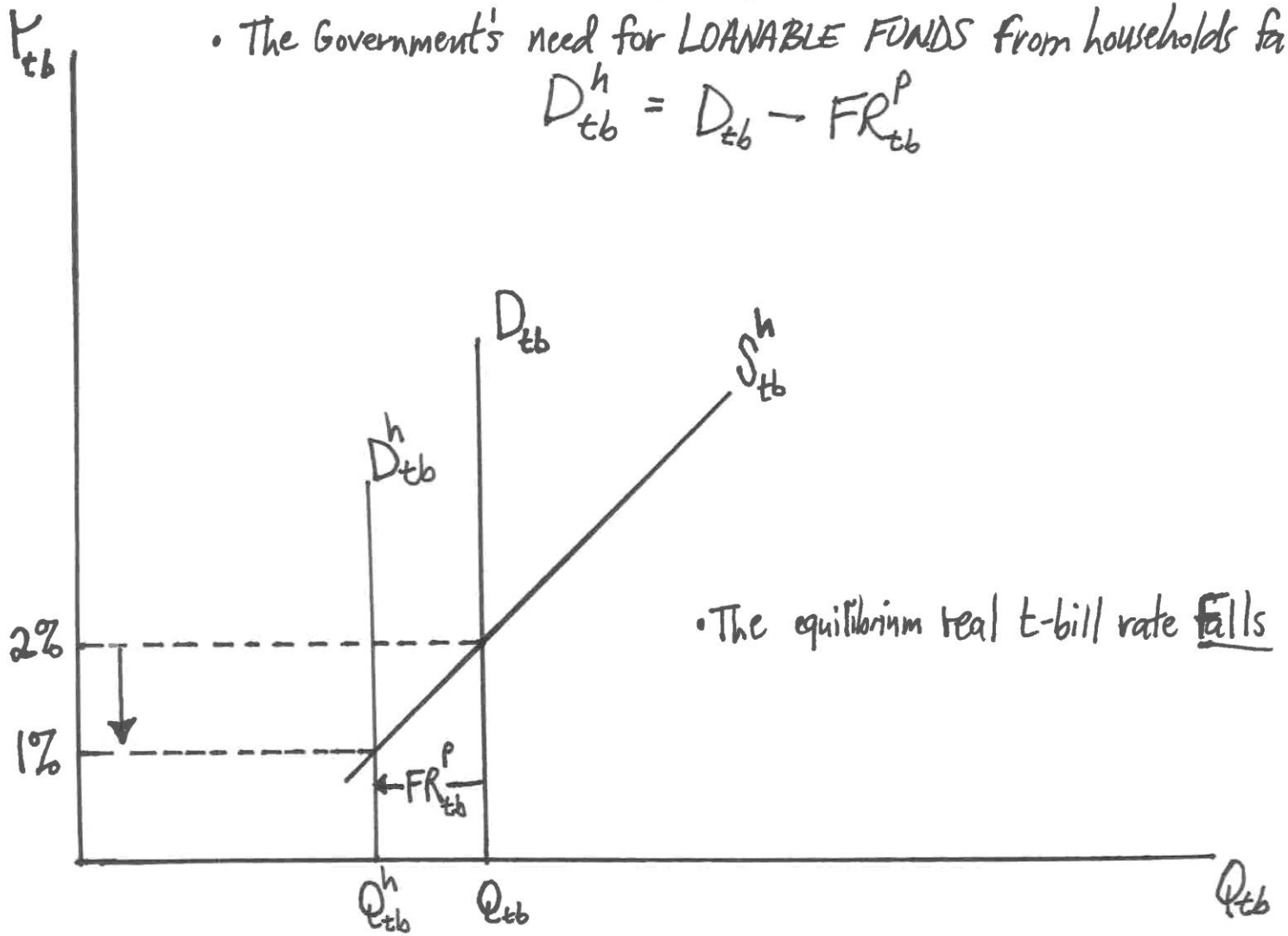
  Thus the Fed moves the federal funds rate, by buying or selling t-bills and moving the t-bill rate.

What drives bankers' lending decisions?

- A bank pays 2% to borrow reserves in the federal funds market.
- A bank charges corporations 5%, to loan money to them
- If the Fed raises the federal funds rate—the rate the bank pays for getting funds---it will have to charge corporations a higher rate.

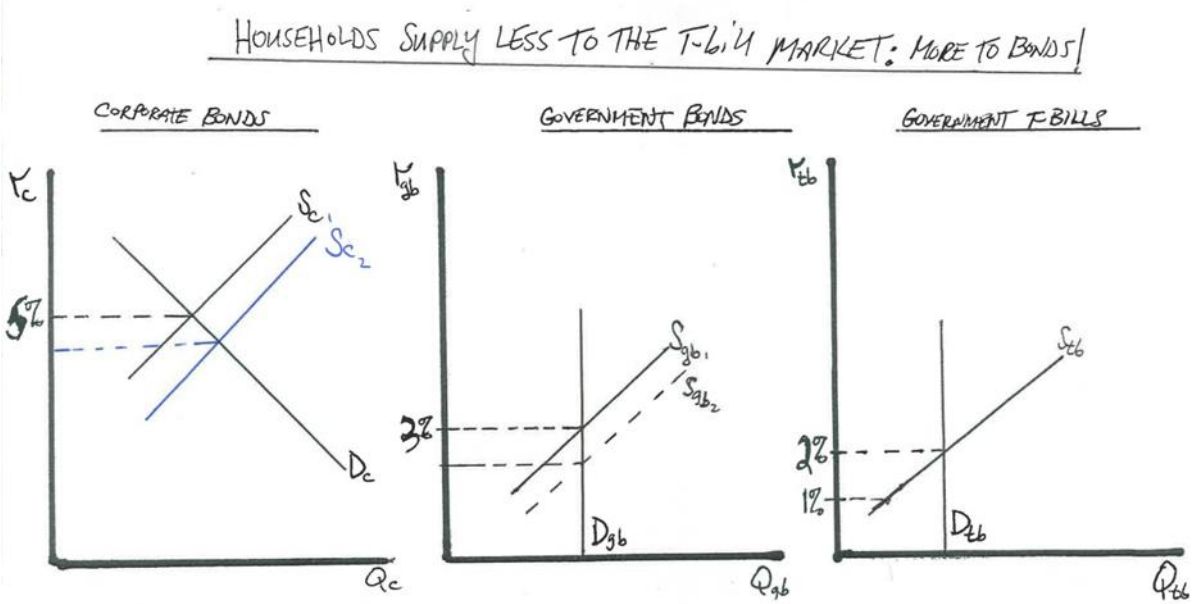
- Suppose the F.R.B. wants to lower their target interest rate
- The F.R.B. buys t-bills (FR^p_{tb})
- The Government's need for LOANABLE FUNDS from households falls

$$D^h_{tb} = D_{tb} - FR^p_{tb}$$



- The equilibrium real t-bill rate <u>falls</u>

The Fed sets the short rate. It influences other rates. It attempts to influence output and inflation, by changing interest rates that households and businesses confront.



How Fed actions permeate the financial system:

- Fed buys or sells t-bills: we move along the household supply curve for t-bills.
- We find new equilibrium. The t-bill rate paid buy the gov't/collected by households changes.
- This, in turn changes households' attitudes about lending in the t-bond and corporate bond market.
- The change in household lending attitudes is captured as shifts in the household supply curves in the government and corporate bond quadrant.

Rules vs. Discretion

- We know the Fed wants low inflation, high employment, strong growth and safe banks.
- Should they actively pursue these goals?
- Or should we impose a rule on the Fed?

The Quantity Theory and a plan for central banks

- Suppose FRB and ECB agree that 2% real growth + 2% inflation is IDEAL.

- IF Quantity theory works, what should the central bank do?

- Set %ΔM at 4%, and hope that it splits into:

  2% real growth and 2% inflation.

The Quantity Equation versus the Taylor Rule

- MV = PY requires stable ‘V’, not true

- John Taylor’s rule to replace money targeting:

- $ff = \pi + 0.5 \text{ X } (\pi - \pi^*) + (U^* - U) + r^*$

What do we do when Taylor Rule Signals the need for negative fed funds?

- Taylor Rule:

  $ff = \pi + 0.5 \times (\pi - \pi^*) + (U^* - U) + R^*$

  Assume $\pi^* = 2\%$ and $U^* = 5\%$ and $R^* = 1\%$

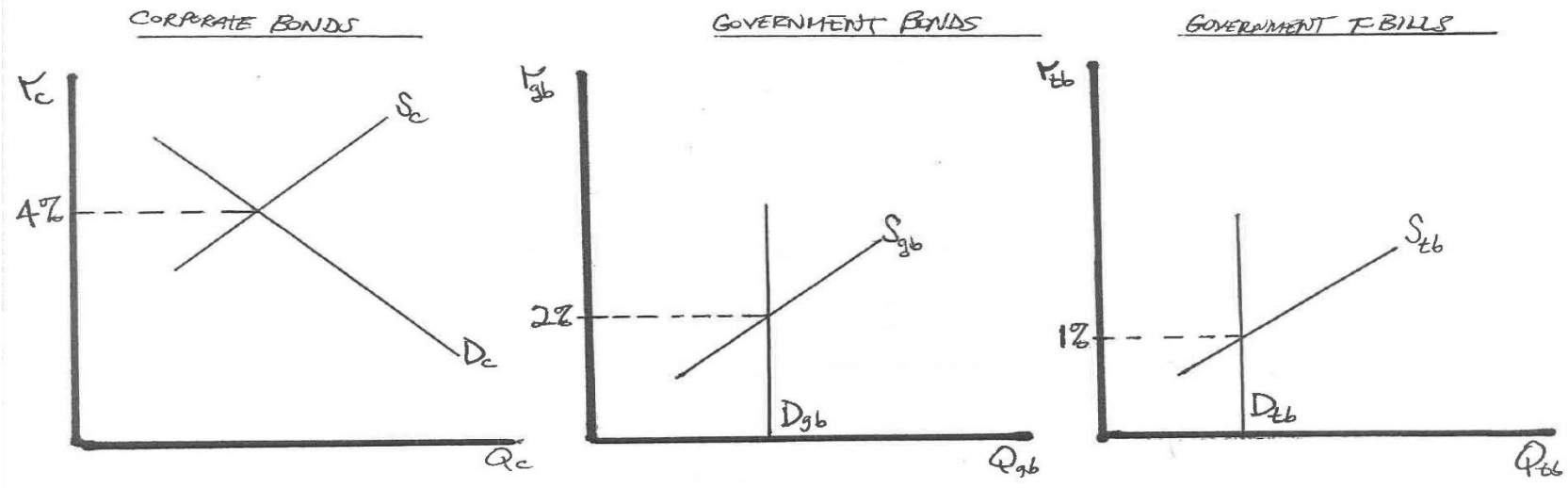
  ZERO BOUND PROBLEM: $\pi = 1\%$ and $U = 10\%$

  $ff = 1 + 0.5 \times (1 - 2) + (5 - 10) + 1 = -3.5\%$

  (nominal fed funds TARGET IS -3.5%)

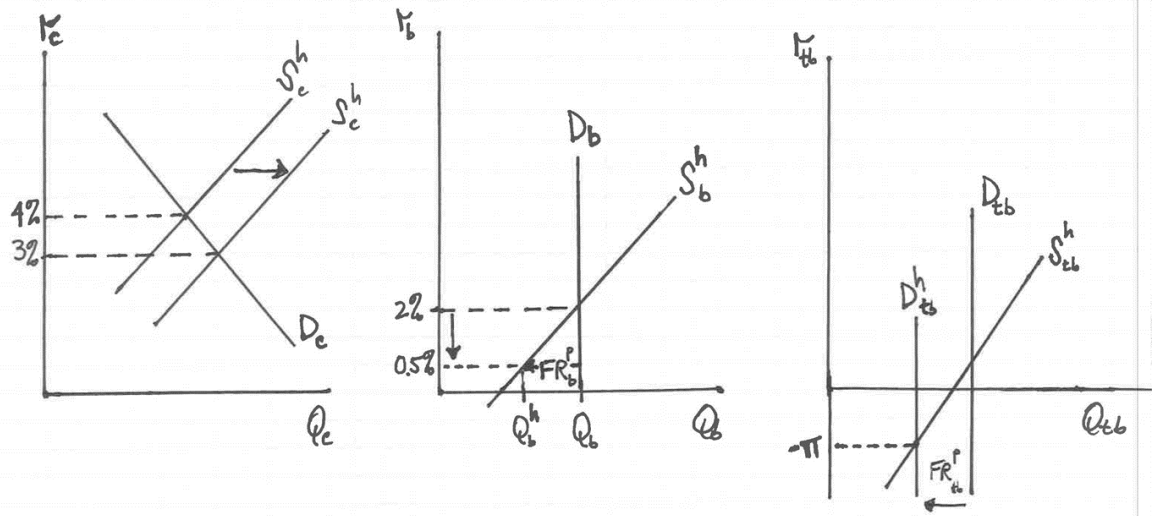
  thus real fed funds equal -4.5%

Our expanded loanable funds model:
Target the real short rate, to elicit a change in the risky real borrowing rate



By directly buying t-bonds, QE, the Fed attempts to lower long rates

- THE FRB BUYS T-BONDS
- HOUSEHOLDS ACCEPT A LOWER REAL RATE AS THEY NEED TO BUY FEWER T-BONDS
- HOUSEHOLDS SHIFT OUT THEIR SUPPLY CURVE FOR RISKY BONDS



Size of Government and Cyclical Fiscal Policy

- The Long run Question: How big should the government be?

  (what percent of GDP should be public vs. private?)

- The Business Cycle Question:

  Should we manipulate government spending or tax rates, to make our economy grow faster or more slowly, in the short run?

(BEFORE WE HIT THE ZERO BOUND FOR FED FUNDS MOST ECONOMISTS SAID, LET MONETARY POLICY HANDLE CYCLICAL ISSUES)

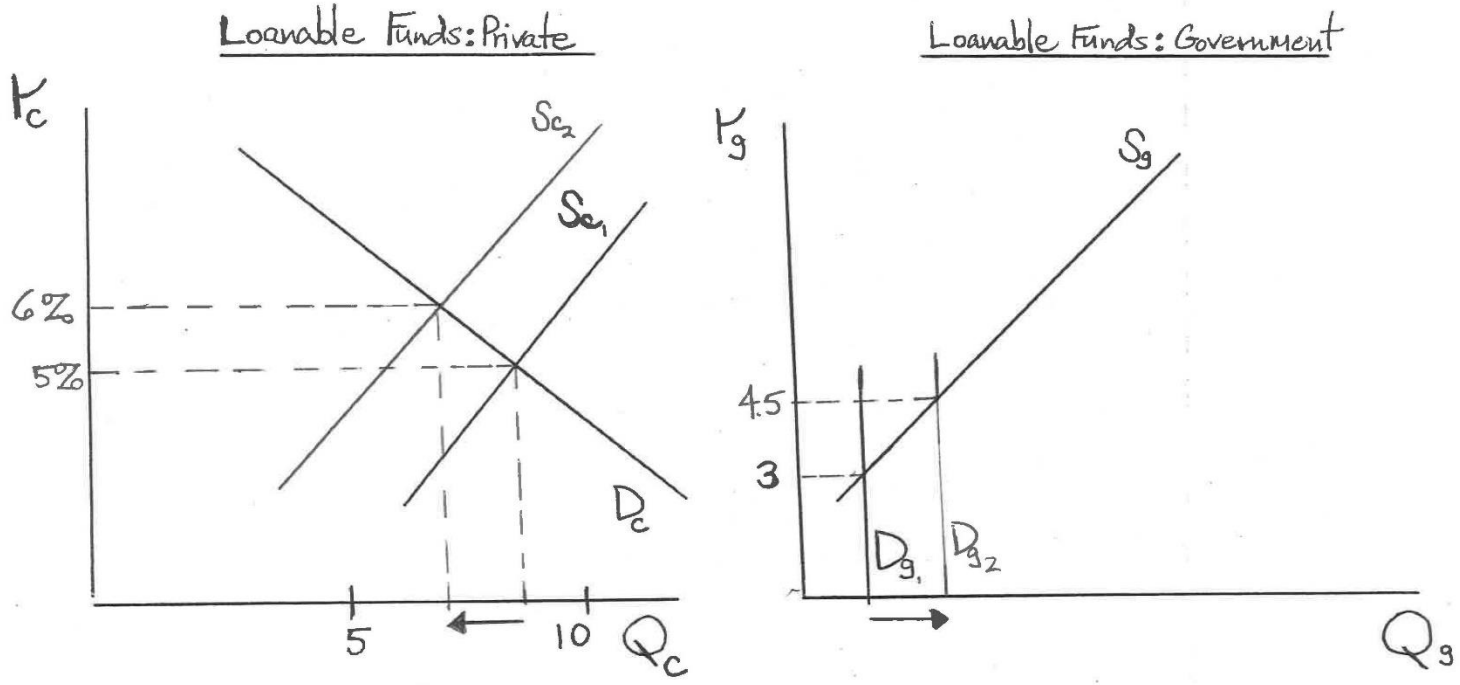
Discretionary Fiscal Policy? Only in the worst of Times

Monetary Policy is more nimble, and so better suited to steer the bus.

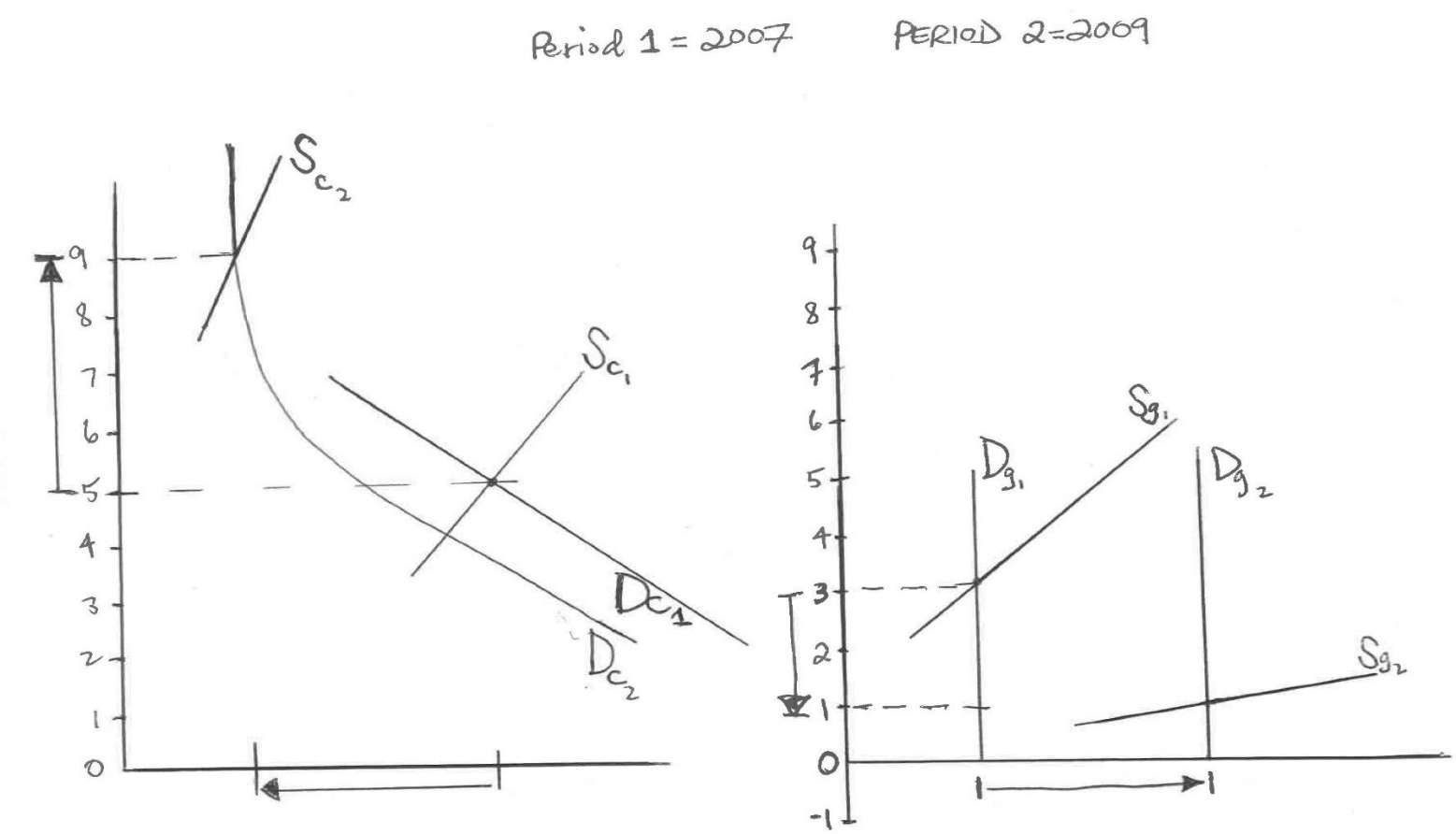
Fiscal Policy is a product of Congress and the White House: therefore it is always highly politicized. And it takes TOO MUCH TIME!

Fiscal Stimulus: Policies that give money away, are very easy to enact, but very hard to take back.

The Loanable Funds Model: Crowding Out, when the economy is near full employment.



The Great Recession: the government borrowing rate, r_g , plunged: no crowding out occurred



When is government a preferred provider of goods?

What is a PURE PUBLIC GOOD?

My consumption of the good does not reduce its availability to you.

Government takes over banana market

I eat the banana, it is gone, for you.

Government provides national defense.

My benefit does not reduce the benefit to you.

NATIONAL DEFENSE, A CLASSIC

PURE PUBLIC GOOD

- The U.S. spends around $600 billion per year.
- That is close to $2,000 per person per year.
- I benefit from that defense, but it does not diminish your benefit.
- If you refused to pay for a ‘privatized’ military, we could not prevent you from benefiting from its efforts:

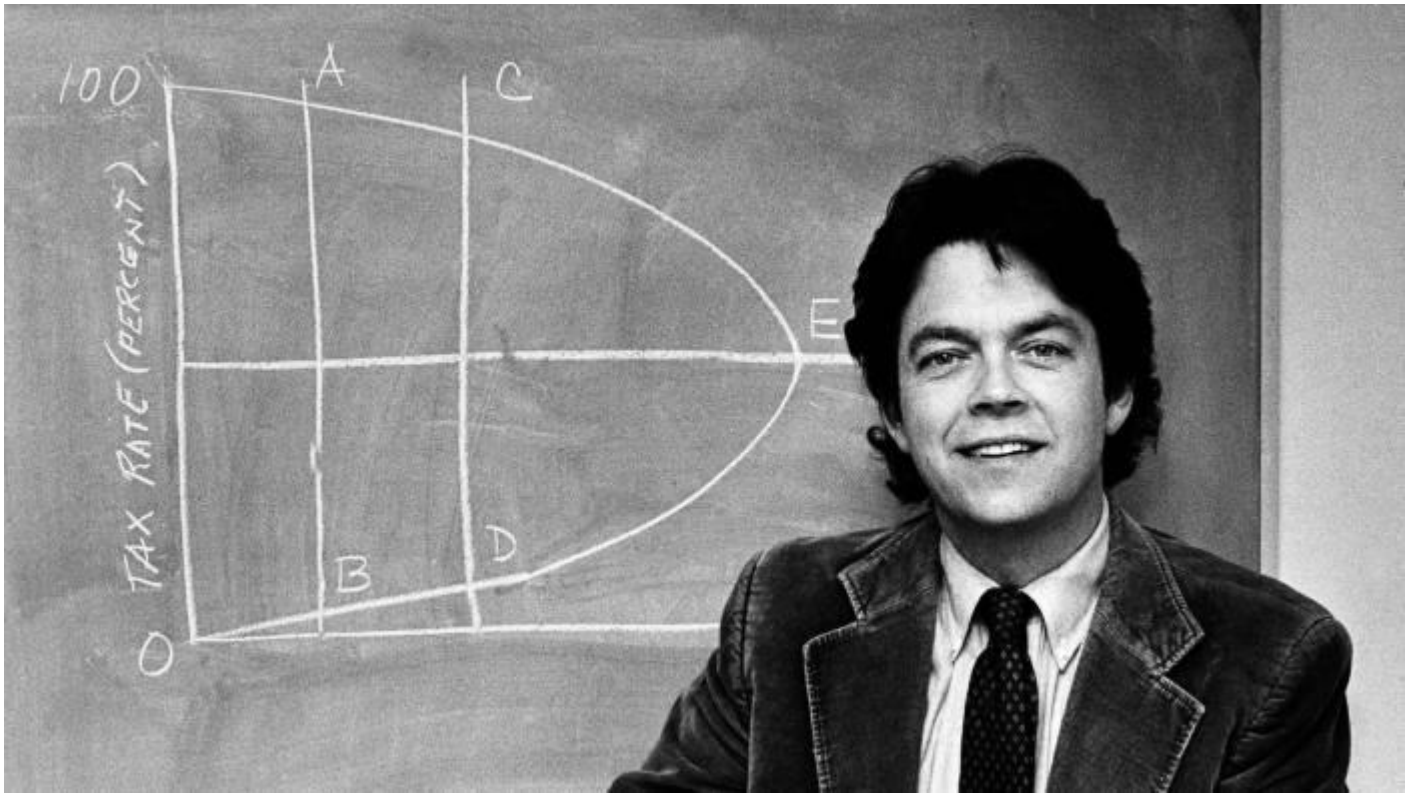
THE FREE RIDER PROBLEM

Paul Romer: Innovation has Public Good aspects

- Non-rival: my use of Susan's idea does not prevent Kumar from using Susan's idea.
- The INVISIBLE HAND, will cause Susan to be only modestly interested in coming up with a new idea, since most people who use her idea will not pay her.
- Romer says that is why we should have **government pay for basic research**, and that is why government should create and enforce **PATENT LAWS**.

Taxation: Super High Tax Rates
Destroy Incentives, and may lower Revenues
(that is Art Laffer, with his famous curve, circa 1981)

NOTE HIS GRAPH SUGGESTS THAT 50% IS THE RATE THAT DELIVERS THE MOST IN REVENUES



How about the top tax rate?
Where are we today, on the Laffer Curve?

1950s through 1970s	70%
1981 Reagan Tax cut	50%
1986 Reagan Tax reform	28%
1992 Clinton Budget	39.6%
2001 Bush tax cut	35%
2012 Obama Tax Cut Extension	39.6%
2012 Affordable Care Act	43.4%
The Trump Tax Cut	37%

Cyclical Fiscal Policy: Cut taxes or increase Spending to stimulate economic growth

Monetary Policy is more nimble, and so better suited to steer the bus.

Fiscal Policy is a product of Congress and the White House: therefore it is always highly politicized. And it takes TOO MUCH TIME!

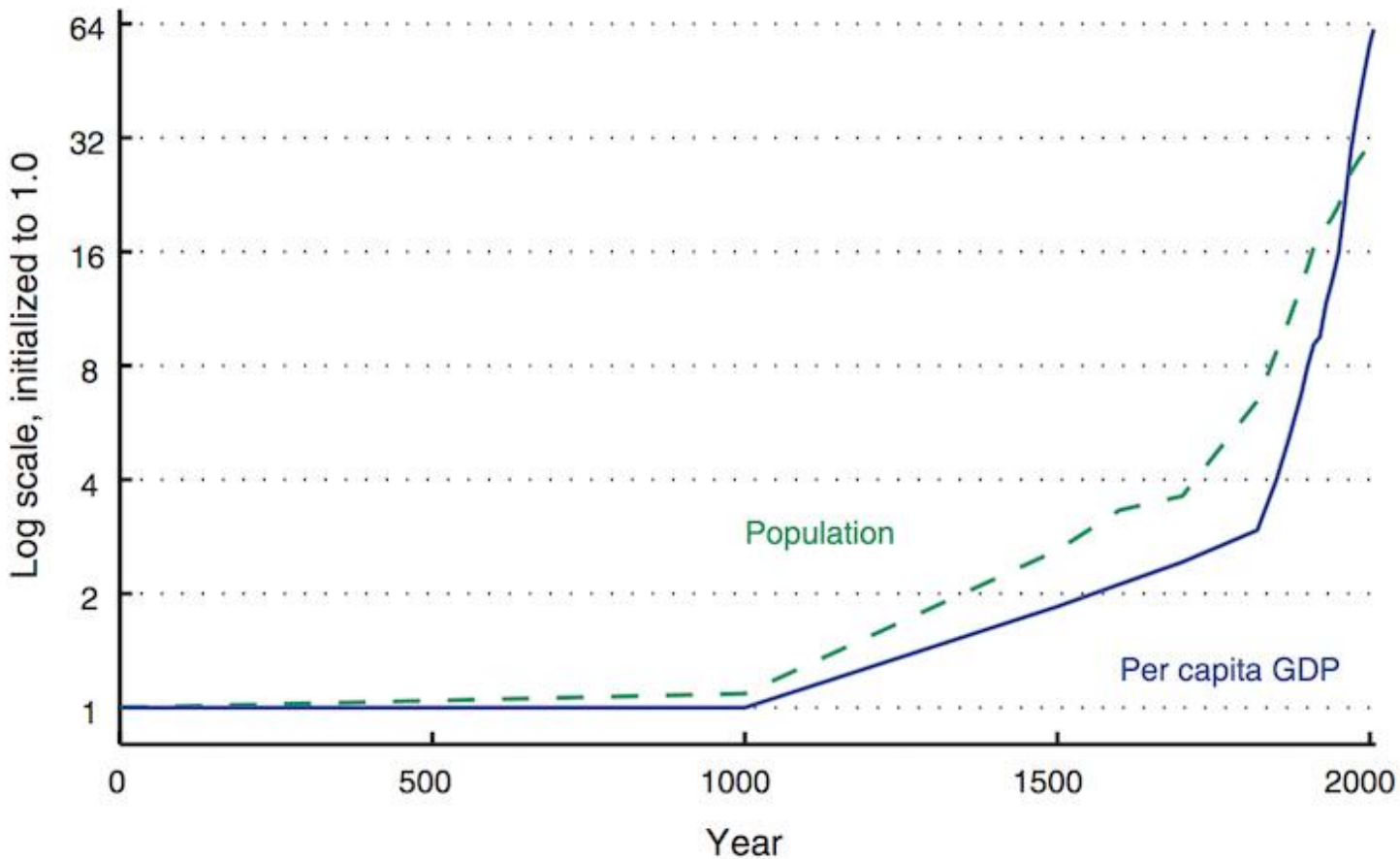
Fiscal Stimulus: Policies that give money away, are very easy to enact, but very hard to take back.

BUT WHEN MONETARY POLICY CONFRONTS THE ZERO BOUND FISCAL POLICY MAY MAKE SENSE.

Size of government: international comparisons

	Total outlays	total ex-defense
France	56%	53%
U.K.	48%	45%
Germany	45%	44%
Japan	42%	41%
U.S.A.	42%	38%
Brazil	39%	37%
India	27%	24%
China	24%	20%

Slow Growth: Here to Stay or Just a Pause.
Robert Gordon sees four headwinds.
Paul Romer, (and I), Are betting on You!



A Summary of the IMF Summary Table:

	Percent of Global	Percent of Global	Percent of Global	Percent of Global
	Real GDP: 2001	Real GDP: 2017	Population: 2001	Population: 2017
United States	21.4	15.3	4.6	4.4
Germany	4.5	3.3	1.4	1.1
China	12.1	18.2	21.0	18.8
India	4.7	7.4	16.7	17.8
Russia	2.6	3.2	2.4	2.0

Exchange Rates: The amount of one currency you can exchange for another.

- You arrive in Paris, 11/15/17, with $500
- A bank offers you €431 (431 euros) for your $500.
- Your hotel cost €431 per night.
- That means, given the $/€ exchange rate on 11/15/17,
  your hotel room will cost you $500 per night.

The IMF: market exchange rates not the best guide to relate Nations' real GDP levels.
They evaluate the PURCHASING POWER of currencies

Purchasing Power Parity: what exchange rate lets you buy the same amount of stuff for a specified amount of money:

Purchasing Power Parity:

In nation Alpha, I spend $100,000 per year:
I buy a 3000 ft^2 house, an SUV, and good food and wine.

In Nation Beta, I spend ¥500,000 per year:

I buy a 3000 ft^2 house, an SUV, and good food and wine. (same stuff)

What exchange rate gives me the same purchasing power?
$1 = ¥5

THINKING ABOUT THE ECONOMY FROM A GLOBAL PERSPECTIVE

- Goods flow between nations

  USA sends corn to China

  China sends flat screen TVs to the USA

  Services flow between nations

  USA processes European transactions, via Mastercards

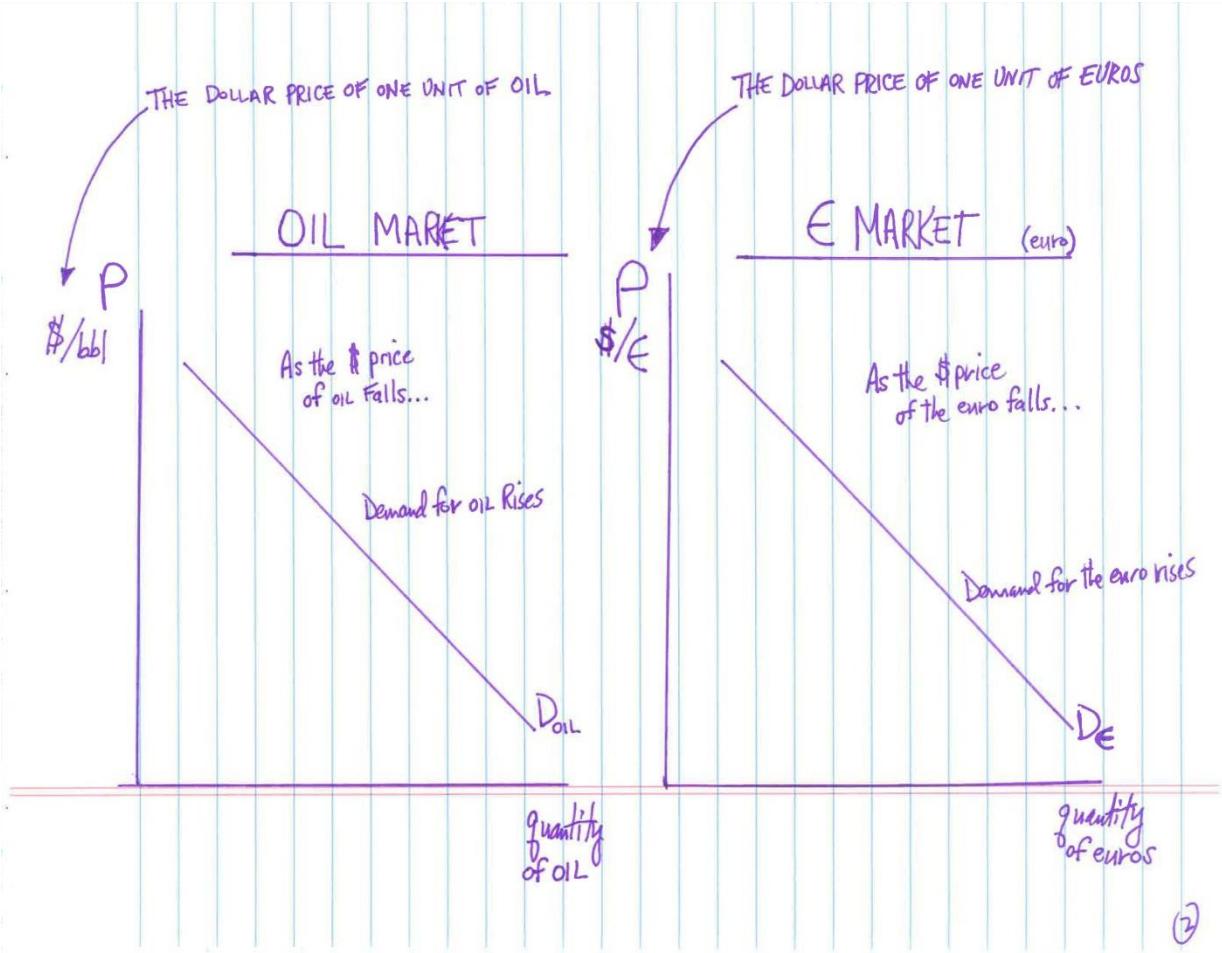
  India fields questions on IPAD usage, via call centers

  Financial Assets flow between nations

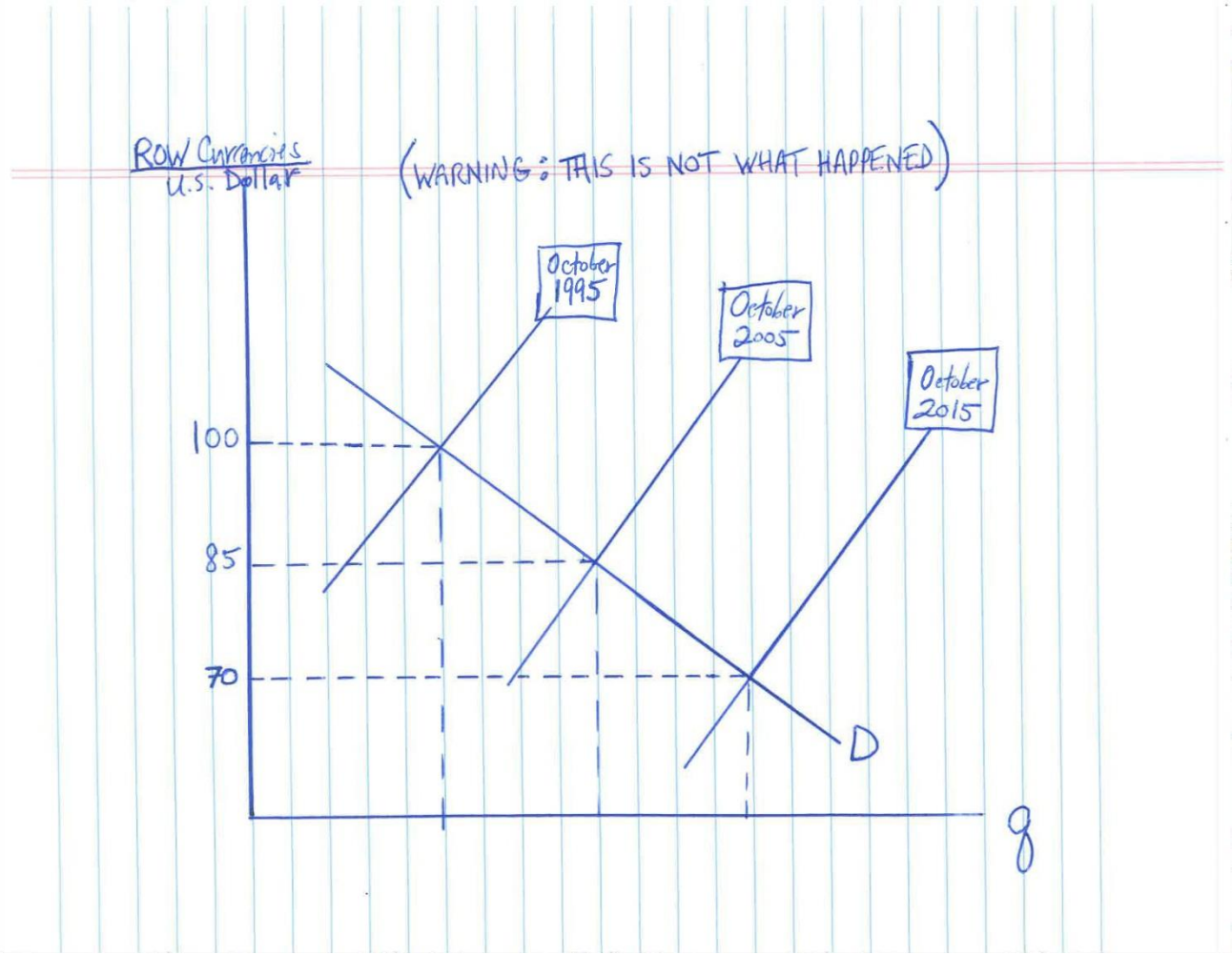
  China buys billions of U.S. treasury bonds each month

  U.S. Companies invest $billions building factories in China

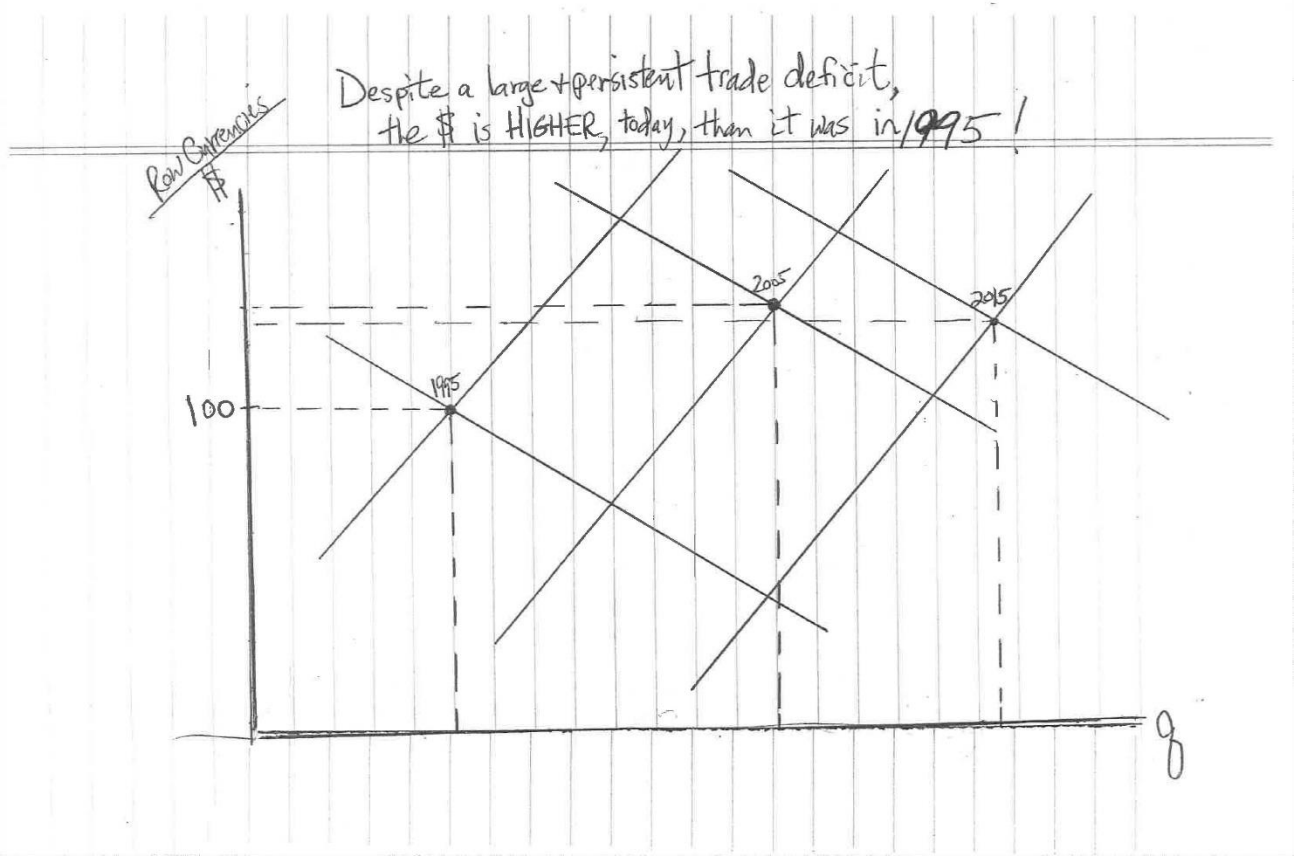
The price is dollars per unit of **oil**. The quantity is units of **oil**.
The price is dollars per unit of euro. The quantity is units of **euro**.
And, of course, we have downward sloping demand!



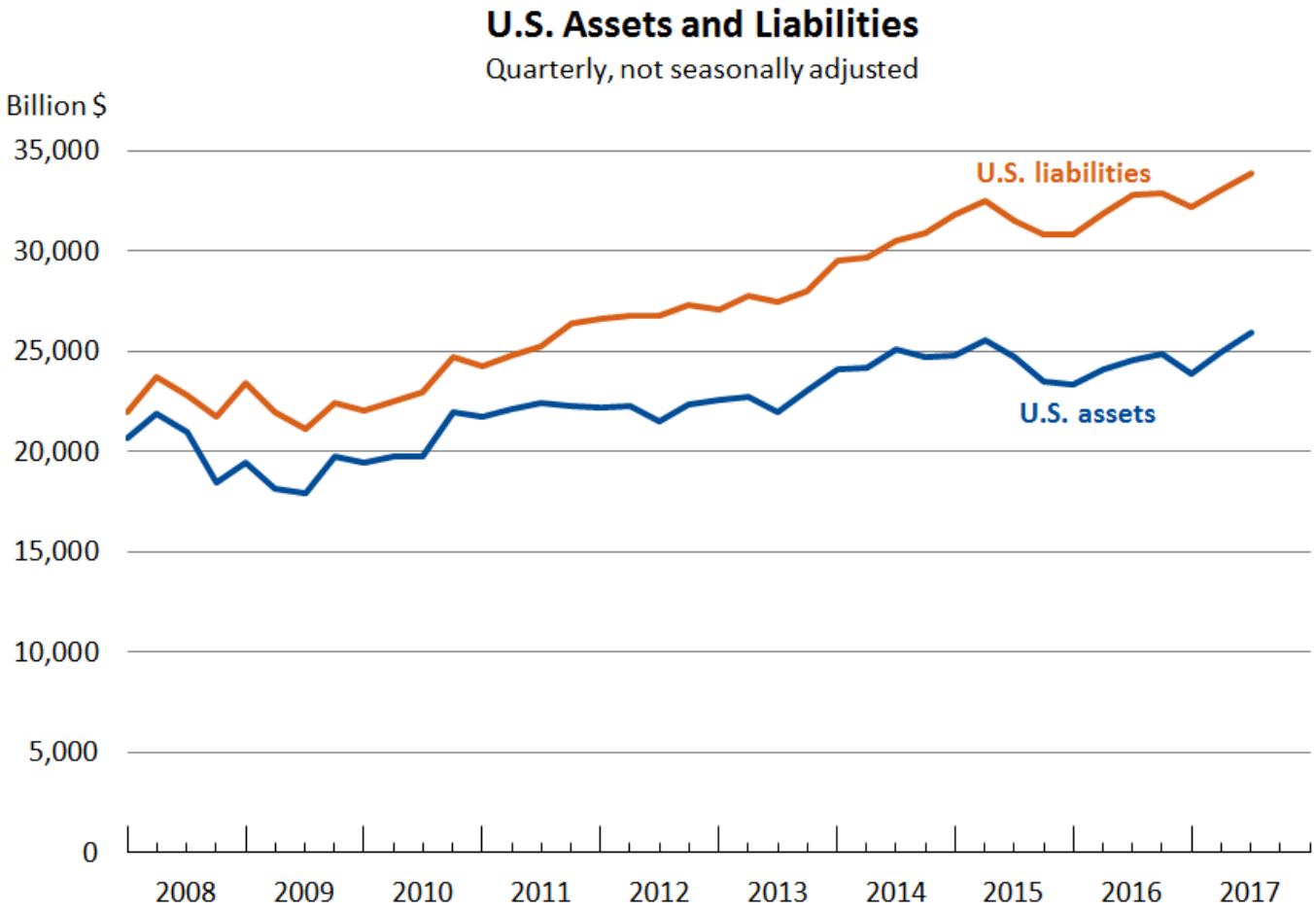
What might the U.S. dollar have done if currencies were driven ONLY by supply/demand of global trade of goods and services?



Currency movements, however, reflect supply/demand for tradable goods and for assets. Healthy appetite for U.S. assets, 1995-2015, more than made up for the trade deficit and the dollar rose.



What is also clear? The U.S. owns a very large sum of ROW Assets. The 'net' of our net debtor status is small relative to gross cross national asset ownership



U.S. Bureau of Economic Analysis

REAL EXCHANGE RATES SEEK OUT CHANGES IN PURCHASING POWER

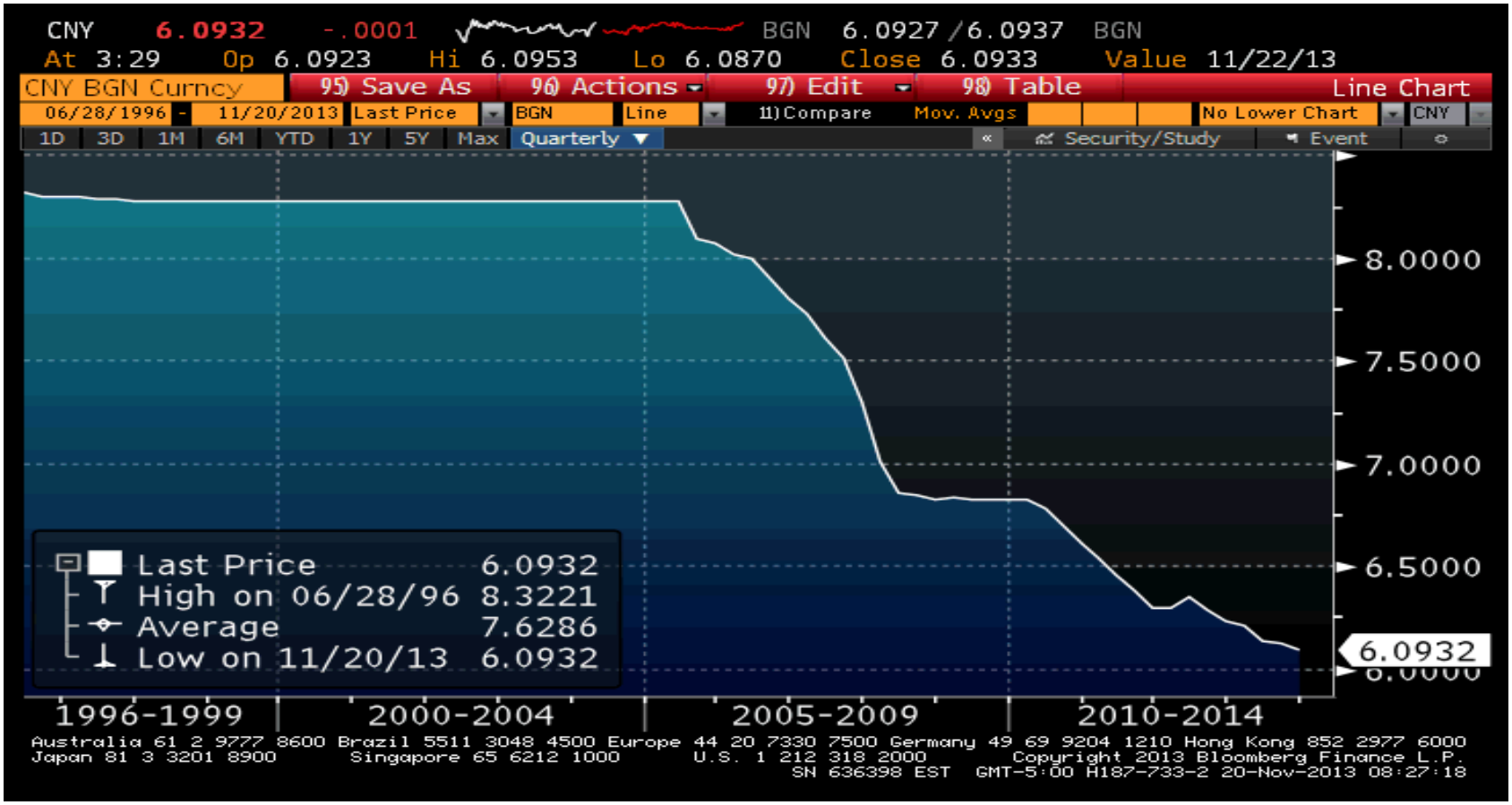
REAL EXCHANGE RATE =

(Nominal exchange rate) x($\frac{\textbf{Domestic Price Level}}{\textbf{Foreign Price Level}}$)

If our goal is to evaluate the change in the U.S. dollar's power to purchase goods in Europe, we need to know TWO things:

1. what did the $ do, relative to the euro
2. what did prices in USA do, relative to Europe

Or, like the China central bank, they can buy their currency to PEG IT!



A Nation Actually Has Four Monetary policy Options:

1. Target the Money Supply

2. Target an interest rate

3. Target Its Exchange Rate

4. Join a Monetary Union, give up its currency and surrender control of interest rates to an international authority:

Italy's wages climb faster and productivity is slower than Germany's

Suppose Italy's Lira Is Stable versus Germany's D-Mark?

Then Italy's labor costs jump versus Germany's.

BUT THEY CANNOT DEVALUE!

		1985	1995
German unit labor costs (D-marks per unit of output)		0.10	0.10
Italian unit labor costs (Lira per unit of output)		0.10	0.13
Italian Lira per D-mark		1	1
Italian unit labor costs (D-mark per unit of output)		0.100	0.128

Imagine applying a dual mandate: Spain vs Germany?

- Germany, the Taylor Rule:

  short rates = 1% +0.5*(1-2) + (6-5) + 2 = 3.5%

- Spain, the Taylor Rule:

  short rates = 1% +0.5*(1-2) + (8-17) + 2 = -5.5%