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# The Phillips Curve

## Evaluating Short-Run Inflation/Unemployment Dynamics

# Outline

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1. Inflation-Unemployment Trade-Off

2. Phillips Curve

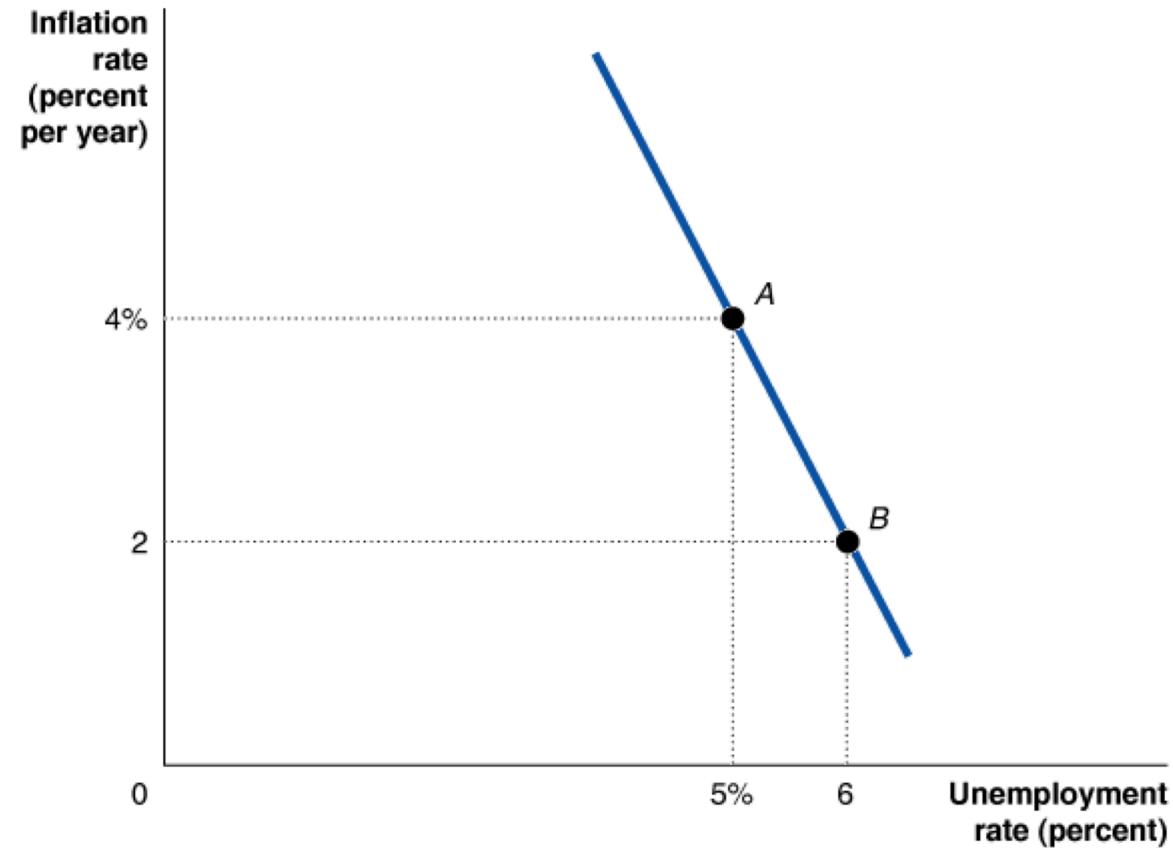
3. Zero Bound for Inflation

- Textbook Readings: Ch. 17

# Discovery of Short-Run Trade-Off between $U$ and $\pi$

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- **Phillips curve:** A curve showing the **short-run inverse** relationship between the unemployment rate and the inflation rate
- Named after economist A. W. Phillips (**1958**)



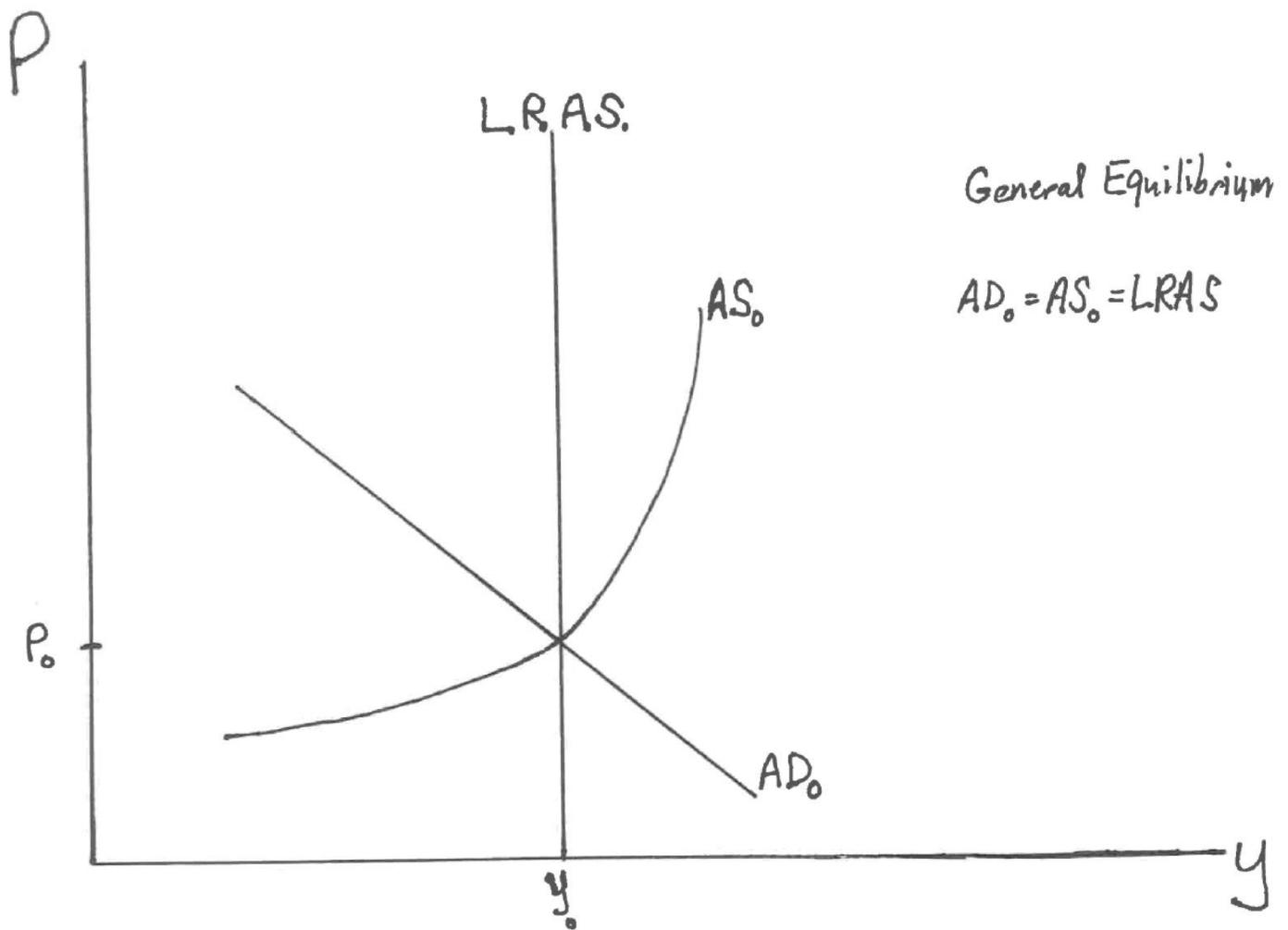
# Is The Phillips Curve A Policy Menu?

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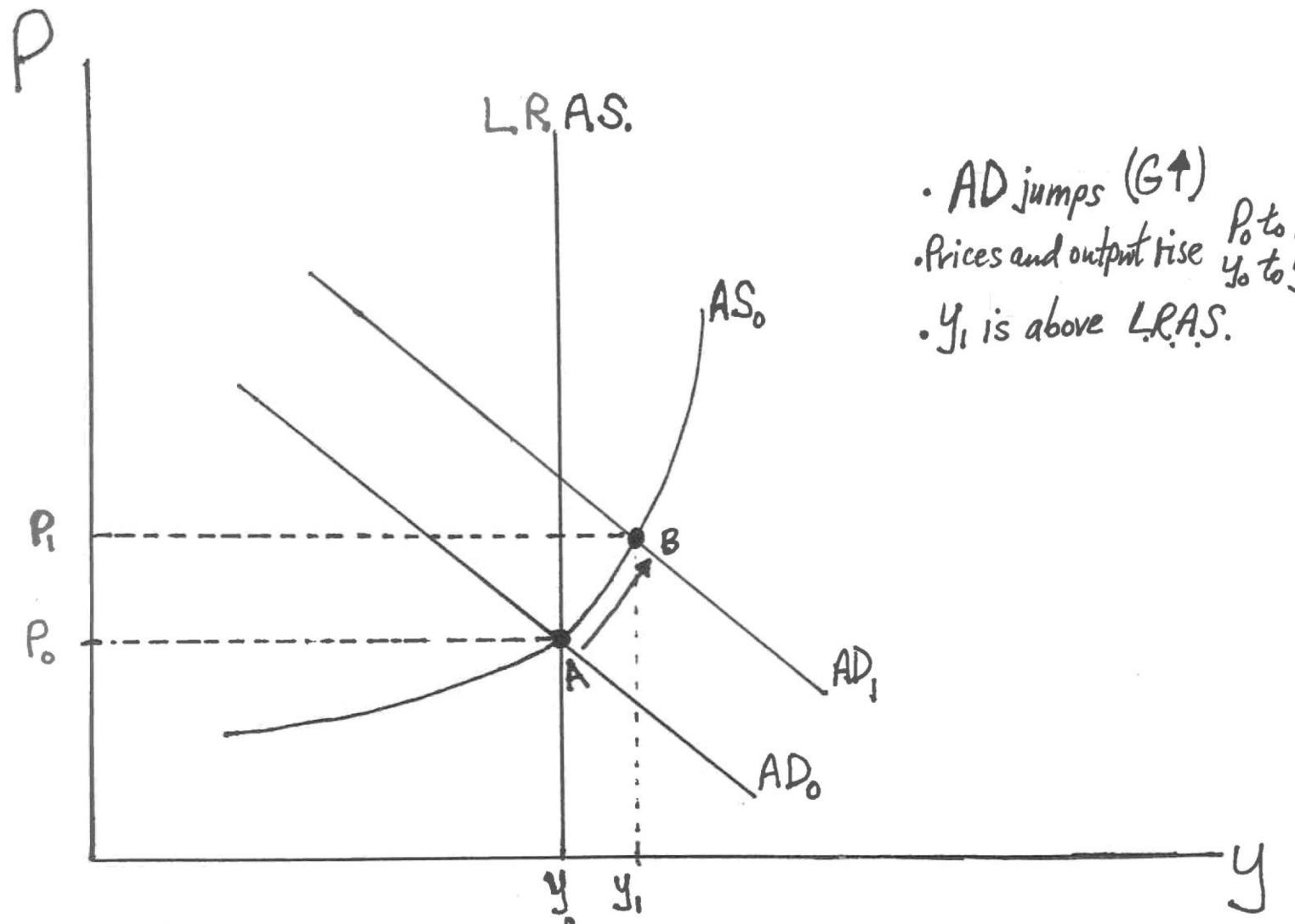
- During the 1960s, some economists argued that the Phillips curve was a **structural relationship**:
  - A relationship that depends on the basic behavior of consumers and firms, and that remains *unchanged* over a long period
- IF this was true, policy-makers could choose a point on the curve

# Our AD/AS Model Helps Us Derive the Phillips Curve

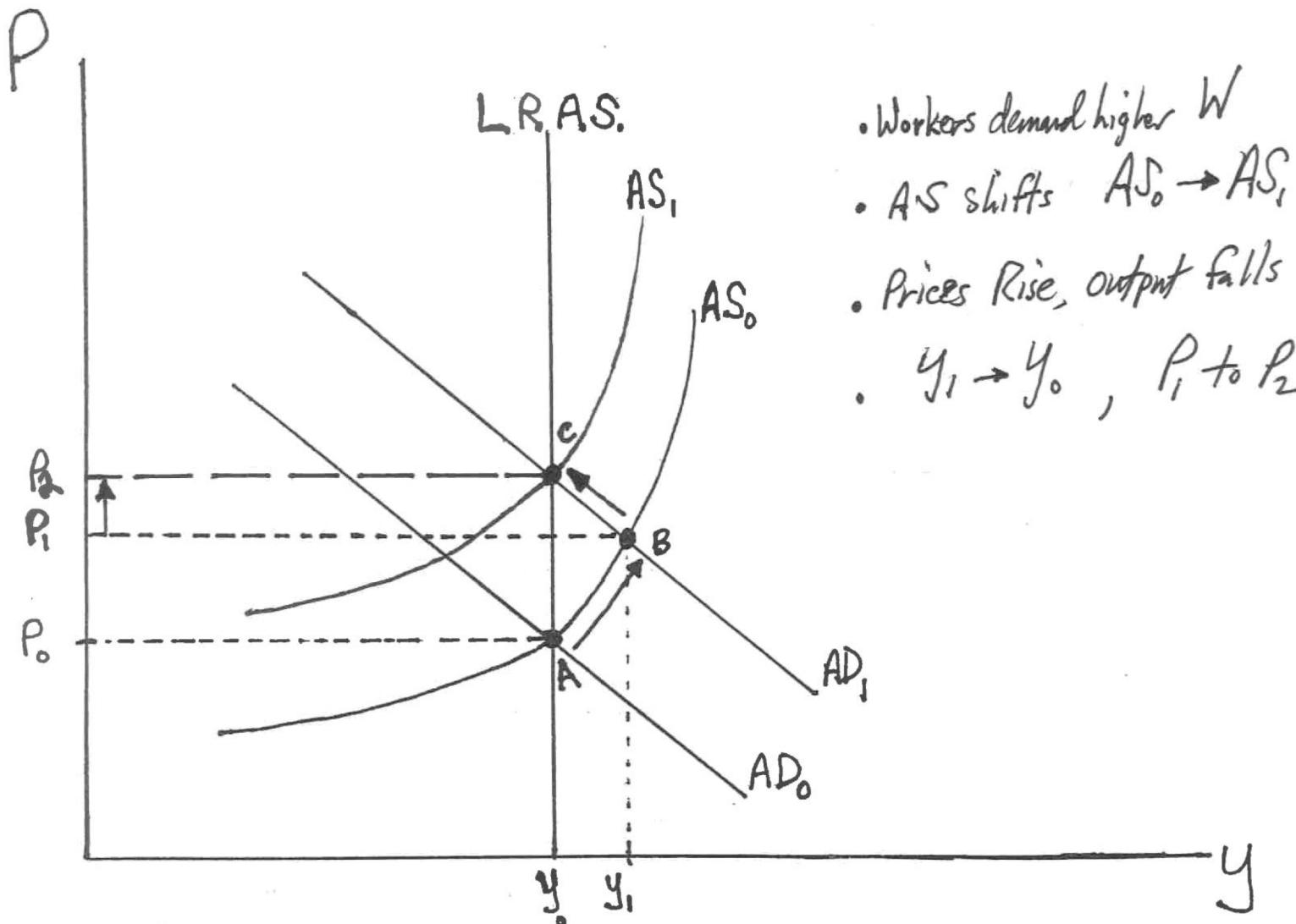
- Recall:
  - The **short-run** macroeconomic equilibrium occurs when the AD and SRAS curves intersect
  - The **long-run** macroeconomic equilibrium occurs when the AD and SRAS curves intersect **at the LRAS**



# Short-Run Equilibrium



# Long-Run Equilibrium



# Short-Run vs Long-Run Equilibrium

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- We began in long run equilibrium:  $AD = SRAS = LRAS$
- We increased  $G$ , increasing  $AD$ :  $AD = SRAS \neq LRAS$
- This drives prices up, wage earners demand increased wages.  
SRAS shifts leftward:  $AD = SRAS = LRAS$
- Notice we are at the **same** level of **output**,  $LRAS$
- But **prices** are **higher!**

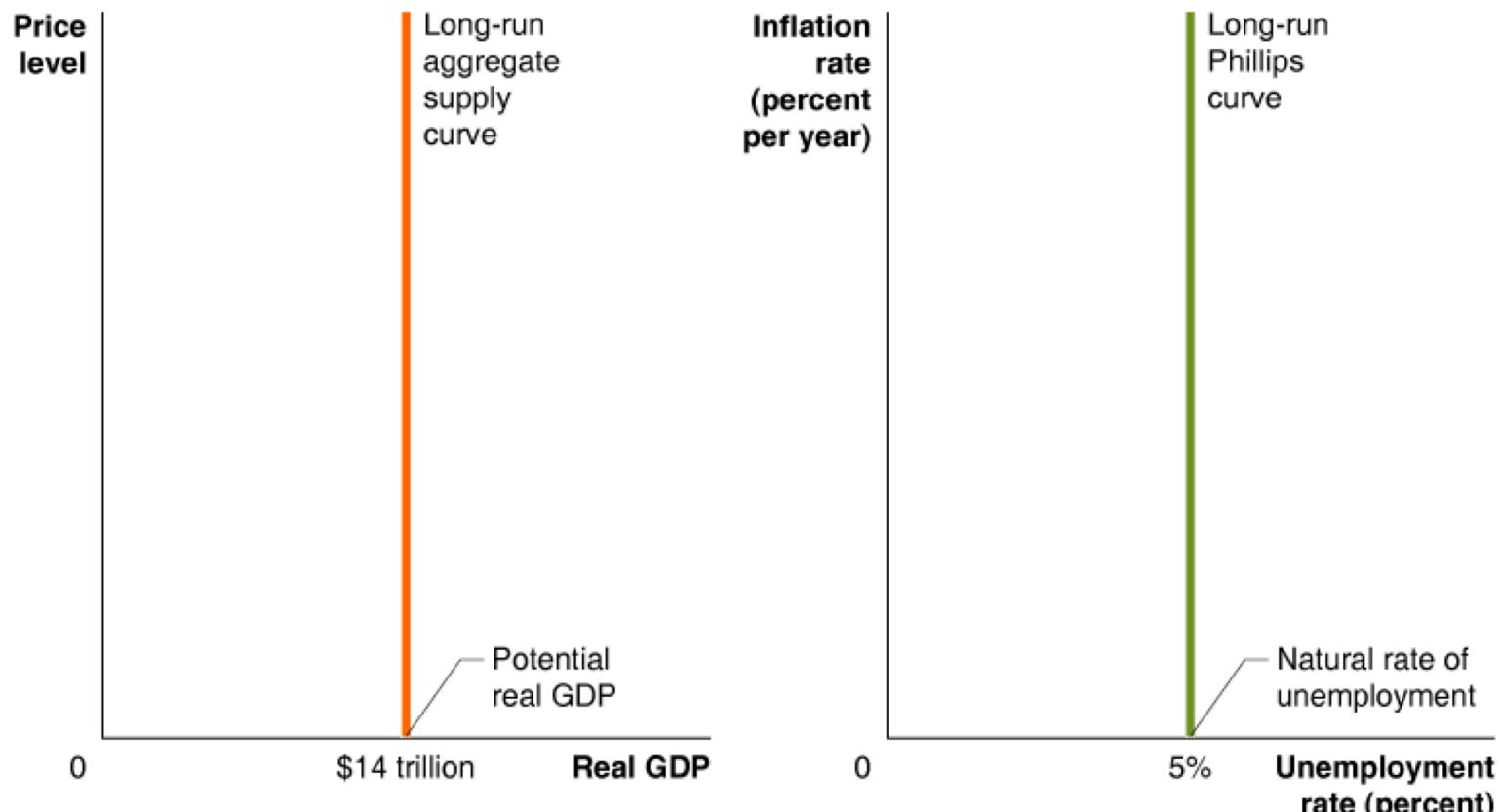
# Is The Phillips Curve A Policy Menu?

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- We end up with higher  $P$ , but the same level of  $Y$  (no change in  $U$ )
- So there is a **short run**  $\pi$ - $U$  tradeoff, but **NOT** in the long run!
  - The relationship is not structural
- Phillips curve should not be used as a policy menu
  - Allowing more  $\pi$  does **not** lead to **permanently** lower  $U$

# The Long-Run Phillips Curve

- In the long run, **employment** is determined by output, which in long run does not depend on the price level
- A vertical long-run **AS** curve is compatible with a vertical long-run **PC**



# Relation to LTSG

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- Potential GDP grows over time

$$LTSG = LFG + LPG$$

- It does not depend on prices → Vertical long-run AS curve
- Think of LTSG as the speed limit for economic growth
- Monetary policy cannot make LF or LP grow faster

# Natural Rate of Unemployment

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- Optimal level of joblessness in an economy
- Recall that there are 3 kinds of unemployment:
  - **Frictional**: When people change jobs results in some unemployment
  - **Structural**: Some people have skills that don't match any available jobs
  - **Cyclical**: When economy is operating below full potential, willing workers can't find work

# Natural Rate of Unemployment

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- At potential GDP, there is **no cyclical unemployment**
  - Only structural and frictional unemployment
- **Natural rate of unemployment:** Unemployment rate that exists when the economy is at potential GDP
  - When unemployment is at the **natural rate**, output equals **potential GDP**
- Actual levels of U and real GDP will fluctuate in the SR but will come back to the natural rate and potential GDP in the LR

# What Value for the Natural Rate of Unemployment?

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- Economists today are unclear about the natural rate, but many posit that **4.5%** is a **reasonable estimate**
- **IF** that is right, today's 4% rate suggests we need to make sure the US economy slows to cruising speed, keeping jobless rate steady
- Why the confusion?
  - LFPR and part-time workers make it hard to tell **how tight** the labor market is today

# What If An Economy Operates Below Natural Rate?

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- When economy is **below** the natural rate of unemployment there is **great competition for workers**
  - Too many jobs for too few workers
- Firms bid up the price of workers—wage rates—and soon find they need to raise prices to cover their higher labor costs
- Soon **wages and prices are rising rapidly**

# When Is It Safe to Exceed the LTSG Speed Limit?

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- When **U** is **very high**, the economy can safely grow **faster** than the LTSG pace
- Why?
  - Economic growth produces jobs for both new entrants to the LF and the cyclically unemployed members of the LF

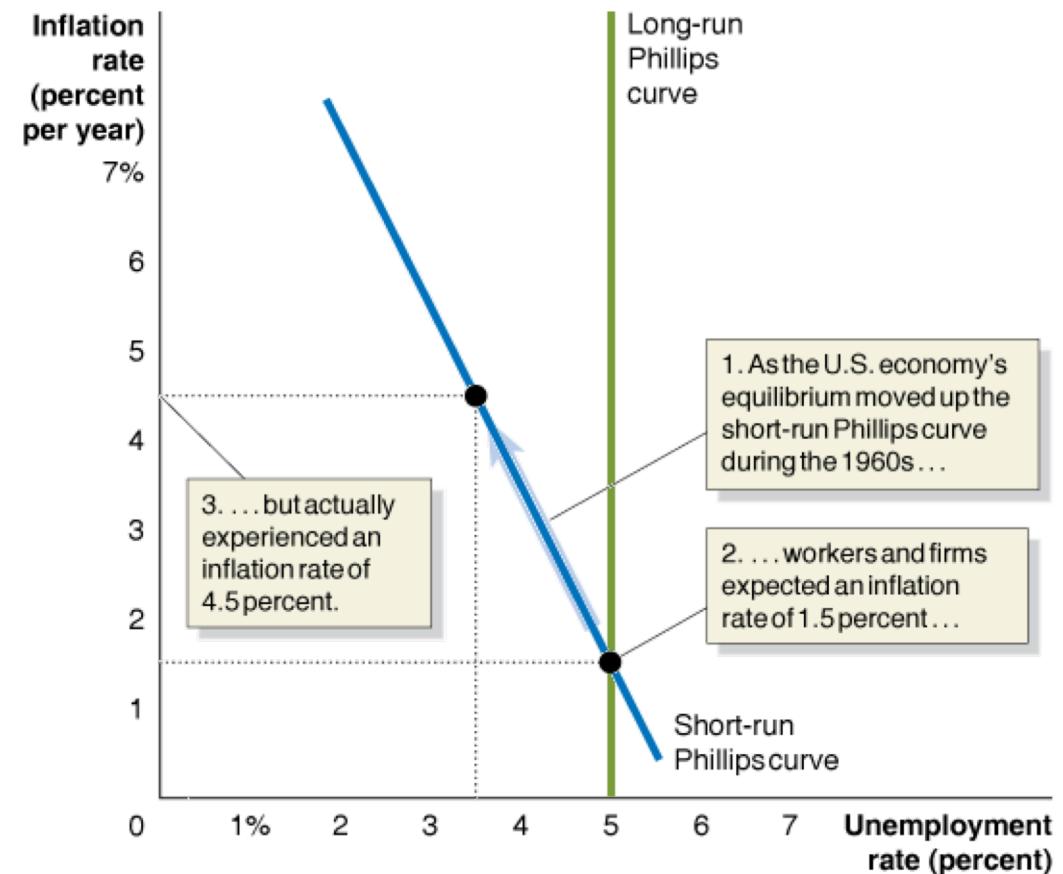
# LRPC and SRPC

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- We had 2 curves for aggregate supply
- Here we also have two curves:
  - **Long run** Phillips curve
  - **Short run** Phillips curve
- The curves intersect at  $\pi^e$

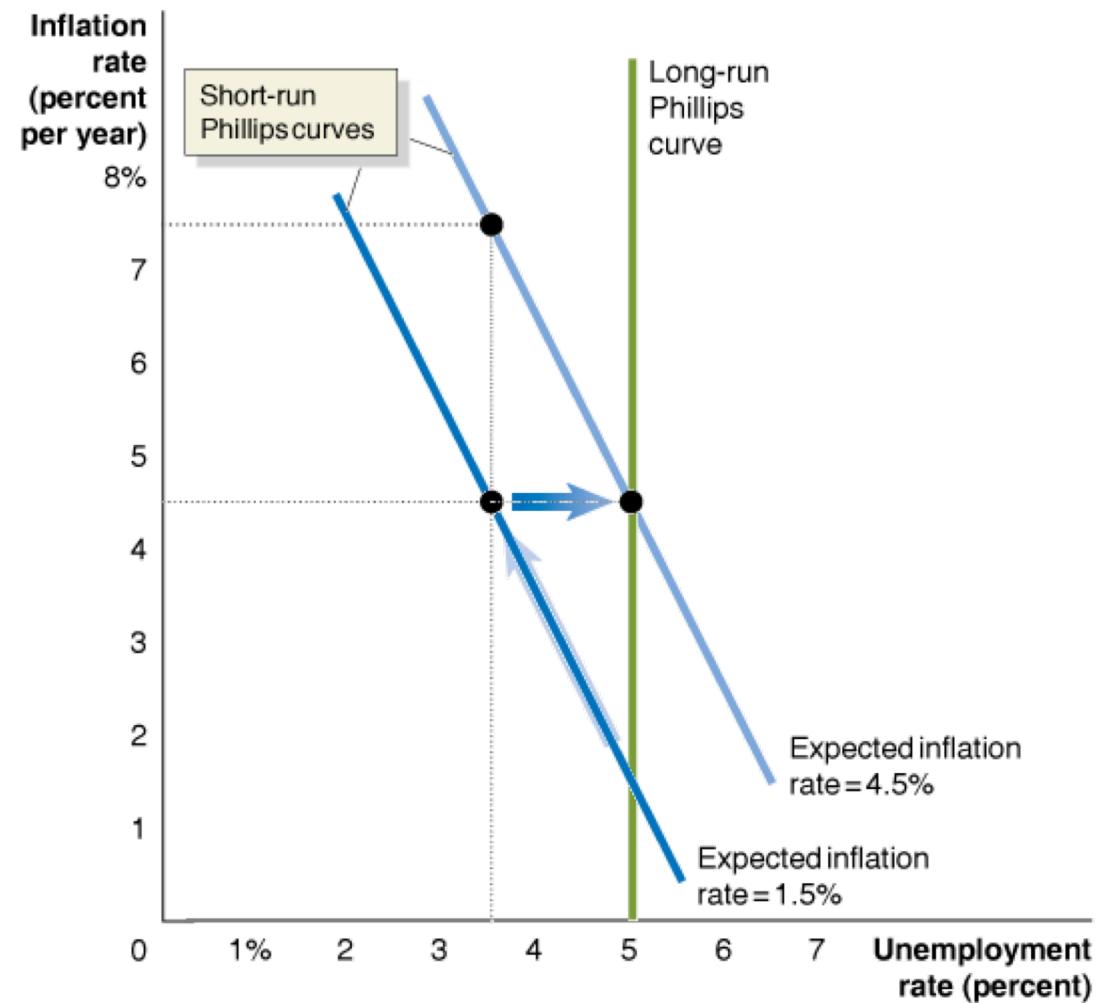
# Example: Phillips Curve in the 1960s

- In early 60s, low  $\pi$  ( $\sim 1.5\%$ )
- Stimulative policies in place
- Firms and workers **expected 1.5% inflation**
- Instead, inflation rose and joblessness fell
- Thus, economy **moved along the short-run Phillips curve**
  - U **fell** to 3.5%, as  $\pi$  **climbed** to 4.5%



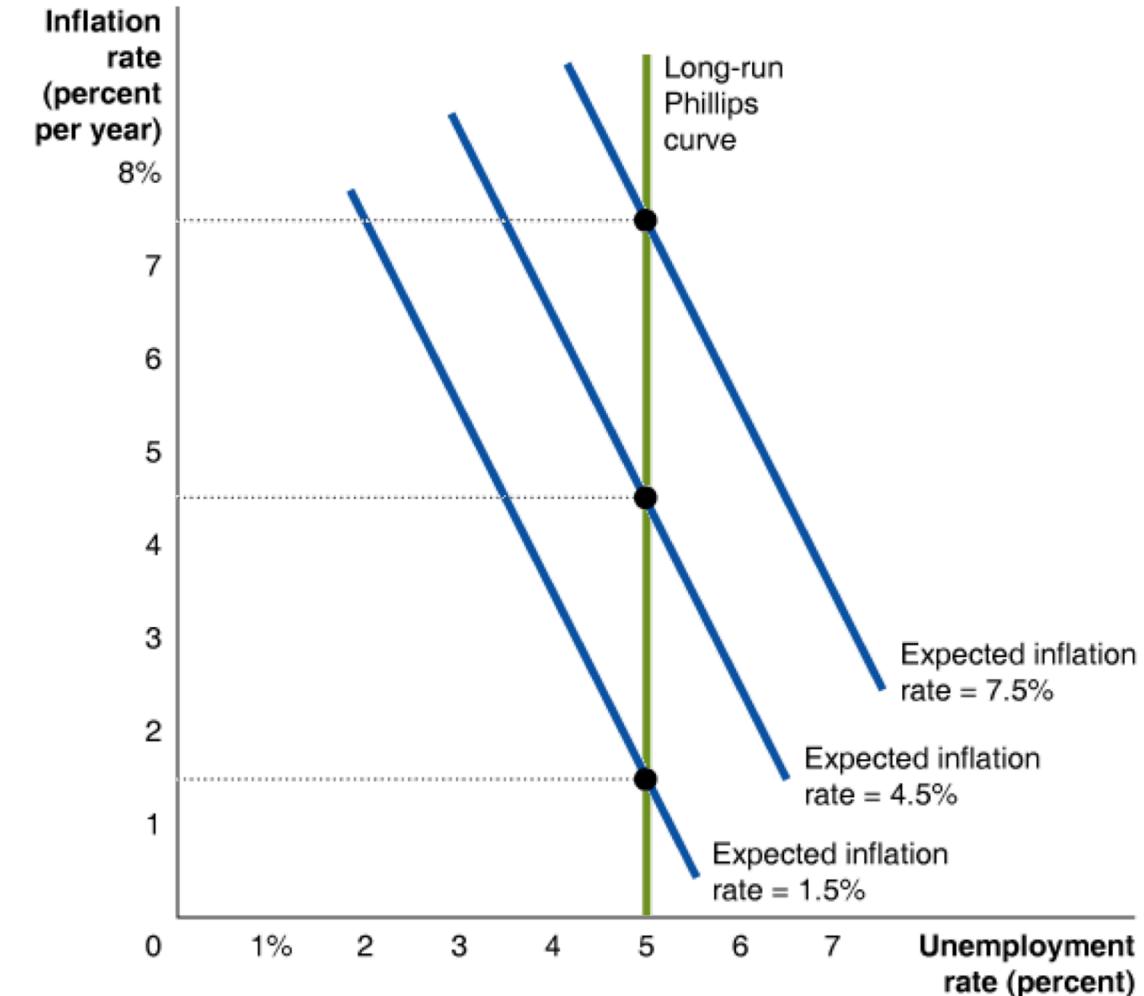
# Shifts In The Short-Run Phillips Curve

- Agents then **adjusted expectations** for inflation (4.5%)
  - “New normal” inflation became embedded in the economy
- SRPC **shifts to the right**
  - When interest rates increased (driving  $U = 6\%$ ), inflation fell but only to 3%
  - $U = 3.5\%$  would require another unexpected increase in inflation



# A Short-Run Phillips Curve For Every Inflation Rate

- There is a SRPC **for every level** of expected inflation
  - Each SRPC intersects the LRPC at the  $\pi^e$  rate
  - A  $\pi \uparrow \rightarrow U \downarrow$  only if the increase in  $\pi$  is unexpected
- When  $\pi = \pi^e$ , the unemployment level is at its natural rate—i.e. the **long-run Phillips curve**



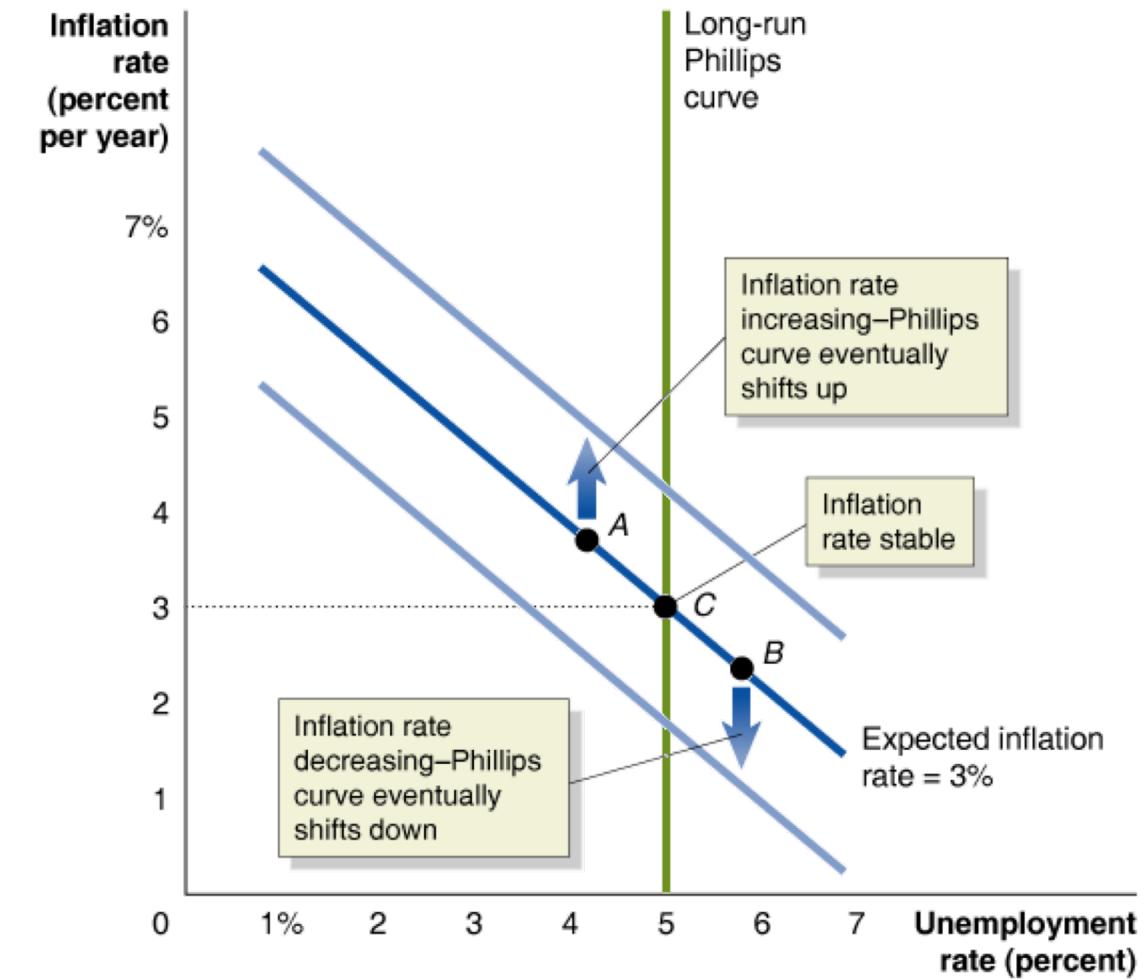
# What Are the Implications for Monetary Policy?

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- By the 1970s, most economists agreed that the LRPC was **vertical**
  - It was **not possible** to “buy” a permanently lower unemployment rate at the cost of permanently higher inflation
- To keep unemployment lower than the natural rate, the Fed would need to continually increase inflation
  - With increasing inflation, SRPC would eventually **shift up**
- Or it could decrease inflation at the cost of a temporarily higher unemployment rate

# Non-Accelerating Inflation Rate Of Unemployment

- $\pi$  is stable only when  $U = U^*$
- $U \neq U^*$  results in the **inflation rate increasing or decreasing**
- So, natural rate of unemployment is sometimes referred to as the **non-accelerating inflation rate of unemployment**
  - **NAIRU:** Unemployment rate at which the inflation rate has no tendency to increase or decrease



# Can We Write A Formula For The Phillips Curve?

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

Inflation in period t = **Expected** inflation in period t-1  
+ alpha times the **deviation** of unemployment from NAIRU

# What Does the Formula Imply If U is Below NAIRU?

$$\pi_t = \pi_e + \alpha (U^* - U_t) \quad \text{assume } \alpha=1.4$$

Phillips Curve π PREDICTION	EXPECTED		JOBLESS		
			RATE	NAIRU	JOBS
	π				
2	2		5.5	5.5	0
4.8	2		3.5	5.5	2
7.6	4.8		3.5	5.5	2
10.4	7.6		3.5	5.5	2

- If  $U < U^*$ ,  $\pi$  accelerates

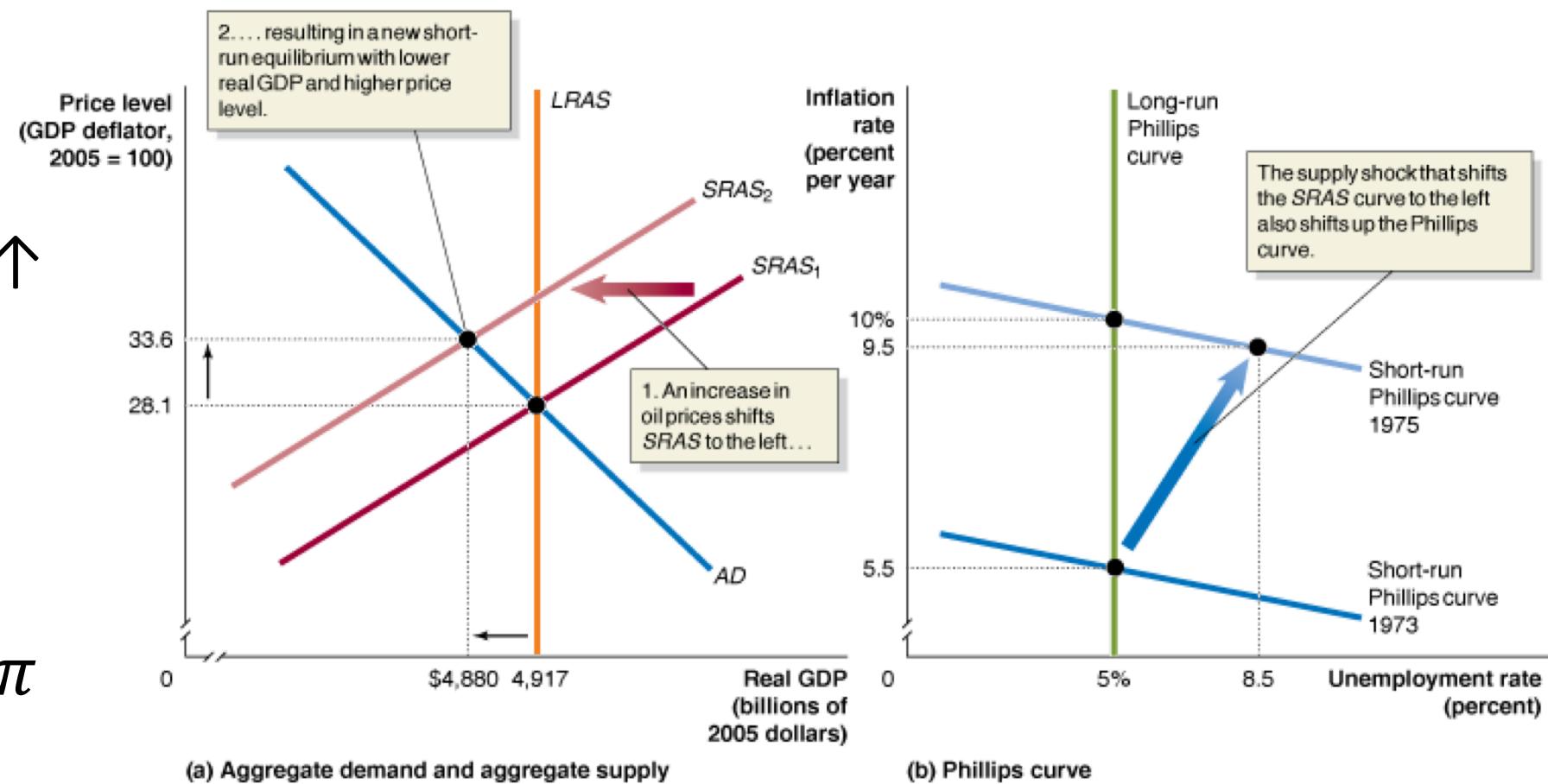
# Rational Expectations and a Vertical Short-Run PC

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- **Keynesians:**
  - 1950s and 1960s showed an obvious short-run trade-off between  $\pi$  & U
- **R. Lucas and T. Sargent** (New classical school):
  - This happened because the Fed was secretive, not announcing changes in policy. If Fed announces its policies, people will correctly anticipate inflation and act in advance to counteract it
- **New Keynesians:**
  - Wages and prices don't adjust fast enough
  - Even if people anticipate inflation correctly, aggregate markets may not clear instantaneously to make the SRPC vertical

# Application: Oil Price Shocks in the 1970s

- Start: US in 1973
  - **U = NAIRU**
- 1974: OPEC caused oil prices↑
  - Supply shock:  
**SRAS shift left**
- U↑ but so people's expectations for  $\pi$ 
  - **A higher SRPC**



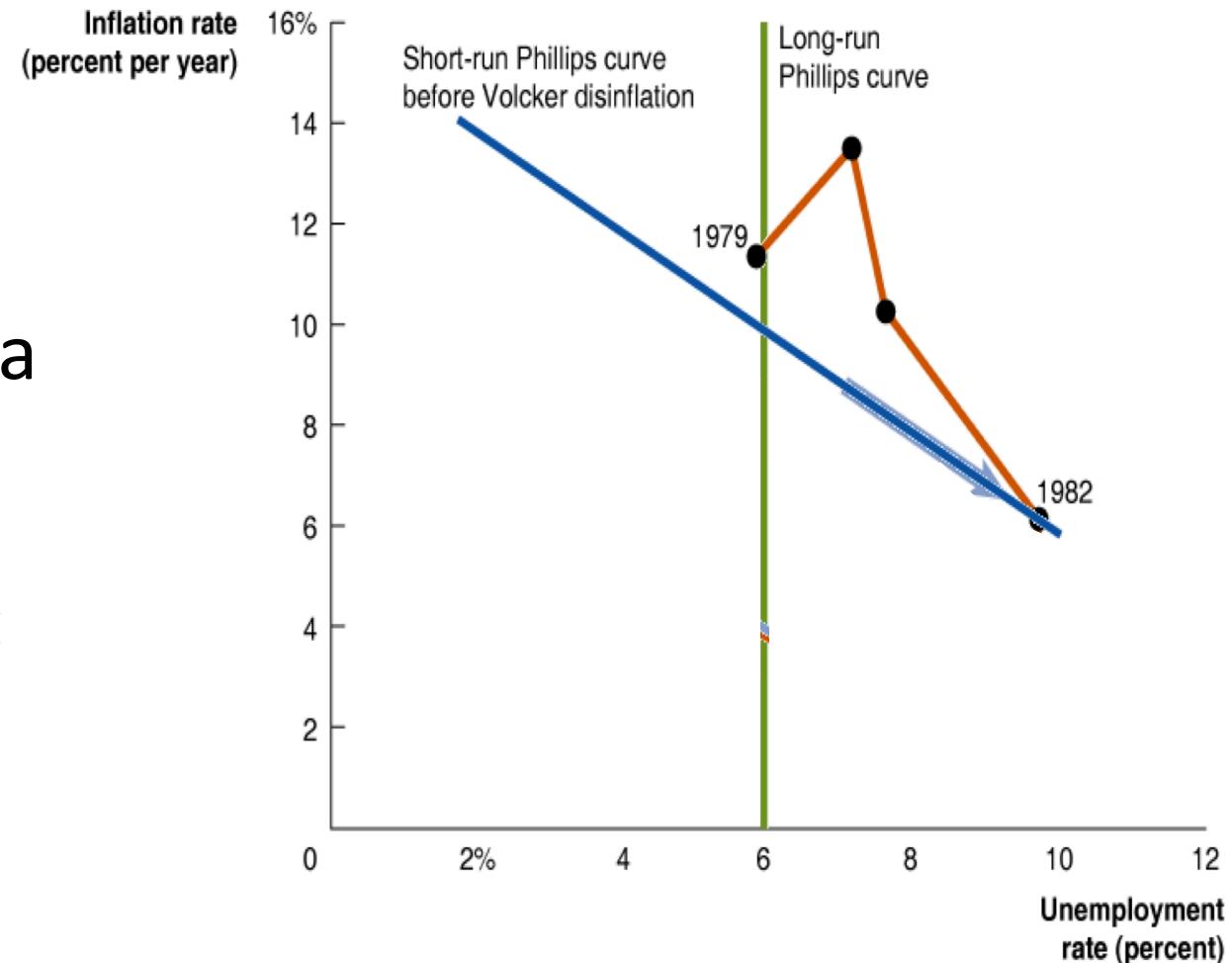
# What Could The Fed Do?

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- Fed wanted to **fight both** inflation and unemployment
- But the short-run Phillips curve makes clear that **improving one worsens the other**
- The Fed chose **expansionary** monetary policy:
  - Reducing unemployment, at the **cost** of even **more inflation**
- The newly high inflation was incorporated into people's expectations and became **self-reinforcing**

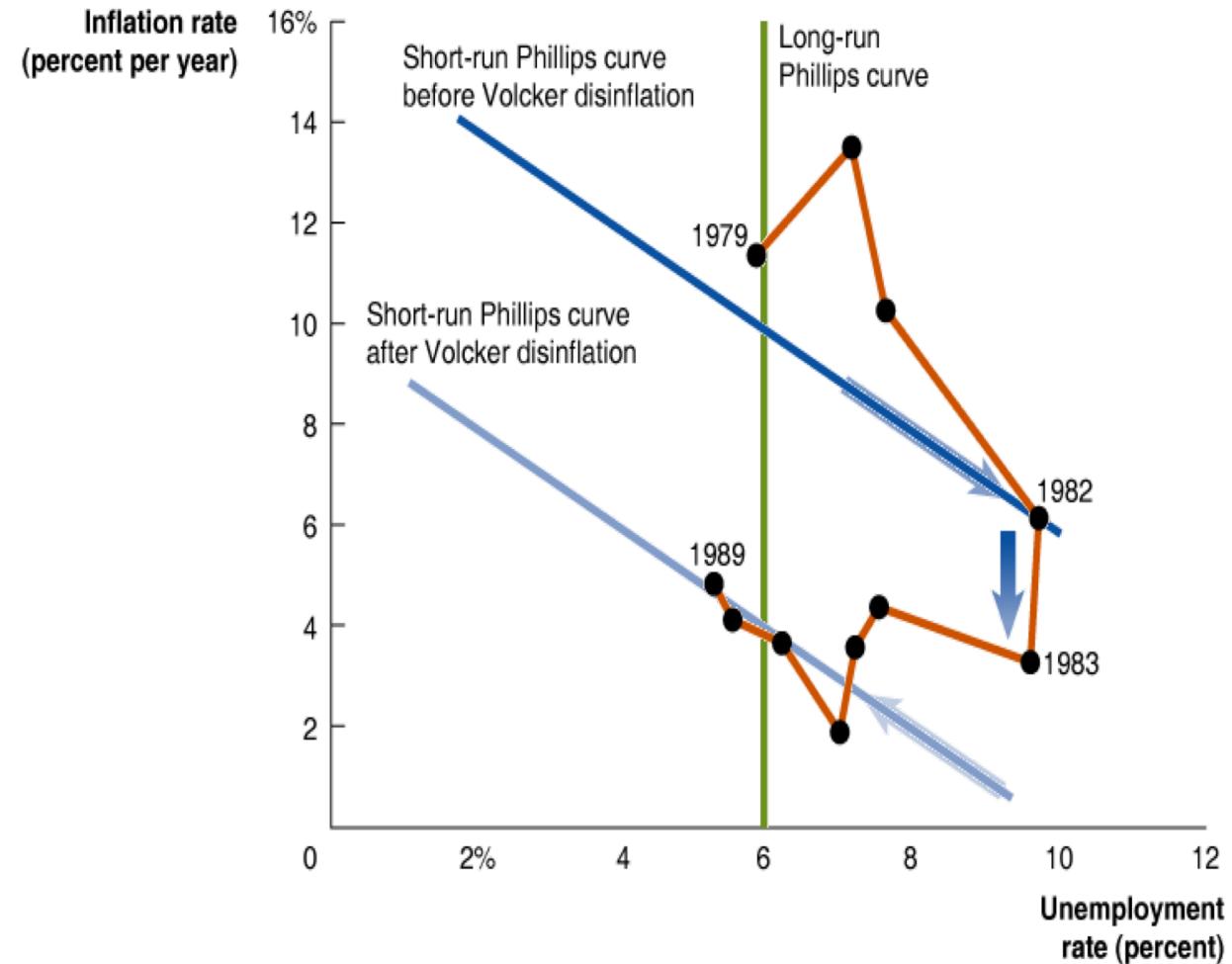
# High Inflation: Must It Continue?

- Fed's new chairman P. Volcker **wanted inflation lower**
  - He believed high inflation was hurting the economy
- Volcker announced and enacted a **contractionary** monetary policy
  - If people believed the announcement, they would adjust down to a lower Phillips curve
- But for several years, the Phillips curve appeared **not to move**

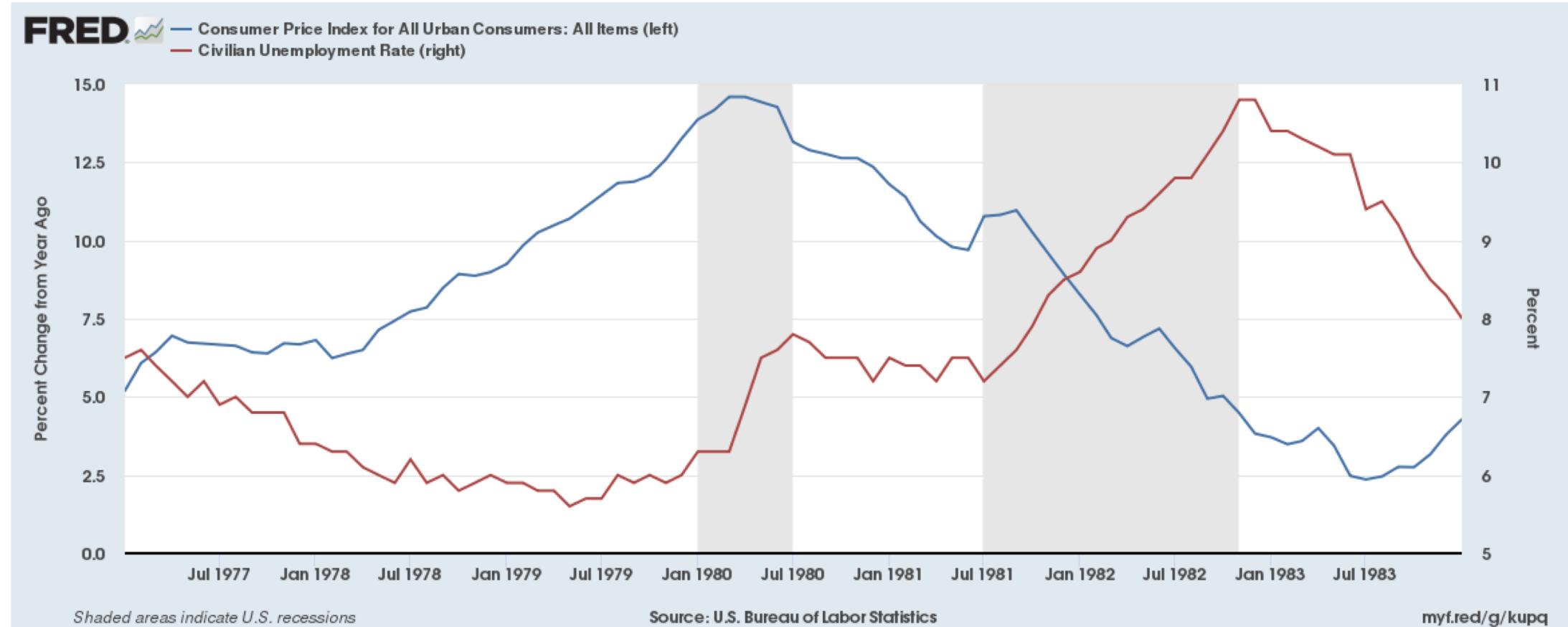


# Did Rational Expectations Fail?

- Does this prove people were not forming expectations rationally?
  - Not necessarily
- Fed had a **credibility problem**:
  - Previously, it announced contractionary policy but allowed inflation to occur anyway
- Eventually, several years of **tight money** convinced people
  - Price fell and so inflation expectations → New **lower SRPC**



# A Brutal Demonstration of the Phillips Curve At Work



# Volcker Disinflationary Policy

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- Brutal real economy effects **dominated** expectations as Volcker triumphed over inflation in early 1980s
- Change in monetary policy to fight  $\pi \rightarrow$  Back to back recessions
  - A rise of near 11% in joblessness
- Phillips curve explains the fall for  $\pi$ 
  - **Credibility** was **very hard to earn**

# Predict the Disinflation During Volcker Recessions

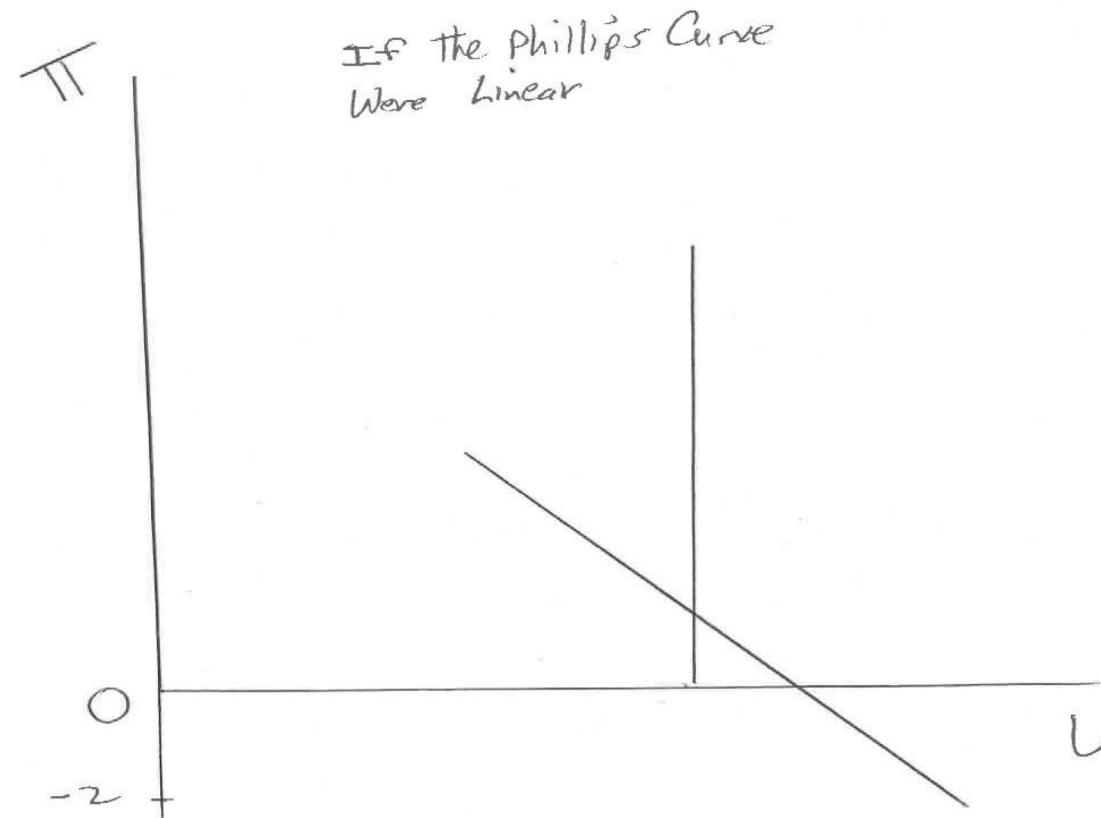
$$\pi_t = \pi_e + \alpha (U^* - U_t)$$

- Let  $\pi_e = \pi_{t-1}$  (last year's inflation)
  - Overstate the case for non-rational expectations

t	$\pi_t$	$U^*$	$U_t$	$\pi_e$	$\pi_f$
1978	9.5	6.5	6.0		
1979	13.3	6.5	6.0	9.5	10.2
1980	12.5	6.5	7.4	13.3	12.0
1981	8.9	6.5	8.2	12.5	10.1
1982	3.8	6.5	10.7	8.9	3.0

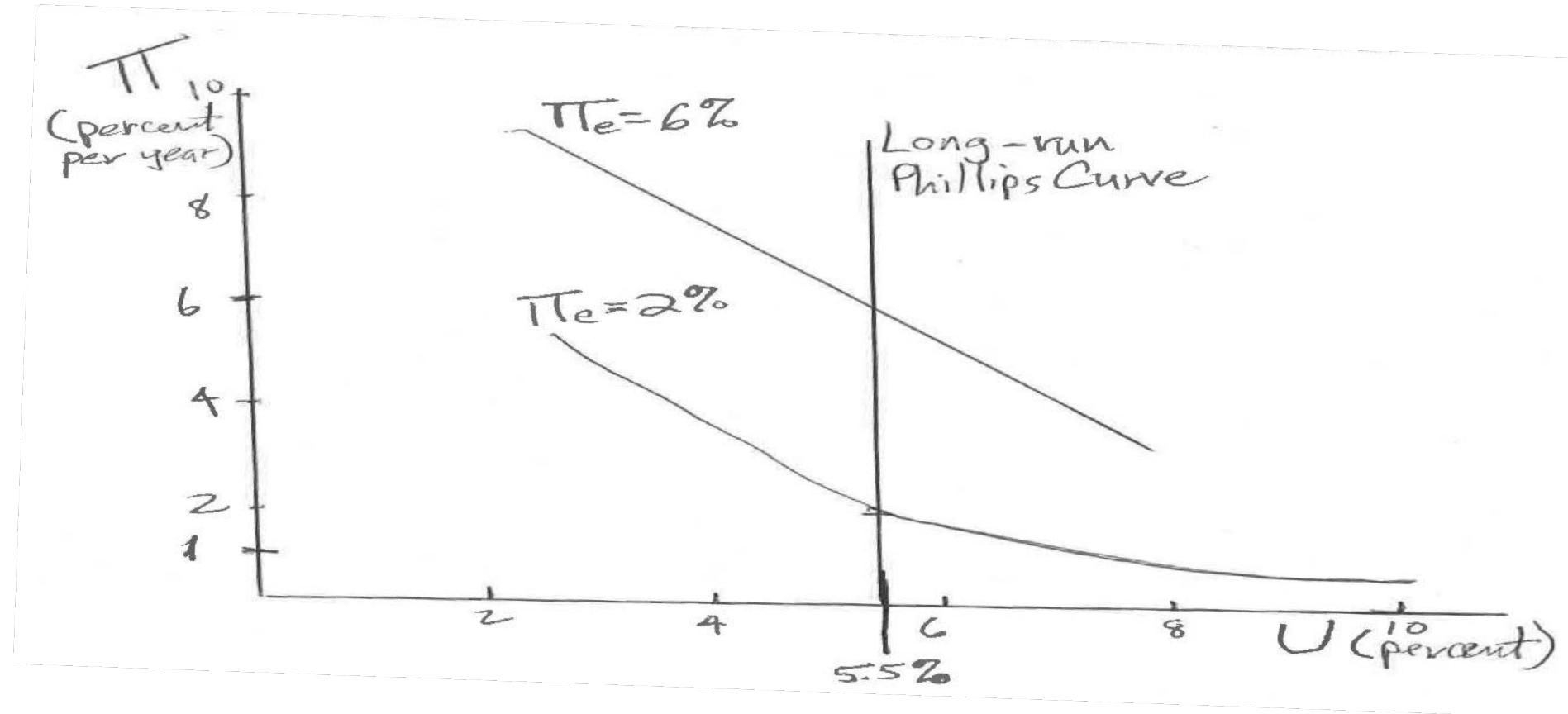
# Does the Formula Work for All Inflation Rates?

- We wrote a **linear equation**: At ‘high’ inflation rates this worked
- Life is **not so simple** as we approach **zero**



# Zero Bound Is A Problem For Disinflation And PC As Well

- Empirically, the relationship between  $U$  and  $\pi$  is not exactly linear



# Consider the Italian Experience

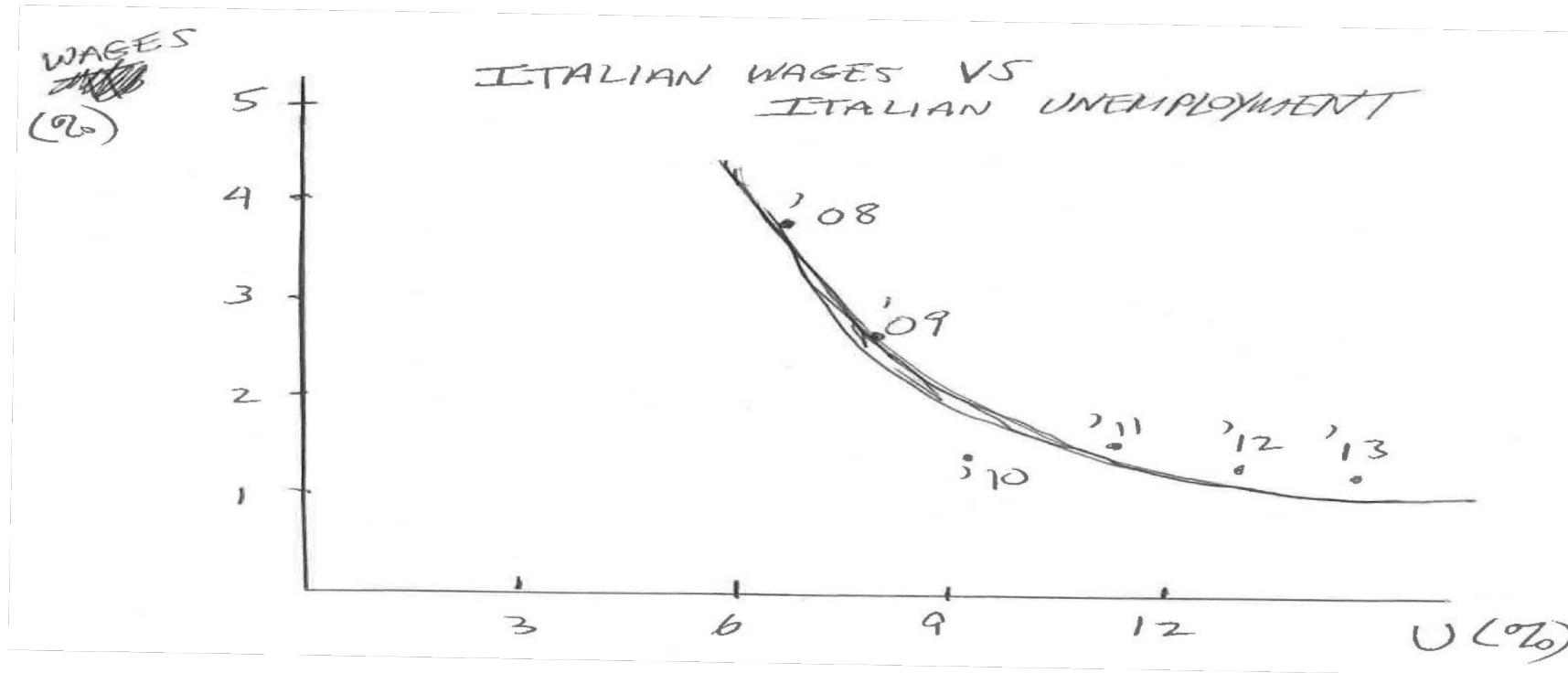
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- Great recession drove jobless rates to very high levels
- But **inflation did not fall below zero**

Italy	2008	2009	2010	2011	2012	2013	2014
jobless rate	6.8	8.3	8.2	9.5	11.4	12.4	12.3
hourly earnings*	4.0	2.8	1.7	1.4	1.7	1.4	1.1
*(YOY, percent change)							

# The Short-Run Phillips CURVE

- Wages bounce along, just **above zero**



- SRPC is indeed a **curve** (not a straight line) → Recall 'curved' SRAS

# PLOGs Don't Deliver Deflation

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- P Persistent
- L Large
- O Output
- G Gaps
- PLOGs –long periods of very high unemployment– **don't** push price and wage gains below zero
  - It seems **slowing** pay and price increases is much **easier than** actually **cutting** wages and prices
- The zero bound for inflation seems to matter

# Divine Coincidence And The Zero Bound

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- **Divine coincidence:** Situation where stabilizing inflation is the same as stabilizing output
  - Dual-mandate CB (**both**  $\pi$  and U) vs Single-mandate CB (**only**  $\pi$ )
- **Scenario 1** - Falling prices: Inflation-fighting CB will be as accommodative as a dual-mandate CB
- **Scenario 2** - High U and low  $\pi$ : Dual-mandate CB will step on the gas while other CB fails to see deflation so is less stimulative
  - Over time, cyclical joblessness becomes structural
- **Zero bound** for wage restraint **kills** the **divine coincidence**

# Back to the Italian Example

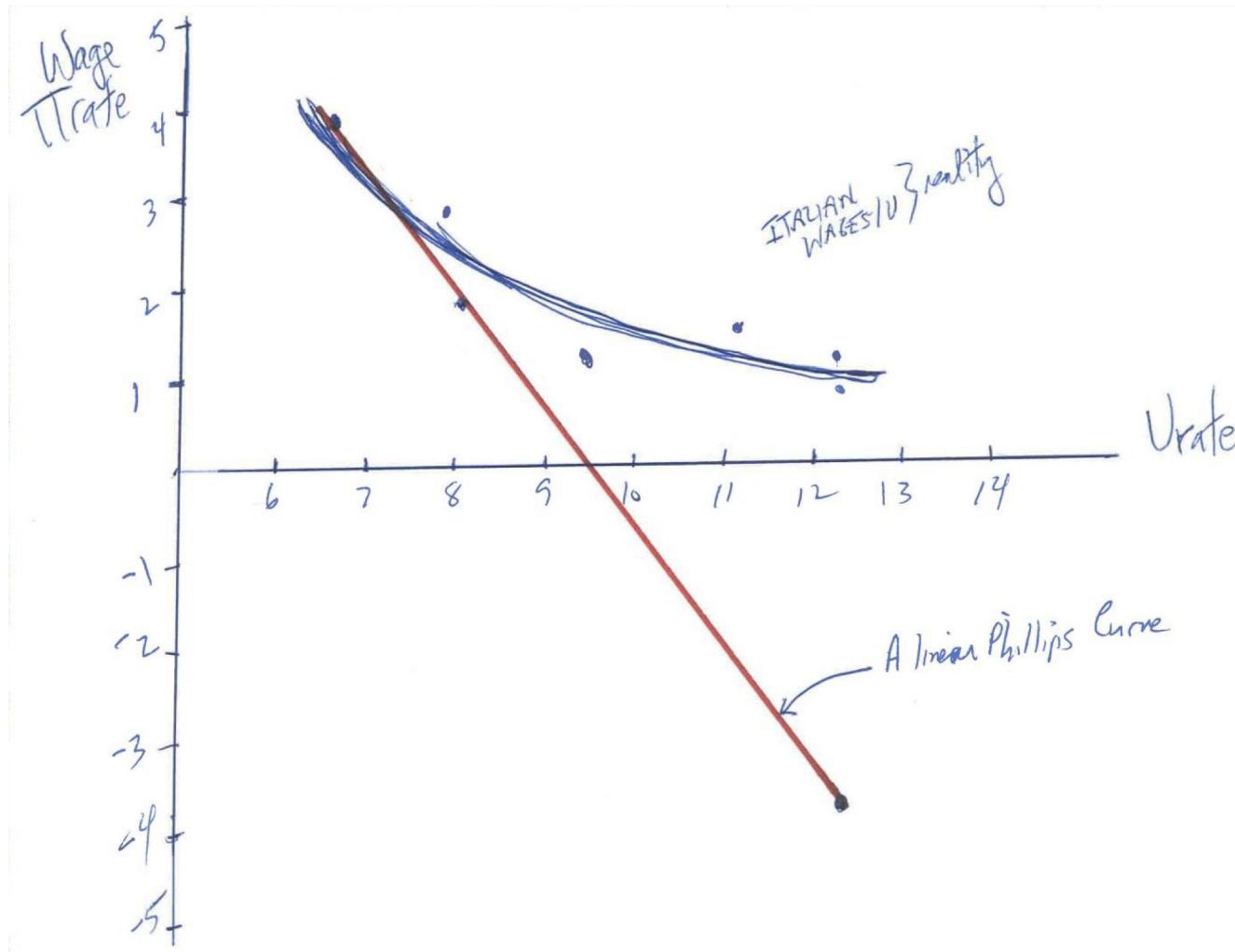
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- Suppose Italy had a liner Phillips curve. Suppose  $U^* = 8\%$ ,  $\alpha = 0.5$  and 6 years of a  $U = 10\%$  on average, where should  $\pi$  be in 2014?

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

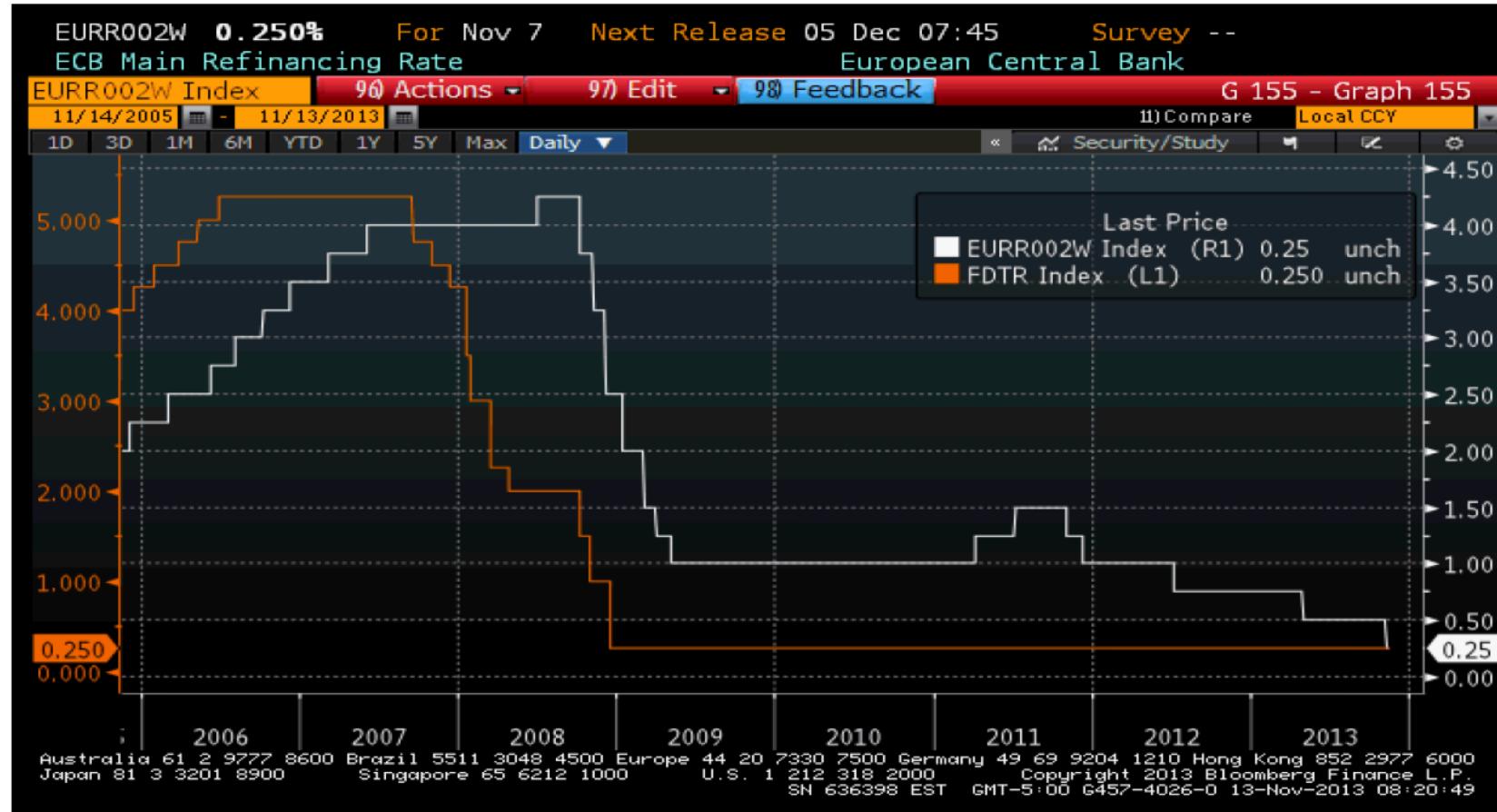
- $\pi_{2009} = 4.0\% + 0.5 \times (8\% - 10\%) = 2.5\%$
- $\pi_{2010} = 2.5\% + 0.5 \times (8\% - 10\%) = 1\%$
- $\pi_{2011} = 1\% + 0.5 \times (8\% - 10\%) = -0.5\%$
- $\pi_{2012} = -0.5\% + 0.5 \times (8\% - 10\%) = -2.0\%$
- $\pi_{2013} = -2.0\% + 0.5 \times (8\% - 10\%) = -3.5\%$
- $\pi_{2014} = -3.5\% + 0.5 \times (8\% - 10\%) = -5\%$

# Such a Fall for Wages Might Get the ECB's Attention



# Absence of a Divine Coincidence

- It may explain ECB tightening alongside FRB easing in 2008 and 2011



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# Fiscal Policy

## How to Use It to Smooth Business Cycles?

# Outline

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1. An Overview of Government Spending and Taxes
  2. Macroeconomic Effects of Fiscal Policy
  3. Fiscal Policy vs Monetary Policy
- Textbook Readings: Ch. 16

# Types of Goods

	Excludable	Non-Excludable
Rival	<b>Private Goods</b> "Typical Goods" (Clothes, Food, Flowers, etc.)	<b>Common Goods</b> "Common Pool Resources" (Mines, Fisheries, Forests, etc.)
Non-Rival	<b>Club Goods</b> "Artificially Scarce Goods" (Cable TV, Private Parks, Cinemas, etc.)	<b>Public Goods</b> "Collective Goods" (Air, News, Sunshine, etc.)

# When Is Government A Preferred Provider of Goods?

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- Pure public goods
- My **consumption** of the good does not reduce its availability to you
- My **benefit** does not reduce the benefit to you
- It is **impossible to exclude** any individuals from consuming the good

# Police Force: A Standard Public Good

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- Police work to make **your town** safer
- The fact that I benefit from being safer, does not reduce your benefit from being safer
- Police make things safer, in an area, **not for an individual**

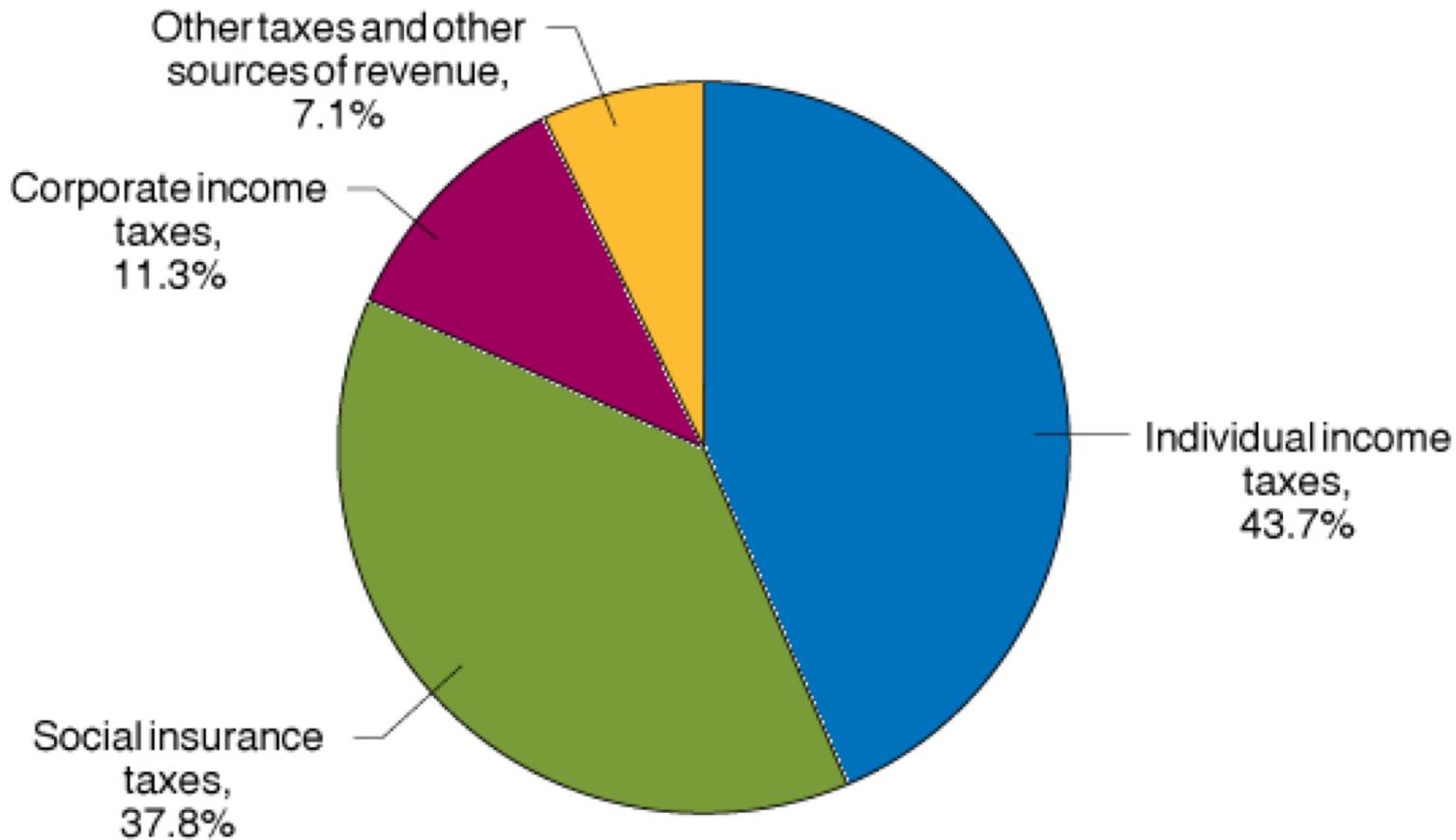
# Why A Governmental Agency Provides A Police Service?

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- An answer: **Free Rider Problem**
- Suppose you ‘privatize’ the police force
- How would you charge for it?
  - Volunteer funds, and the sum pays for the policing
  - But I can **contribute ZERO** and I get exactly the **same protection**—because the police **can’t exclude me** from their efforts

# Where Does Federal Revenue Come From?

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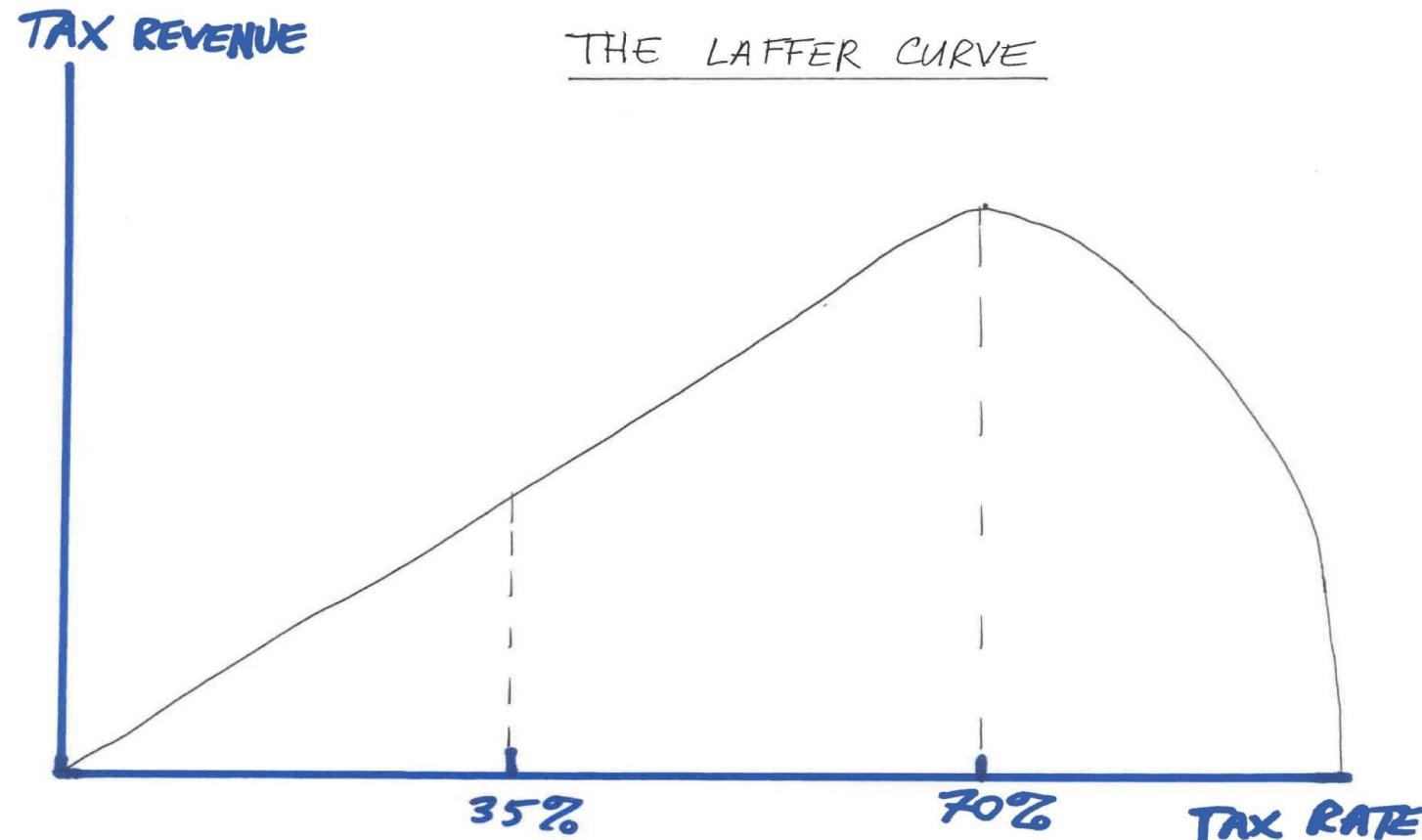
# Federal Revenues, 2017

	billions of \$	% of GDP	% of total revenues
Individual Income Taxes	1,574	8.2%	47.6%
Payroll Taxes	1,164	6.1%	35.2%
Corporate Income Taxes	310	1.6%	9.4%
Other	267	1.4%	8.1%
Total	3,315	17.3%	100.0%

Source: Congressional Budget Office, 9/17 Report

# The Laffer Curve

- Taxation can **adversely** affect effort
  - One cannot ignore **effects on incentives**



# Tax Brackets

2016 TAX BRACKETS		2017 Trump Tax Brackets	
<u>INCOME TAX RATE</u>	<u>INCOME BRACKET</u>	<u>INCOME TAX RATE</u>	<u>INCOME BRACKET</u>
10%	0 to \$18,550		
15%	\$18,551 top \$75,300	12%	\$0 to \$75,000
25%	\$75,301 to \$151,900		
28%	\$151,901 to \$231,450	25%	\$75,001 to \$225,000
33%	\$231,451 to \$413,350		
35%	\$413,351 to \$466,950		
39.6%	\$466,951 and up	33%	\$225,000 and up

# Tax Brackets

2017 Tax Brackets		2018 Tax Brackets	
Income Tax Rate	Income Bracket	Income Tax Rate	Income Bracket
10%	Up to \$18,650	10%	Up to \$19,050
15%	\$18,651 to \$75,900	12%	\$19,051 to \$77,400
25%	\$75,901 to \$153,100	22%	\$77,401 to \$165,000
28%	\$153,101 to \$233,350	24%	\$165,001 to \$315,000
33%	\$233,351 to \$416,700	32%	\$315,001 to \$400,000
35%	\$416,701 to \$470,000	35%	\$400,001 to \$600,000
39.60%	\$470,001 or more	37%	over \$600,000

# Top Tax Rate

- From 1932 to 1981, top tax rate was higher than today's



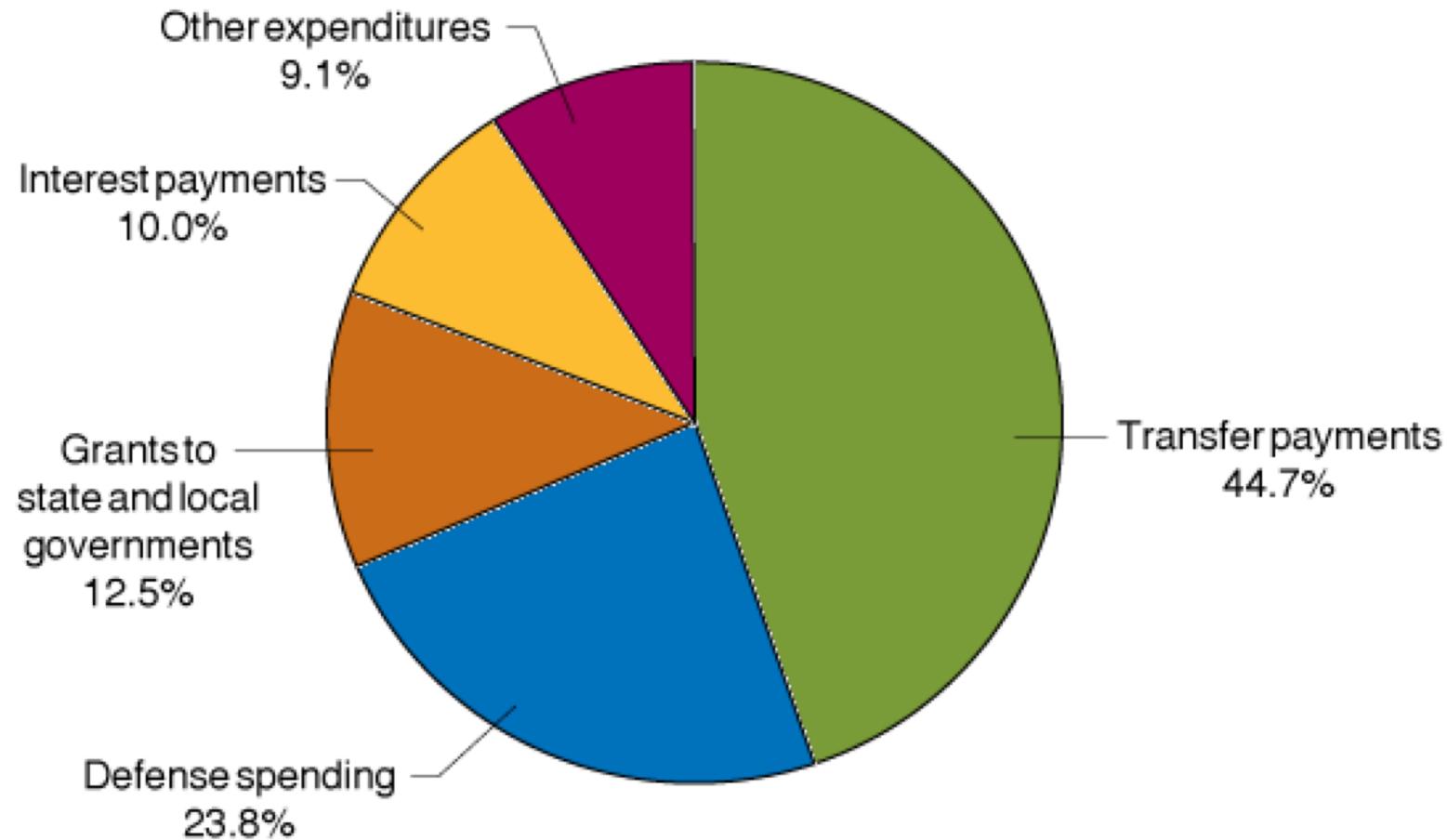
# Top Tax Rate: Where Are We Today on the Laffer Curve?

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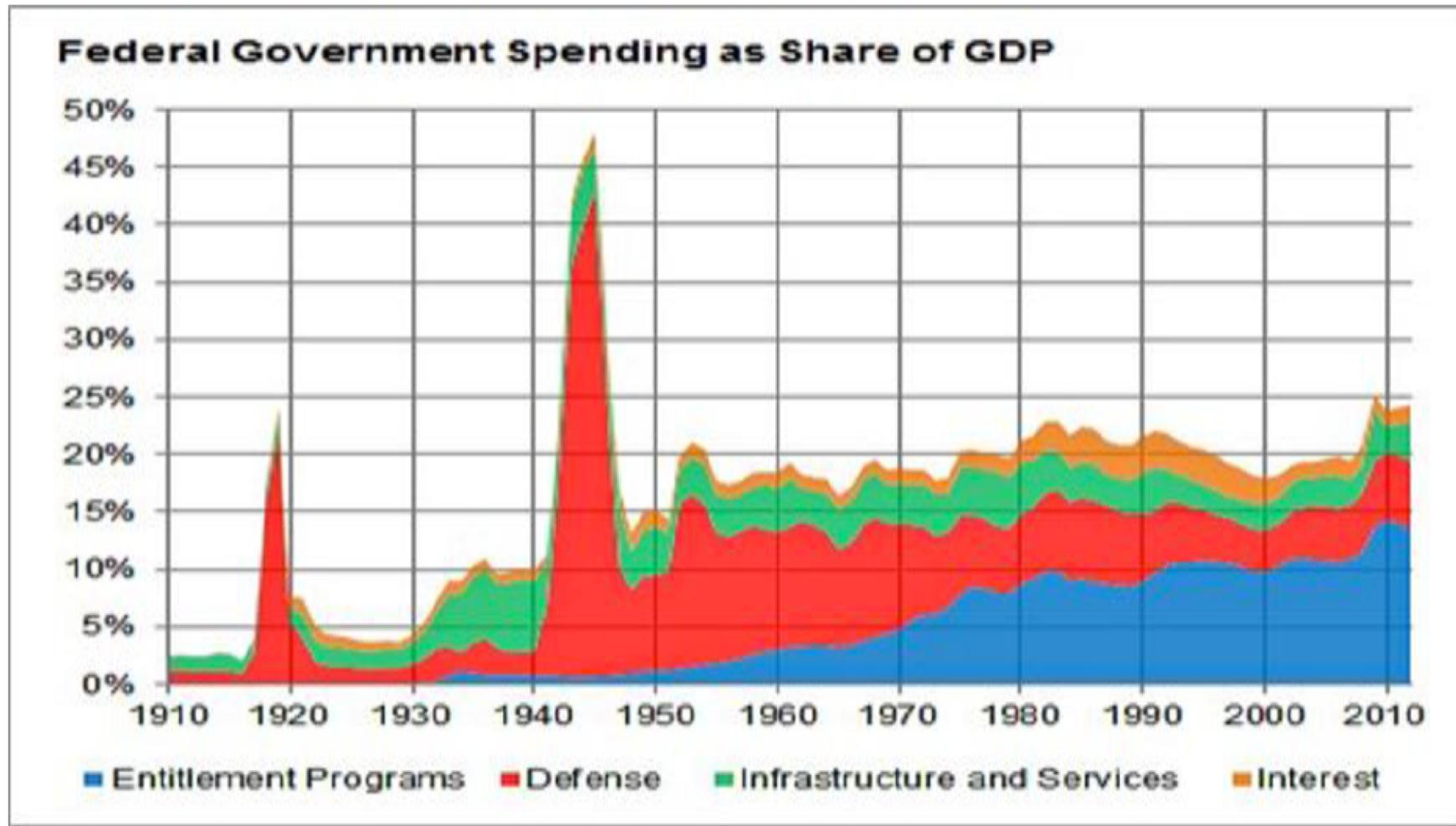
1950s through 1970s	70%
1981 Reagan Tax cut	50%
1986 Reagan Tax reform	28%
1992 Clinton Budget	39.6%
2001 Bush tax cut (temporary)	35%
2012 Obama Tax Cut Extension	39.6%
2012 Affordable Care Act	43.4%

# What Does The Federal Government Spend Money On?

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# Federal Government Outlays as a Share of GDP



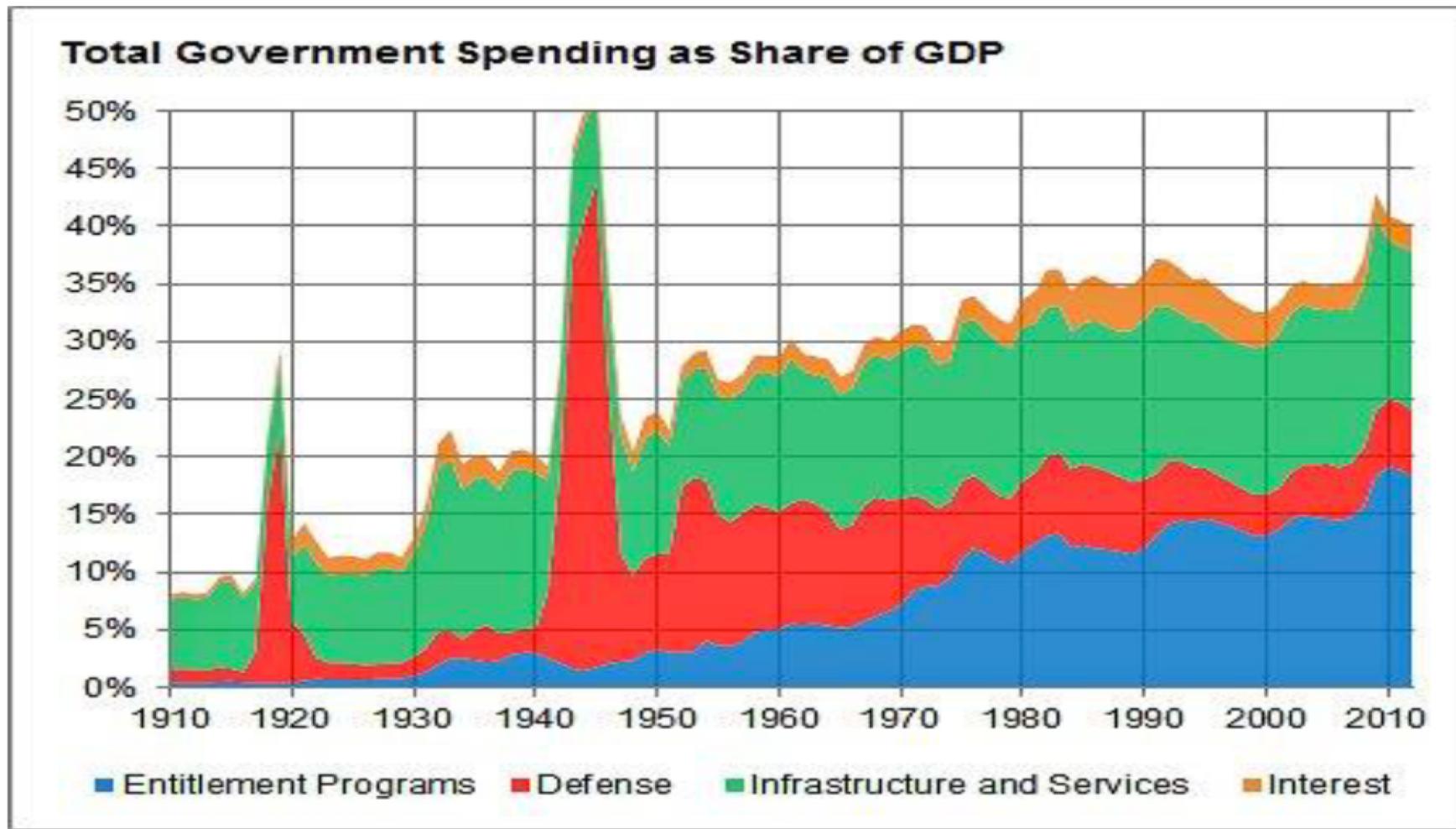
Source: Nate Silver's blog

# Outlays, 2017

	<u>billions of \$</u>	<u>% of GDP</u>		
Social Security & Government Retirees	1101	5.8%		
Medicare & Medicaid & Child Health Ins	1,152	6.0%		
Welfare Programs	297	1.6%	Social Security	5.8%
Defense	589	3.1%	Medical	6.0%
Other discretionary items	600	3.1%	Defense	3.1%
Interest	269	1.4%	Interest	1.4%
Total Outlays	4,008	21.0%	Big 4 Total	16.3%
nominal GDP	19,120	100.0%	Overall Total	21.0%
			Big 4 as % of Overall	77.5%

Source: Congressional Budget Office

# Total Government Outlays as a Share of GDP

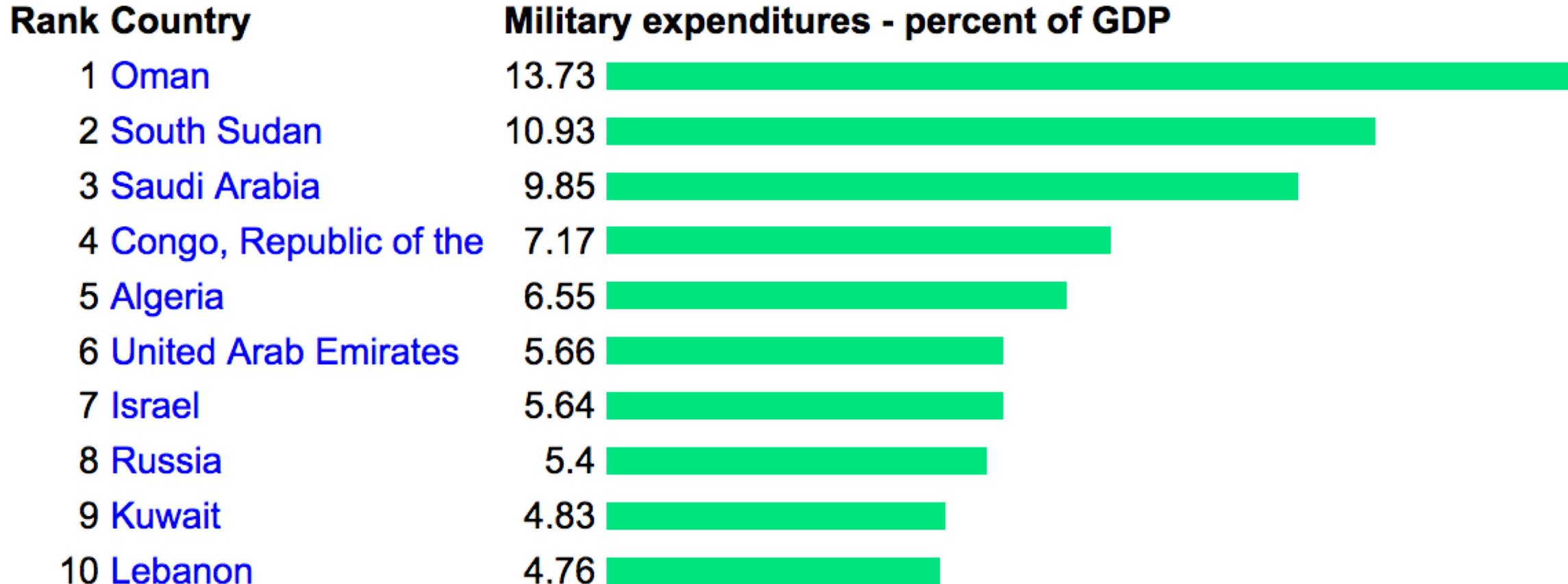


Source: Nate Silver's blog

# 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%

# Top 10 Military Spenders as a Share of GDP



Source: Index Mundi

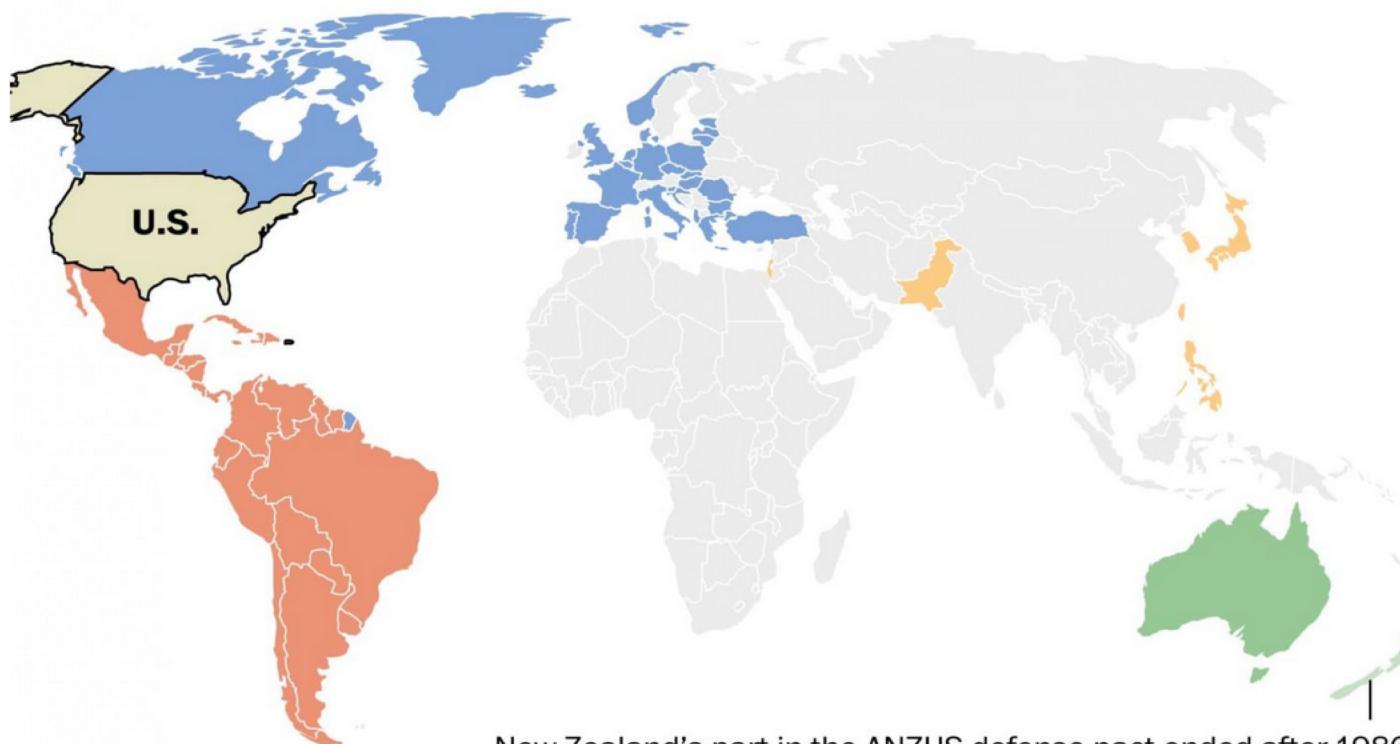
# An International Free-Rider Problem?

- Trump: “Why should the US be the world’s policeman?”

	MILITARY SPENDING			
	DOLLARS	PERCENT	POPULATION	DOLLARS
	(BILLIONS)	OF GDP	(MILLIONS)	PER CAPITA
USA	612	4.1	318	1,925
CHINA	126	4.3	1,360	93
RUSSIA	77	3.9	150	513
SAUDI ARABIA	57	10.1	28	2,036
U.K.	53	2.7	65	815
JAPAN	49	0.8	128	383
INDIA	46	2.5	1,220	38
GERMANY	45	1.5	82	549
FRANCE	43	2.6	67	642
ITALY	34	1.8	63	540

# U.S. Defense Pacts, 1947-2014

● OAS   ● NATO   ● ANZUS   ● Bilateral



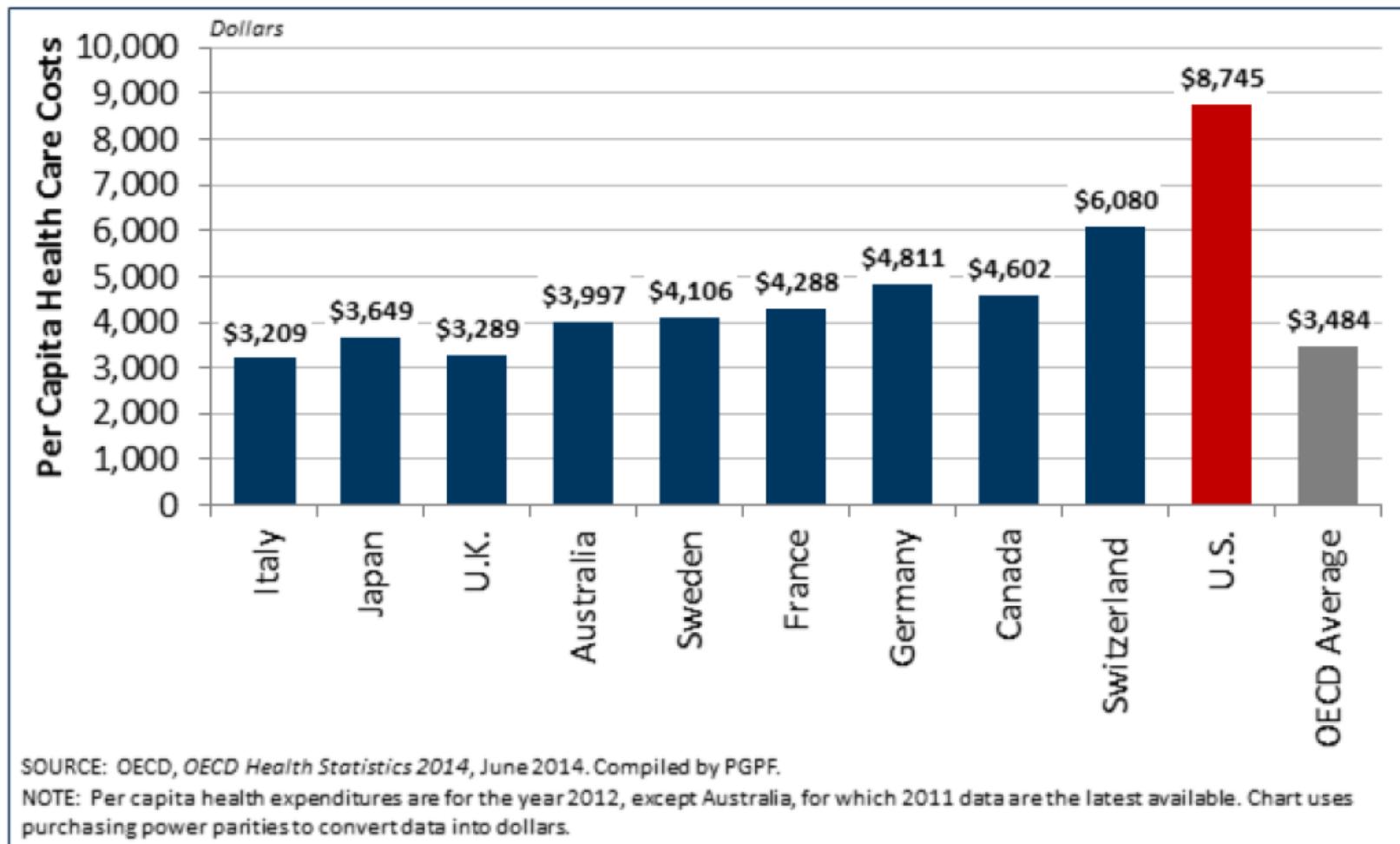
New Zealand's part in the ANZUS defense pact ended after 1986.

Note: OAS stands for Organization of American States; NATO for North Atlantic Treaty Organization; and ANZUS for Australian, New Zealand, United States Security Treaty.

Source: Belfer Center of Harvard University, CIA

THE WASHINGTON POST

# U.S. Health Care Costs: A Major Contributor to Outlays



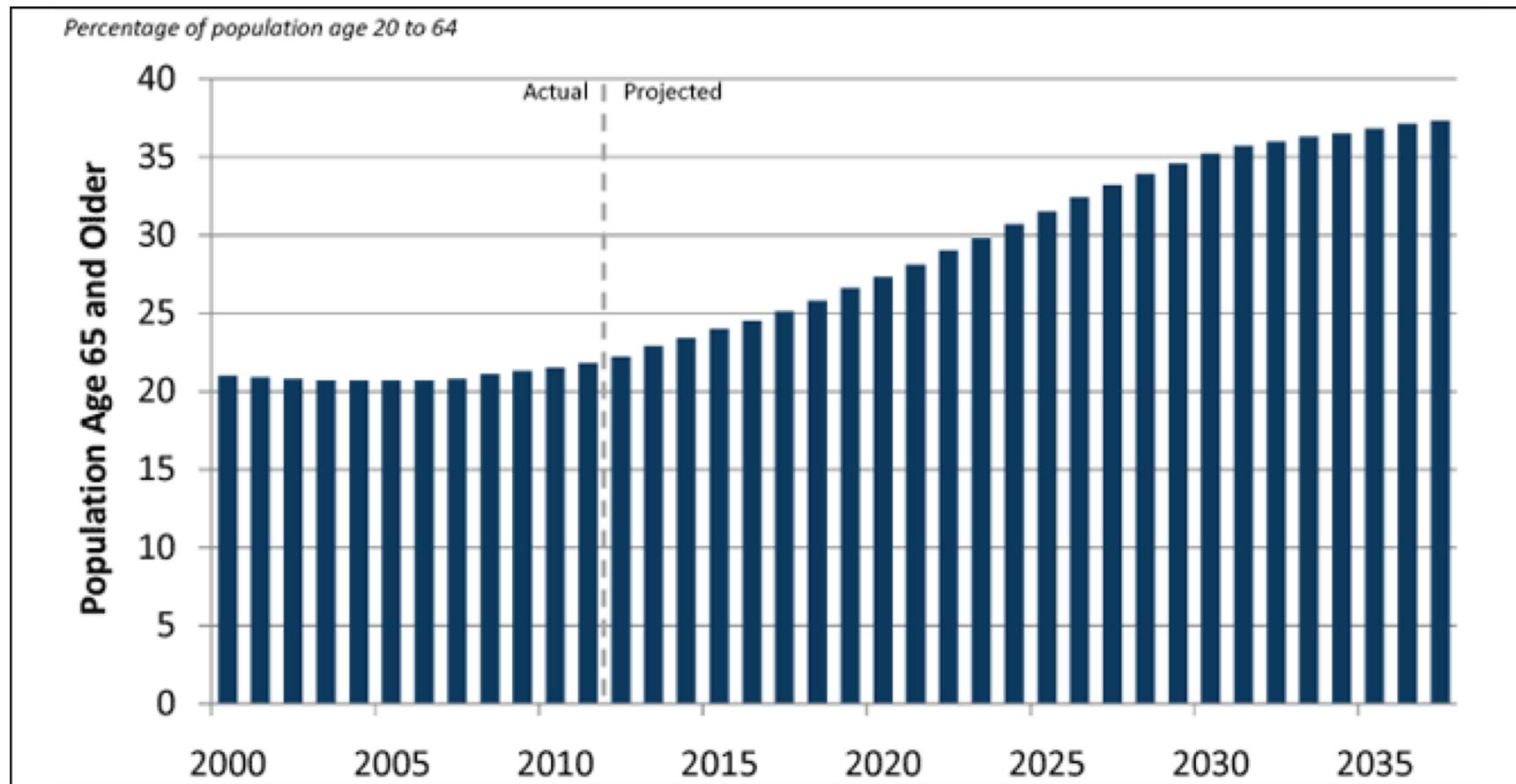
# Health Outcomes in High Income Countries

- U.S. spends twice as much on medical care
  - It doesn't seem to get anything extra

HEALTH OUTCOMES IN HIGH INCOME COUNTRIES:	2012 DATA:				
	USA	CANADA	JAPAN	U.K.	OECD AVG.
Life Expectancy, newborn	79	81	83	81	78
Life expectancy, 65 yr.old Male	18	18	19	18	17
Life expectancy, 65 yr.old Female	20	22	24	21	21
Infant mortality (deaths per 1,000)	6	5	2	4	3.5
Obesity (% of pop $\geq$ 30% above BMI*)	36%	26%	3%	26%	13%
MRI's per 1,000	26%	8%	43%	6%	10%

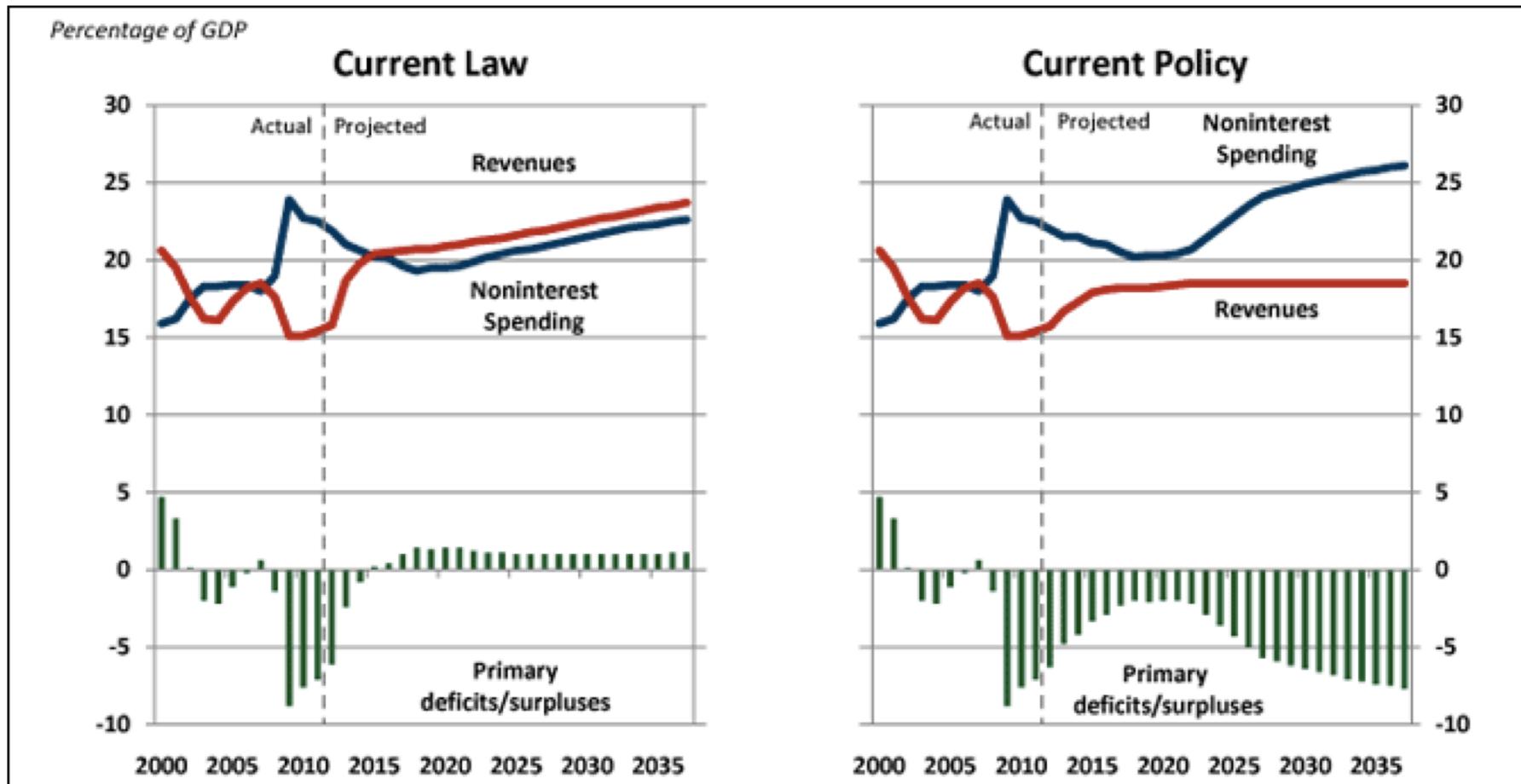
# Is There A Looming Fiscal Crisis In The US?

- What will happen to U.S. government outlays as the baby boomers retire?



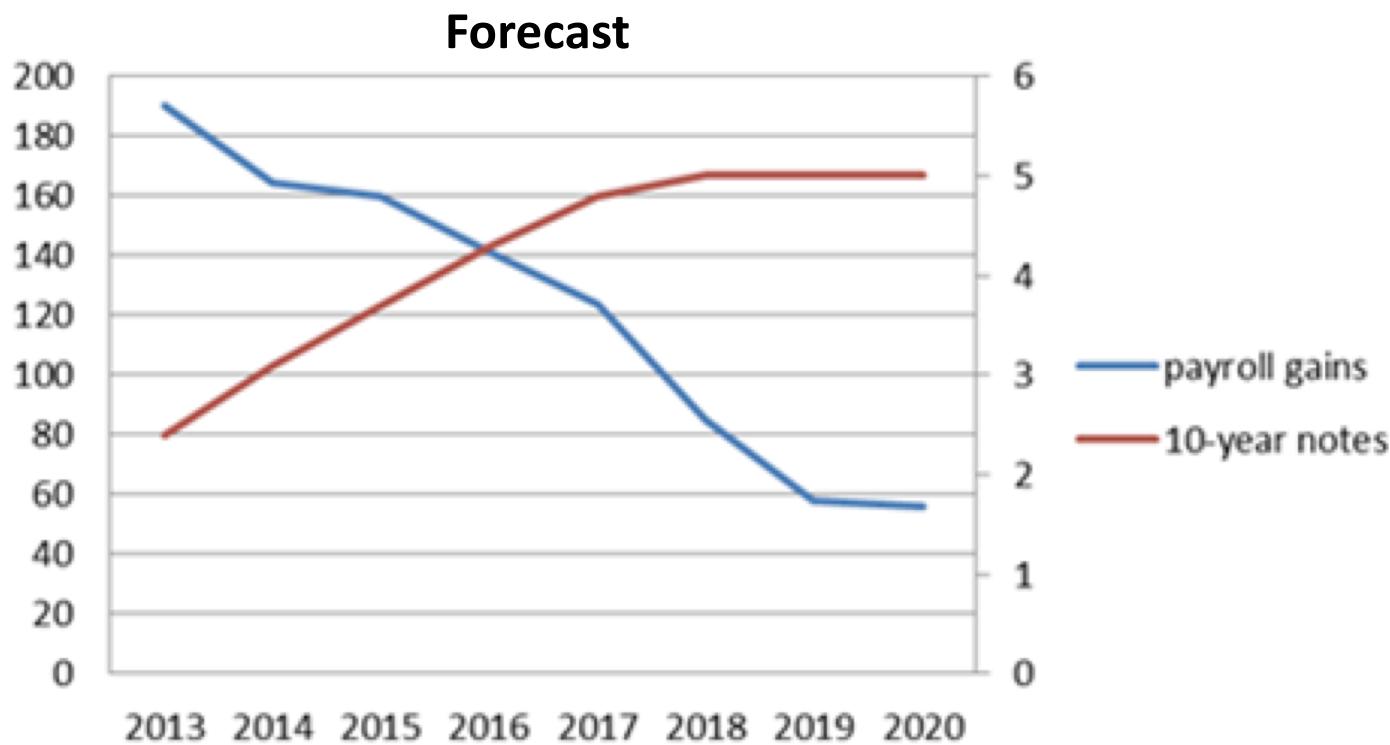
# Budget Forecast 2011

- In 2011, estimates suggested a radical increase in U.S. government debt



# The 2013-2015 Reality?

- A fiscal crisis looms...

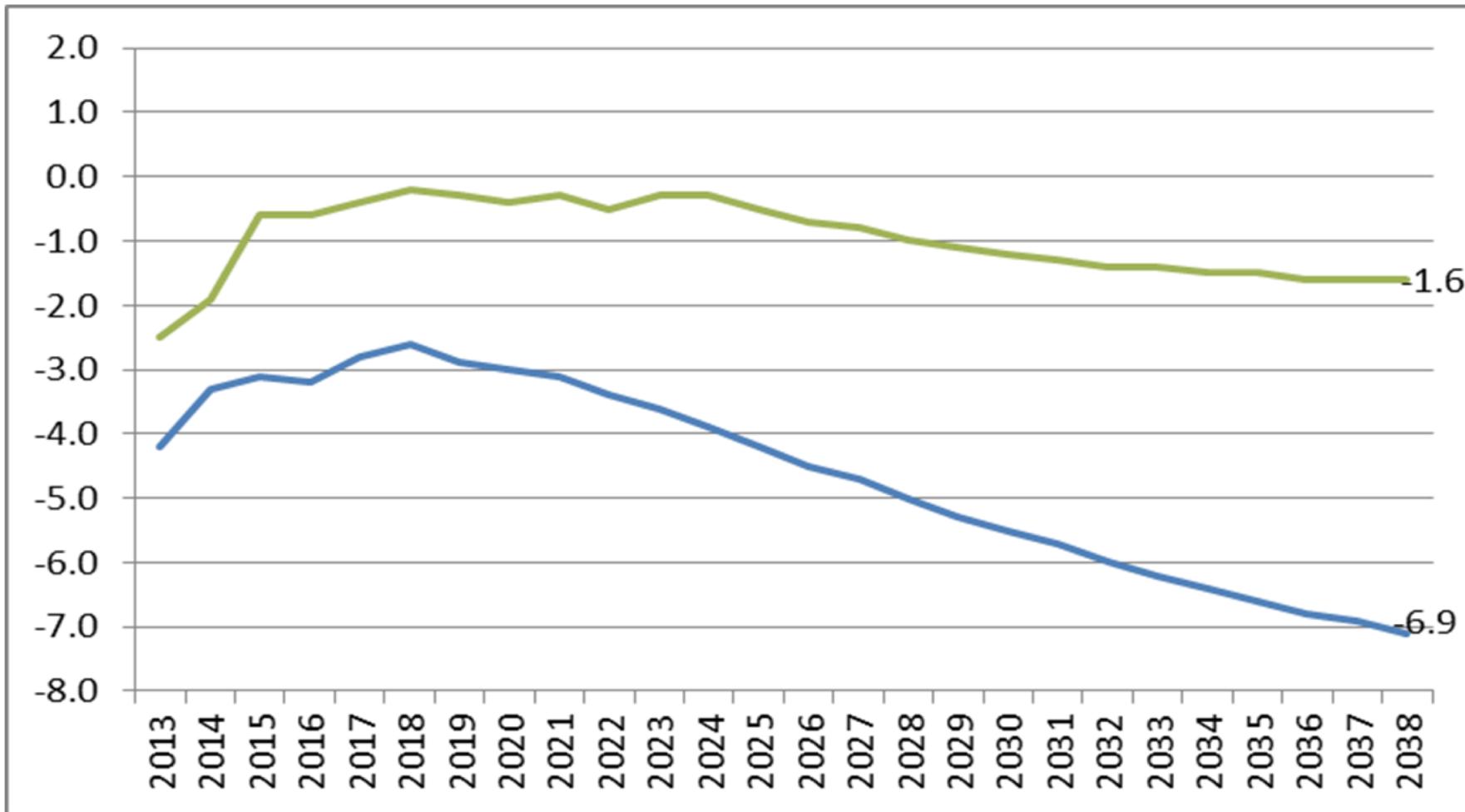


- But job growth was strong and bond yields fell!

	10-Year (CBO)	10-Year (actual)	job (CBO)	job (actual)
2013	2.35%	2.35%	190	200
2014	3.10%	2.35%	162	260
2015	3.70%	2.20%	159	235
2016	4.20%	1.80%	135	190

# News on the ‘Primary Balance’ Radically Improved

Primary Balance Estimates: 2011 vs 2013 (share of GDP)



# Is There Precedent for a Giant Budget Forecast Error?

## 2001: \$5 tr surplus by 2010

*Everything that can go right will go right*

Individual **tax receipts** stay at **10%** of GDP

They have been there for 5 years

**Labor productivity** rises at **2.6%** per year

It had risen at that rate for 5 years

We fight **no wars**

None fought in 10 years

We have **no recessions**

No recession had occurred in 10 years

## 2009: \$1 tr deficit

*Everything that could go wrong went wrong*

Individual **tax receipts swooned**

Falling stocks squeezed receipts

**Labor productivity decreased** on average

U.S. fought **two wars**

U.S. had **two recessions**

Small in 2001, Great Recession 2008-09

# Budget Forecast 2014

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- Estimates in 2014 are wildly better than in 2011
- Why do they still envision a surge in borrowing?
  - Retiring baby boomers swell payments on Medicare and social security
  - Retiring baby boomer stunt growth in the labor force
  - Labor productivity growth will be weak
  - Despite weak real GDP, real U.S. borrowing costs will rise to pre-crisis levels

# Size of the Government: Summary

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- Some items need to be **provided** by the government
- **High tax rates** do stifle growth and can, paradoxically, reduce tax receipts
- Nations have **different sizes** of government
- Some argue that the U.S. faces a **fiscal crisis**
  - Maybe so, but a lot depends on **assumptions** about productivity and real interest rates
  - Ample precedent for forecasters to **mistakenly believe** that the past few years are a good gauge for the next 25 years

# What Is Fiscal Policy?

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- Fiscal policy refers to changes in *federal taxes* and *purchases* that are intended to achieve **macroeconomic policy objectives**
- What is **not** fiscal policy?
  - State and local government taxes and spending are not generally aimed at affecting *national-level* objectives
  - Tax cut to buy electric cars → Environmental policy action
  - Spending increases to fund a war → Defense security policy

# Automatic Stabilizers vs Discretionary Fiscal Policy

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- **Automatic stabilizers** refers to government spending and taxes that *automatically* increase or decrease along with the business cycle
  - **Example:** Unemployment insurance payments are larger during a recession
- **Discretionary** fiscal policy refers to *intentional* actions the government takes to change spending and taxes
  - **Example:** Tax cuts and spending increases by Trump administration

# Does Government Spending Create Jobs?

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- Government spending is a component of GDP:

$$Y = C + I + G + NX$$

- It seems as if  $G \uparrow \rightarrow Y \uparrow$  as other variables like employment
- Some economists argue that  $G$  simply shifts employment from one sector to another  $\rightarrow$  It does not increase total employment
- **Debate was important after 2007-09 recession**
  - Can the government use discretionary FP to increase employment?

# Expansionary Fiscal Policy

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- Involves **increasing G** or **decreasing T**
  - Increasing G *directly* increases AD
  - Decreasing T *indirectly* affects demand by increasing disposable income, and hence consumption spending
- If the government believes real GDP will be **below** potential GDP, it can enact an **expansionary** FP in an attempt to restore long-run equilibrium
  - Decreasing **unemployment**

# Contractionary Fiscal Policy

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- Involves **decreasing G** or **increasing T**
- Works like expansionary FP, only in reverse
- If the government believes real GDP will be **above** potential GDP, it can enact an **contractionary** FP in an attempt to restore long-run equilibrium
  - Decreasing **inflation**

# Effects of Fiscal Policy on Real GDP and the Price Level

## Expansionary and Contractionary Fiscal Policy

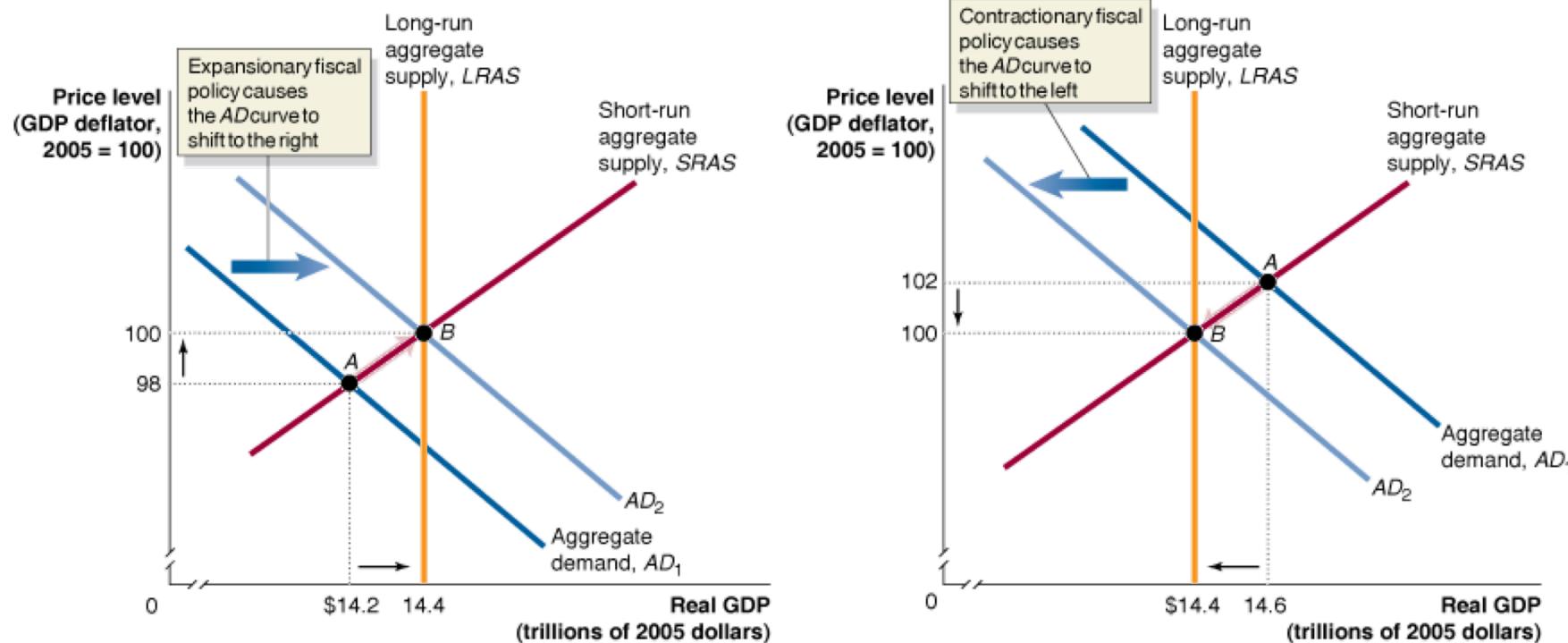


Figure 27-5

(a) Expansionary fiscal policy

(b) Contractionary fiscal policy

- **Terminology:** Fiscal Stimulus & Fiscal Austerity

# Effects of Fiscal Policy on Real GDP and the Price Level

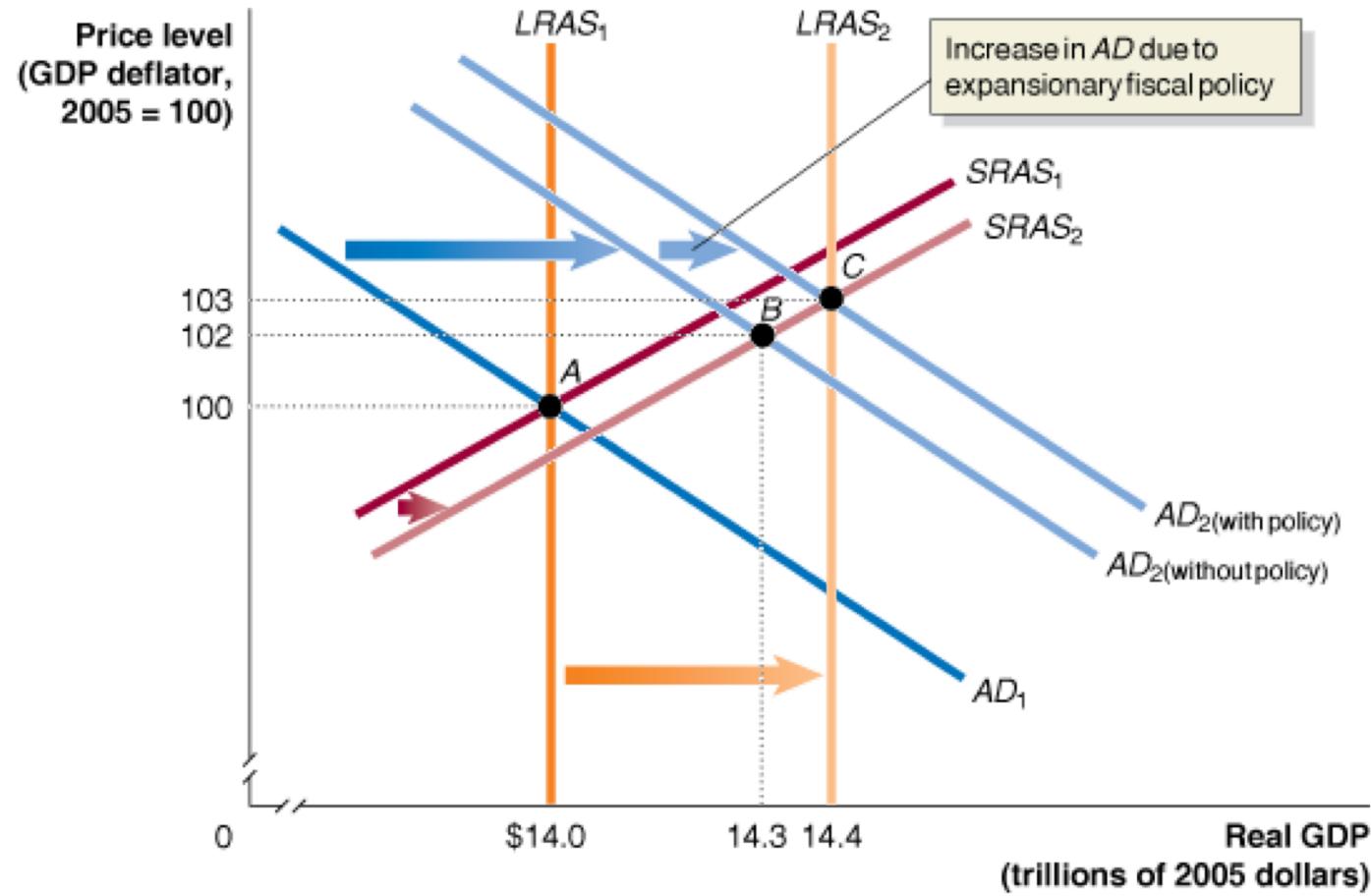
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## A Summary of How Fiscal Policy Affects Aggregate Demand

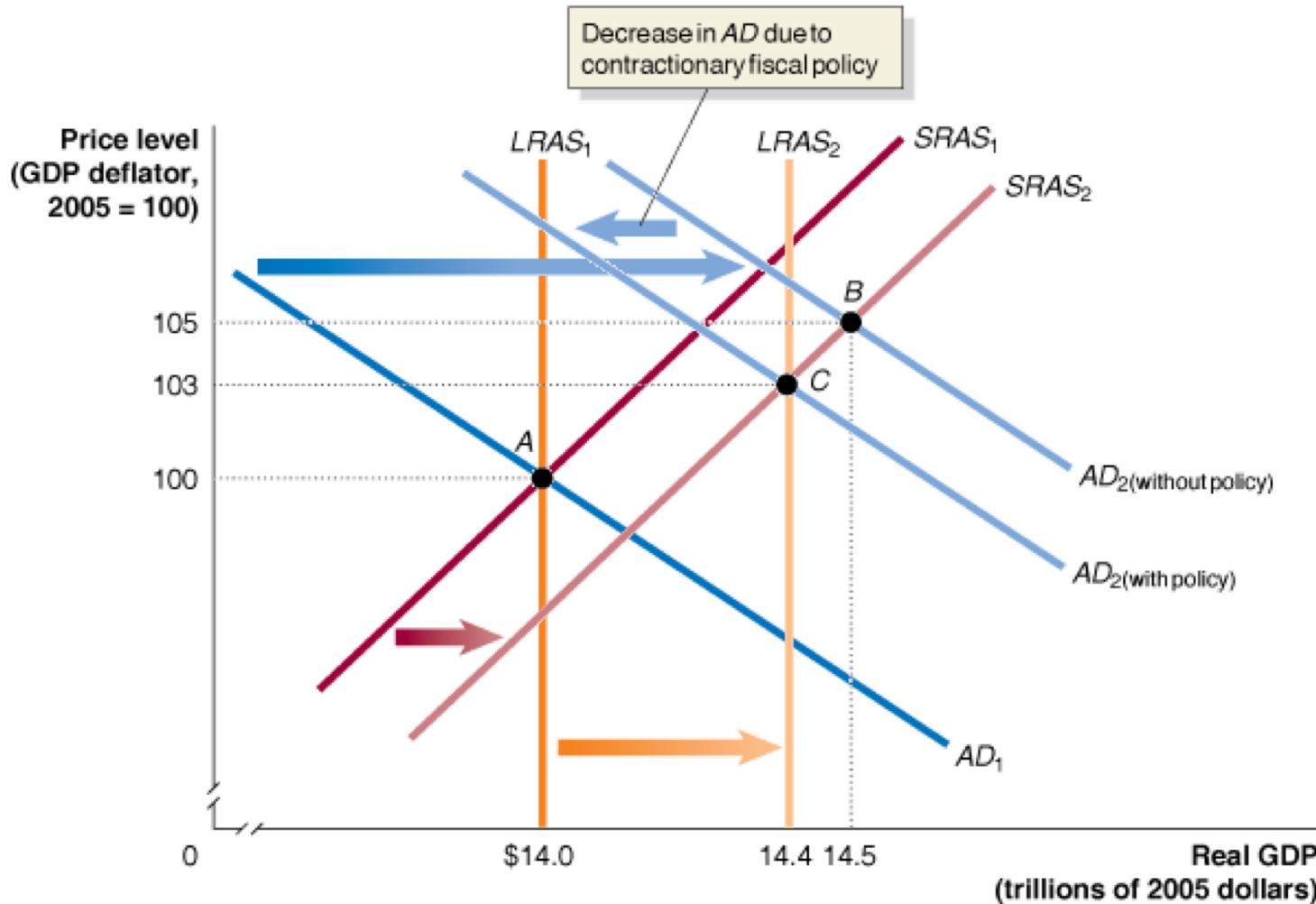
### Countercyclical Fiscal Policy

PROBLEM	TYPE OF POLICY	ACTIONS BY CONGRESS AND THE PRESIDENT	RESULT
Recession	Expansionary	Increase government spending or cut taxes	Real GDP and the price level rise.
Rising inflation	Contractionary	Decrease government spending or raise taxes	Real GDP and the price level fall.

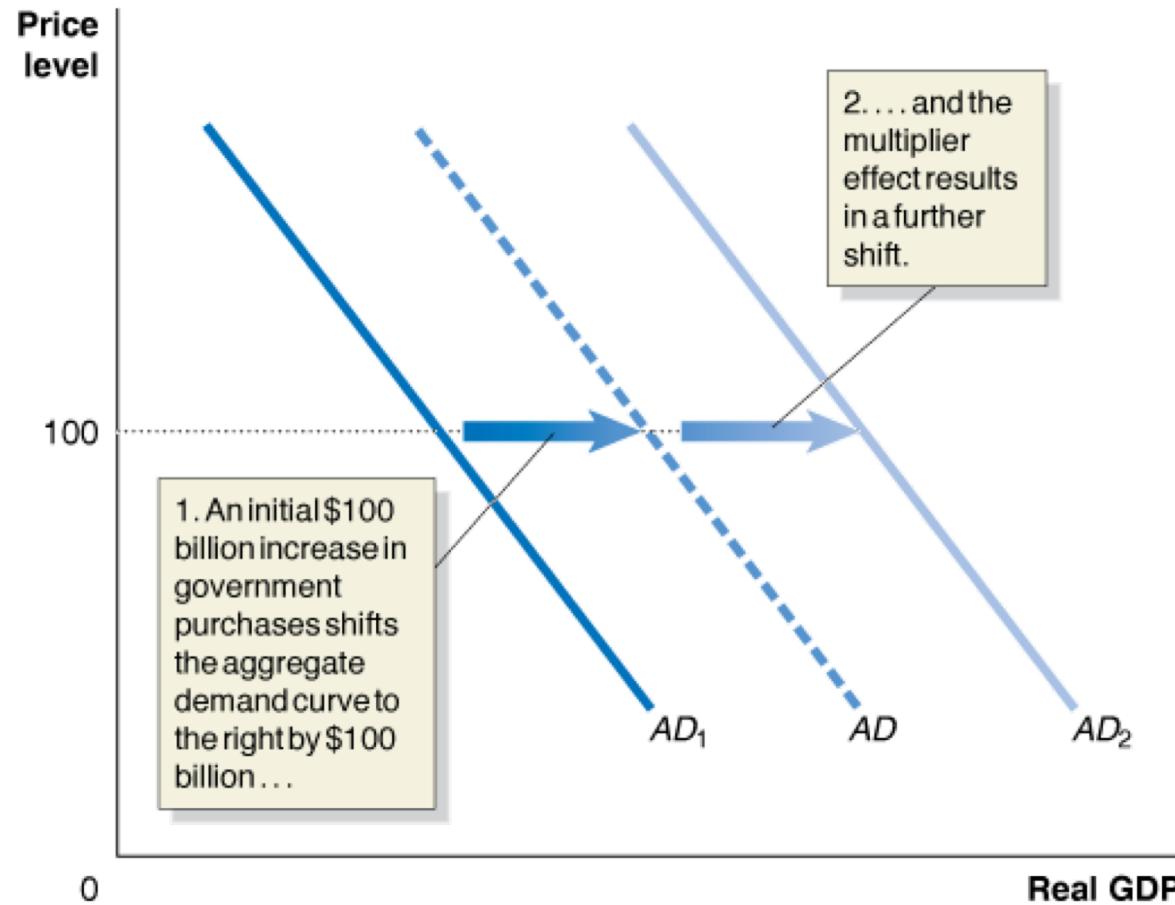
# An Expansionary Fiscal Policy in the Dynamic Model



# A Contractionary Fiscal Policy in the Dynamic Model

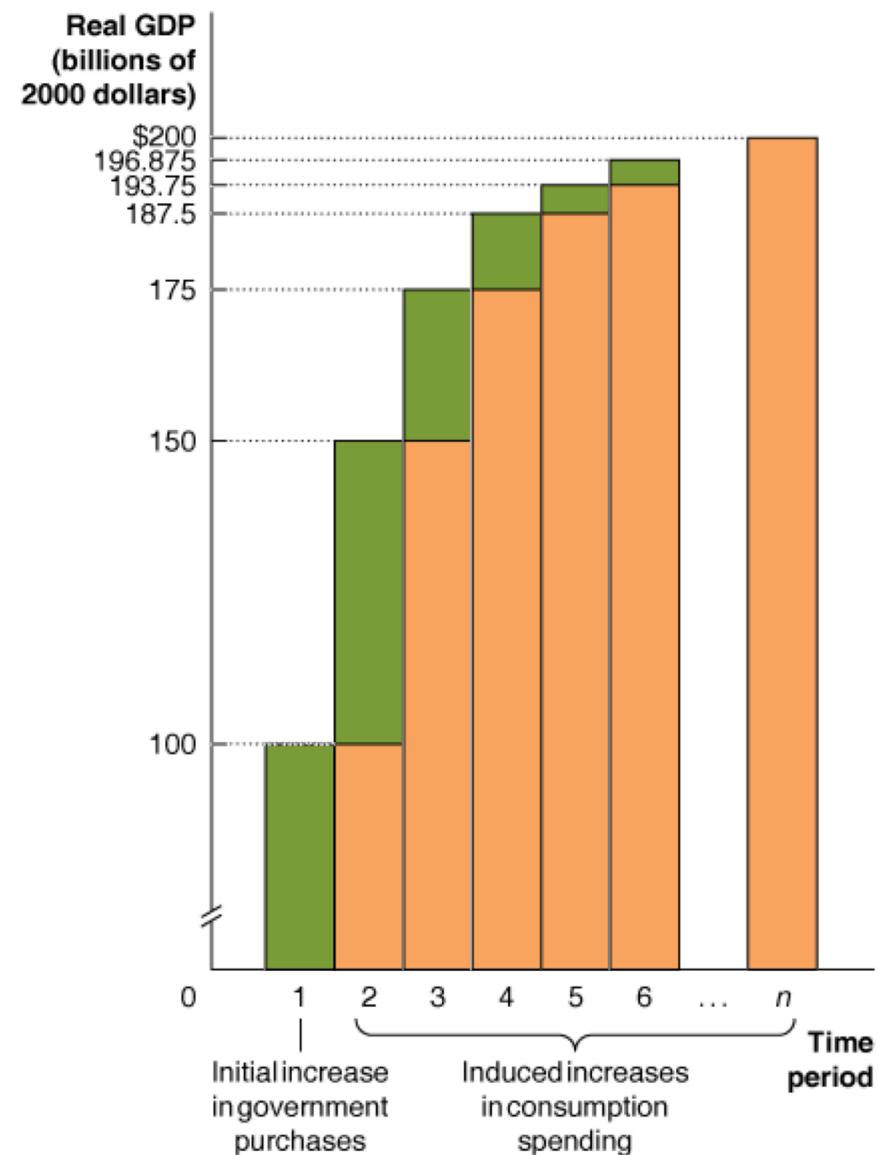


# The Multiplier Effect and Aggregate Demand



# Government Purchases and Tax Multipliers

Period	Additional Spending this Period	Cumulative Increase in Spending and Real GDP
1	\$100 billion in government purchases	\$100 billion
2	\$50 billion in consumption spending	\$150 billion
3	\$25 billion in consumption spending	\$175 billion
4	\$12.5 billion in consumption spending	\$187.5 billion
5	\$6.25 billion in consumption spending	\$193.75 billion
6	\$3.125 billion in consumption spending	\$196.875 billion
.	.	.
$n$	0	\$200 billion



# The Size of the Multiplier

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- **Key** to estimating the effects of fiscal policy
- Economists have been debating size of the multiplier for years
  - Difficult to estimate because over time several factors shift AD and SRAS
- **Estimates** of the size of the multiplier **vary widely**
  - From 0.5 to 3
- This **complicates assessment** of effects of fiscal policy

# Effects of 2009 Stimulus Package

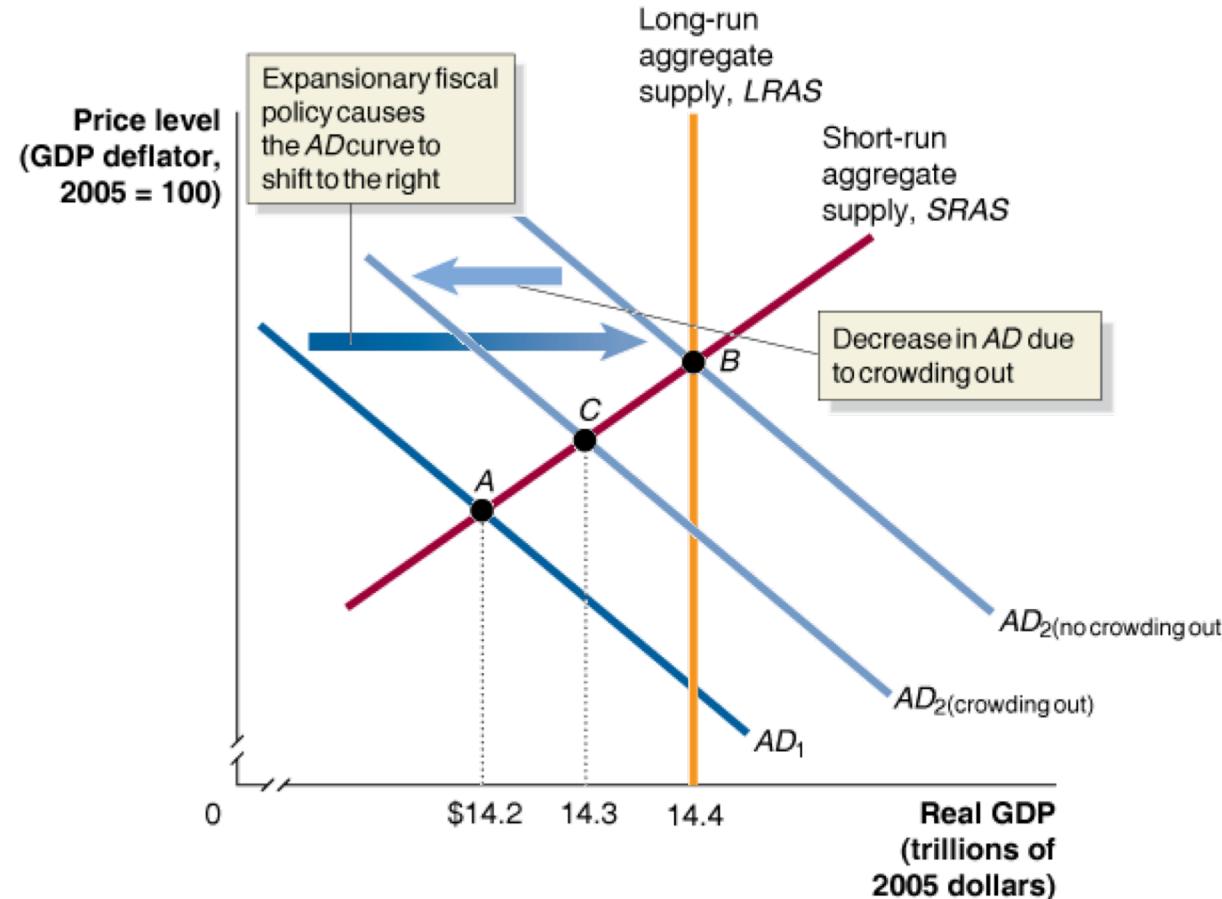
- Congressional Budget Office (CBO) is a non-partisan organization that estimates the **effects of government policies**
- CBO estimated effect of **2009 stimulus package**, *relative to what would have happened without it*

Table 16.2

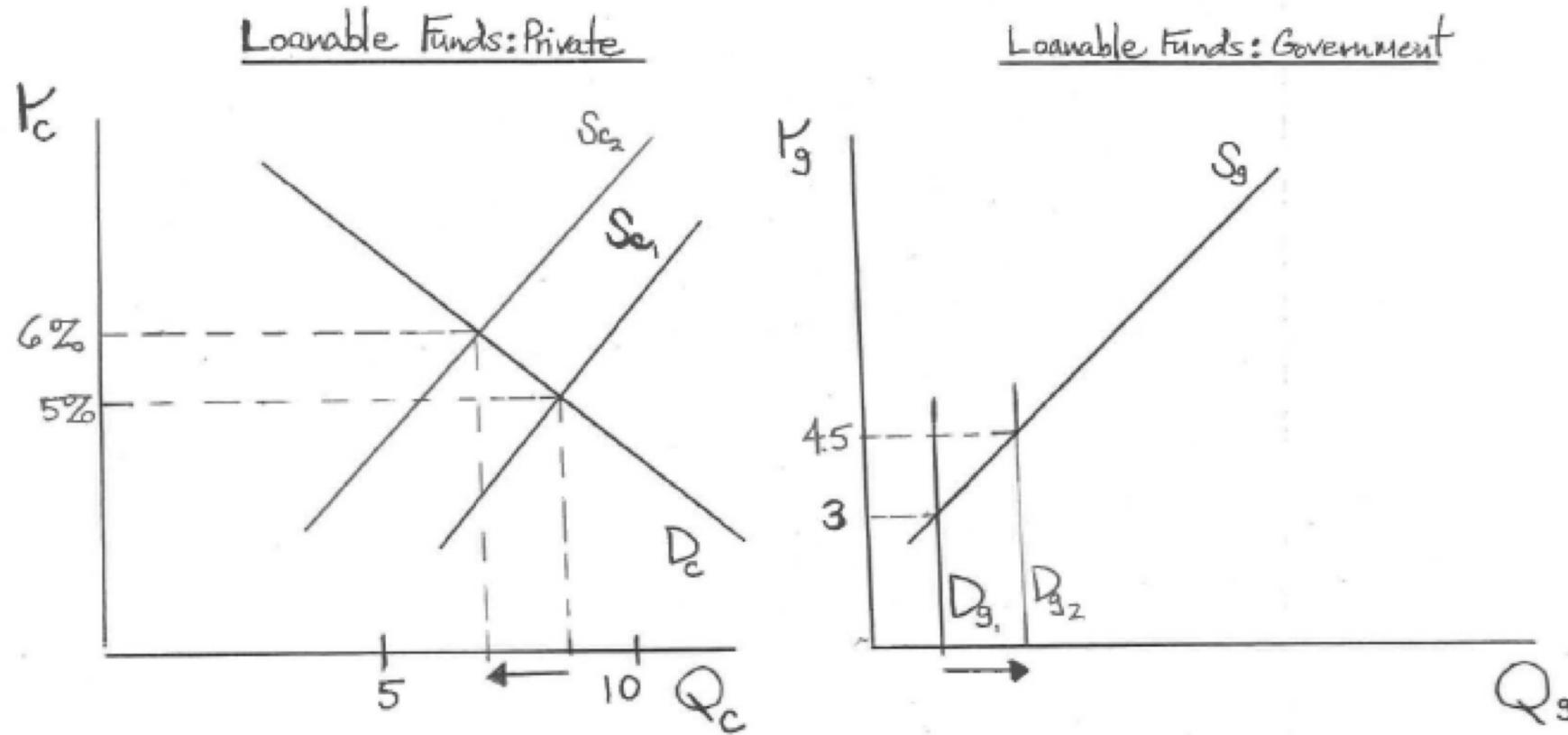
Year	Change in Real GDP	Change in the Unemployment Rate	Change in Employment (millions of people)
2009	0.9% to 1.9%	-0.3% to -0.5%	0.5 to 0.9
2010	1.5% to 4.2%	-0.7% to -1.8%	1.3 to 3.3
2011	0.8% to 2.3%	-0.5% to -1.4%	0.9 to 2.7
2012	0.3% to 0.8%	-0.2% to -0.6%	0.4 to 1.1

- CBO's Conclusion: It **reduced the severity** of the recession but it **did not** come close to **bring** the economy close to **full employment**

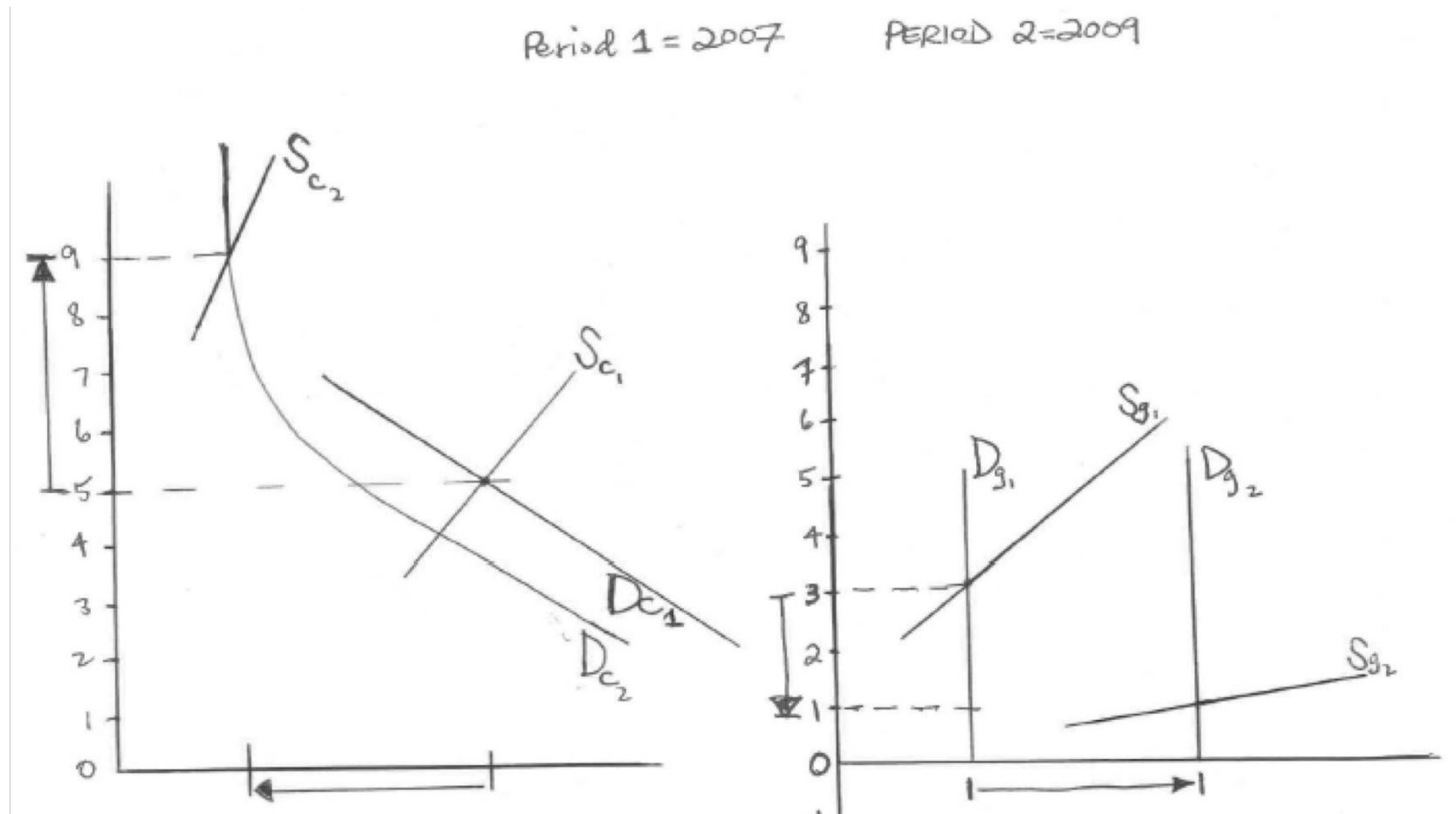
# Effects of Crowding Out in the Short Run



# Crowding Out Near Full Employment



# Crowding Out During the Great Recession?



- Government borrowing rate **plunged** → **No crowding out** occurred

# Fears of Crowding Out In Disastrous Recessions

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- In our expanded loanable funds model we saw that **collapsing risk appetites** radically **reduced government's borrowing costs** during the Great Recession
- So the 2008-09 debate makes no sense
  - Although it was waged by well-known economists
- Perhaps other motives existed behind arguing that G could crowd out in 2009-10
  - Size of the government

# Fears of Crowding Out In Disastrous Recessions

- Those warning of crowding out spoke of rising borrowing costs for companies

	Q4:2006	Q4:2008	Q4:2010
U.S. 10-YEAR	4.7	2.2	3.3
CORPORATE BOND	6.2	8.4	6.1
SPREAD	1.5	6.2	2.8

- We got the opposite

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# Fiscal Policy vs Monetary Policy

# Fiscal Policy vs Monetary Policy

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- Both aim to be at potential, smooth business cycles
  - But they attempt to reach goal in different ways
- Monetary policy, each and every day, works toward delivering desired macroeconomic objectives
  - Low inflation
  - Low unemployment
  - Strong real GDP growth
  - Secure financial system
- **Monetary policy is on the job 24/7**

# Discretionary Fiscal Policy?

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- Monetary policy is more nimble, and so **better suited to manage the macroeconomy** (steer the bus)
- Fiscal stimulus
  - Policies that give money away are very easy to enact but very hard to take back
- Fiscal policy is a product of Congress and the White House so:
  - It is always **highly politicized**
  - It takes **TOO much time**

# How Long Does It Take To Get A Fiscal Stimulus Deal?

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- 435 House representatives must pass a bill
- 100 Senators must pass a bill
- A House/Senate conference must agree upon a compromise bill
- Both the Senate and the House must approve the compromise bill
- The President must sign the bill
- Then the changes can begin to be implemented

# How Long to See Effects of Fiscal Policy?

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- Jobless benefits immediately put money into the pockets of the unemployed –a good thing
- Similarly, monetary policy is enacted the moment it appears a change is needed
  - Its *effects take time* but the policy change requires only a vote among 12 people
- It takes **more time** for (discretionary) fiscal policy **to show its effect**

# When Is Fiscal Policy A Reasonable Alternative?

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- Fiscal policy especially good when monetary policy is hampered
- When the federal funds rate is at ZERO, the Fed has fired all of its traditional ammunition
- At such times fiscal policy seems like a reasonable alternative to ‘hoping things get better’
- Discretionary policy only in the worst of times