Lecture 18:
Fiscal Policy

Macroeconomics (Quantitative)
Economics 101B

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Fiscal Policy

- Main tools of stabilization policy:
  - Monetary policy
  - Fiscal policy
- Types of fiscal policy:
  - Automatic stabilizers (e.g., unemployment insurance)
  - Fiscal stimulus checks
  - Countercyclical government spending (purchases)

Stimulus Checks vs. Government Purchases

- Stimulus checks:
  - Transfer from taxpayers to recipients
  - What is MPC of recipients?
  - Taxpayers may spend less
- Government purchases
  - Government purchases goods and services
  - No issue of MPC (government's "MPC" is 1 on these funds)

- Government purchases often referred to as government spending or fiscal stimulus

Monetary Policy vs. Government Purchases

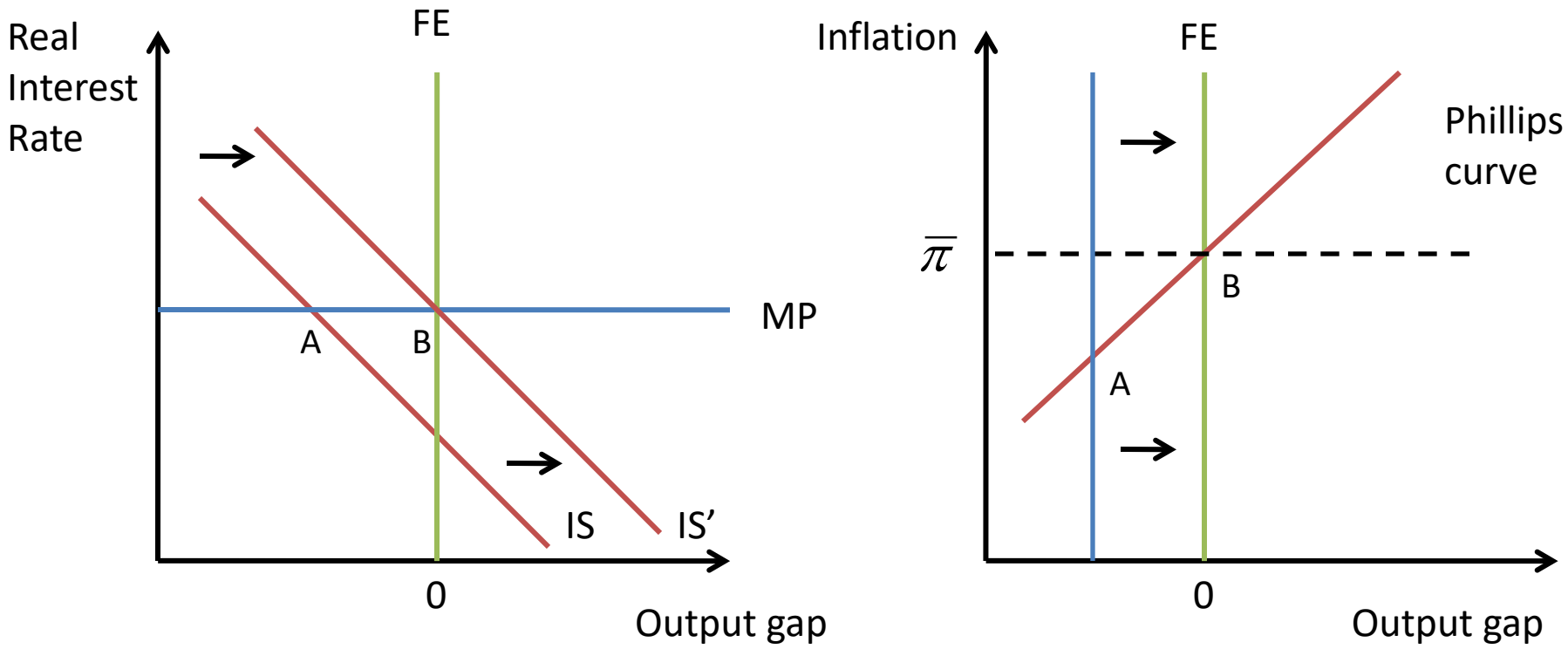
- Common view: Monetary policy is stabilization policy of choice during normal times.
  - Central bank nimbler than Congress
  - Less political
- However: If monetary policy hits the ZLB, fiscal stimulus becomes more important

Fiscal Stimulus in Keynesian Model

1. Base case: No monetary response, no hand-to-mouth consumers, no-ZLB
   - IS curve: $\tilde{Y}_t = \bar{a} - \bar{b}(R_t - \bar{r})$
   - G increases by 1% of GDP. How much does $\tilde{Y}_t$ rise?
   - By 1% ($\bar{a}$ increases by 1%, no response of R_t)
   - Fiscal multiplier equal to 1

- Fiscal multiplier is defined as the % increase in output when government spending increases by 1% of GDP (equivalent to dollar increase in GDP when G increases by $1)

Fiscal Stimulus (Not ZLB)



FE: Full Employment

Fiscal Stimulus in a Keynesian Model

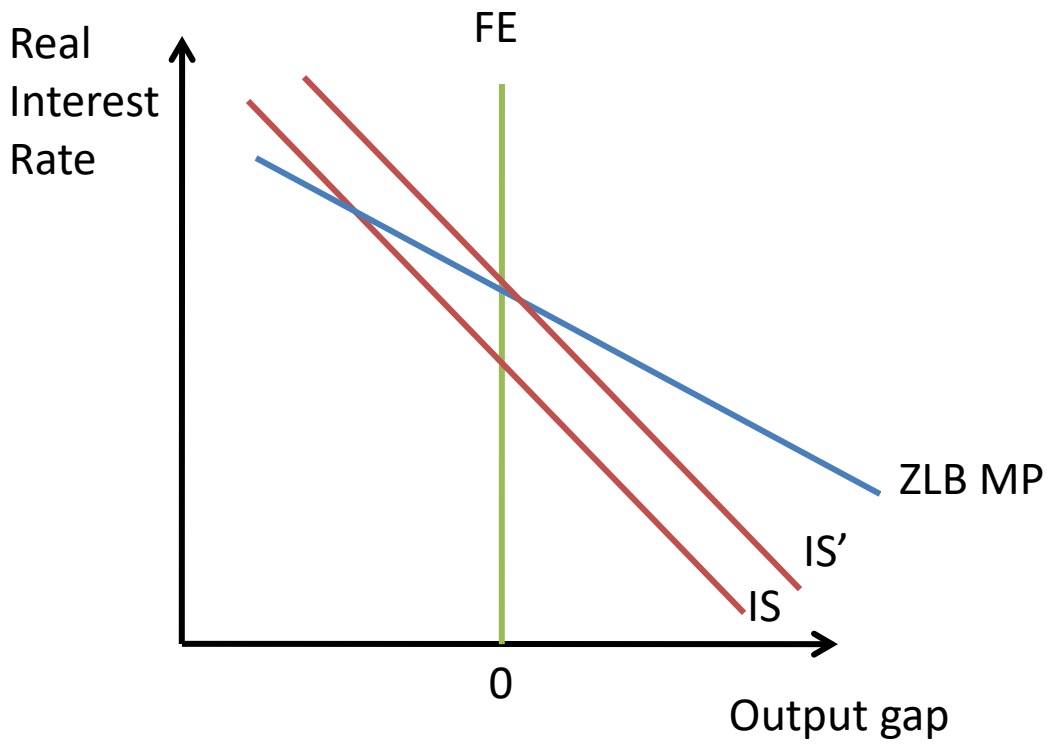
2. What if monetary policy responds?
   - If fiscal policy is expansionary, monetary policy need not be as expansionary.
   - Monetary policy will systematically do less the more fiscal policy does (when not at ZLB)
   - Fiscal stimulus will thus induce higher R_t than in counterfactual
   - IS curve: $\tilde{Y}_t = \bar{a} - \bar{b}(R_t - \bar{r})$
   - $\Delta\bar{a} \uparrow$ but $R_t \uparrow$ than otherwise
   - Measured fiscal multiplier less than one (because of response of monetary authority)

Fiscal Stimulus in Keynesian Model

3. Hand-to-mouth consumers (no MP response)
   - IS curve: $\tilde{Y}_t = \frac{1}{1-\bar{x}}\left(\bar{a} - \bar{b}(R_t - \bar{r})\right)$
   - What is fiscal multiplier?
   - $\frac{1}{1-\bar{x}} > 1$ (response to 1% increase in $\bar{a}$)
   - Fiscal multiplier larger than 1

Fiscal Stimulus in Keynesian Model

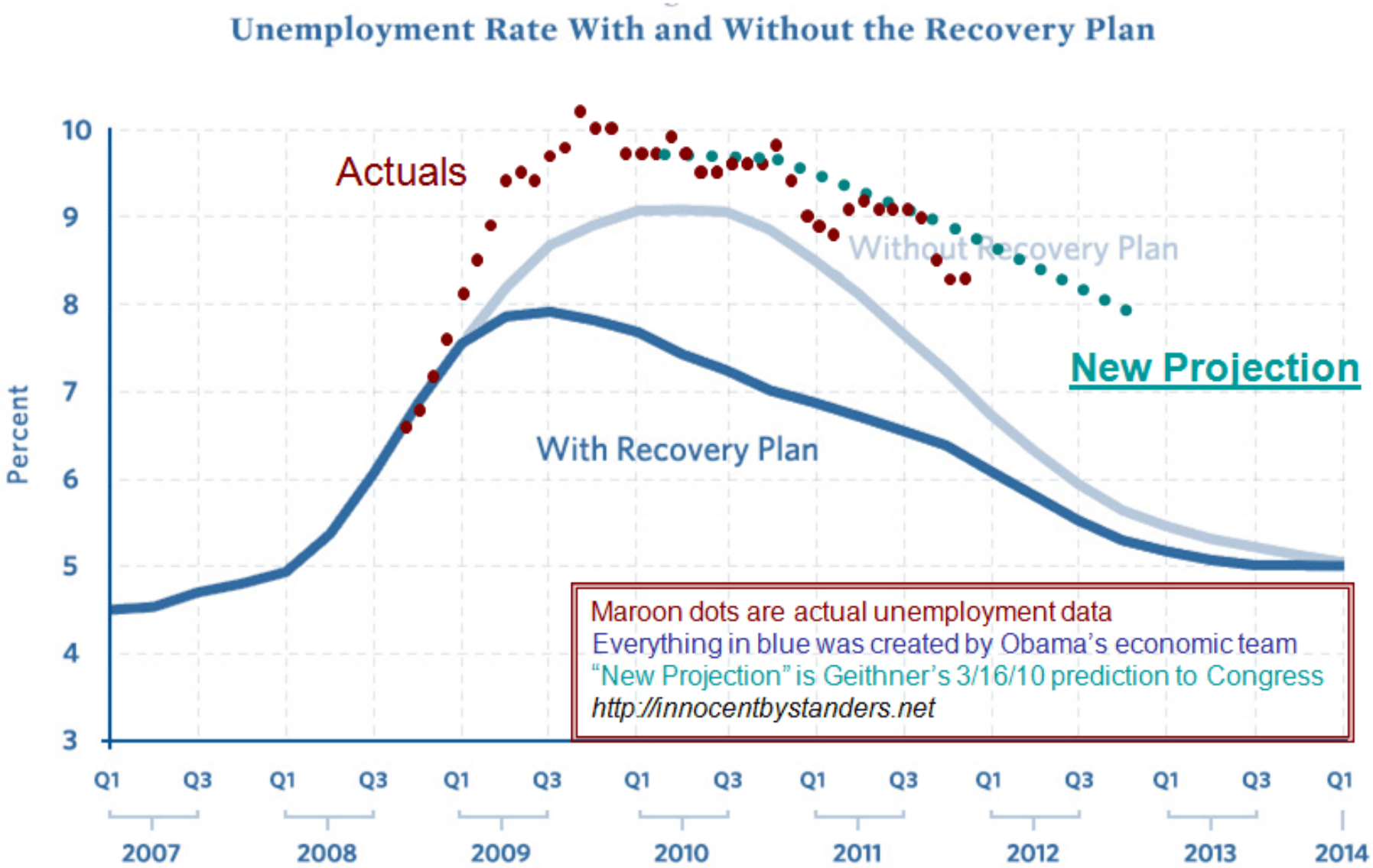
4. At Zero Lower Bound
   - IS curve: $\tilde{Y}_t = \bar{a} - \bar{b}(R_t - \bar{r})$
   - MP curve: $R_t = -\bar{v}\tilde{Y}_t - \pi_{t-1} - \bar{o}$
   - Government raises spending by 1% of GDP
   - Higher output raises inflation => lowers real interest rate
     => raises output, etc.
   - Virtuous spiral!
   - Fiscal multiplier large than 1



Keynesian Fiscal Stimulus

1. Basic model with fixed R_t
   - Fiscal multiplier = 1
2. Basic model with "normal" monetary response
   - Fiscal multiplier < 1
3. Hand-to-mouth model with fixed R_t
   - Fiscal multiplier > 1
4. Basic model at Zero Lower Bound
   - Fiscal multiplier > 1

Obama administration in 2009: Fiscal multiplier = 1.5


Unemployment Rate With and Without the Recovery Plan
Actuals
Without Recovery Plan
New Projection
With Recovery Plan
Maroon dots are actual unemployment data
Everything in blue was created by Obama's economic team
"New Projection" is Geithner's 3/16/10 prediction to Congress
http://innocentbystanders.net
Percent
10
9
8
7
6
5
4
3
Q1
Q3
2007
2008
2009
2010
2011
2012
2013
2014

Neo-Classical View of Fiscal Stimulus

- Government takes away people's stuff
  (i.e., taxes them to buy some of the output)
- People are poorer. What do they do?
  - Consume less of goods
  - And less of leisure (work more)
- Positive multiplier due to negative wealth effect
- Multiplier less than one since people don't increase effort enough to get to old level of consumption

Neo-Classical View of Fiscal Stimulus

- Intuitively, government takes some stuff away from people

$$C = Y - G$$

- Several ways they can respond:
  1. Increase Y (work more) to keep C constant
  2. Decrease C to keep Y (and therefore L) constant
  3. A little bit of both
- It is optimal to do a little bit of both

Neo-Classical Fiscal Stimulus with Investment

- We have been ignoring investment
- In economy with investment, people have three options:

$$C = Y - I - G$$

  - Consume less
  - Work more
  - Invest less
- Optimally, they do a little bit of each
- Government spending “crowds out” investment as well as consumption and leisure

Fiscal Stimulus

- Basic (New) Keynesian with constant R_t: Multiplier = 1
- Keynesian with normal MP response: Multiplier < 1
- Keynesian at ZLB: Multiplier > 1
- Keynesian with hand-to-mouth: Multiplier > 1
- Neo-Classical: 0 < Multiplier < 1

Fama (2009)

- Identity:

$$I = S_H + S_c + S_g$$

  - Investment must equal sum of household, corporate and government saving
- Fama argues: This implies fiscal stimulus can't work
  - Logic: $G \uparrow$ implies that $S_g \downarrow$ implies that $I \downarrow$
- Is this true?
  - No. Completely false. Makes no sense at all.
  - If government demands more, this can lead people to produce more which can raise household savings
  - Even if demand is not important (neoclassical model), wealth effects lead people to produce more

Barro (2009)

- Skeptical that multiplier can be greater than one
- “In addition to the free airplane or bridge, we also have more goods and services left over to raise private consumption or investment”
- “If this mechanism is genuine, one might ask why the government should stop with only $1 trillion of added purchases”
- Responses: Long run versus short run / ZLB

Fiscal Multiplier: Empirics

- How large is the fiscal multiplier?
- How can we tell empirically?
- Simple minded approach:
  - Look at correlation between changes in spending and changes in GDP
  - But a correlation is not the same as causation!
- What are potential “confounding effects”?
  - When economy is sagging (federal) government tries to stimulate economy with spending (downward bias)
  - When economy is booming (state and local) governments spend more (upward bias)

Natural Experiments: Wars

- Wars lead to large changes in gov. spending that are random from perspective of output
- Barro and Redlick (2011) use wars to estimate fiscal multiplier:

$$\frac{Y_t - Y_{t-1}}{Y_{t-1}} = \alpha + \beta \frac{G_t - G_{t-1}}{Y_{t-1}} + \text{other variables} + \varepsilon_t$$

- Where G_t is military spending

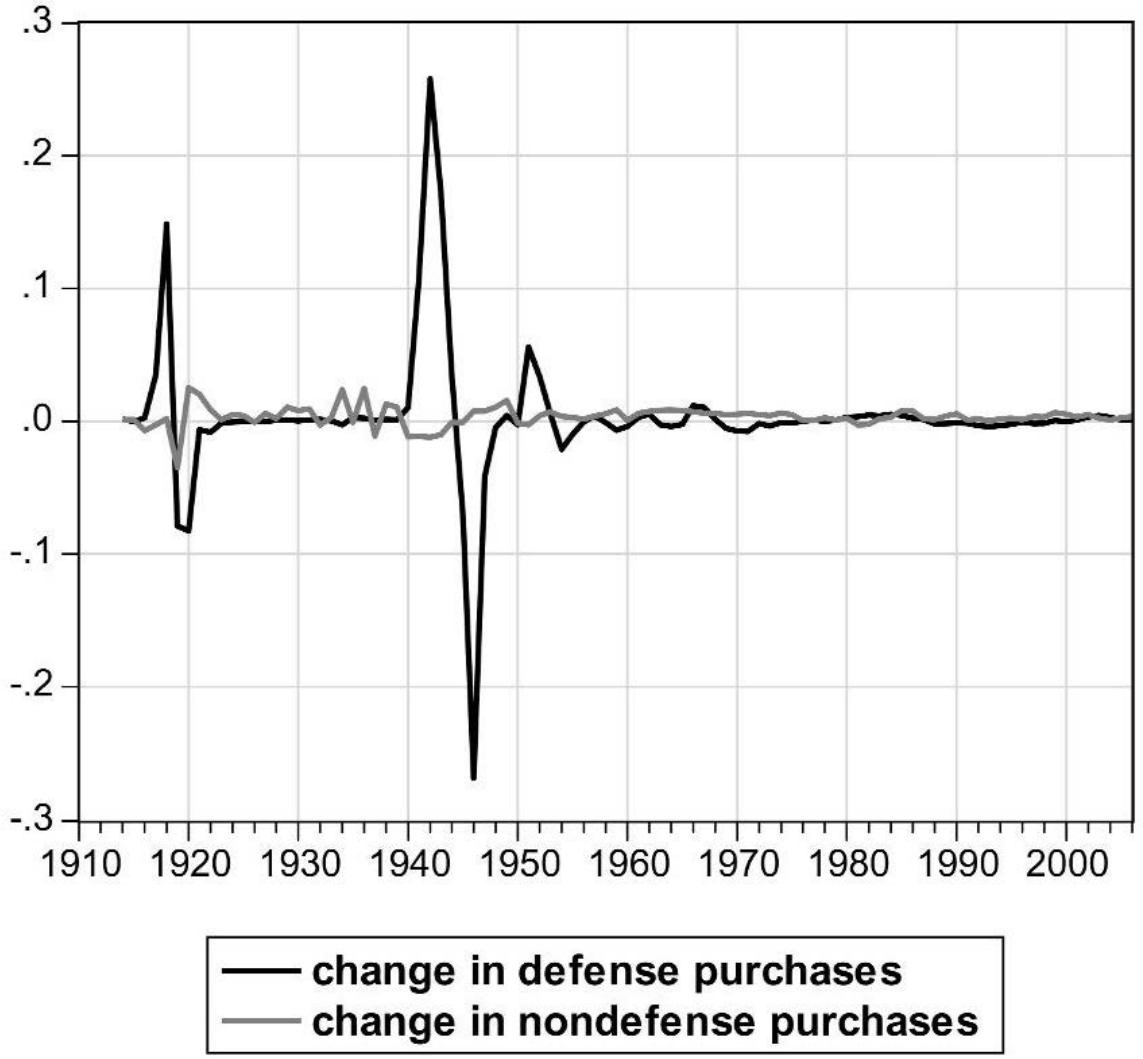


Table: Changes in Defense Spending

Year	DG (% GDP)	Year	DG (% GDP)
WWI		Korea	
1917	3.5	1951	5.6
1918	14.9	1952	3.3
1919	-7.9	1953	0.5
1920	-8.2	1952	-2.1
WWII		Vietnam	
1941	10.6	1966	1.2
1942	25.8	1967	1.1
1943	17.2		
1944	3.6	Reagan	
1945	-7.1	1982-1985	0.4-0.5
1946	-25.8	Bush II	
		2002-2004	0.3-0.4

TABLE II
Equations for GDP Growth, Various Samples

	(1)	(2)	(3)	(4)	(5)	(6)
Starting date	1950	1939	1930	1930 (w/o 1949)	1917	1954
Δg: *defense*	0.68*	0.44**	0.46**	0.48**	0.47**	0.98
	(0.27)	(0.06)	(0.08)	(0.08)	(0.08)	(0.65)
Δg: *defense* (–1)	0.01	0.20**	0.21*	0.25**	0.16	–0.54
	(0.28)	(0.06)	(0.09)	(0.08)	(0.08)	(0.56)
Δg^*: *defense news*	0.026	0.039**	0.034*	0.034*	0.034*	–0.120
	(0.016)	(0.011)	(0.015)	(0.014)	(0.017)	(0.112)
$U(-1)$	0.50**	0.58**	0.61**	0.58**	0.47**	0.51**
	(0.17)	(0.14)	(0.10)	(0.10)	(0.10)	(0.18)
$\Delta\tau(-1)$	–0.54**	–0.16	–0.26	–0.52*	–0.19	–0.48*
	(0.21)	(0.16)	(0.22)	(0.23)	(0.25)	(0.22)
Yield spread squared	–43.9*	–37.8	–101.5**	–103.4**	–73.6**	–43.1*
	(20.7)	(22.0)	(12.8)	(12.4)	(12.2)	(21.8)
p-value, defense variables	0.030	0.000	0.000	0.000	0.000	0.47
R^2	0.48	0.82	0.75	0.77	0.66	0.45
σ	0.017	0.019	0.027	0.026	0.030	0.018

Barro and Redlick (2011)

Fiscal Multipliers in Wars

- War multiplier: 0.6-0.7
- Why might war multiplier be different from “fiscal stimulus” multipliers?
  - Large wars feature “command-and-control”
  - Rationing of consumer products (downward bias in multiplier)
  - Patriotism / mandated production(upward bias in multiplier)
  - Bottlenecks in large wars

Regional Evidence on Fiscal Stimulus

- Major problems with war estimates:
  - There are only so many wars! (imprecise estimates)
  - Confounding effects: Patriotism, rationing, etc.
- US states have different amounts of military production
- Perhaps we can look at whether states with a lot of military production do better than states with little military production when there is a military buildup
  (Nakamura and Steinsson, 2014)

Regional Variation in Military Spending

- California much more sensitive to aggregate variation in military spending than Illinois
- We can ask, does GDP in CA rise relative to GDP in IL when US military spending increases

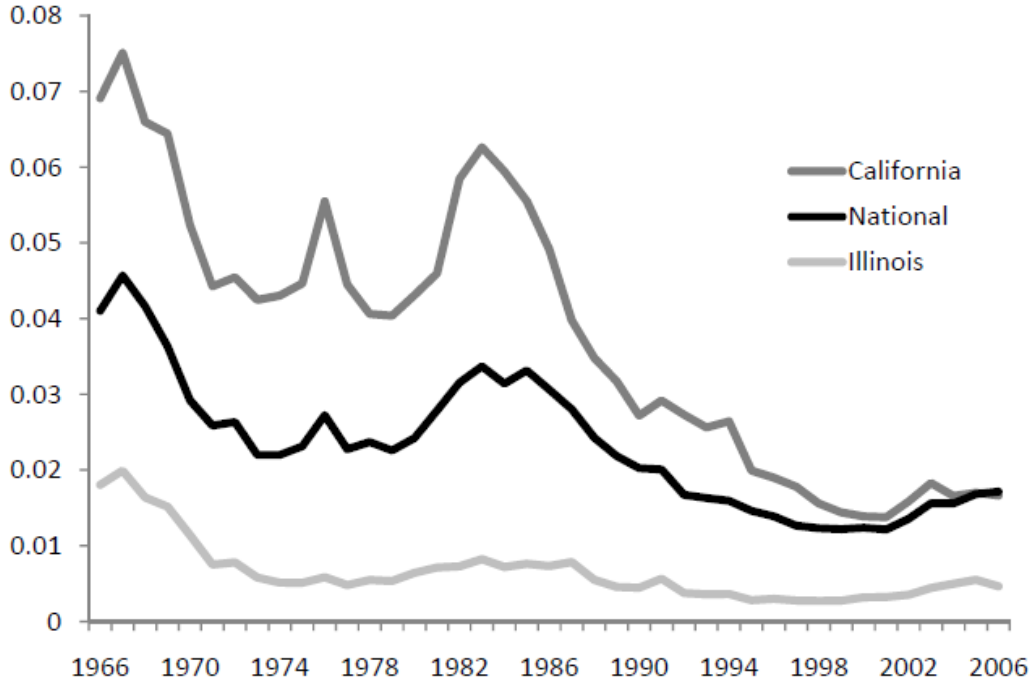


Figure I
Prime Military Contract Spending as a Fraction of State GDP

Nakamura and Steinsson (2014)

Regional Variation in Military Spending

- Turns out it does
- Most points in SW and NE quadrants indicating positive relationship between systematic military spending and state GDP

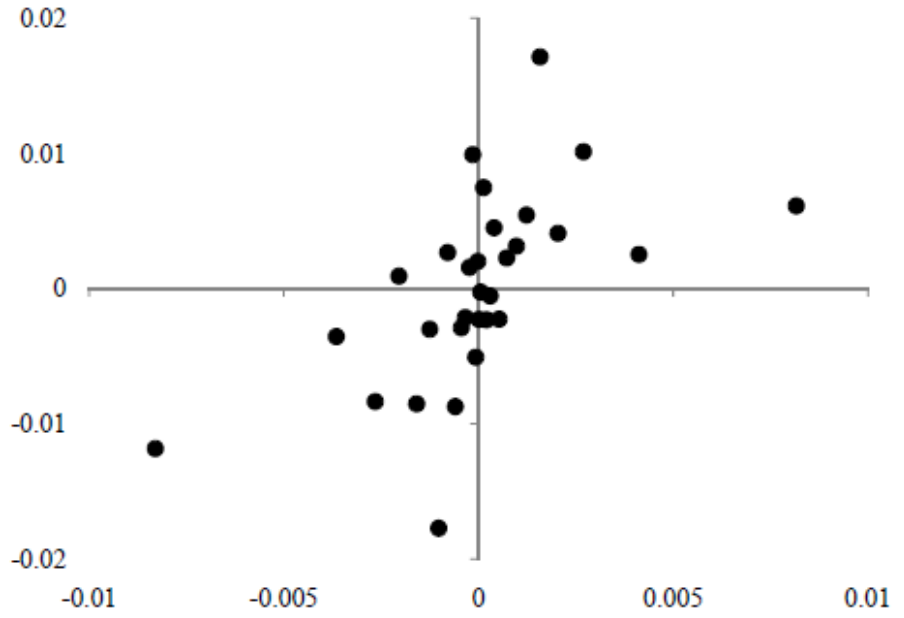


FIGURE III
Quantiles of Change in Output Versus Predicted Change in Military Spending

The figure shows averages of changes in output and predicted military spending (based on our first-stage regression), grouped by 30 quantiles of the predicted military spending variable. Both variables are demeaned by year and state fixed effects.

Nakamura and Steinsson (2014)

TABLE 2—THE EFFECTS OF MILITARY SPENDING

	Output		Output defl. state CPI		Employment		CPI	Population
	States	Regions	States	Regions	States	Regions	States	States
Prime military contracts	1.43	1.85	1.34	1.85	1.28	1.76	0.03	−0.12
	(0.36)	(0.58)	(0.36)	(0.71)	(0.29)	(0.62)	(0.18)	(0.17)
Prime contracts plus military compensation	1.62	1.62	1.36	1.44	1.39	1.51	0.19	0.07
	(0.40)	(0.84)	(0.39)	(0.96)	(0.32)	(0.91)	(0.16)	(0.21)
Observations	1,989	390	1,989	390	1,989	390	1,763	1,989

Notes: Each cell in the table reports results for a different regression with a shorthand for the main regressor of interest listed in the far left column. A shorthand for the dependent variable is stated at the top of each column. The dependent variable is a two-year change divided by the initial value in each case. Output and employment are per capita. The regressor is the two-year change divided by output. Military spending variables are per capita except in Population regression. Standard errors are in parentheses. All regressions include region and time fixed effects, and are estimated by two-stage least squares. The sample period is 1966–2006 for output, employment, and population, and 1969–2006 for the CPI. Output is state GDP, first deflated by the national CPI and then by our state CPI measures. Employment is from the BLS payroll survey. The CPI measure is described in the text. Standard errors are clustered by state or region.

Nakamura and Steinsson (2014)

Regional Variation in Military Spending

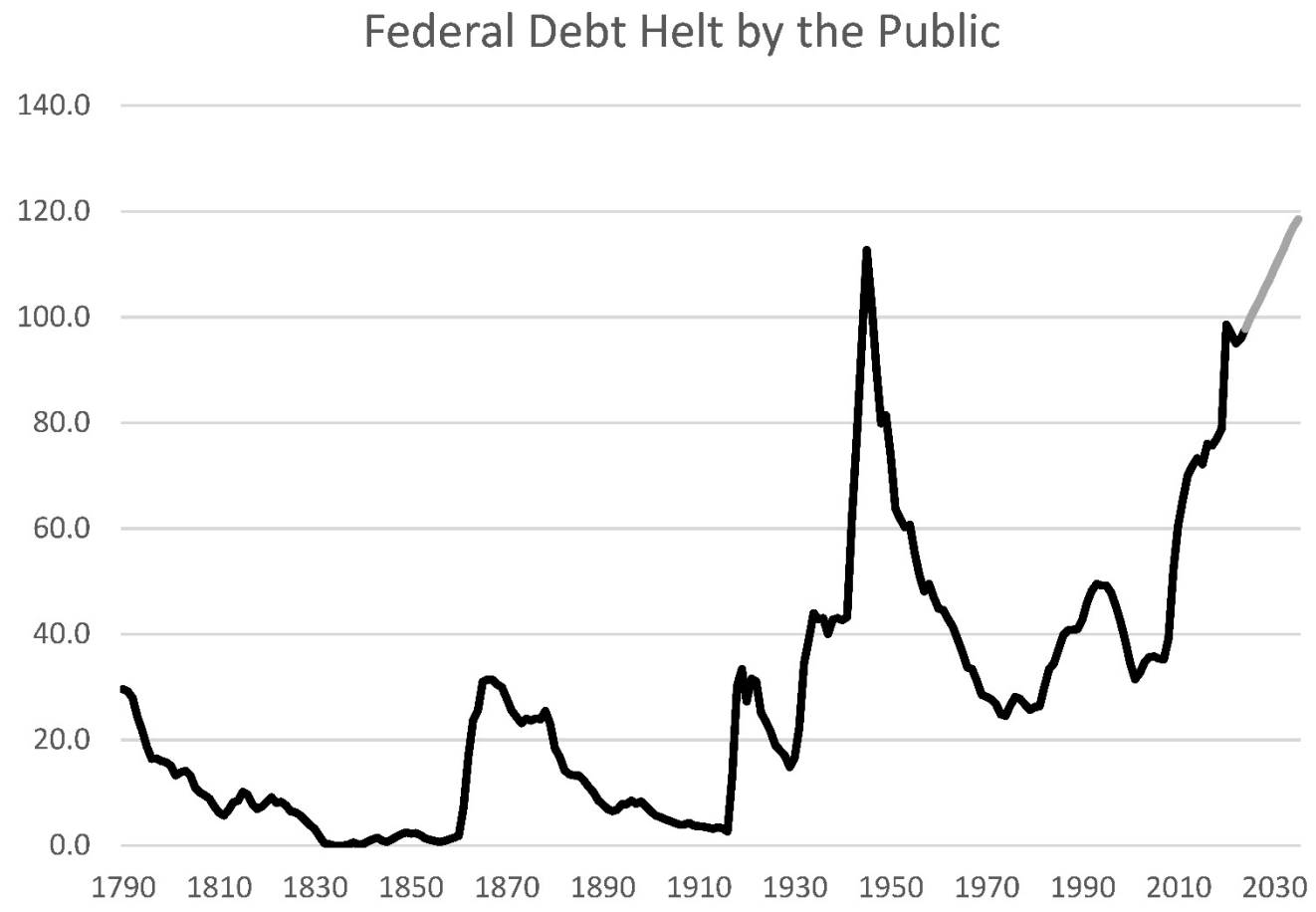
- We find a “relative multiplier” of 1.5
- I.e., when military spending goes up by 1% of GDP in CA relative to IL, output goes up by 1.5% in CA relative to IL
- But how do we interpret this?
  - Not the same as aggregate multiplier
  - No response of “relative” monetary policy or tax policy
  - States don’t pay for spending

Interpretation of Relative Multiplier

- Since relative monetary policy held fixed, relative multiplier is roughly analogous to aggregate multiplier for fixed R_t
- Our results thus more consistent with Keynesian model with hand-to-mouth consumers than with Neoclassical model
- Implies that aggregate multiplier is big at the zero lower bound

Exploding Government Debt?

- US government debt has risen rapidly as a fraction of GDP in recent years
- Almost as high as at the end of WWII
- Is this dangerous?



Source: Congressional Budget Office

Fiscal Space

- There is a limit to how much debt governments can issue
- At some point, markets will not buy more debt
  - Because the don't think the government will be able to repay
- Fiscal space: Amount of debt a government can issue before hitting its "borrowing limit"

Fiscal Space

- Hard to know how high the borrowing limit is
- Probably different for different countries
  - "Screwed-up countries" often default when debt hits something like 60% of GDP
  - "Advanced countries" can have debt of at least 120% of GDP without defaulting

Debt and Deficits Across Countries in 2017

	Gross Debt	Net Debt	Budget Surplus/Deficit
Australia	45.1	-8.9	-2.0
Canada	101.3	34.0	-2.3
France	124.1	78.8	-3.0
Germany	71.7	39.3	0.5
Iceland	63.6	4.8	0.5
Italy	159.5	132.5	-2.4
Japan	237.5	136.1	-5.2
Norway	41.3	-270.3	2.9
Switzerland	41.7	3.7	1.3
United Kingdom	113.1	81.8	-3.1
United States	116.9	91.8	-4.9
Euro area	108.1	70.7	-1.5

Source: OECD

Fiscal Space and Fiscal Stimulus

- When crisis strikes, fiscal space determines how much fiscal stimulus country can do
- Say debt limit is 120% of GDP
- Country that starts with 120% of GDP in debt can't do any fiscal stimulus (must actually do austerity if GDP falls)
- Country that starts with 40% of GDP in debt can do lots of fiscal stimulus
- Fiscal space is very valuable in a crisis!!