Economics 302
Intermediate Macroeconomic Theory and Policy
(Fall 2010)

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Lecture 5

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Outline

- Sources of analysis
- Current events: Stimulus package (ARRA)
- Budget implications of fiscal policy
- Full employment budget balance

Non-partisan and Partisan Analyses

- The CBO is the Congress's nonpartisan economic/budget analytical arm
- Other agencies include General Accountability Office (GAO) and Congressional Research Service (CRS)
- Mirrors the Executive Branch's Office of Management and Budget (OMB) and Council of Economic Advisers (CEA) in White House
- Always think about who's writing what you read

Did the Stimulus "Work"

- What does "work" mean?
- We'll interpret "work" to mean increase aggregate demand, output, employment
- One has to be careful about over what period one talks about "working"
- Uncertainty pervades all these analyses (real world vs. textbook)

Estimates of the Impact of ARRA

Table 8. Estimates of the Effects of the ARRA on the Level of GDP

	2009:Q2	2009:Q3	2009:Q4	2010:Q1	2010:Q2
	Percent				
CEA: Model Approach	+0.8	+1.7	+2.1	+2.5	+2.7
CEA: Projection Approach	+0.7	+1.4	+2.5	+2.9	+3.2
CBO: Low	+0.9	+1.3	+1.5	+1.7	+1.7
CBO: High	+1.5	+2.7	+3.5	+4.2	+4.6
Goldman Sachs	+0.5	+1.4	+1.9	+2.3	+2.6
IHS/Global Insight	+0.5	+1.2	+1.7	+2.0	+2.2
James Glassman, J.P.Morgan Chase	+1.2	+1.8	+2.6	+3.3	+3.7
Macroeconomic Advisers	+0.5	+1.0	+1.4	+1.7	+2.1
Mark Zandi, Moody's Economy.com	+0.8	+1.6	+2.2	+2.5	+2.7

Sources: See text for details.

Table 9. Estimates of the Effects of the ARRA on the Level of Employment

	2009:Q2	2009:Q3	2009:Q4	2010:Q1	2010:Q2
CEA: Model Approach	+399,000	+1,120,000	+1,747,000	+2,215,000	+2,529,000
CEA: Projection Approach[a]	+336,000	+1,064,000	+1,944,000	+2,840,000	+3,574,000
CBO: Low	+300,000	+700,000	+1,000,000	+1,200,000	+1,400,000
CBO: High	+500,000	+1,300,000	+2,100,000	+2,800,000	+3,400,000
IHS/Global Insight	+228,000	+689,000	+1,245,000	+1,696,000	+2,107,000
Macroeconomic Advisers	+248,000	+623,000	+1,057,000	+1,462,000	+1,847,000
Mark Zandi, Moody's Economy.com	+500,000	+1,008,000	+1,486,000	+1,893,000	+2,249,000

Sources: See text for details.

Note: a. Estimates are for the middle month of the quarter.

Source: CEA, *Fourth Quarterly Report on the Economic Impact of ARRA* (July 14, 2010)

How Did They Estimate This Effect?

- Use the multiplier model we have learned
- Figure out how much tax payments have been reduced, how much transfers have increased
- Figure out how much government spending on goods and services
- Apply multipliers, then add up effects, compare to GDP
- Annualize to get growth rates
- Caveat: Have to account for time dimension (impact takes time)

Quantities (Cumulative)

Table 2. Fiscal Stimulus by Functional Category

	2009:Q1 (March)	2009:Q2 (June)	Through the end of[a] 2009:Q3 (September)	2009:Q4 (December)	2010:Q1 (March)	2010:Q2 (June)
			Billions of Dollars			
Individual Tax Cuts	2.3	28.4	42.1	55.0	96.7	117.0
AMT Relief	0.0	7.0	12.4	15.5	25.7	68.0
Business Tax Incentives	0.1	10.9	20.0	28.0	34.1	38.5
State Fiscal Relief	8.5	28.2	43.8	59.3	75.5	92.1
Aid to Directly Impacted Individuals	0.1	9.8	32.2	56.2	72.8	78.3
Public Investment Outlays	0.0	7.4	24.9	41.5	59.2	86.3
Total[b]	11.0	91.7	175.4	255.6	364.0	480.3
Change in Total (from End of Previous Quarter)	11.0	80.7	83.7	80.2	108.4	116.3

Sources: Agency Financial and Activity Reports to the Office of Management and Budget; simulations from the Department of the Treasury (Office of Tax Analysis) based on the FY2011 Mid-Session Review.

Notes: a. Data on outlays and obligations are for the last day of each calendar quarter.

b. Items may not add to total due to rounding.

Source: CEA, *Fourth Quarterly Report on the Economic Impact of ARRA* (July 14, 2010)
http://www.whitehouse.gov/files/documents/cea_4th_arra_report.pdf

Apply Multipliers

IMPACT MULTIPLIERS (within the quarter)

- Tax cuts: $28.7 bn × 0
- AMT relief: $7.0 bn × 0
- Bus. Tax incentives: $10.9 bn × 0
- State fiscal relief: $28.2 bn × 0.5
- Aid to directly impacted: $9.8 bn × 1
- Govt. investment outlays: $7.4 bn × 1

= (28.7 ×0)+(7.2×0)+(10.9×0)+(28.2×0.5)+(9.8×1)+(7.4×1)

= $31.3 bn

Deflate, calculate q/q impact

- GDP deflator in 2009Q2: 109.671 ≈ <u>110</u>
- $31.3 bn/1.10 = <u>28.45</u> Ch.2005$
- '09Q2 real GDP SAAR: 13363.31-28.45=<u>13334.86</u>
- '09Q2 real GDP: 13334.86/4 = <u>3333.72</u>
- Impact 2009Q2: 28.45/3333.72 = <u>0.00853</u>
- Annualize impact: $(1.00853)^4$ = <u>1.0346</u>
- Impact on growth: (1.0346-1)×100%= <u>3.5 ppts</u>

Comparisons, Complications

- Impact of 3.5 ppts vs. CEA 2.8 ppts.
- Impact vs. dynamic multipliers
- In our math, we assume everything happens with "a period"
- In reality, impact is different from cumulative long run
- In 2009Q3, some of the tax cuts in 2009Q2 will have an impact: how much?

Budget Implications of Fiscal Policy

- What happens if (lump sum) taxes are increased?

- Does the budget surplus increase dollar-for-dollar with tax increases?

- Can the budget balance improve with tax cuts?

A (Lump Sum) Tax Increase

$$BuS \equiv T - G$$

$$T = TA_0 + tY$$

$$BuS = (TA_0 + tY) - GO_0$$

$$\Delta BuS = \Delta TA + t\Delta Y - \Delta GO$$

$$Y_0 = \overline{\alpha}A_0$$

$$\Delta Y = \overline{\alpha}\Delta A$$

Tax Increase (cont'd)

$$A_0 \equiv (a_0 - bTA_0 + IN_0 + GO_0 + g_0)$$

$$\Delta A = (\Delta a - b\Delta TA + \Delta IN + \Delta GO + \Delta g)$$

here

$$\Delta A = -b\Delta TA \Rightarrow \Delta Y = \overline{\alpha}(-b\Delta TA)$$

$$\Delta BuS = \Delta TA + t\Delta Y - \Delta GO$$

$$\Delta BuS = \Delta TA + t(-\overline{\alpha}b\Delta TA)$$

$$\Delta BuS = \Delta TA(1 - \overline{\alpha}bt) \Rightarrow \frac{\Delta BuS}{\Delta TA} = (1 - \overline{\alpha}bt) < 1$$

Balanced Budget Multiplier

- Suppose one needs to keep budget balanced.
- Assume t=0

$$Y_0 = \alpha[a_0 - b(TA_0) + IN_0 + GO_o + g_0]$$

$$\Delta Y = \alpha[\Delta a_0 - b\Delta TA + \Delta IN + \Delta GO + \Delta g]$$

$$\Delta Y = \alpha[-b\Delta TA + \Delta GO] \qquad \Delta TA = \Delta GO$$

$$==> \Delta Y = \alpha[-b\Delta GO + \Delta GO]$$

$$\Delta Y = \alpha[1 - b]\Delta GO$$

$$\Delta Y / \Delta GO = \alpha[1 - b] = 1 \quad \text{for balanced budget multiplier}$$

Full Employment Budget Balance

Budget Balance

$$BuS \equiv T - G$$

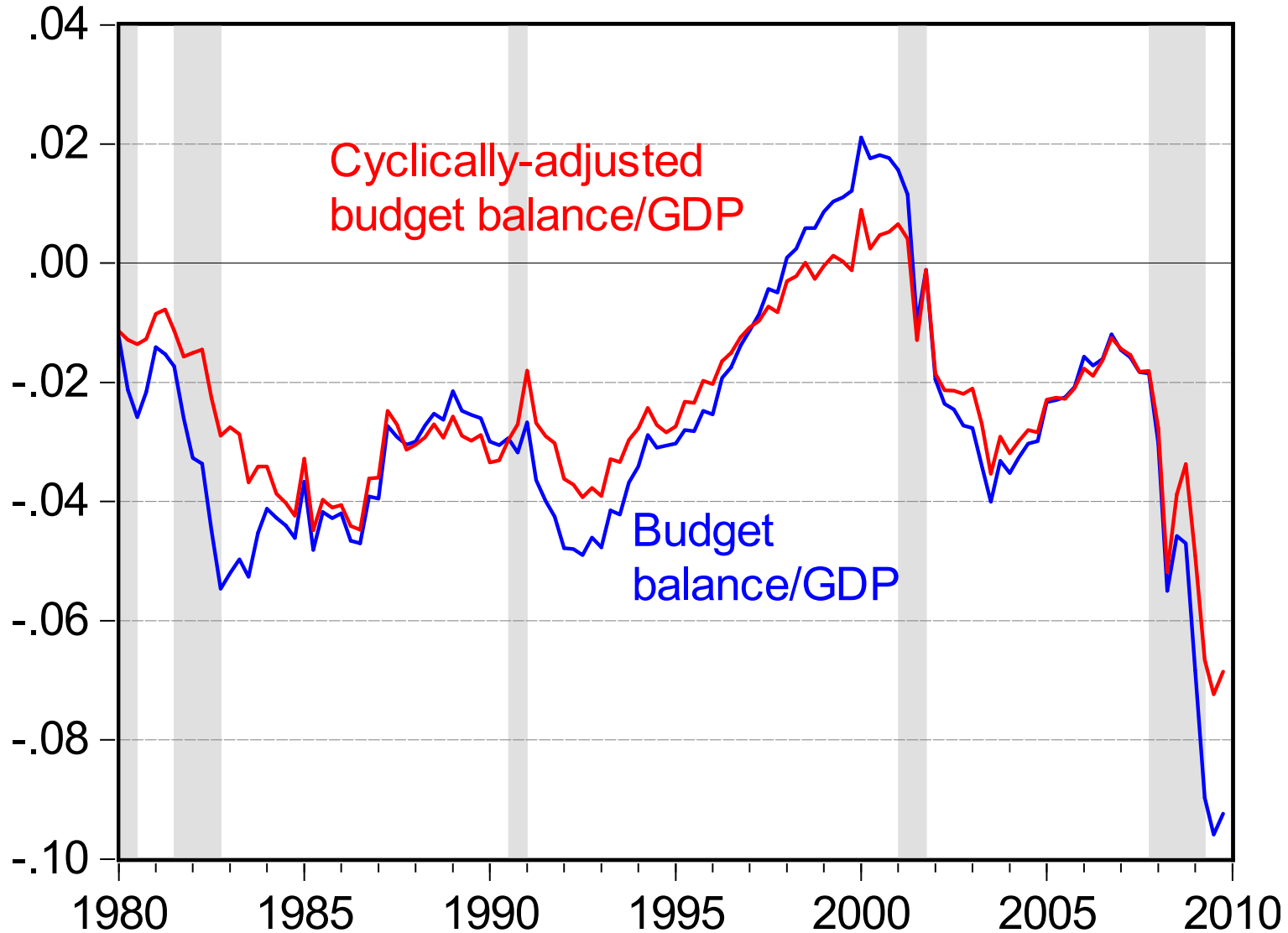$$T = TA_0 + tY$$

$$BuS = (TA_0 + tY) - GO_0$$

Full-Employment Budget Balance

$$BuS* \equiv T* - G$$

$$T* = TA_0 + tY*$$

$$BuS = (TA_0 + tY*) - GO_0$$

Full Employment and Actual BuS

Source: CBO, *The Effects of Automatic Stabilizers on the Federal Budget*, May 2010.