Economics 302
Intermediate Macroeconomic Theory and Policy
(Fall 2010)

Prof. Menzie Chinn
Lecture 5
Wednesday, September 22, 2010
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

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>CEA: Model Approach</td>
<td>+0.8</td>
<td>+1.7</td>
<td>+2.1</td>
<td>+2.5</td>
<td>+2.7</td>
</tr>
<tr>
<td>CEA: Projection Approach</td>
<td>+0.7</td>
<td>+1.4</td>
<td>+2.5</td>
<td>+2.9</td>
<td>+3.2</td>
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<tr>
<td>CBO: Low</td>
<td>+0.9</td>
<td>+1.3</td>
<td>+1.5</td>
<td>+1.7</td>
<td>+1.7</td>
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<tr>
<td>CBO: High</td>
<td>+1.5</td>
<td>+2.7</td>
<td>+3.5</td>
<td>+4.2</td>
<td>+4.6</td>
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<td>Goldman Sachs</td>
<td>+0.5</td>
<td>+1.4</td>
<td>+1.9</td>
<td>+2.3</td>
<td>+2.6</td>
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<tr>
<td>IHS/Global Insight</td>
<td>+0.5</td>
<td>+1.2</td>
<td>+1.7</td>
<td>+2.0</td>
<td>+2.2</td>
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<tr>
<td>James Glassman, J.P. Morgan Chase</td>
<td>+1.2</td>
<td>+1.8</td>
<td>+2.6</td>
<td>+3.3</td>
<td>+3.7</td>
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<tr>
<td>Macroeconomic Advisers</td>
<td>+0.5</td>
<td>+1.0</td>
<td>+1.4</td>
<td>+1.7</td>
<td>+2.1</td>
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<tr>
<td>Mark Zandi, Moody's Economy.com</td>
<td>+0.8</td>
<td>+1.6</td>
<td>+2.2</td>
<td>+2.5</td>
<td>+2.7</td>
</tr>
</tbody>
</table>

Sources: See text for details.

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

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>CEA: Model Approach</td>
<td>+399,000</td>
<td>+1,120,000</td>
<td>+1,747,000</td>
<td>+2,215,000</td>
<td>+2,529,000</td>
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<tr>
<td>CEA: Projection Approach²</td>
<td>+336,000</td>
<td>+1,064,000</td>
<td>+1,944,000</td>
<td>+2,840,000</td>
<td>+3,574,000</td>
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<tr>
<td>CBO: Low</td>
<td>+300,000</td>
<td>+700,000</td>
<td>+1,000,000</td>
<td>+1,200,000</td>
<td>+1,400,000</td>
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<tr>
<td>CBO: High</td>
<td>+500,000</td>
<td>+1,300,000</td>
<td>+2,100,000</td>
<td>+2,800,000</td>
<td>+3,400,000</td>
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<tr>
<td>IHS/Global Insight</td>
<td>+228,000</td>
<td>+689,000</td>
<td>+1,245,000</td>
<td>+1,696,000</td>
<td>+2,107,000</td>
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<tr>
<td>Macroeconomic Advisers</td>
<td>+248,000</td>
<td>+623,000</td>
<td>+1,057,000</td>
<td>+1,462,000</td>
<td>+1,847,000</td>
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<td>Mark Zandi, Moody's Economy.com</td>
<td>+500,000</td>
<td>+1,008,000</td>
<td>+1,486,000</td>
<td>+1,893,000</td>
<td>+2,249,000</td>
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</tbody>
</table>

Sources: See text for details.

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

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

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

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.

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: $109.671 \approx 110$
- $31.3 \text{ bn}/1.10 = 28.45 \text{ Ch.2005}$
- ‘09Q2 real GDP SAAR: $13363.31 - 28.45 = 13334.86$
- ‘09Q2 real GDP: $13334.86/4 = 3333.72$
- Impact 2009Q2: $28.45/3333.72 = 0.00853$
- Annualize impact: $(1.00853)^4 = 1.0346$
- Impact on growth: $(1.0346 - 1) \times 100\% = 3.5 \text{ ppts}$
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

\[ BuS \equiv T - G \]
\[ T = TA_0 + tY \]
\[ BuS = (TA_0 + tY) - GO_0 \]
\[ \Delta BuS = \Delta TA + t\Delta Y - \Delta GO \]
\[ Y_0 = \bar{\alpha}A_0 \]
\[ \Delta Y = \bar{\alpha}\Delta A \]
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
\[ \Delta A = -b\Delta TA \Rightarrow \Delta Y = \bar{\alpha} (-b\Delta TA) \]
\[ \Delta BuS = \Delta TA + t\Delta Y - \Delta GO \]
\[ \Delta BuS = \Delta TA + t(-\bar{\alpha}b\Delta TA) \]

\[ \Delta BuS = \Delta TA(1 - \bar{\alpha}bt) \Rightarrow \frac{\Delta BuS}{\Delta TA} = (1 - \bar{\alpha}bt) < 1 \]
Balanced Budget Multiplier

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

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

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

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

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

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

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

Cyclically-adjusted budget balance/GDP

Budget balance/GDP