Countercyclical Fiscal Policy

- Complicating the basic IS-LM model
- Analyzing the ARRA, using our tools
- CEA, CBO estimates
- Interpreting the multiplier debate in AD-AS
Solving for Multipliers, in general

\[ Y_0 = \hat{\gamma} \left[ \Lambda_0 + \frac{b_2}{h} \left( \frac{M_0}{P} \right) - \frac{b_2 \mu_0}{h} \right] \]

\[ \Delta Y = \hat{\gamma} \left[ \Delta \Lambda + \frac{b_2}{h} \Delta \left( \frac{M}{P} \right) - \frac{b_2}{h} \Delta \mu \right] \]

**For Fiscal Policy**

\[ \Delta Y = \hat{\gamma} \Delta GO \Rightarrow \frac{\Delta Y}{\Delta GO} = \hat{\gamma} \]

If it is lump sum taxes:

\[ \Delta Y = -\hat{\gamma} c_1 \Delta t_0 \Rightarrow \frac{\Delta Y}{\Delta t_0} = -\hat{\gamma} c_1 \]
The “Multiplier”

\[
\hat{\gamma} \equiv \frac{1}{1 - c_1 (1 - t_1) - b_1 + \frac{b_2}{h}}
\]

- This could fall during financial distress
- Interest semi-elasticity, goes to infinity in liquidity trap
Endogenous Monetary Supply

Suppose money supply is increased with the interest rate.

\[
\frac{M^s}{P} = \omega_0 + \theta i
\]

Then:

\[
\hat{\gamma}' \equiv \frac{1}{1 - c_1(1-t_1) - b_1 + \frac{b_2}{h + \theta}}
\]

As \( \theta \) goes to infinity, then multiplier goes to \( \gamma \)
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>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</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>
<td>+2.7</td>
</tr>
<tr>
<td>CEA: Projection Approach</td>
<td>+0.7</td>
<td>+1.1</td>
<td>+2.1</td>
<td>+2.7</td>
<td>+2.7</td>
<td>+2.7</td>
</tr>
<tr>
<td>CBO: Low</td>
<td>+0.8</td>
<td>+1.2</td>
<td>+1.4</td>
<td>+1.7</td>
<td>+1.7</td>
<td>+1.5</td>
</tr>
<tr>
<td>CBO: High</td>
<td>+1.3</td>
<td>+2.4</td>
<td>+3.3</td>
<td>+4.1</td>
<td>+4.5</td>
<td>+4.2</td>
</tr>
<tr>
<td>Goldman Sachs</td>
<td>+0.5</td>
<td>+1.4</td>
<td>+1.9</td>
<td>+2.3</td>
<td>+2.6</td>
<td>+2.4</td>
</tr>
<tr>
<td>IHS/Global Insight</td>
<td>+0.5</td>
<td>+1.7</td>
<td>+2.0</td>
<td>+2.2</td>
<td>+2.2</td>
<td>+2.3</td>
</tr>
<tr>
<td>James Glassman, J.P. Morgan Chase</td>
<td>+1.3</td>
<td>+1.8</td>
<td>+2.6</td>
<td>+3.2</td>
<td>+3.7</td>
<td>+3.5</td>
</tr>
<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>
<td>+2.1</td>
</tr>
<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>
<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>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CEA: Model Approach</td>
<td>+399,000</td>
<td>+1,200,000</td>
<td>+1,747,000</td>
<td>+2,223,000</td>
<td>+2,547,000</td>
<td>+2,673,000</td>
</tr>
<tr>
<td>CEA: Projection Approach</td>
<td>+318,000</td>
<td>+1,010,000</td>
<td>+1,844,000</td>
<td>+2,701,000</td>
<td>+3,376,000</td>
<td>+3,668,000</td>
</tr>
<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>
<td>+1,400,000</td>
</tr>
<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>
<td>+3,700,000</td>
</tr>
<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>
<td>+2,342,000</td>
</tr>
<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>
<td>+2,119,000</td>
</tr>
<tr>
<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>
<td>+2,522,000</td>
</tr>
</tbody>
</table>

*Sources: See text for details.*

*Notes:* a. Estimates are for the middle month of the quarter.

http://www.whitehouse.gov/sites/default/files/cea_5th_arra_report.pdf
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>Through the end of³</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2009:Q1 (March)</td>
</tr>
<tr>
<td>Billions of Dollars</td>
<td>(In billions of dollars)</td>
</tr>
<tr>
<td>Individual Tax Cuts</td>
<td>2.3</td>
</tr>
<tr>
<td>AMT Relief</td>
<td>0.0</td>
</tr>
<tr>
<td>Business Tax Incentives</td>
<td>0.1</td>
</tr>
<tr>
<td>State Fiscal Relief</td>
<td>8.5</td>
</tr>
<tr>
<td>Aid to Directly Impacted Individuals</td>
<td>0.1</td>
</tr>
<tr>
<td>Public Investment Outlays</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Total³</strong></td>
<td><strong>11.0</strong></td>
</tr>
<tr>
<td><strong>Change in Total (from End of Previous Quarter)</strong></td>
<td><strong>11.0</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.

http://www.whitehouse.gov/sites/default/files/cea_5th_arra_report.pdf
Apply Multipliers (for ‘09Q2)

IMPACT MULTIPLIERS (within the quarter)

• Tax cuts: $28.4 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

= (28.4 ×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: 109.555 ≈ 110
• $31.3 bn/1.10 = 28.57 Ch.2005$
• ‘09Q2 real GDP SAAR: 12810.45-28.57=12781.88
• ‘09Q2 real GDP: 12781.88/4 = 3195.47
• Impact 2009Q2: 28.57/3195.47 = 0.00894
• Annualize impact: (1.00894)^4 = 1.0362
• Impact on growth: (1.0362-1)×100%= 3.6 ppts
  (q/q, annualized)
Comparisons, Complications

• Impact of 3.6 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?
ARRA and What Could Have Been

CEA, The Economic Impact of the American Recovery and Reinvestment Act Five Years Later (Feb. 2014)
ARRA and Other Fiscal

Figure 7

Source: Bureau of Economic Analysis, National Income and Product Accounts; Congressional Budget Office; CEA calculations.

CEA, The Economic Impact of the American Recovery and Reinvestment Act Five Years Later (Feb. 2014)
Keynesian vs. New Classical

Graph showing the relationship between price (p) and output (y), with AS<sub>New Classical</sub> and Linear AS<sub>SR</sub> curves. The diagram illustrates the difference between Keynesian and New Classical economic theories.
Kinked AS

$p$

$\text{AS}_{LR}$

Nonlinear $\text{AS}_{SR}$

Linear $\text{AS}_{SR}$

$AD$

$y$

$y^{FE}$