Economics 302
Intermediate Macroeconomic Theory and Policy
(Fall 2010)

Instructor: Prof. Menzie Chinn
Lecture 4
Monday, September 20, 2010
Outline

• Overview/Recap
• Definitions
• Multipliers
• What about taxes, transfers?
• Imports, Exports
Overview

• We want to build up a general model where supply and demand determine output, and (over time) price level.

• To begin with, we simplify by:
  - Holding the price level constant (so demand completely determines output)
  - Ignore the financial side of the economy
FIGURE 7.1 The Aggregate Demand (AD) Curve
FIGURE 7.2 Output Declines When AD Shifts Inward

After the AD shift, the price level is the same but output is lower.

The initial point, in equilibrium.
FIGURE 7.3 A Price Shock
### Recap: the Keynesian Model

<table>
<thead>
<tr>
<th>Eq. No.</th>
<th>Equation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>$Y = AD$</td>
<td>Output equals aggregate demand, an equilibrium condition</td>
</tr>
<tr>
<td>(2)</td>
<td>$AD = C + I + G + X$</td>
<td>Definition of aggregate demand</td>
</tr>
<tr>
<td>(3)</td>
<td>$C = a_o + bY_d$</td>
<td>Consumption function, $b$ is the mpc</td>
</tr>
<tr>
<td>(4)</td>
<td>$Y_d \equiv Y - T$</td>
<td>Definition of disposable income</td>
</tr>
<tr>
<td>(5)</td>
<td>$T = TA_0 + tY$</td>
<td>Tax function; $TA_0$ is lump sum taxes, $t$ is marginal tax rate.</td>
</tr>
<tr>
<td>(6)</td>
<td>$I = IN_0$</td>
<td>Investment function, exogenous</td>
</tr>
<tr>
<td>(7)</td>
<td>$G = GO_0$</td>
<td>Government spending on goods and services, exogenous</td>
</tr>
<tr>
<td>(8)</td>
<td>$X = g_0$</td>
<td>Net Exports, exogenous</td>
</tr>
</tbody>
</table>
Definitions

- **Parameters**: relate the behavior of two variables
- **Endogenous variables**: variables determined within the system of equations
- **Exogenous variables**: variables determined outside the system of equations
- **Autonomous spending**: $a_0, \ IN_0, \ GO_0, \ g_0$
Fiscal Policy (Lump Sum Tax Cut)

\[ AD = b(1-t)Y + A_1 \]

\[ AD = b(1-t)Y \backslash A_0 \]

\[ \Delta Y = -\bar{\alpha}b\Delta TA \]
Multipliers

\[ Y_0 = \overline{\alpha} [a_0 - bTA_0 + IN_0 + GO_0 + g_0] \]
\[ \Delta Y = \overline{\alpha} [\Delta a - b\Delta TA + \Delta IN + \Delta GO + \Delta g] \]
\[ \Delta Y = \overline{\alpha} \Delta GO \]
\[ \Delta Y = \overline{\alpha} (-b\Delta TA) \]

\[ \Rightarrow \frac{\Delta Y}{\Delta GO} = \overline{\alpha} \]
\[ \Rightarrow \frac{\Delta Y}{\Delta TA} = -\overline{\alpha}b \]
Multipliers (II)

\[ \Delta Y = \bar{\alpha} \frac{\partial A}{\partial t} \Delta t + \frac{\partial \bar{\alpha}}{\partial t} [A_0] \Delta t \]

\[ \frac{\partial \bar{\alpha}}{\partial t} = (-1) \times \left( \frac{1}{1 - b(1-t) + m} \right)^2 \times (b) \]

\[ \Delta Y = \frac{\partial \bar{\alpha}}{\partial t} [A_0] \Delta t = -b(\bar{\alpha}^2) [A_0] \Delta t \]

\[ \frac{\Delta Y}{\Delta t} = -b(\bar{\alpha}^2) [A_0] \]
Fiscal Policy, Tax Rate Cut

\[ AD = b(1-t')Y + A_0 \]

\[ AD = b(1-t)Y + A_0 \]

\[ \Delta Y = -b(\bar{c}^2)[A_0]\Delta t \]

(correction 9/15)
Fiscal Bang for the Buck
*One-year $ change in real GDP per $ reduction in federal tax revenue or increase in spending*

<table>
<thead>
<tr>
<th>Tax Cuts</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonrefundable Lump-Sum Tax Rebate</td>
<td>1.02</td>
</tr>
<tr>
<td>Refundable Lump-Sum Tax Rebate</td>
<td>1.26</td>
</tr>
<tr>
<td>Temporary Tax Cuts</td>
<td></td>
</tr>
<tr>
<td>Payroll Tax Holiday</td>
<td>1.29</td>
</tr>
<tr>
<td>Across the Board Tax Cut</td>
<td>1.03</td>
</tr>
<tr>
<td>Accelerated Depreciation</td>
<td>0.27</td>
</tr>
<tr>
<td>Permanent Tax Cuts</td>
<td></td>
</tr>
<tr>
<td>Extend Alternative Minimum Tax Patch</td>
<td>0.48</td>
</tr>
<tr>
<td>Make Bush Income Tax Cuts Permanent</td>
<td>0.29</td>
</tr>
<tr>
<td>Make Dividend and Capital Gains Tax Cuts Permanent</td>
<td>0.37</td>
</tr>
<tr>
<td>Cut Corporate Tax Rate</td>
<td>0.30</td>
</tr>
<tr>
<td>Spending Increases</td>
<td></td>
</tr>
<tr>
<td>Extend Unemployment Insurance Benefits</td>
<td>1.64</td>
</tr>
<tr>
<td>Temporarily Increase Food Stamps</td>
<td>1.73</td>
</tr>
<tr>
<td>Issue General Aid to State Governments</td>
<td>1.36</td>
</tr>
<tr>
<td>Increase Infrastructure Spending</td>
<td>1.59</td>
</tr>
</tbody>
</table>

*Source: Moody's Economy.com*
Import Function

- A more realistic net exports function – imports?

\[ X = g_0 - mY \]
Export Function?

Source: BEA, 10Q2 GDP 2nd release; Federal Reserve Board; *Economist*
Parameter Estimates for the Multiplier

\[ b(1-t) = 0.73 \]

\[ m = 0.23 \]

\[
\alpha \equiv \left( \frac{1}{1 - b(1-t) + m} \right)
\]

\[
\alpha = \left( \frac{1}{1 - 0.73 + 0.23} \right) = 2
\]