Economics 302 (Sec. 001)
Intermediate Macroeconomic Theory and Policy (Spring 2012)
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Outline

• Deriving the IS, LM
• Multipliers and policy efficacy
• Graphical depiction of policy efficacy
5-1 Deriving the IS Relation

Deriving the IS Curve

Figure 5 - 2

*The Derivation of the IS Curve*

An increase in the interest rate decreases the demand for goods at any level of output, leading to a decrease in the equilibrium level of output.
5-2 Deriving the $LM$ Relation

Deriving the $LM$ Curve

An increase in income leads, at a given interest rate, to an increase in the demand for money. Given the money supply, this increase in the demand for money leads to an increase in the equilibrium interest rate.

The Derivation of the $LM$ Curve

![Diagram showing the derivation of the LM curve]
Multipliers and Policy Efficacy

A “multiplier” is a parameter which summarizes the change in one variable for a one unit change in another (typically exogenous) variable. As the model changes, the “multiplier” for fiscal policy changes.

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

Note further that

\[
\frac{1}{1 - c_1(1-t_1) - b_1 + \frac{b_2}{h}} \equiv \hat{\gamma} \leq \bar{\gamma} \equiv \frac{1}{1 - c_1(1-t_1)} \quad \text{if } b_1 = 0
\]
Solving for Multipliers, in general

\begin{align*}
(21) \quad Y_0 &= \hat{\gamma} \left[ \Lambda_0 + \frac{b_2}{h} \left( \frac{M_0}{P} \right) - \frac{b_2 \mu_0}{h} \right] \\
(22) \quad \Delta Y &= \hat{\gamma} \left[ \Delta \Lambda + \frac{b_2}{h} \Delta \left( \frac{M}{P} \right) - \frac{b_2}{h} \Delta \mu \right] \\
\end{align*}

For Fiscal Policy

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

If it is lump sum taxes:

\[ \Delta Y = -\hat{\gamma}c_1 \Delta t_0 \Rightarrow \frac{\Delta Y}{\Delta t_0} = -\hat{\gamma}c_1 \]
Monetary Policy

If monetary policy is being used, the $\Delta \Lambda = 0$, so:

$$\Delta Y = \hat{\gamma} \frac{b_2}{h} \Delta \left( \frac{M}{P} \right) \Rightarrow \frac{\Delta Y}{\Delta (M / P)} = \hat{\gamma} \frac{b_2}{h}$$

- Notice this is a new “multiplier”: the change in real GDP for a one unit change in the price-deflated money stock (or “real money stock” for short).
- Critical to understand how monetary policy works.
Fiscal (LM steep vs. flat)

Slope

\[ \gamma = \frac{1}{h} \]

\[ \hat{\gamma} = \frac{1}{1 - c_1 (1 - t_1) - b_1 + \frac{b_2}{h}} \]
Fiscal (IS steep vs. flat)

\[ \text{slope} = -\left( \frac{1 - c_1(1-t_1) - b_1}{b_2} \right) \]

\[
\hat{\gamma} \equiv \frac{1}{1 - c_1(1-t_1) - b_1 + \frac{b_2}{h}}
\]
Monetary (LM flat vs. steep)

Slope

\[ \frac{\Delta Y}{\Delta (M/P)} = \hat{\gamma} \frac{b_2}{h} \]

\[ \hat{\gamma} \equiv \frac{1}{1 - c_1(1-t_1) - b_1 + \frac{b_2}{h}} \]
Monetary (IS steep vs. flat)

\[ \text{slope} = \frac{1 - c_1(1 - t_1) - b_1}{b_2} \]

\[ \frac{\Delta Y}{\Delta (M / P)} = \hat{\gamma} \frac{b_2}{h} \]

\[ \hat{\gamma} = \frac{1}{1 - c_1(1 - t_1) - b_1 + \frac{b_2}{h}} \]
The Zero Interest Bound

Ten year constant maturity

Fed Funds

3 month Treasury

Year
Monetary Policy in a Liquidity Trap

$\Lambda_0/d$

$i$

$i_0=0$

$Y_0$

LM$|M_0, P_0, \mu_0$

LM$|M_1, P_0, \mu_0$
Fiscal Policy in a Liquidity Trap