LECTURE 8
Review of Open Economy IS-MP and the AD-IAA Framework

February 14, 2013
Announcements

• Hand in Problem Set 1.

• Suggested Answers will be posted on Monday.
I. OVERVIEW OF WHERE WE ARE HEADED
IS-LM Useful for the Great Depression

• Key story of the Depression is a collapse in aggregate demand.

• IS-LM useful for understanding the sources of the decline in demand.

• International factors present, but not essential.

• Likewise, inflation adjustment present, but swamped by the collapse in demand.
Need a Richer Model for the Postwar Era

• Useful to incorporate international trade and flexible exchange rates.

• Need a framework that includes inflation adjustment.
II. **Open-Economy IS-MP with Flexible Exchange Rates**
Preliminaries

- Working with IS-MP because we are focusing on the postwar period.
  - Fed has been targeting interest rates for most of this period, so MP is appropriate.
- Only doing the case of flexible exchange rates.
Real Exchange Rate ($\varepsilon$)

- Nominal exchange rate adjusted for differences in prices between countries.
- Number of units of foreign goods we can obtain by buying one less unit of domestic goods.
- For $\varepsilon$ between the dollar and some foreign currency, a rise is a real **appreciation** of the dollar.
Planned Expenditures

- $E = C(Y-T) + I(r) + G + NX$
- $NX$ (Net Exports) is Exports - Imports
- Proximate determinant of net exports is the real exchange rate: $NX = NX(\varepsilon)$
- Relationship is negative: A rise in $\varepsilon$ lowers $NX$. 
Key Relationship between NX and CF

• Supply of dollars to foreign currency market must equal the demand for dollars

• Supply of Dollars: Imports (M) + Capital Outflows (CO)

• Demand for Dollars: Exports (X) + Capital Inflows (CI)

• $M + CO = X + CI$

• $CO − CI = X − M$

• Net Capital Outflow (CF) = Net Exports (NX)
What Determines CF?

- The real interest rate in US.
- \( CF = CF(r) \)
- Relationship is negative.
- A higher \( r \) in U.S. reduces CF.
A Helpful Substitution

• \( E = C(Y-T) + I(r) + G + NX(\varepsilon) \)

• Since \( CF(r) = NX(\varepsilon) \), we can write instead:

\[
E = C(Y-T) + I(r) + G + CF(r)
\]

• Now two pieces of planned expenditures depend negatively on \( r \).
A Rise in the Interest Rate in the Closed-Economy Keynesian Cross

\[ E = Y \]

\[ E = C(Y - T) + I(r_0) + G \]

\[ E = C(Y - T) + I(r_1) + G \]

E shifts down for only one reason: \( I = I(r) \).

\( r_1 > r_0 \)
Closed-Economy vs. Open-Economy IS
A Rise in the Interest Rate in the Open-Economy Keynesian Cross

\[ E = Y \]
\[ E = C(Y-T) + I(r_0) + G + CF(r_0) \]
\[ E = C(Y-T) + I(r_1) + G + CF(r_1) \]

\[ r_1 > r_0 \]

E shifts down for two reasons: \( I = I(r) \) and \( CF = CF(r) \).
Open-economy IS is flatter because spending is more sensitive to $r$. 
Monetary policy changes have more impact in an open economy.
What happens to the real exchange rate?

• r fell, so CF(r) rises.
• CF=NX, so NX must rise as well.
• What makes NX rise? The real exchange rate falls.
• The dollar depreciates.
III. AGGREGATE DEMAND
Where we are headed: AD-IA

\[ \pi_0 \]

\[ Y_0 \]
Impact of Inflation in IS-MP

• No impact on IS curve

• MP curve shows Fed’s policy rule for the real interest rate.

• \( r = r(Y, \pi) \), where \( \pi \) is inflation.

• Since we draw \( r = r(Y) \), a change in \( \pi \) will shift the MP curve.
π is a shift variable for the MP Curve in (Y, r) space

\[ \pi_1 > \pi_0 \]
Derivation of the Aggregate Demand (AD) Curve

\[ MP_1 (\pi_1) \]
\[ MP_0 (\pi_0) \]

\[ Y_1 Y_0 \]

\[ \pi \]

\[ \pi_1 \]

\[ \pi_0 \]

\[ Y_1 Y_0 \]
What shifts the AD curve?

• Anything other than inflation that shifts the IS or MP curves.

• A change in government spending (G) or taxes (T).

• Change in animal spirits.

• A change in Federal Reserve tastes.
IV. INFLATION ADJUSTMENT
Key Assumptions about Inflation Behavior

• At a point in time, inflation is given.
• When $Y > \bar{Y}$, inflation gradually rises.
• When $Y < \bar{Y}$, inflation gradually falls.
• When $Y = \bar{Y}$, inflation is constant.

• $\bar{Y}$ is normal or potential output – the level of output that prevails when prices are fully flexible.
Inflation gradually rises when output is above potential.
Inflation gradually falls when output is below potential.
Inflation is relatively constant when output is at potential.
Inflation has fallen less in the current severe recession than in previous recessions.
Two important points

• Inflation does not respond immediately to deviations of output from potential.

• We are talking about inflation, not prices. Output below potential causes the rate of inflation to fall from one positive number to a smaller positive number.
Inflation Adjustment Curve (IA)
Short-Run Equilibrium

\[ \pi \]

\[ \pi_0 \]

\[ \text{AD}_0 \]

\[ \text{IA}_0 \]

\[ Y_0 \]
AD/IA Intersect at $\bar{Y}$
Long-Run Equilibrium
AD/IA Intersect below $\bar{Y}$

IA will shift down.
AD/IA Intersect above $\bar{Y}$
IA will shift up.
Long-Run Equilibrium $r$

Graph:
- $r$ axis
- $r_{LR}$
- $IS$ line
- $Y$ axis
- $Y_{LR}$
- $\pi$ axis
- $\pi_{LR}$
- $IA$ line
- $Y$ axis
- $Y_{LR}$
V. Example: A Decrease in Government Purchases
A Decrease in G

The graph illustrates the effects of a decrease in government spending (G) on the economy. The top graph shows the relationship between the real interest rate (r) and income (Y), with the IS and MP curves indicating the equilibrium point at Y_1 \bar{Y}.

The bottom graph shows the relationship between the expected inflation rate (\pi) and income (Y), with the IA and AD curves indicating the equilibrium point at Y_1 \bar{Y}.

Key points:
- MP_0 and MP_{LR} are the short-run and long-run marginal product curves, respectively.
- IS_0 and IS_1 are the short-run and long-run income (Y) curves, respectively.
- AD_0 and AD_1 are the short-run and long-run aggregate demand curves, respectively.
- \pi_0 and \pi_{LR} are the expected inflation rates in the short-run and long-run, respectively.
- \pi_0 is constant in the short-run.
- \pi_{LR} is constant in the long-run.
Impact of a Decrease in G

- Reduces output in the short run.
- Causes inflation to gradually fall because output is below potential.
- Leads Fed to shift the MP curve.
- Output returns to $\bar{Y}$.
- $r$ is lower in the long run.
What happens to the real exchange rate ($\epsilon$)?

- $r$ is lower in the long run.
- Lower $r$ means that net capital outflow ($CF$) will increase.
- $CF = NX$, so $NX$ must rise as well.
- What causes $NX$ to rise? $\epsilon$ must fall.
- A fall in $G$ leads the dollar to depreciate.