LECTURE 18
Expanding the IS-MP Framework to Include Financial Crises

April 2, 2013
Announcement

- Problem Set 3 is being distributed. It is due a week from today.
I. EXTENDING THE IS-MP MODEL
Assumptions (I)

• 2 real interest rates:
  • The saving real interest rate, $r_s$.
  • The borrowing real interest rate, $r^b$.

• The central bank’s interest rate rule is for the saving interest rate: $r_s = r_s(Y, \pi)$.

• The demand for goods depends on the borrowing interest rate: $E = C(Y - T) + I(r^b) + G$. 
Assumptions (II)

- The interest rate differential, \( r^b - r^s \), is a decreasing function of output:

  \[ r^b - r^s = d(Y) \]. When \( Y \) rises, the differential falls.

- A financial market disruption shifts the \( d(Y) \) function up: the differential at a given \( Y \) is higher than before.
Assumptions (III)

The rest of the model is the same as before:

• \(C(Y - T)\): When \(Y - T\) rises, consumption rises, but by less than the increase in \(Y - T\).

• \(I(r^b)\): When \(r^b\) rises, desired investment falls.

• \(G\) and \(T\) are exogenous.

• Inflation adjustment: Inflation rises when \(Y > \bar{Y}\), falls when \(Y < \bar{Y}\), and holds steady when \(Y = \bar{Y}\).
The Effect of Introducing an Interest Rate Differential on the MP Curve? None
The Keynesian Cross without an Interest Rate Differential (so $r^b = r^s$)

$$E = Y$$

$$E = C(Y - T) + I(r^s) + G$$

45°
We want to find planned expenditure for a given $r^s$.

- $E = C(Y - T) + I(r^b) + G$
- $r^b = r^s + (r^b - r^s)$
- $r^b - r^s = d(Y)$
- So: $E = C(Y - T) + I(r^s + d(Y)) + G$
The Keynesian Cross with an Interest Rate Differential: 

\[ E = C(Y - T) + I(r^s + d(Y)) + G \]

Planned exp. line with no differential: 
\[ E = C(Y - T) + I(r^s) + G \]

Planned exp. line with diff.: 
\[ E = C(Y - T) + I(r^s + d(Y)) + G \]
The Effect of Introducing an Interest Rate Differential on the Planned Expenditure Line (II)

- $E = C(Y - T) + I(r^s + d(Y)) + G$

Thus introducing an interest rate differential:

- Shifts the planned expenditure line (for a given $r^s$) down.
- Makes the planned expenditure line steeper.
The Effect of a Fall in the Saving Int. Rate with and without an Int. Rate Differential

\[ E = Y \]

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

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

\[ r_1^s < r_0^s \]
The IS Curve with an Int. Rate Differential

$r^s$ vs. $Y$

IS (interest rate differential)

IS (no interest rate differential)
Another Way of Finding How an Interest Rate Differential Affects the IS Curve

Step 1: Another Interpretation of the Conventional IS Curve

- Recall: \( Y = C(Y - T) + I(r) + G \)
- Rewrite as \( Y - C(Y - T) - G = I(r) \)
- \( \Rightarrow [(Y - T) - C(Y - T)] + [T - G] = I(r) \)
- This is: Private saving + public saving = investment
- Or: Saving = Investment
- So: The IS curve shows, as a function of \( Y \), the \( r \) that causes saving to equal investment.
Another Interpretation of the Conventional IS Curve – Graphical Version

As $Y$ rises, the $r$ such that $S = I$ falls: the IS curve slopes down.

$Y_1 > Y_0$
Another Way of Finding How an Interest Rate Differential Affects the IS Curve

Step 2: Introducing the Interest Rate Differential

• Write \( r^s \) as: \( r^s = r^b - (r^b - r^s) \).
• Thus, \( r^s = r^b - d(Y) \).
• So: The \( r^s \) that causes saving to equal investment equals the \( r^b \) that causes saving to equal investment minus \( d(Y) \).
Step 2 – Graphical Version

This is just another way of seeing how the interest rate differential affects the IS curve.
Deriving the AD Curve with an Interest Rate Differential

- IS (no differential)
- IS (with differential)

Graph showing the relationship between interest rate differential and output (Y).

Axes:
- $r^s$ (interest rate)
- Y (output)

Lines:
- MP$_0$
- MP$_1$

Points:
- IS (with differential)
- IS (no differential)
The AD Curve with an Int. Rate Differential

\[
\begin{align*}
\pi & \quad \text{Y} \\
& \quad \text{IA} \\
& \quad \text{AD (with differential)} \\
& \quad \text{AD (no differential)}
\end{align*}
\]
II. APPLICATIONS
The Effects of a Rise in Consumer Confidence

The rise in output is larger than it would be without an int. rate differential.
The “Financial Accelerator”

• Financial market imperfections magnify the effects of shocks.

• When output is higher:
  • Financial intermediaries are more profitable, and so can borrow at lower interest rates.
  • Consumers and firms are in better financial shape, and so can borrow at lower interest rates.

• So : Output rises $\rightarrow$ interest rate differentials fall $\rightarrow$ borrowing to finance spending rises $\rightarrow$ output rises further $\rightarrow$ ...

• A better name might be “financial amplifier.”
The Effects of a Financial Market Disruption
(The d(Y) function shifts up, so that r^b-r^s at a given Y is higher than before)

\[ E = Y \]

\[ E = C(Y - T) + I(r^s + d^0(Y)) + G \]

\[ E = C(Y - T) + I(r^s + d^1(Y)) + G \]
The Effects of a Financial Market Disruption (cont.)

The graph illustrates the effects of a financial market disruption on the economy. The IS curve shifts from $IS_0$ to $IS_1$, indicating a change in the equilibrium income. The money market curve $MP_0$ remains unchanged. The new equilibrium income is $Y_1$.
Figure 5
The Federal Funds Rate Target and Some Interest-rate Spreads

- FF target
- 10-year term premium
- Baa-Treasury spread
- LIBOR-OIS spread

Percentage points

2003  2004  2005  2006  2007  2008  2009  2010
The BAA bond rate was unchanged as the Fed was raising the funds rate in 2004–06.
Figure 5
The Federal Funds Rate Target and Some Interest-rate Spreads

- FF target
- 10-year term premium
- Baa-Treasury spread
- LIBOR-OIS spread

Percentage points

2003 2004 2005 2006 2007 2008 2009 2010
The BAA bond rate rose as the Fed was cutting the federal funds rate in 2007–08.
Implications for Monetary Policy

• Monetary policy should account for interest rate differentials: $r^s = r^s(Y, \pi, r^b - r^s)$, with $r^s$ lower when $r^b - r^s$ is higher.

• If credit market disruptions are causing high differentials, the central bank may be able to improve welfare by direct credit market interventions.