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Housekeeping

• The reading for next time ("A Non-Technical Introduction to Regressions") is in the main course reader, after the "Short-Run Fluctuations" material.

• Reminder: The final exam is Monday, May 7, 3–6 P.M.
I. THE IS–LM/MP MODEL
The IS–LM/MP Model: Where We Are Headed

Y is output; r is the real interest rate ($\equiv i - \pi^e$)
What Have You Seen in Previous Courses?

• IS plus an interest rate rule for monetary policy (IS–MP)?

• IS plus a curve describing equilibrium in the money market under the assumption that the central bank is targeting the money supply (IS–LM)?

• Both?

• Neither or don’t know?
A Key Assumption

• The starting point of the IS–LM/MP model: prices and wages are not completely flexible.
• In today’s lecture, a stronger assumption: the price level and expected inflation are exogenous.
• A general comment about models and assumptions:
The Equations of the IS Curve #1: Planned Expenditure and Output

E is planned expenditure, Y is output.
The Equations of the IS Curve #2: Modeling Planned Expenditure

- $T$ is taxes (net of transfers)
- $G$ is government purchases
- $C(Y - T)$ is a function giving consumption as a function of disposable income.
- $I(r)$ is a function giving desired investment as a function of the real interest rate.
Assumptions about Planned Expenditure

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

- T is exogenous: \( T = \bar{T} \).
- G is exogenous: \( G = \bar{G} \).
- \( C(Y - T) \): When \( Y - T \) rises, consumption rises, but by less than the increase in \( Y - T \).
- \( I(r) \): When \( r \) rises, desired investment falls.
The Keynesian Cross
The Effects of a Rise in the Interest Rate in the Keynesian Cross

\[ E = Y = C(Y - T) + I(r_0) + G \]
The IS Curve
One Approach to the Other Curve: An Interest Rate Rule and the MP Curve
An Interest Rate Rule

- When $Y$ rises, the central bank raises $r$.
- When $\pi$ rises, the central bank raises $r$.

So:

$$r = r(Y, \pi)$$

The real interest rate the central bank targets is an increasing function of both $Y$ and $\pi$. 
The MP Curve and the IS–MP Diagram
But How is the Central Bank Able to Control the Real Interest Rate?

By adjusting the money supply

• Unless all prices are completely and instantaneously flexible, an increase in the money supply lowers the real interest rate, and a decrease in the money supply raises the real interest rate.

• The central bank can change the money supply.

• Therefore, the central bank, by changing the money supply, can raise \( r \) when \( Y \) rises or \( \pi \) rises, and can lower \( r \) when \( Y \) falls or \( \pi \) falls.
The Other Approach to the Other Curve: The Money Market and the LM Curve
The Concept of Money We Will Focus On

High-powered money

- Controlled directly by the central bank.
- Pays no nominal interest (usually), so the opportunity cost of holding it is the nominal interest rate.
The Supply and Demand for Money

• Money supply:

• Demand for “real” money balances (M/P):
The Interest Rate for a Given Level of Output: The Money Market

\[ \frac{M}{P} = L(i, Y) \]
The Effects of a Rise in Output in the Money Market Diagram

Recall: $i = r + \pi^e$
The LM Curve and the IS–LM Diagram
MP or LM?

• Where the two models differ is in what they assume about how monetary policy is conducted.

• Thus, in deciding whether to use MP or LM, the key consideration is how monetary policy is conducted in the situation you are looking at.
MP or LM? Examples

• The effects of any development in the United States in the 1990s.

• The central bank is targeting the money supply, and decides to raise its target.

• The Island of Yap.
II. EXAMPLES
Example: A Fall in Investment Demand

The development we want to analyze: In 2000 and 2001, firms realized that high-tech investment goods, such as fiber-optic cable, were not going to have as large payoffs as they had thought.
MP or LM?
The Effects of a Fall in Investment Demand in the Keynesian Cross

\[ E = Y \]
\[ E = C(Y - T) + I^{OLD}(r) + G \]
The Effects of a Fall in Investment Demand in the IS-MP Diagram

The diagram illustrates the effects of a fall in investment demand on the IS-MP diagram. The IS curve, labeled $IS_0$, shows the equilibrium level of output, $Y_0$, at the initial interest rate, $r_0$. After a fall in investment demand, the IS curve shifts, leading to a new equilibrium at a higher interest rate and a lower level of output, demonstrated by the new IS curve $IS_0'$. The new equilibrium point is at a higher interest rate $r_0'$ and a lower output $Y_0'$. The MP curve, labeled $MP_0$, remains unchanged, indicating that the money market remains in balance at the new equilibrium.
The Effects of a Fall in Investment Demand in the IS-LM Diagram

\[
\begin{align*}
Y_0 & \quad \text{Initial aggregate income} \\
r_0 & \quad \text{Initial interest rate}
\end{align*}
\]
Example: Financial Innovation

The development we want to analyze: New technologies allow people to make many purchases using debit cards that they used to have to make using cash.
If the Central Bank Keeps the Money Supply Fixed

Step 1: The Effect on the Money Market at a Given Y?

\[ M/P \]

\[ i \]

\[ i_0 \]

\[ L_{OLD}(i, Y) \]

\[ M/P \]
If the Central Bank Keeps the Money Supply Fixed
Step 2: The Effect on the IS and/or LM Curves?
If the Central Bank Is Following an Interest Rate Rule
The Effect on the IS and/or MP Curves?
Interest rates were very volatile in the period when the Fed was – to some extent – targeting the money supply.