Open Economy IS/LM Model: Floating Exchange Rates

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Equilibrium: Outline

We need to clear

1. the goods market: IS
2. the money market: LM
3. the foreign exchange market: UIP

Endogenous variables: Y, i, E

We take as given:

1. P and P^* (short run assumption)
2. M: controlled by the Fed
3. E^e: the expected future exchange rate

Equilibrium: Equations

$$IS: Y = C(Y-T) + I(Y,i) + G + NX(\underset{-,+,-}{Y, Y^*, \varepsilon}) \tag{1}$$

$$LM: M/P = YL(i) \tag{2}$$

$$UIP: E = \frac{1+i}{1+i^*} E^e \tag{3}$$

Digression

What would happen if capital were completely immobile?

Modified IS Curve

We combine IS and UIP into a new IS curve

- It clears goods and FX markets

Then we have 2 equilibrium conditions again

The equilibrium graph looks a lot like a closed economy

The main difference:

- additional variables shift IS (Y^* and what's in the real exchange rate: E, E^e, i^*).

Modified IS Curve

Start from IS

$$Y = C(Y-T) + I(Y,i) + G + NX(\underset{-,+,-}{Y, Y^*, \varepsilon}) \tag{4}$$

Use UIP to substitute out the real exchange rate

$$\varepsilon = EP/P^* \tag{5}$$

$$= \frac{1+i}{1+i^*}\frac{P}{P^*}E^e \tag{6}$$

We can write $NX\left(Y, Y^*, \frac{1+i}{1+i^*}E^e\right)$

- $i \uparrow$ and $E^e \uparrow$ lead to dollar appreciation $(\varepsilon \uparrow)$ and $NX \downarrow$

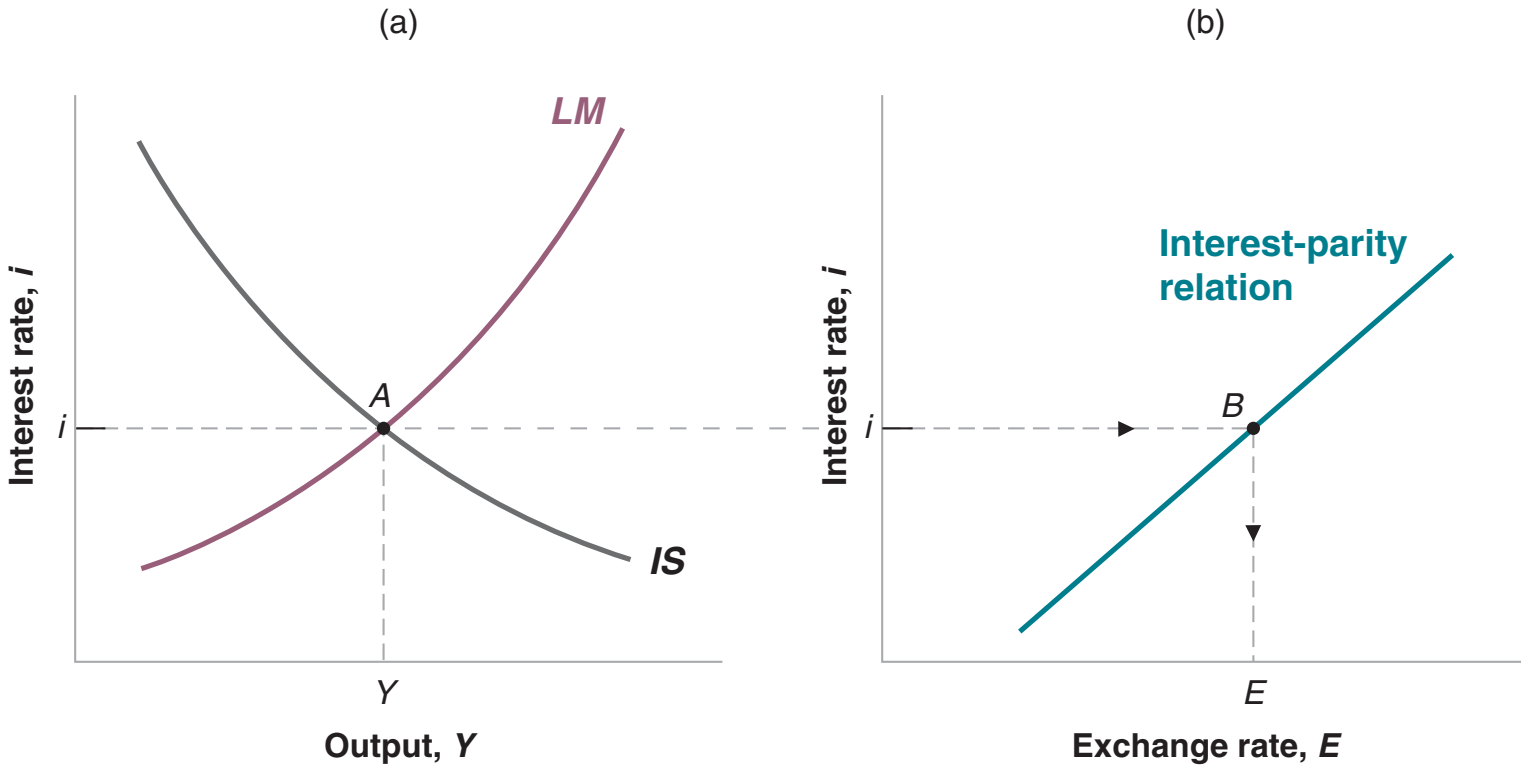
Modified IS Curve

$$IS: Y + C(Y-T) + I(Y,i) + G + NX\left(Y, Y^*, \frac{1+i}{1+i^*}E^e\right) \qquad (7)$$

Properties:

- downward sloping: $r \uparrow \Longrightarrow Y \downarrow$
- shifters: as closed economy *plus* anything that increases NX

IS-LM Graph


(a)
(b)
LM
IS
A
B
i
Interest rate, i
Y
Output, Y
Interest-parity relation
E
Exchange rate, E

What Has Changed

Relative to a closed economy:

1. the interest rate has an additional effect on IS:
   $i \uparrow \Longrightarrow E \uparrow \Longrightarrow NX \downarrow$
   this is driven by capital mobility (UIP)
   more mobile capital $\Longrightarrow$ flatter IS curve
2. additional shifters of IS: i^*, Y^*, E^e

Model Summary

$$IS: Y + C(Y-T) + I(Y,i) + G + NX\left(Y, Y^*, \frac{1+i}{1+i^*}E^e\right) \quad (8)$$

$$LM: M/P = YL(i) \quad (9)$$

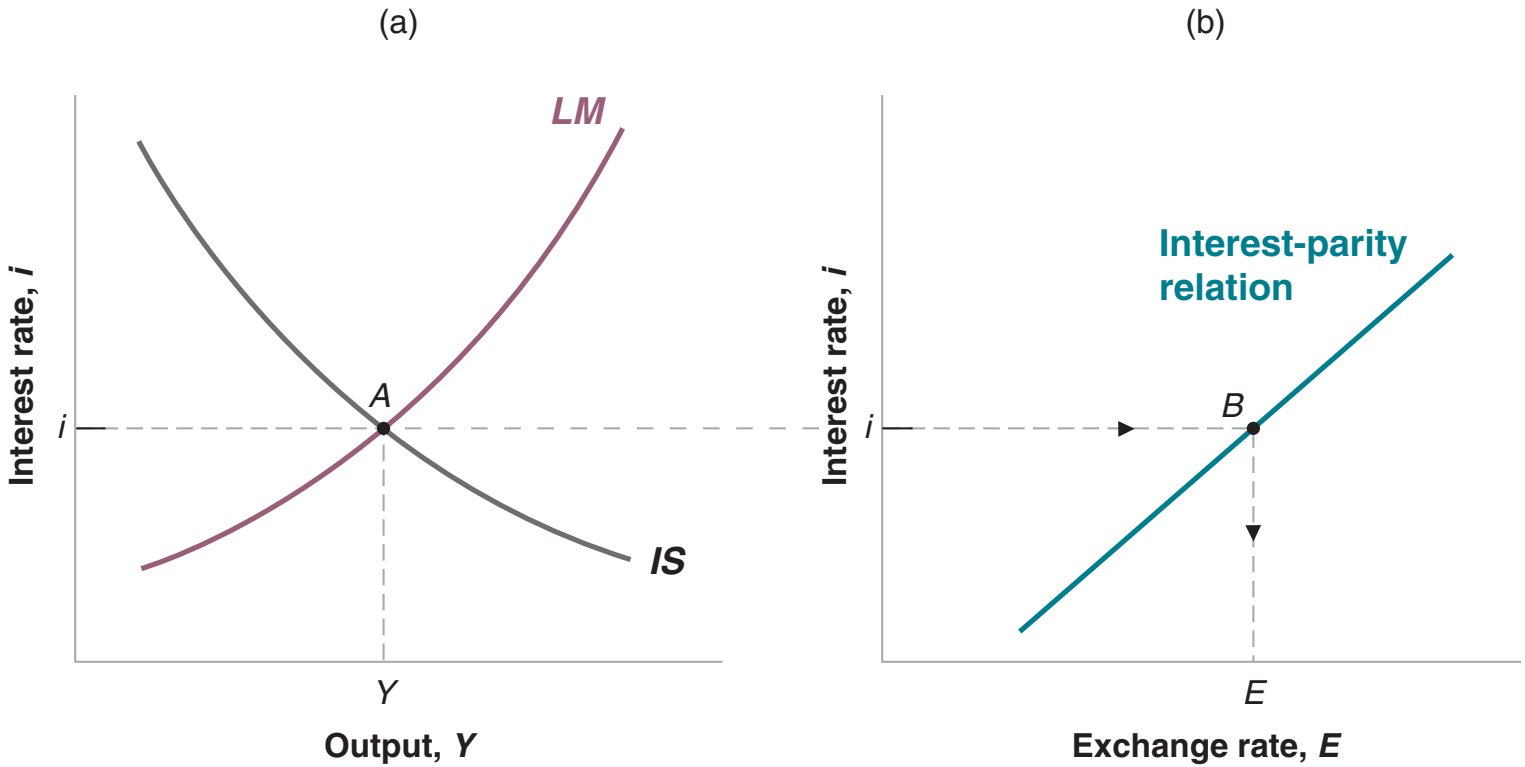
$$UIP: E = \frac{1+i}{1+i^*}E^e \quad (10)$$

Exogenous: P, P^*, Y^*, E^e, G, T

Endogenous: Y, i, E

Analyzing Shocks

Government Spending Rises

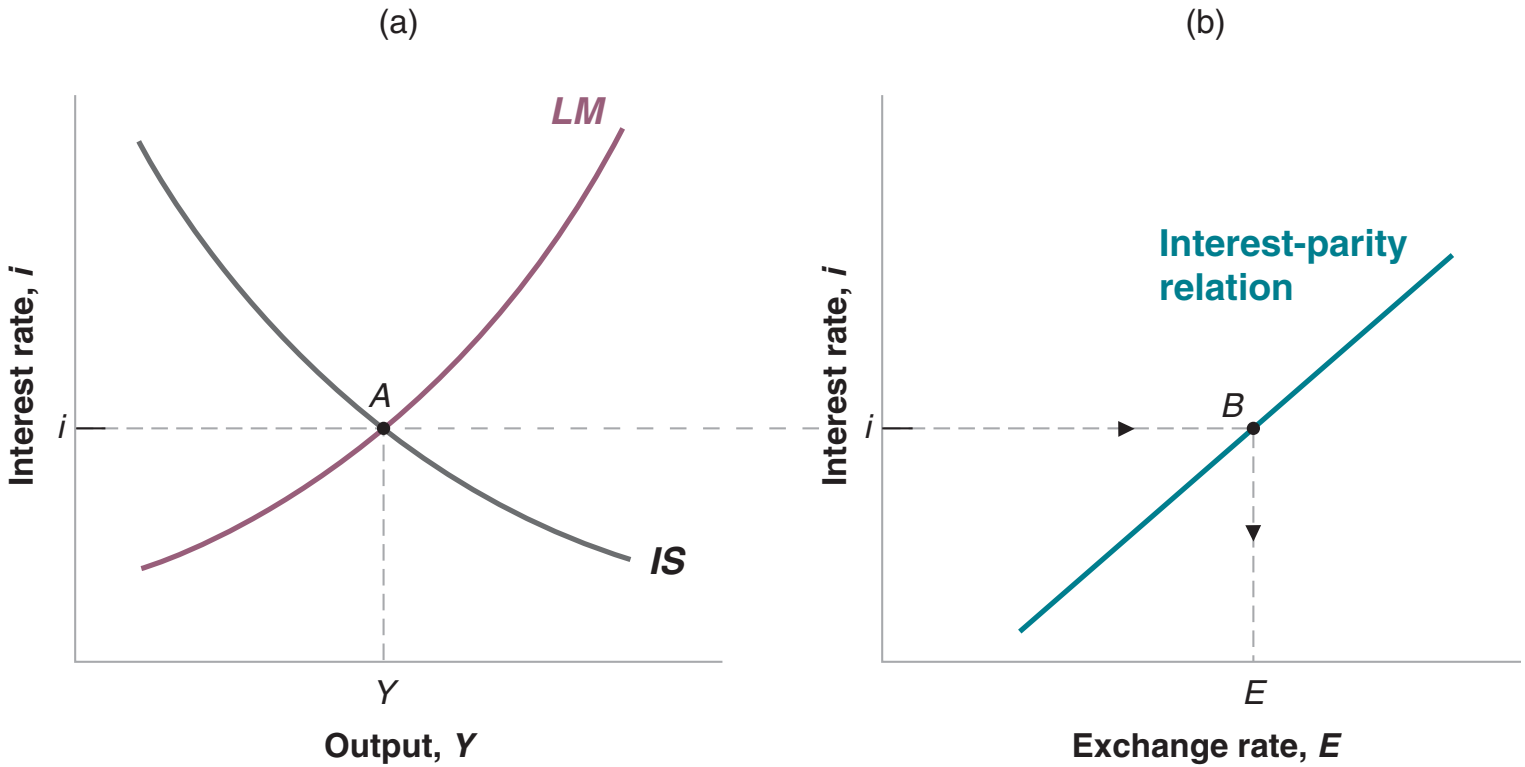


Government Spending Rises

Higher G leads to:

1. higher Y and i
2. capital inflows (attracted by higher i)
3. dollar appreciation $(E \uparrow)$ (due to capital inflows)
4. lower NX (due to higher Y and E)

Monetary Contraction



Monetary Contraction

Lower M leads to:

1. lower Y, but higher i
2. capital inflows
3. dollar appreciation $(E \uparrow)$
4. lower NX (b/c we have capital inflows)

Combining Monetary and Fiscal Policy

	Y	i	NX	E
$G\uparrow$	$\uparrow$	$\uparrow$	$\downarrow$	$\uparrow$
$M\uparrow$	$\uparrow$	$\downarrow$	$\uparrow$	$\downarrow$
Both	$\uparrow$	–	–	–

In principle, monetary and fiscal policy can be used jointly to increase output without affecting the trade balance.

Intuition:

International Spillovers

What are the effects of a foreign

- monetary expansion
- fiscal expansion

on the home country?

Reading

Blanchard / Johnson, Macroeconomics, 6th ed., ch. 19, 20