AS/AD Model: Fixed Exchange Rate

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Objectives

In this section you will learn:

1. how to set up an open economy AS/AD model
2. how to analyze shocks for fixed exchange rates
   (floating exchange rates are up next)

Fixed Exchange Rate Model

We need to clear these markets:

1. Foreign exchange: $i = i^*$
2. **Money** market:

$$M/P = YL(i^*) \tag{1}$$

3. **Goods** market:
   3.1 demand:

$$Y = C(Y-T) + I(Y,i^*) + G + NX(Y,Y^*,P/(\bar{E}P^*)) \tag{2}$$

   3.2 supply:

$$Y = F\left(\frac{P}{P^e}\frac{1}{1+m}, z\right) \tag{3}$$

Endogenous: Y, M, P (note that M is endogenous!)

Fixed Exchange Rate Model

Key point

Just by looking at the equations, we can see that

- IS and AS determine Y and P
- LM only determines M

That makes sense

- We already know that the CB cannot control M or i
- With fixed i, there is no monetary transmission

Market Clearing

Short run:

- P^e fixed
- AS is upward sloping

Medium run:

- $P^e = P$
- vertical AS curve determines Y_n by itself:

$$Y_n = F\left(\frac{1}{1+m}, z\right) \tag{4}$$

Aggregate Demand

The AD curve is just IS with $i = i^*$:

$$Y = C(Y - T) + I(Y, i^*) + G + NX(Y, Y^*, P/(\bar{E}P^*)) \tag{5}$$

Negative slope: $P \uparrow \implies Y \downarrow$

- this works through the real exchange rate and NX

New shifters: Y^*, i^*, P^*, E

Aggregate Demand

M/P no longer shifts AD

Why not?

3. Analyzing the Model

Analyzing the Model

We can forget about the money market and FX market and just analyze

AS:

$$Y/L = F\left(\frac{P}{P^e}\frac{1}{1+m}, z\right) \tag{6}$$

AD:

$$Y = C(Y-T) + I(Y, i^*) + G + NX(Y, Y^*, P/(\bar{E}P^*)) \tag{7}$$

Short run: P^e is given.

Medium run: $P^e = P$.

Transition: $P^e \to P$ shifts AS.

Analysis: Medium Run

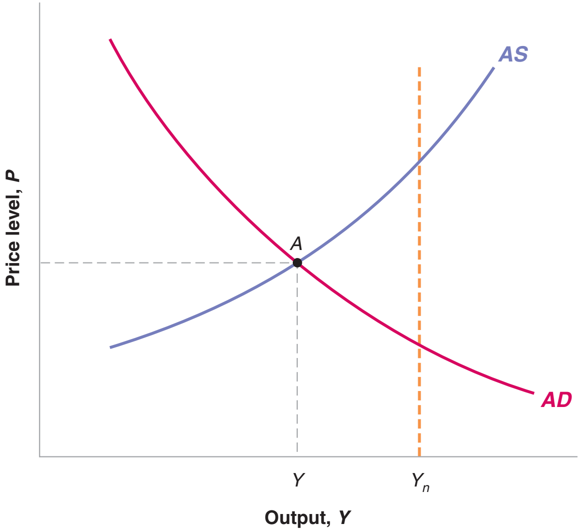
$P = P^e$: AS is vertical and determines Y_n:

$$Y_n = F\left(\frac{1}{1+m}, z\right) \tag{8}$$

P adjusts to get the "right" real exchange rate, such that $AD = Y_n$:

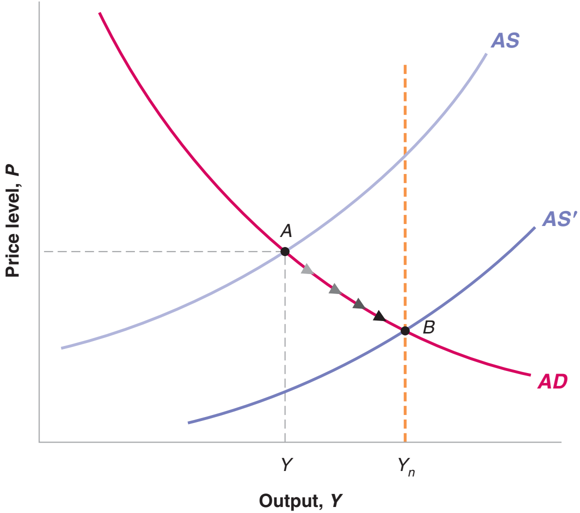
$$Y_n = C(Y_n - T) + I(Y_n, i^*) + G + NX(Y_n, Y^*, P/(\bar{E}P^*))$$

AS/AD Graph



Short run: P^e is fixed.
Output is not at the natural rate.

Adjustment Over Time



Initially: $P < P^e$.
W/P^e too low.
P^e falls over time.
AS shifts down

What Differs From Closed Economy?

The graph looks exactly like a closed economy.

What differs?

Closed economy:

- $P \downarrow \Longrightarrow M/P \uparrow \Longrightarrow i \downarrow \Longrightarrow I \uparrow$

Open economy:

- $P \downarrow \Longrightarrow NX \uparrow$
- in the background: M adjusts to hold $i = i^*$

Understanding the Transition

Start from $P < P^e$.

AS implies: $Y < Y_n$.

Prices fall. NX improves. AD rises.

Understanding the Transition

Moving along AD.

Money market: $M/P = YL(i^*)$

- Higher $Y \implies$ Households need more (real) money (M/P).
- But also lower $P \implies$ change in M ambiguous.

Let's say households want higher M (otherwise change signs)

- Households try to buy bonds.
- i rises $\implies$ capital inflows
- Fed must sell dollars $\implies M \uparrow$

Model Summary

AS:

$$Y/L = F\left(\frac{P}{P^e}\frac{1}{1+m}, z\right) \tag{9}$$

AD:

$$Y = C(Y-T) + I(Y, i^*) + G + NX(Y, Y^*, P/(\bar{E}P^*)) \tag{10}$$

Short run: P^e is given.

Medium run: $P^e = P$.

Transition: $P^e \to P$ shifts AS.

Key Points

With fixed exchange rates, the money market becomes irrelevant

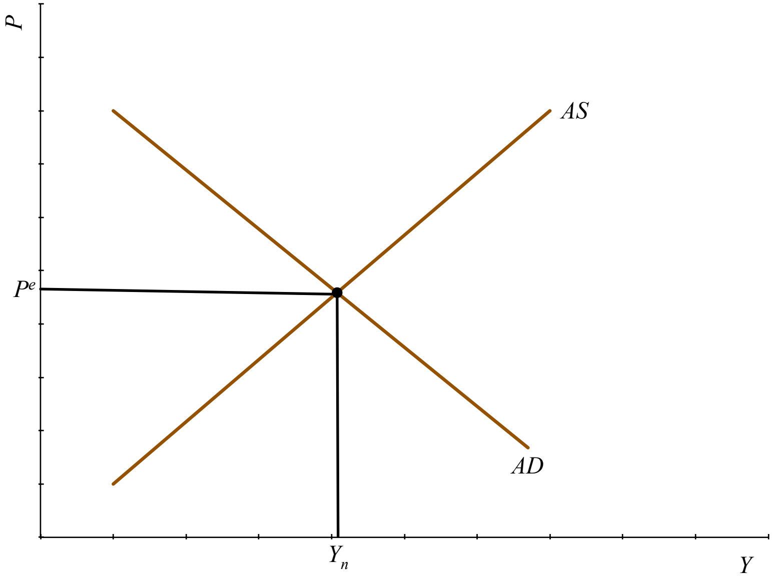
- the Fed is busy fixing $i = i^*$
- that breaks any transmission to the real sector

The economy "works" much like a closed economy

- but foreign shocks now transmit into the home economy (in the short run)
- and monetary policy is gone

4. Policy Analysis

4.1 Government spending



$G\uparrow$: Results

Medium run:

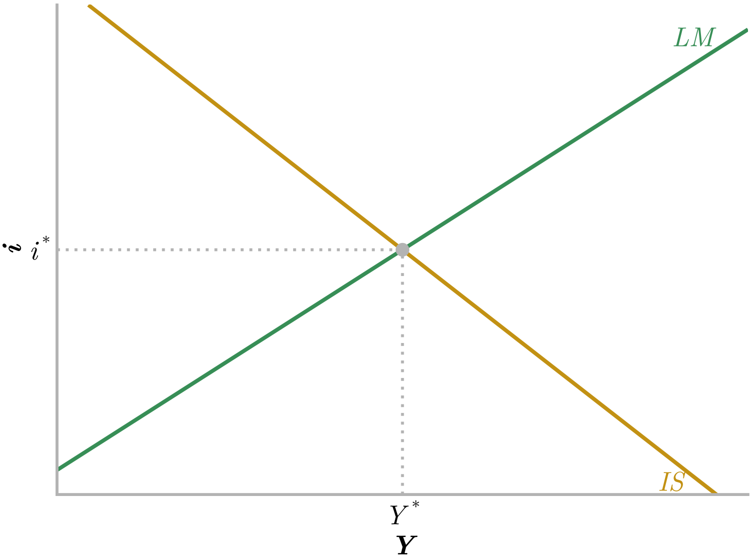
- full crowding out
- the government ends up sending all of its extra demand abroad!
- but no crowding out of investment $(i = i^*)$

Short run:

- partial crowding out $(NX\downarrow)$
- investment rises

Draw IS/LM diagram for more intuition (and understanding transition) ...

$G\uparrow$: IS/LM Diagram



4.2 Currency Devaluation

Suppose the economy is in recession with $Y < Y_n$.

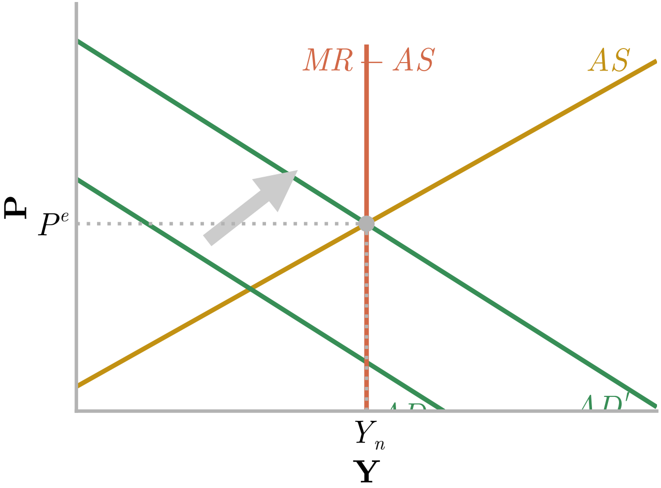
What are the options?

1. $G \uparrow$ (budget deficit, $NX \downarrow$)
2. Wait for the AS curve to shift
   takes time (how does it work?)

Instead of waiting for P to fall, why not simply lower E?

- The effect on the real exchange rate and on demand is the same.
- Avoid the painful period of unemployment.

Devaluation



A Free Lunch?

Now fixed exchange rates look like a free lunch.

- Avoid exchange rate volatility
- Gain instant adjustment to full employment through devaluation.

What's the catch?

- Hint: what happens to E^e?

International Spillovers

What are the effects of a devaluation on the other country?

- "Beggar my neighbor"

Contrast with the effects of a fiscal expansion

4.3 Tariffs

The U.S. has a large trade deficit.

How could it be “fixed?”

- Fiscal contraction (e.g. higher taxes)?
- Tariffs?

Trade Restrictions

Would tariffs fix the trade deficit?

> *The most important economic truth to grasp about the U.S. trade deficit is that it has **virtually nothing to do with trade policy**. A nation's trade deficit is determined by the flow of investment funds into or out of the country. And those flows are determined by how much the people of a nation save and invest — two variables that are only marginally affected by trade policy. – Daniel Griswold, 1998*

How is it possible that making foreign goods more expensive does not reduce imports?

Trade Restrictions

Tariff: NX rises, holding everything else fixed.

- shifts AD right

Short run:

- the same as other AD shifters: $Y \uparrow, P \uparrow$
- the Fed must raise M to prevent i from rising
- tariffs work in the short run (while price expectations are fixed)

But not clear that NX/Y improves:

$$\underbrace{\frac{I}{Y}}_{?} = \underbrace{\frac{Y-C-T}{Y}}_{S^P \text{ unchanged}} + \underbrace{\frac{T-G}{Y}}_{S^G ?} + \underbrace{\frac{NX}{Y}}_{?} \tag{11}$$

Trade Restrictions: Medium Run

AS/AD graph

- vertical AS curve fixes $Y = Y_n$
- AD shifts right $\rightarrow P \uparrow$

Y, C, I, G, T all unchanged $\implies NX$ unchanged

- tariffs don't work – what gives?
- prices rise until NX is unchanged again

Price adjustments mimic the role of exchange rate adjustments.

Even with a fixed exchange rate, tariffs do not improve the trade balance.

Recap

1. Demand shocks do not change output in the MR
   As in the closed economy: Y_n is determined by labor supply and productivity.
   Tariffs don't create jobs.
2. Increase domestic demand (e.g., $G\uparrow$):
   - MR: **full crowding out** via $NX\downarrow$
   - real exchange rate moves even with fixed E
3. Increase in foreign demand (e.g., devaluation):
   - MR: no change in NX
   - tariffs don't work

Review Questions

1. Why is the AD curve downward sloping?
2. Real demand shocks are extra powerful under fixed exchange rates. Why?
3. How does foreign monetary policy affect the home economy?

Reading

- Blanchard / Johnson, Macroeconomics, 6th or 7th ed., ch. 21

Additional reading:

- Jones, Macroeconomics, ch. 15.