# Open Economy AS/AD Model

Prof. Lutz Hendricks

Econ520

February 23, 2023

# Objectives

In this section you will learn:

1. how to analyze an open economy in the medium run (AS/AD model)
2. how the effects of policies and shocks differ from the short run

Key result:

The medium run outcomes under floating and pegging are similar
(in contrast to the short run)

# Short Run vs Medium Run

| | Short run | Medium run |
|---|---|---|
| Prices | fixed | flexible |
| Adjustment of $\varepsilon$ | only by changing $E$ | also by changing $P$ |
| Fixed vs floating | different | similar |

Key:

- $P$ can be changed by adjusting $M$
- $M$ is neutral in the medium run
- this is why the exchange rate regime is no longer that important

# Fixed Exchange Rates

# Fixed Exchange Rate Model

We need to clear these markets:

1. Foreign exchange: UIP with fixed $E$ implies: $i = i^*$
2. **Money**:
$$M/P = YL(i^*) \tag{1}$$
3. **Goods**:
   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: $Y, M, P$

# Market Clearing

Short run:

- $P^e$ fixed
- AS is upward sloping

Medium run:

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

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

# Irrelevance of Money

We show:

- The goods market determines $Y$ and $P$
- The money market determines $M$
  - so that $i = i^*$ holds at all times
- The Fed has no control over the money supply
- This is true in short run and medium run
- Key assumption: high capital mobility (UIP holds).

## Aggregate Demand

Start from IS with $i = i^*$:

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

Simplify:

$$Y = Y\left(P/(\bar{E}P^*), G, T\right) \qquad (6)$$

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?

# Analyzing the Model

We can forget about the money market and UIP and just analyze AS:

$$Y/L = F\left(\frac{P}{P^e}\frac{1}{1+m}, z\right) \tag{7}$$

AD:

$$Y = Y\left(P/(\bar{E}P^*), G, T\right) \tag{8}$$

Short run: $P^e$ is given.

Medium run: $P^e = P$.

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

# Analysis: Medium Run

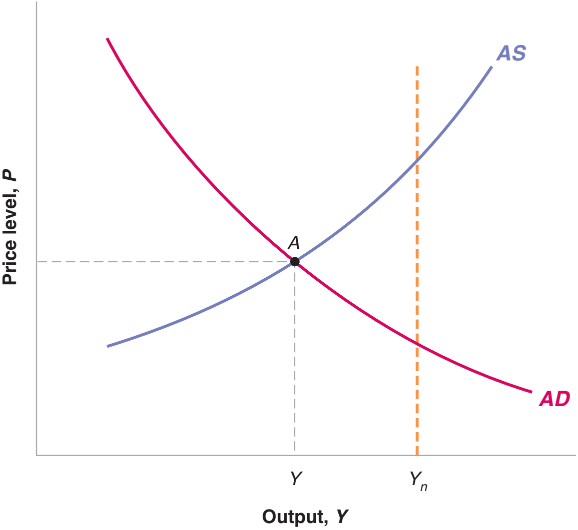
$P = P^e$: AS is vertical and determines $Y_n$:

$$Y = F\left(\frac{1}{1+m}, z\right) \tag{9}$$

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

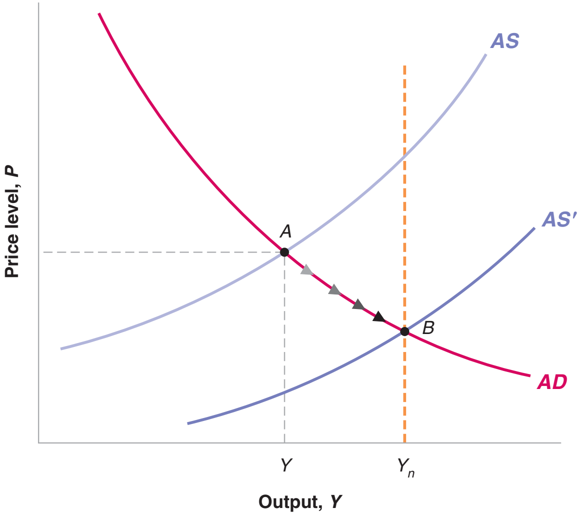
$$Y_n = Y\left(P/(\bar{E}P^*), G, T\right) \rightarrow P$$

# 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?

Closed economy:

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

Open economy:

- $P \downarrow \Longrightarrow NX \uparrow$

# Understanding the Transition

Start from $P < P^e$.

AS implies: $Y < Y_n$.

Prices fall. $NX$ improves. $AD$ rises.

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 $\implies M \uparrow$

# 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

# Reading

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

Additional reading:

- Jones, Macroeconomics, ch. 15.