

Open Economy AS/AD Model

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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
3. why the medium run outcomes under floating and pegging are similar

Short vs Medium Run

Short run:

- ▶ P is fixed.
- ▶ Any adjustment of the real exchange rate must work through the nominal exchange rate:

$$\varepsilon = EP/P^* \quad (1)$$

Medium run:

- ▶ P adjusts
- ▶ Any change in E can be mimicked by a change in P
 - ▶ same effect on ε
 - ▶ no other real effects of money in the medium run

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:

$$M/P = YL(i^*) \quad (2)$$

Endogenous: $M/P, Y$

3. Goods:

3.1 demand:

$$Y = C(Y - T) + I(Y, i^* - \pi^e) + G + NX(Y, Y^*, \bar{E}P/P^*) \quad (3)$$

3.2 supply:

$$P = P^e(1 + m)F(1 - Y/L, z) \quad (4)$$

Endogenous: Y, P (really also π^e , but let's set that aside)

Market Clearing

- ▶ Short run:
 - ▶ P^e fixed
 - ▶ AS is upward sloping
- ▶ Medium run:
 - ▶ $P^e = P$
 - ▶ vertical AS curve determines Y_n by itself:

$$1 = (1 + m)F(1 - Y_n/L, z) \quad (5)$$

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 $i = i^*$:

$$Y = C(Y - T) + I(Y, i^* - \pi^e) + G + NX(Y, Y^*, \bar{E}P/P^*) \quad (6)$$

Simplify:

$$Y = Y(\bar{E}P/P^*, G, T) \quad (7)$$

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:

$$P = P^e(1 + m)F(1 - Y/L, z) \quad (8)$$

AD:

$$Y = Y(\bar{E}P/P^*, G, T) \quad (9)$$

Short run: P^e is given.

Medium run: $P^e = P$.

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

Analysis: Medium Run

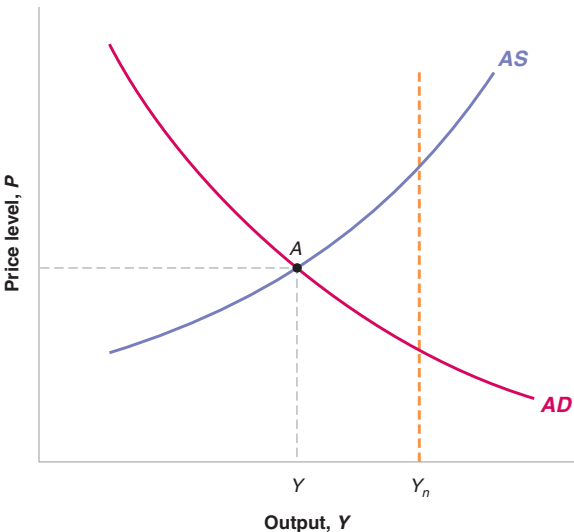
- ▶ $P = P^e$: AS is vertical and determines Y_n :

$$1 = (1 + m)F(1 - Y_n/L, z) \rightarrow Y_n$$

- ▶ P adjusts to get the “right” real exchange rate, such that $AD = Y_n$:

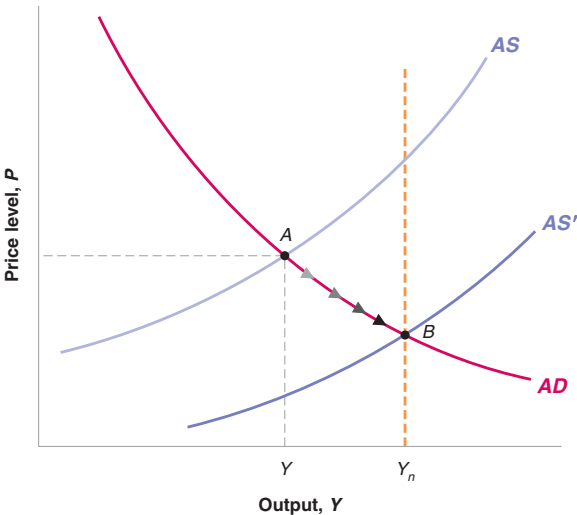
$$Y_n = Y(\bar{E}P/P^*, G, T) \rightarrow P$$

AS/AD Graph



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

Adjustment Over Time



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

What Differs From Closed Economy?

- ▶ Closed economy:

- ▶ $P \downarrow \implies M/P \uparrow \implies i \downarrow \implies I \uparrow$

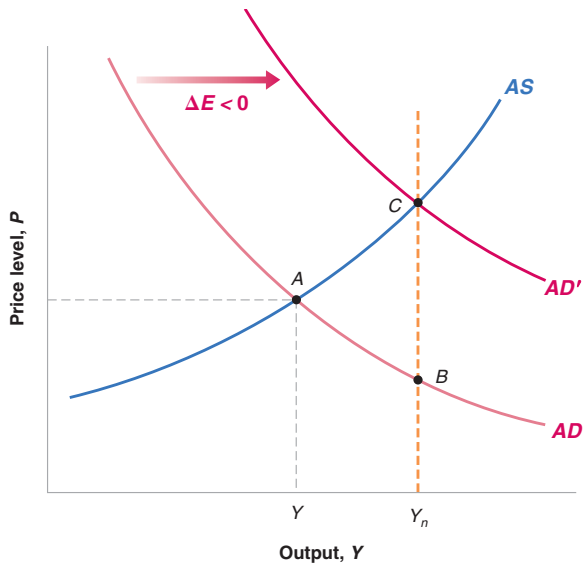
- ▶ Open economy:

- ▶ $P \downarrow \implies NX \uparrow$

Devaluation

- ▶ 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



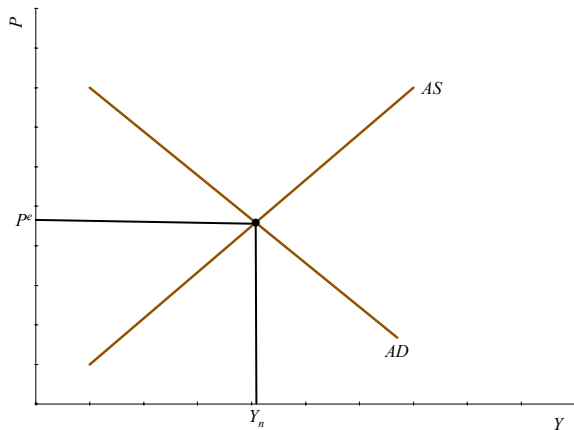
A Free Lunch?

- ▶ 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?
- ▶

International Spillovers

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

Example: Fiscal expansion



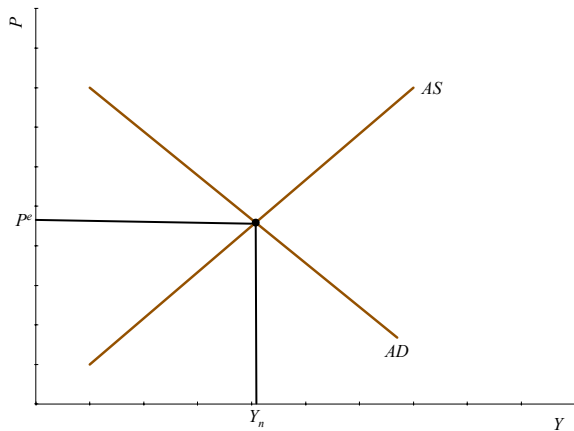
Shock: $G \uparrow$

Medium run:

Short run:

Process:

Example: Increase in i^*



Shock: $i^* \uparrow$

Medium run:

Short run:

Process:

Currency Crises

Currency Crises

- ▶ Under the peg: UIP implies $i = i^*$
- ▶ But what happens if investors doubt the peg?
- ▶ UIP:

$$i_t = i_t^* - x_t \quad (10)$$

$$x_t = \frac{E_{t+1}^e - E_t}{E_t} \quad (11)$$

- ▶ x : expected FX depreciation / dollar appreciation.
- ▶ In general, the depreciation term x_t can be positive or negative.
- ▶ But the peg offers insurance to those who bet against the peg: x_t can never be positive.

Currency Crises

Example:

- ▶ 25% chance of 20% devaluation over the next month
- ▶ $x_t = 0.75 \times 0 + 0.25 \times -0.2 = -0.05$
- ▶ investors demand an interest premium of **5% per month** to compensate for this risk

Policy Options

1. Raise i by 60%
major recession as borrowing shuts down
2. Raise i by less than 60%
 - ▶ capital outflows
 - ▶ CB must sell FX and eventually runs out of reserves
3. Devalue the currency

Lessons

1. Fixed exchange rates are fragile
 - 1.1 they can only be sustained as long as investors remain utterly convinced that a peg will hold
 - 1.2 betting against a peg is insured by the government
2. Fixed exchange rates can collapse without reason
If many investors believe the peg will fail, it will fail.

Crisis Examples

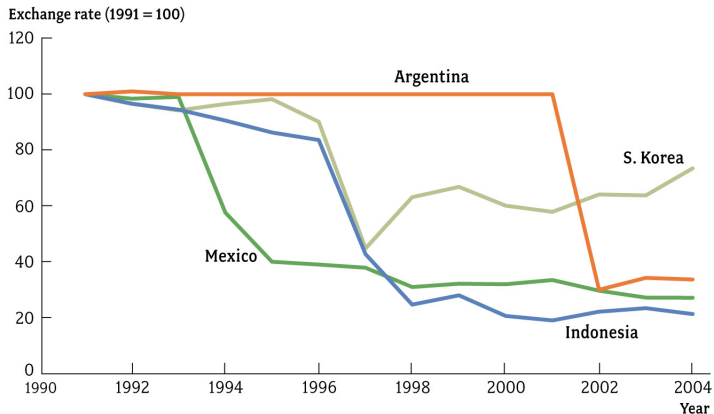
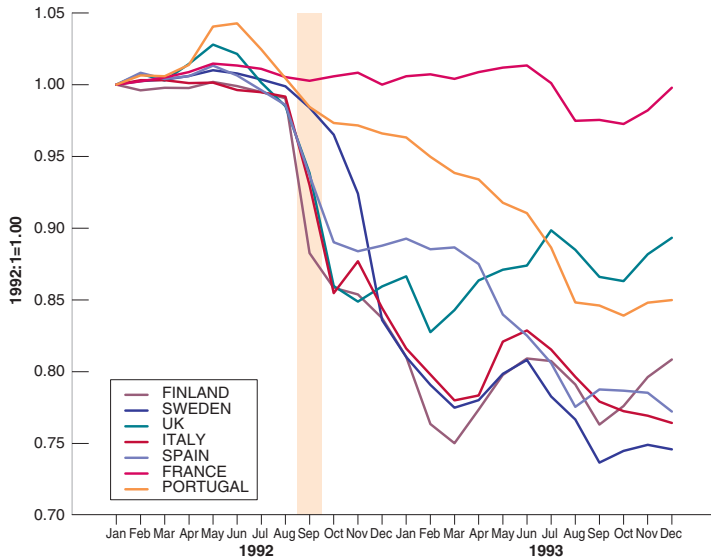


FIGURE 15.7 Depreciations During Several Currency Crises, 1991–2004

Macroeconomics, Charles I. Jones
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Crisis Examples



Which Exchange Rate Regime Is Best?

The costs of fixing the exchange rate

1. Loss of monetary autonomy.
 - ▶ Import the U.S. inflation rate
2. Risk of speculative attacks.
3. Volatile interest rates.
4. Loss of automatic adjustment to certain shocks.

Benefits of fixing the exchange rate

1. Loss of monetary autonomy.
 - ▶ Import the U.S. inflation rate
2. Incentives for fiscal discipline.
 - ▶ Cannot print money to finance budget deficits.
3. Stable exchange rate

The Impossible Trinity

- ▶ Exchange rate regimes pursue 3 goals:
 1. Stable exchange rates
 2. Monetary autonomy
 3. Free capital flows.
- ▶ Only 2 of the 3 goals are attainable.

The Impossible Trinity

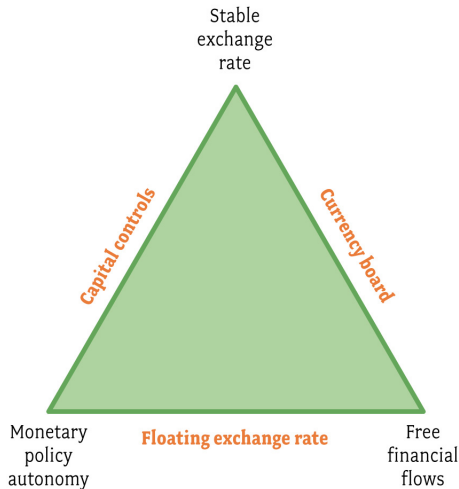


FIGURE 15.6 The Policy Trilemma in Open Economies

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Which regime is best?

- ▶ The answer depends on the characteristics of the country.
- ▶ Large, relatively closed countries can handle volatile currencies - they usually float.
- ▶ Small countries with a major trading partner may want to peg
 - ▶ But beware of pegging against the wrong country (Argentina).
- ▶ Countries with questionable central banks may want to peg

Example: Regime Choice

1. USA vs rest of the world
2. Canada vs USA
3. Argentina vs USA vs Brazil

Currency Unions

- ▶ If the exchange rate is fixed, why not get rid of it?
- ▶ Main example: Euro
- ▶ Benefits:
 - ▶ lower transactions costs
 - ▶ credibility
 - ▶ speculative attacks no longer possible.
- ▶ Costs:
 - ▶ irreversible: cannot devalue in response to shocks
 - ▶ loss of monetary policy

Reading

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

Additional reading:

- ▶ Jones, Macroeconomics, ch. 15.