macro

Aggregate Demand in the Open Economy

macroeconomics

N. Gregory Mankiw

Learning objectives

- The Mundell-Fleming model:
  IS-LM for the small open economy
- Causes and effects of interest rate differentials
- Arguments for fixed vs. floating exchange rates
- The aggregate demand curve for the small open economy

The Mundell-Fleming Model

- *Key assumption:*
  Small open economy with perfect capital mobility.

$$r = r^*$$

- Goods market equilibrium---the *IS** curve:

$$Y = C(Y - T) + I(r^*) + G + NX(e)$$

where

e = nominal exchange rate

= foreign currency per unit of domestic currency

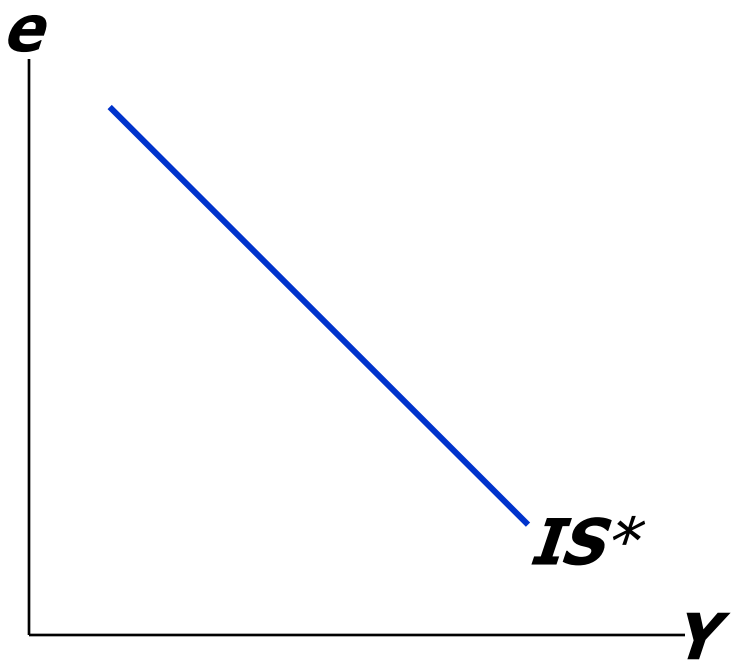
The *IS** curve: Goods Market Eq'm

$$Y = C(Y - T) + I(r^*) + G + NX(e)$$

The *IS** curve is drawn for a given value of r^*.

Intuition for the slope:

$$\downarrow e \Rightarrow \uparrow NX \Rightarrow \uparrow Y$$

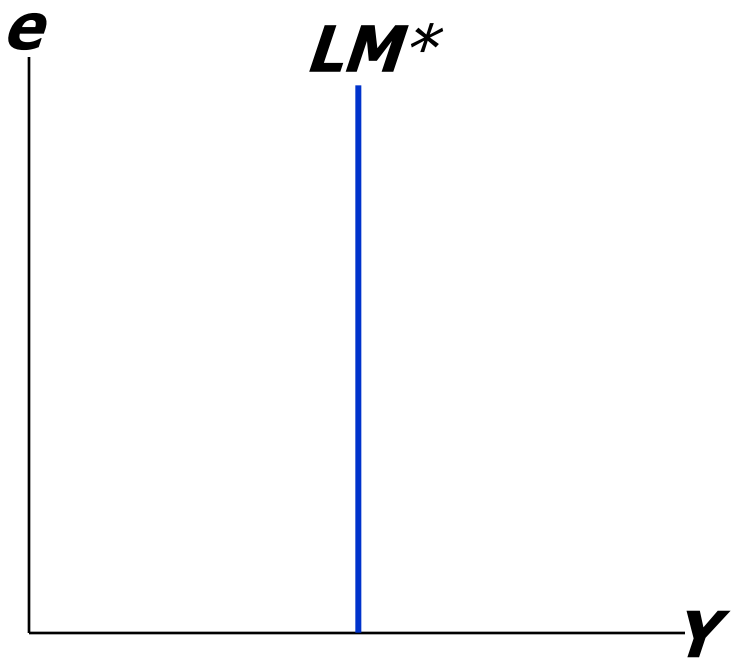


The *LM** curve: Money Market Eq'm

$$M/P = L(r^*, Y)$$

The *LM** curve

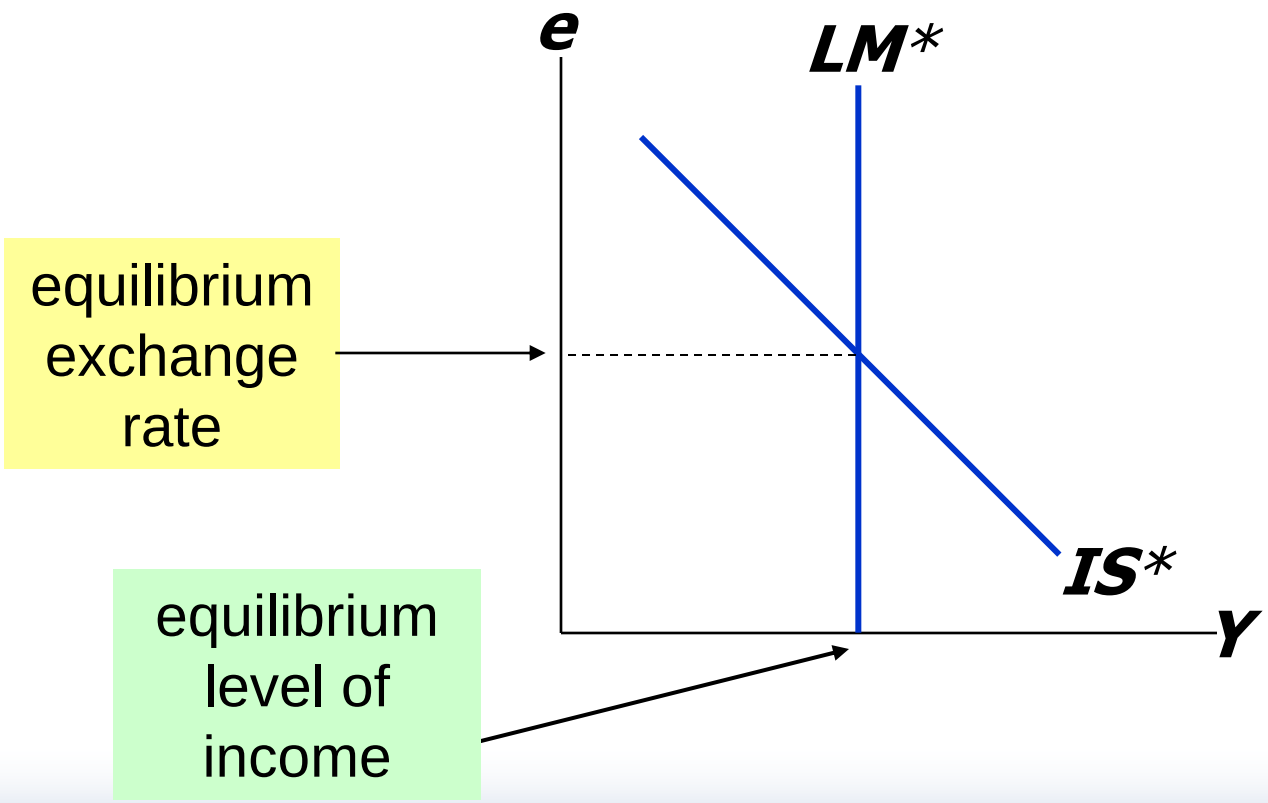
- is drawn for a given value of r^*
- is vertical because: given r^*, there is only one value of Y that equates money demand with supply, regardless of e.



Equilibrium in the Mundell-Fleming model

$$Y = C(Y - T) + I(r^*) + G + NX(e)$$

$$M/P = L(r^*, Y)$$



Floating & fixed exchange rates

- In a system of **floating exchange rates**, ***e*** is allowed to fluctuate in response to changing economic conditions.
- In contrast, under **fixed exchange rates**, the central bank trades domestic for foreign currency at a predetermined price.
- We now consider fiscal, monetary, and trade policy: first in a floating exchange rate system, then in a fixed exchange rate system.

Fiscal policy under floating exchange rates

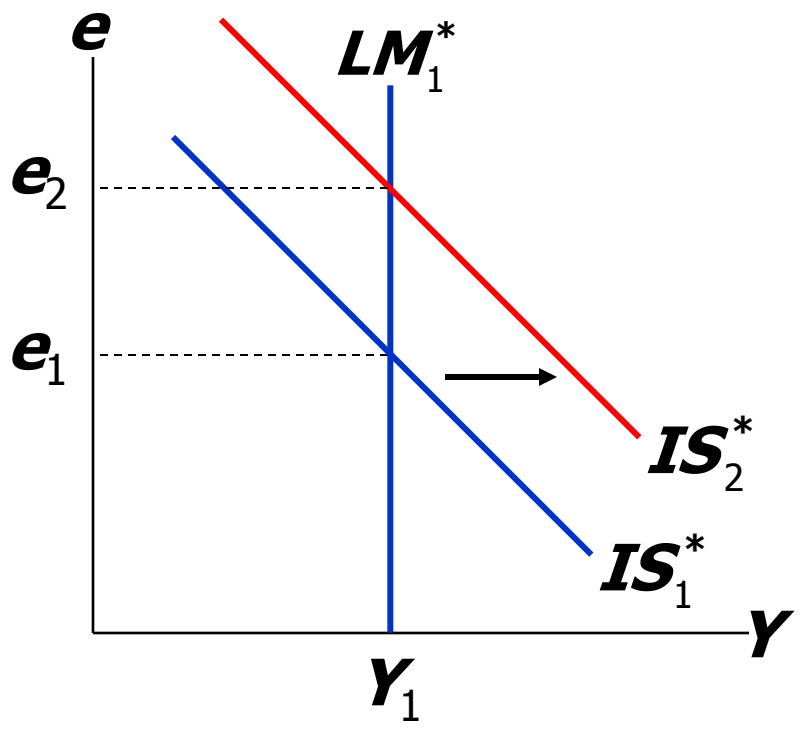
$$Y = C(Y - T) + I(r^*) + G + NX(e)$$

$$M/P = L(r^*, Y)$$

At any given value of e,
a fiscal expansion
increases Y,
shifting IS^* to the right.

Results:

$$\Delta e > 0, \quad \Delta Y = 0$$



Lessons about fiscal policy

- In a small open economy with perfect capital mobility, fiscal policy is utterly incapable of affecting real GDP.
- "Crowding out"
  - *closed economy:*
    Fiscal policy crowds out investment by causing the interest rate to rise.
  - *small open economy:*
    Fiscal policy crowds out net exports by causing the exchange rate to appreciate.

Mon. policy under floating exchange rates

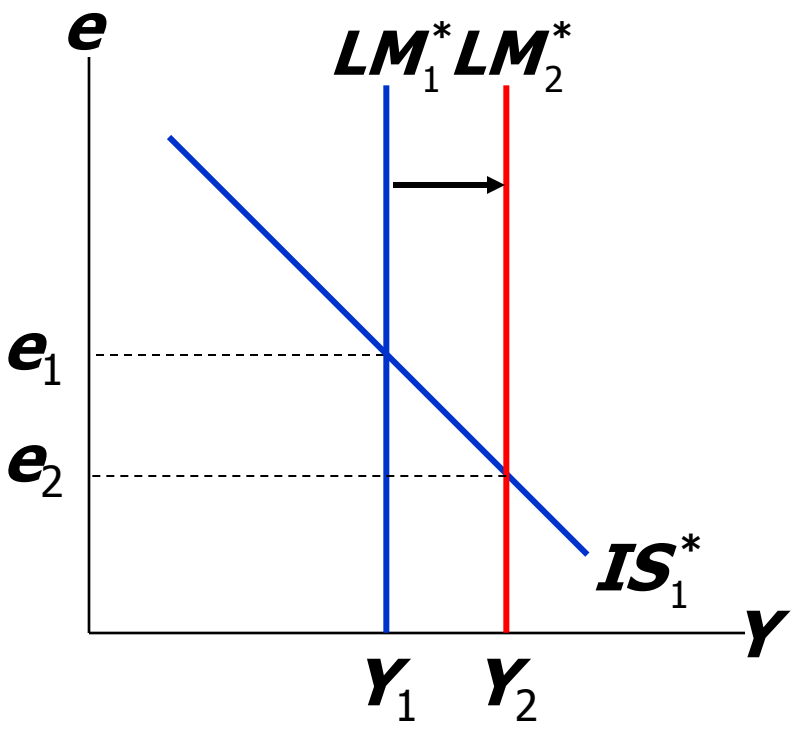
$$Y = C(Y - T) + I(r^*) + G + NX(e)$$

$$M/P = L(r^*, Y)$$

An increase in M shifts LM^* right because Y must rise to restore eq'm in the money market.

Results:

$$\Delta e < 0, \quad \Delta Y > 0$$



Lessons about monetary policy

- Monetary policy affects output by affecting one (or more) of the components of aggregate demand:

  closed economy: $\uparrow M \Rightarrow \downarrow r \Rightarrow \uparrow I \Rightarrow \uparrow Y$

  small open economy: $\uparrow M \Rightarrow \downarrow e \Rightarrow \uparrow NX \Rightarrow \uparrow Y$

- Expansionary mon. policy does not raise world aggregate demand, it shifts demand from foreign to domestic products.

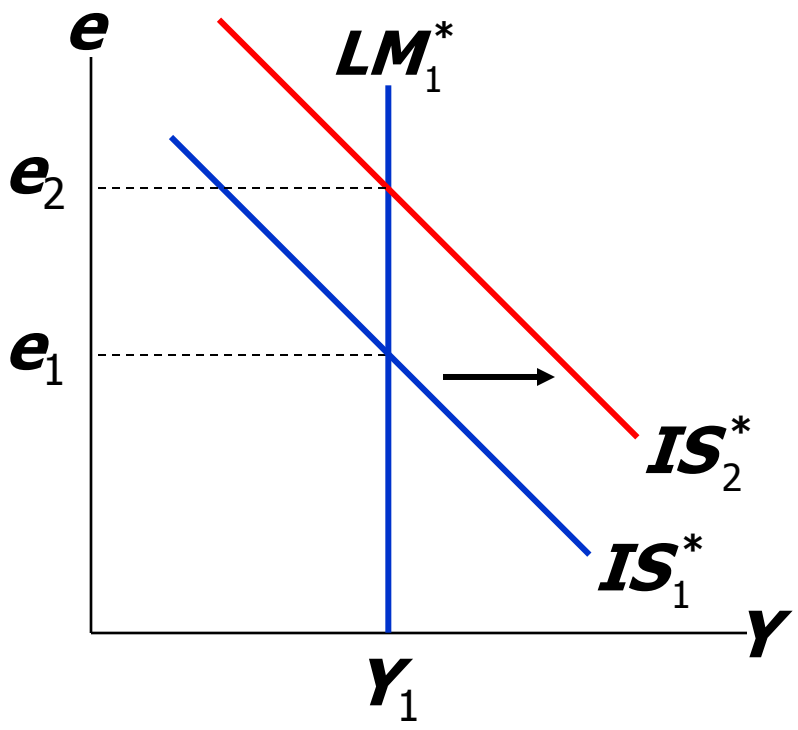
  Thus, the increases in income and employment at home come at the expense of losses abroad.

Trade policy under floating exchange rates

$$Y = C(Y - T) + I(r^*) + G + NX(e)$$

$$M/P = L(r^*, Y)$$

At any given value of e, a tariff or quota reduces imports, increases NX, and shifts IS^* to the right.



Results:

$$\Delta e > 0, \quad \Delta Y = 0$$

Lessons about trade policy

- Import restrictions cannot reduce a trade deficit.
- Even though ***NX*** is unchanged, there is less trade:
  - the trade restriction reduces imports
  - the exchange rate appreciation reduces exports

  Less trade means fewer 'gains from trade.'
- Import restrictions on specific products save jobs in the domestic industries that produce those products, but destroy jobs in export-producing sectors.

  Hence, import restrictions fail to increase total employment.

  Worse yet, import restrictions create "sectoral shifts," which cause frictional unemployment.

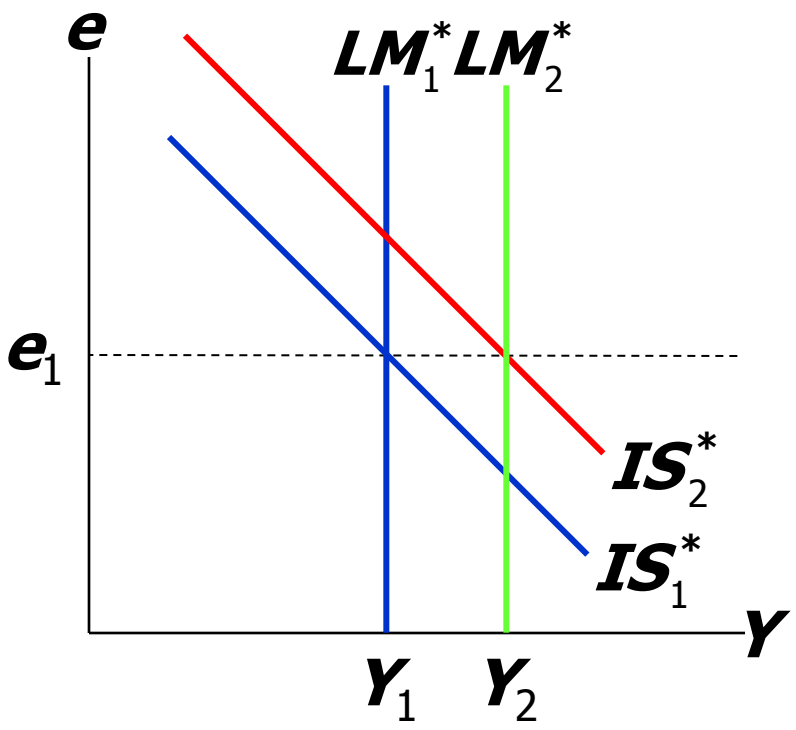
Fixed exchange rates

- Under a system of fixed exchange rates, the country's central bank stands ready to buy or sell the domestic currency for foreign currency at a predetermined rate.
- In the context of the Mundell-Fleming model, the central bank shifts the LM^* curve as required to keep $\boldsymbol{e}$ at its preannounced rate.
- This system fixes the nominal exchange rate. In the long run, when prices are flexible, the real exchange rate can move even if the nominal rate is fixed.

Fiscal policy under fixed exchange rates

Under floating rates, fiscal policy ineffective at changing output.

Under fixed rates, fiscal policy is very effective at changing output.



Results:

$$\Delta e = 0, \quad \Delta Y > 0$$

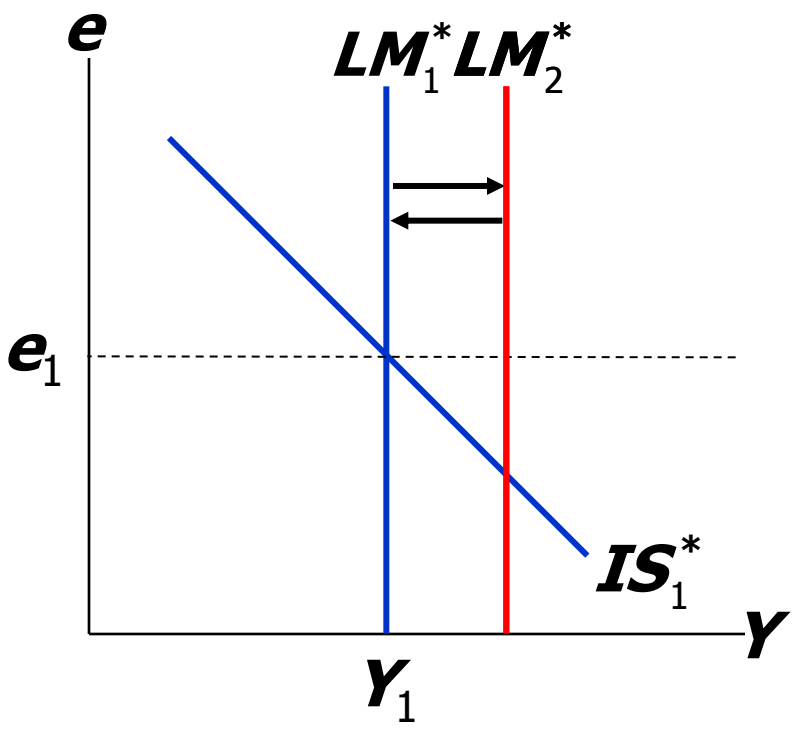
Mon. policy under fixed exchange rates

Under floating rates, monetary policy is very effective at changing output.

Under fixed rates, monetary policy cannot be used to affect output.

Results:

$\Delta e = 0, \ \Delta Y = 0$

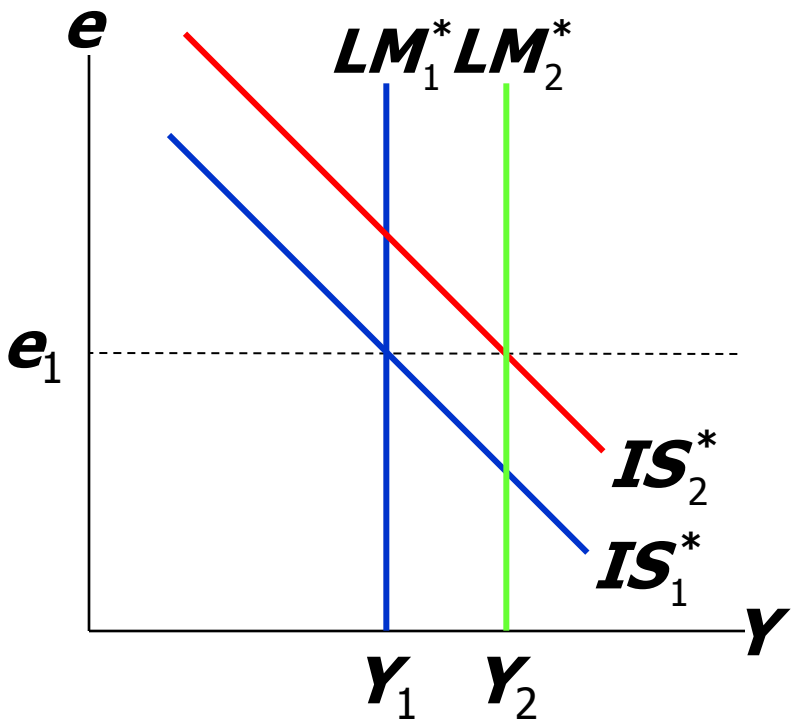


Trade policy under fixed exchange rates

Under floating rates, import restrictions do not affect ***Y*** or ***NX***.

Under fixed rates, import restrictions increase ***Y*** and ***NX***.

But, these gains come at the expense of other countries, as the policy merely shifts demand from foreign to domestic goods.



M-F: summary of policy effects

	type of exchange rate regime:					
	floating			fixed		
	impact on:					
Policy	***Y***	***e***	***NX***	***Y***	***e***	***NX***
fiscal expansion	0	↑	↓	↑	0	0
mon. expansion	↑	↓	↑	0	0	0
import restriction	0	↑	0	↑	0	↑

Interest-rate differentials

Two reasons why r may differ from r^*

- *country risk:*
  The risk that the country's borrowers will default on their loan repayments because of political or economic turmoil.

  Lenders require a higher interest rate to compensate them for this risk.
- *expected exchange rate changes:*
  If a country's exchange rate is expected to fall, then its borrowers must pay a higher interest rate to compensate lenders for the expected currency depreciation.

Differentials in the M-F model

$$r = r^* + \theta$$

where θ is a risk premium.

Substitute the expression for r into the *IS** and *LM** equations:

$$Y = C(Y - T) + I(r^* + \theta) + G + NX(e)$$

$$M/P = L(r^* + \theta, Y)$$

The effects of an increase in θ

*IS** shifts left, because

$\uparrow \theta \Rightarrow \uparrow \boldsymbol{r} \Rightarrow \downarrow \boldsymbol{I}$

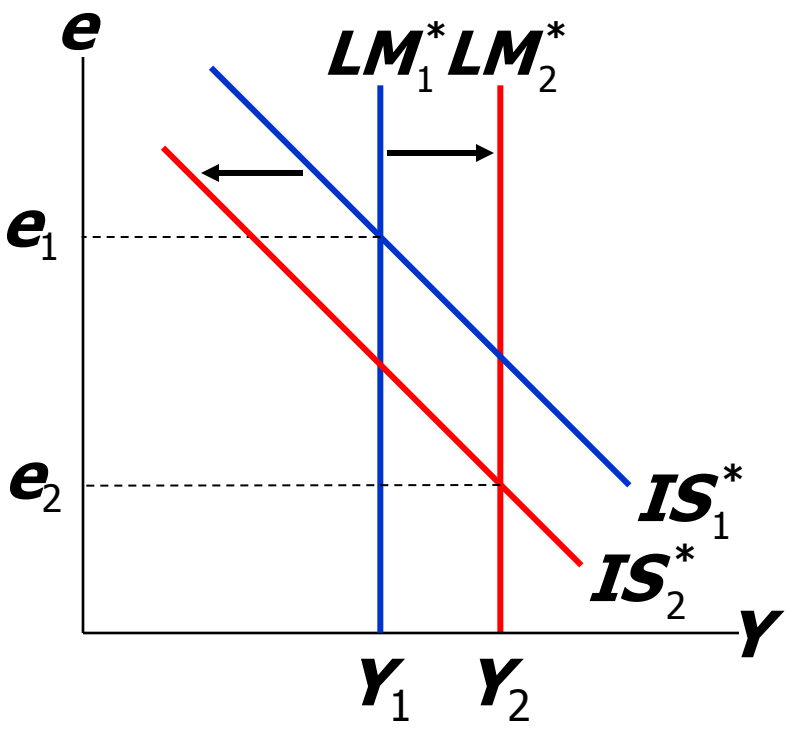
*LM** shifts right, because

$\uparrow \theta \Rightarrow \uparrow \boldsymbol{r} \Rightarrow \downarrow (\boldsymbol{M/P})^d$,

so $\boldsymbol{Y}$ must rise to restore money market eq'm.

Results:

$\Delta \boldsymbol{e} < 0, \ \Delta \boldsymbol{Y} > 0$



The effects of an increase in θ

- The fall in ***e*** is intuitive:
  An increase in country risk or an expected depreciation makes holding the country's currency less attractive.

  Note: an expected depreciation is a self-fulfilling prophecy.

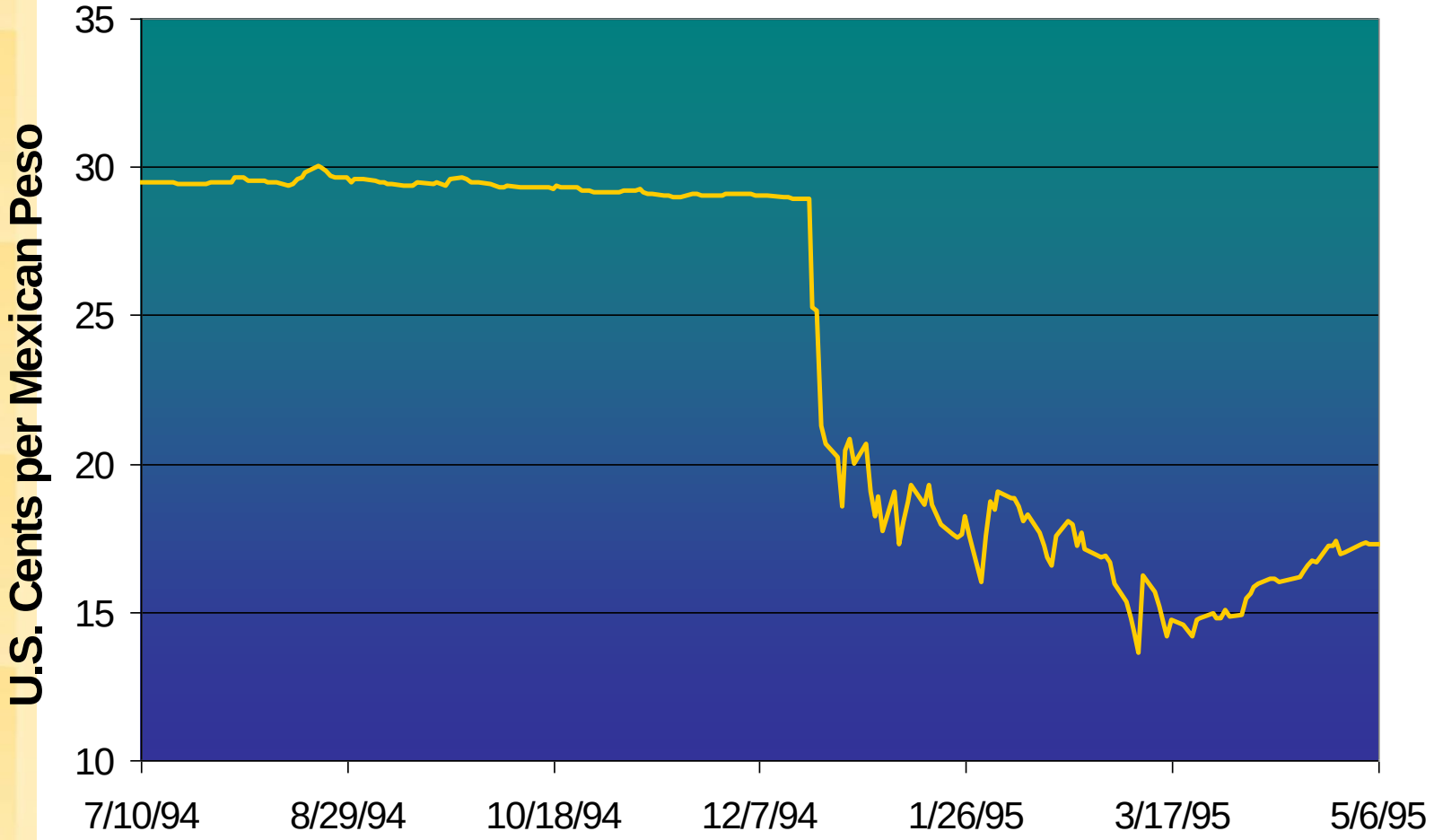
- The increase in ***Y*** occurs because
  the boost in ***NX***
  (from the depreciation)
  is even greater than the fall in ***I***
  (from the rise in ***r***).

Why income might not rise

- The central bank may try to prevent the depreciation by reducing the money supply
- The depreciation might boost the price of imports enough to increase the price level (which would reduce the real money supply)
- Consumers might respond to the increased risk by holding more money.

Each of the above would shift *LM** leftward.

CASE STUDY:
The Mexican Peso Crisis



The Peso Crisis didn't just hurt Mexico

- U.S. goods more expensive to Mexicans
  - U.S. firms lost revenue
  - Hundreds of bankruptcies along U.S.-Mex border
- Mexican assets worth less in dollars
  - Affected retirement savings of millions of U.S. citizens

Understanding the crisis

In the early 1990s, Mexico was an attractive place for foreign investment.

During 1994, political developments caused an increase in Mexico's risk premium (θ):

- peasant uprising in Chiapas
- assassination of leading presidential candidate

Another factor:
The Federal Reserve raised U.S. interest rates several times during 1994 to prevent U.S. inflation. (So, $\Delta r^* > 0$)

Understanding the crisis

- These events put downward pressure on the peso.
- Mexico's central bank had repeatedly promised foreign investors that it would not allow the peso's value to fall,

  so it bought pesos and sold dollars to "prop up" the peso exchange rate.
- Doing this requires that Mexico's central bank have adequate reserves of dollars. Did it?

Dollar reserves of Mexico's central bank

December 1993	$28 billion
August 17, 1994	$17 billion
December 1, 1994	$ 9 billion
December 15, 1994	$ 7 billion

During 1994, Mexico's central bank hid the fact that its reserves were being depleted.

the disaster

- Dec. 20: Mexico devalues the peso by 13%
  (fixes ***e*** at 25 cents instead of 29 cents)
- Investors are *shocked* ***!!!***
  …and realize the central bank must be running out of reserves…
- ↑θ, Investors dump their Mexican assets and pull their capital out of Mexico.
- Dec. 22: central bank's reserves nearly gone. It abandons the fixed rate and lets ***e*** float.
- In a week, ***e*** falls another 30%.

The rescue package

- 1995: U.S. & IMF set up $50b line of credit to provide loan guarantees to Mexico's govt.
- This helped restore confidence in Mexico, reduced the risk premium.
- After a hard recession in 1995, Mexico began a strong recovery from the crisis.

Floating vs. Fixed Exchange Rates

Argument for floating rates:

- allows monetary policy to be used to pursue other goals (stable growth, low inflation)

Arguments for fixed rates:

- avoids uncertainty and volatility, making international transactions easier
- disciplines monetary policy to prevent excessive money growth & hyperinflation

Mundell-Fleming and the *AD* curve

- Previously, we examined the M-F model with a fixed price level. To derive the *AD* curve, we now consider the impact of a change in P in the M-F model.
- We now write the M-F equations as:

$$(IS^*) \quad Y = C(Y - T) + I(r^*) + G + NX(\varepsilon)$$

$$(LM^*) \quad M/P = L(r^*, Y)$$

(Earlier in this chapter, we could write ***NX*** *as a function of* ***e*** *because* ***e*** *and* ε *move in the same direction when* ***P*** *is fixed.)*

Deriving the *AD* curve

Why *AD* curve has negative slope:

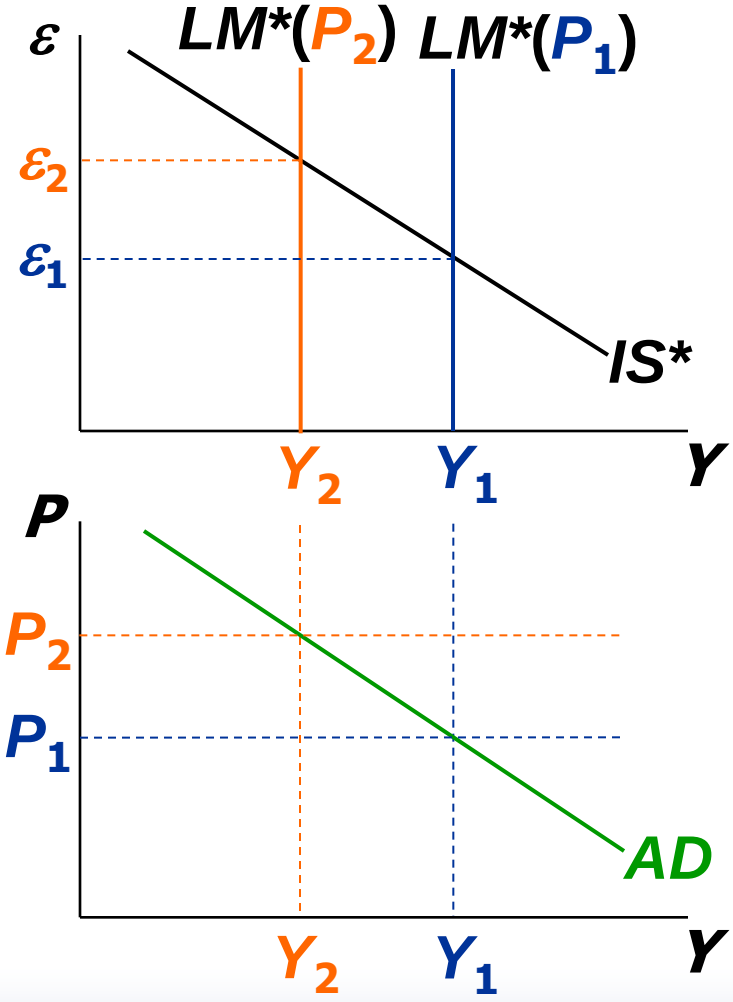
$\uparrow P \Rightarrow \downarrow (M/P)$

$\Rightarrow$ *LM* shifts left

$\Rightarrow \uparrow \varepsilon$

$\Rightarrow \downarrow NX$

$\Rightarrow \downarrow Y$

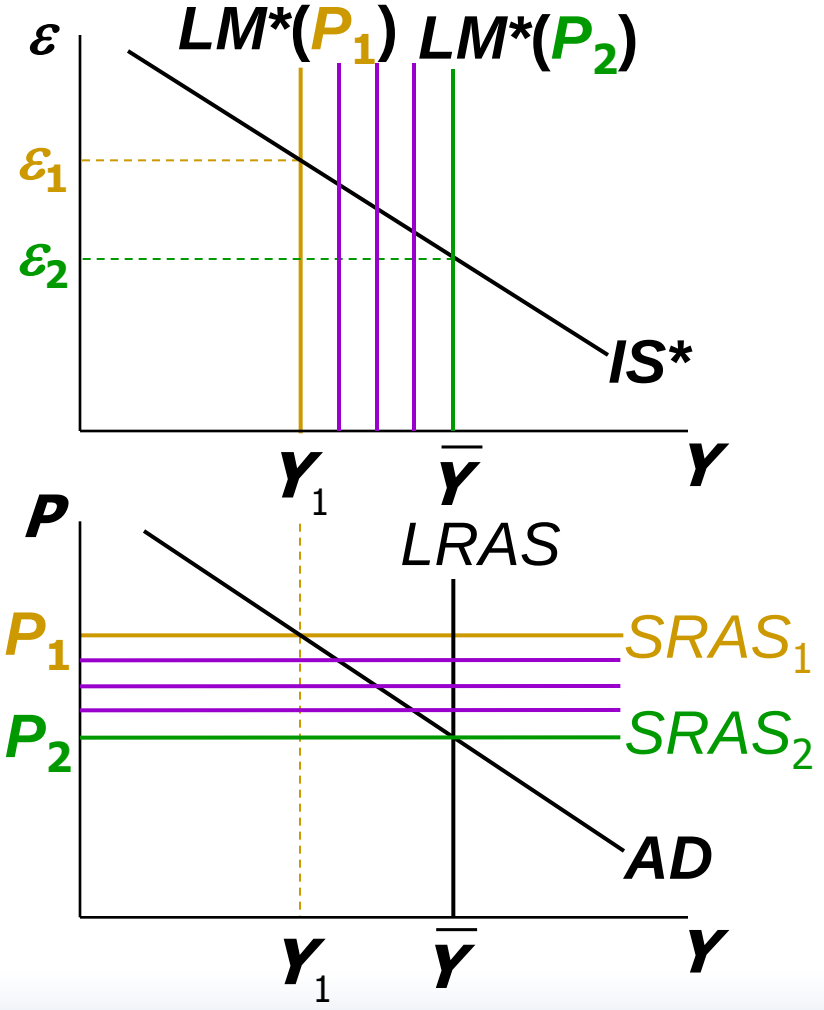


From the short run to the long run

If $Y_1 < \bar{Y}$,
then there is
downward pressure on
prices.

Over time, P will
move down, causing

- $(M/P)\uparrow$
- $\varepsilon\downarrow$
- $NX\uparrow$
- $Y\uparrow$



Chapter summary

1. Mundell-Fleming model
   - the IS-LM model for a small open economy.
   - takes ***P*** as given
   - can show how policies and shocks affect income and the exchange rate
2. Fiscal policy
   - affects income under fixed exchange rates, but not under floating exchange rates.

Chapter summary

3. Monetary policy
   - affects income under floating exchange rates.
   - Under fixed exchange rates, monetary policy is not available to affect output.
4. Interest rate differentials
   - exist if investors require a risk premium to hold a country's assets.
   - An increase in this risk premium raises domestic interest rates and causes the country's exchange rate to depreciate.

Chapter summary

5. Fixed vs. floating exchange rates
   - Under floating rates, monetary policy is available for can purposes other than maintaining exchange rate stability.
   - Fixed exchange rates reduce some of the uncertainty in international transactions.