UNIVERSITY OF CALIFORNIA
DEPARTMENT OF ECONOMICS

Economics 134
Spring 2018
Professor David Romer

LECTURE 8

REVIEW OF OPEN-ECONOMY IS-MP AND THE AD-IA FRAMEWORK
FEBRUARY 12, 2018

I. OVERVIEW

II. OPEN-ECONOMY IS-MP WITH FLEXIBLE EXCHANGE RATES
    A. Preliminaries
    B. Another piece of planned expenditures: net exports (NX)
        1. What determines NX?
        2. Key relationship between NX and net capital outflows (CF)
        3. What determines CF?
    C. How does including international factors change IS-MP?
    D. Example: An expansionary change in the monetary policy rule

III. AGGREGATE DEMAND (AD)
    A. Working toward a model of inflation and output determination
    B. Deriving the AD curve from the IS-MP framework
    C. What shifts the AD curve?

IV. INFLATION ADJUSTMENT (IA)
    A. Behavior of inflation
    B. IA curve
    C. Short-run equilibrium
    D. Transition to long-run equilibrium

V. APPLICATION: RECENT CHANGES IN U.S. FISCAL POLICY
    A. Background: Recent fiscal developments
    B. Effect in IS-MP framework
    C. Effect in the AD-IA framework
    D. Return to long-run equilibrium
    E. Where do we end up?
    F. Discussion

LECTURE 8
Review of Open Economy IS-MP and the AD-IA Framework

February 12, 2018

Announcements

- An answer sheet to Problem Set 1 has been posted on the course website. You should study it carefully.

- The start of lecture on Wednesday will be set aside for you to fill out an "Early Feedback" form.

- I would like each of you to set a goal of speaking in lecture at least once this semester.

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LECTURE 7
Monetary Factors in the
Great Depression (concluded)

0. EXPECTED INFLATION IN THE IS-LM MODEL (REVISITED)

Real versus Nominal Interest Rates

$$i \equiv r + \pi^e$$

- i is the nominal rate

- r is the real rate

- π^e is expected inflation

$$r \equiv i - \pi^e$$

How Expected Inflation Affects the IS-LM Diagram

- As we have discussed, we can use the money market diagram to find the **nominal** interest rate that causes money demand and money supply to be equal for a given Y.

- $r \equiv i - \pi^e$.

- So, the **real** interest rate that causes money demand and money supply to be equal for a given Y is the nominal rate that we find using the money market diagram minus expected inflation.

Expected Inflation in IS-LM
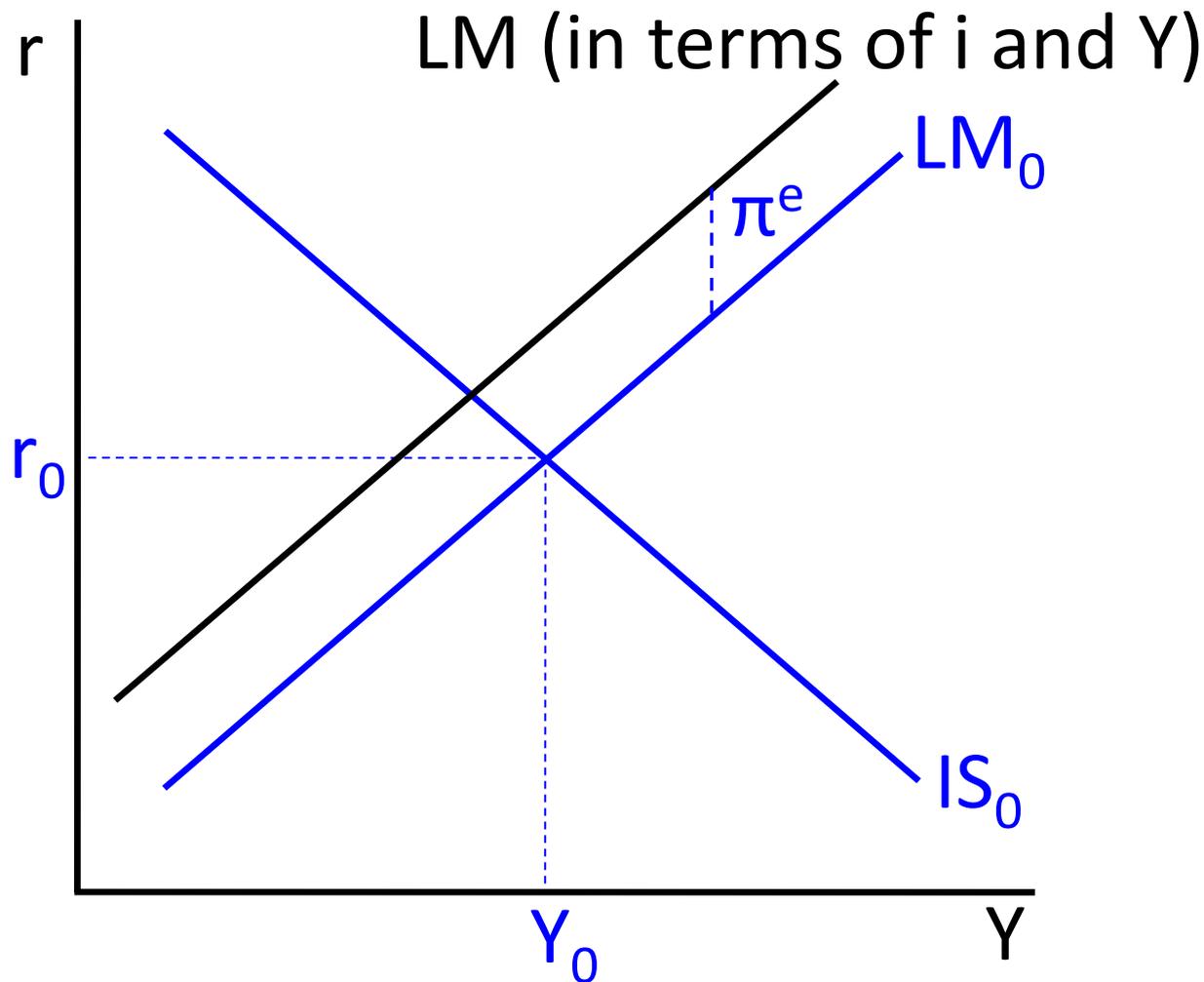
We subtract off π^e from each point on the LM curve in terms of i and Y to get the LM curve in terms of r and Y.

Fall in Expected Inflation in IS-LM

$LM_1 (\pi_1^e)$

$LM_0 (\pi_0^e)$

$\pi_0^e - \pi_1^e$

$\pi_1^e < \pi_0^e$

r_1

r_0

IS_0

Y_1 Y_0

r

Y
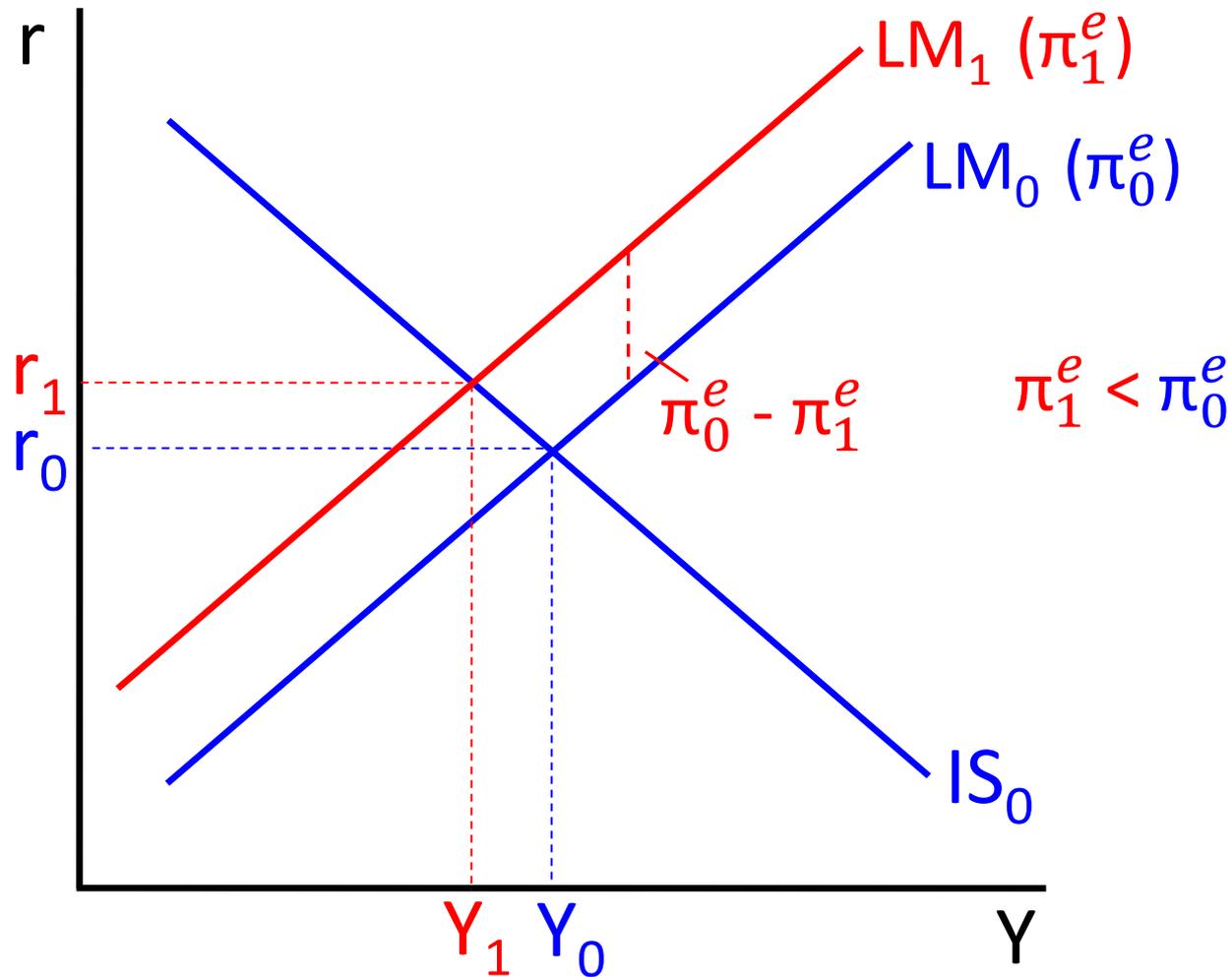
LM curve shifts up by the fall in π^e.

Effect of a Fall in Expected Inflation in IS-LM

- A fall in π^e shifts the LM curve (in terms of r and Y) up.

- The LM curve shifts up by the fall in π^e $(\pi_0^e - \pi_1^e)$.

- r rises and Y falls.

What happens to i when there is a fall in expected inflation?

- $i \equiv r + \pi^e$

- r rises, which tends to increase i.

- π^e falls, which tends to decrease i.

- r rises by less than π^e falls, so *i falls*.

- A fall in expected inflation (to expected deflation) can help explain why real rates rose and nominal rates fell in the early 1930s.

The Impact of a Fall in Expected Inflation on i
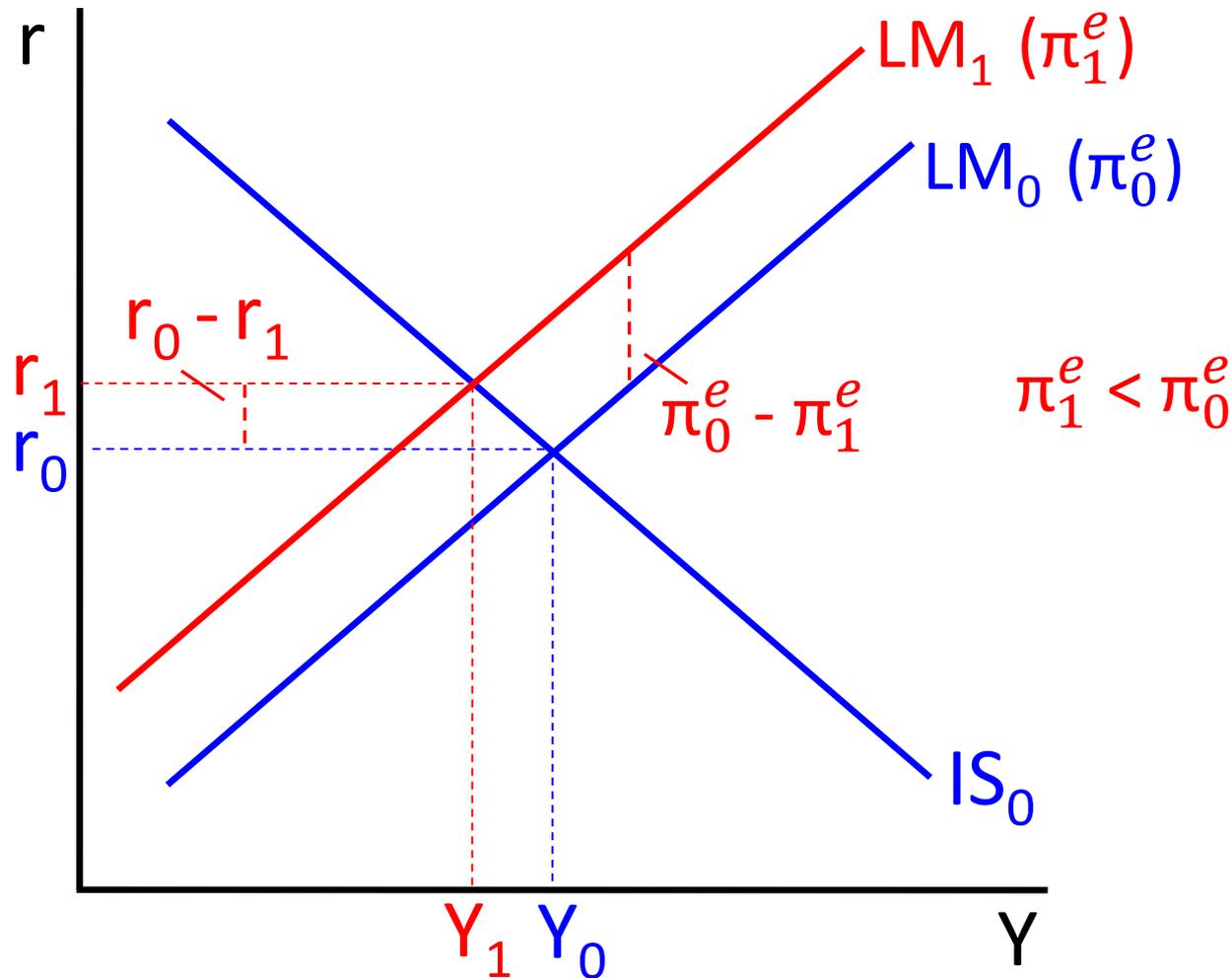
The rise in r (the distance from r_0 to r_1) is less than the fall in π^e (the distance from LM_0 to LM_1).

Another Way to See that i Falls: Incorporate the Fact from the IS-LM Diagram that Y Falls into the Money Market Diagram
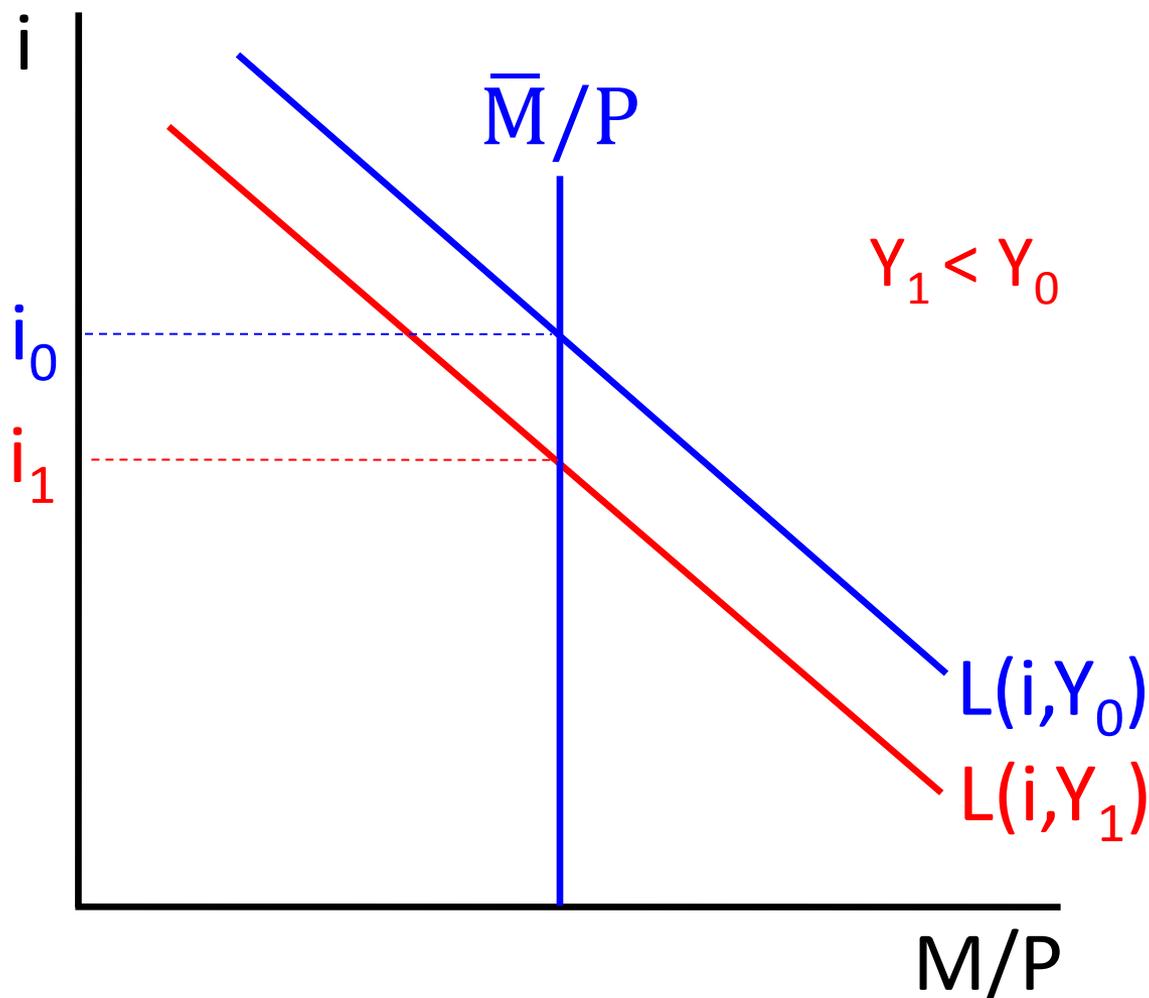
TABLE 3—ACTUAL AND EXPECTED INFLATION, 1929–1933

	Expected inflation		
Quarter	MA(2) model	AR(1) model	Interest-rate model
1929:1	−0.81	−2.73	−0.43
1929:2	−6.30	−2.09	−4.20
1929:3	2.27	0.55	−8.37
1929:4	7.03	4.17	0.10
1930:1	−2.83	−1.75	−5.32
1930:2	−8.09	−4.27	−3.99
1930:3	−0.13	−2.40	−3.98
1930:4	−1.46	−3.98	−3.29
1931:1	−8.96	−7.89	1.04
1931:2	−8.24	−9.60	−7.77
1931:3	−4.62	−8.69	−12.14
1931:4	0.08	−1.81	−10.29
1932:1	−5.46	−9.02	−18.08
1932:2	−12.43	−10.58	−12.96
1932:3	−3.60	−8.41	−12.20
1932:4	1.48	−3.94	−1.21
1933:1	−4.68	−6.48	22.07
1933:2	−10.48	−11.75	12.39
1933:3	7.07	3.51	−4.04
1933:4	22.97	16.62	4.47

Source: Stephen Cecchetti, *American Economic Review*, March 1992.

There was a large fall in expected inflation in 1930 and 1931.

Narrative Evidence from *Business Week*

- Expected deflation after mid-1930.

- Monetary developments and Fed policy were a key source of expectations of deflation.

- "Our idle gold hoard piles up without increasing the means of payment by credit expansion because of paralysis of banking policy, thus prolonging price deflation" (4/29/31, cover).

00. October 1931

(Note: Slides on Oct. 1931 are in the Lecture 7 slides)

LECTURE 8

Review of Open Economy IS-MP and the AD-IA Framework

I. Overview of Where We Are Headed

IS-LM Useful for the Great Depression

- Key story of the Depression is a collapse in aggregate demand.

- IS-LM useful for understanding the sources of the decline in demand.

- International factors present, but not essential.

- Likewise, inflation adjustment present, but swamped by the collapse in demand.

Need a Richer Model for the Postwar Era

- Useful to incorporate international trade and flexible exchange rates.

- Need a framework that includes inflation adjustment.

II. Open-Economy IS-MP with Flexible Exchange Rates

Preliminaries

- Working with IS-MP because we are focusing on the postwar period.

  - Fed has been conducting policy in terms of the interest rate for most of this period, so MP is appropriate.

- Only doing the case of flexible exchange rates.

Real Exchange Rate (ε)

- Number of units of foreign goods we can obtain by buying 1 less unit of domestic goods.

- For ε between the dollar and some foreign currency, a rise in ε is a real appreciation of the dollar.

- Note: We can write ε as eP/P^*, where e is the number of units of foreign currency we can get with 1 unit of domestic currency (so e is the **nominal** exchange rate), P is the price of domestic goods in terms of domestic currency, and P^* is the price of foreign goods in terms of foreign currency. However, we will generally work directly with ε.)

Planned Expenditures

- $E = C(Y-T) + I(r) + G + NX$

- NX (Net Exports) is Exports - Imports

- Proximate determinant of net exports is the real exchange rate: $NX = NX(\varepsilon)$

- Relationship is negative: A rise in ε lowers NX.

Key Relationship between NX and CF

- Quantity of dollars supplied in foreign currency market must equal the quantity demanded

- Supply of Dollars: Imports (M) + Capital Outflows (CO)

- Demand for Dollars: Exports (X) + Capital Inflows (CI)

- M + CO = X + CI

- CO – CI = X – M

- Net Capital Outflow (CF) = Net Exports (NX)

What Determines CF?

- The real interest rate in U.S.

- CF = CF(r)

- Relationship is negative.

- A higher r in U.S. reduces CF.

A Helpful Substitution

- $E = C(Y-T) + I(r) + G + NX(\varepsilon)$

- Since $CF(r) = NX(\varepsilon)$, we can write instead:

$$E = C(Y-T) + I(r) + G + CF(r)$$

- Now two pieces of planned expenditures depend negatively on r.

A Rise in the Interest Rate in the Closed Economy Keynesian Cross

$E = Y$

$E = C(Y-T) + I(r_0) + G$

$E = C(Y-T) + I(r_1) + G$

$r_1 > r_0$
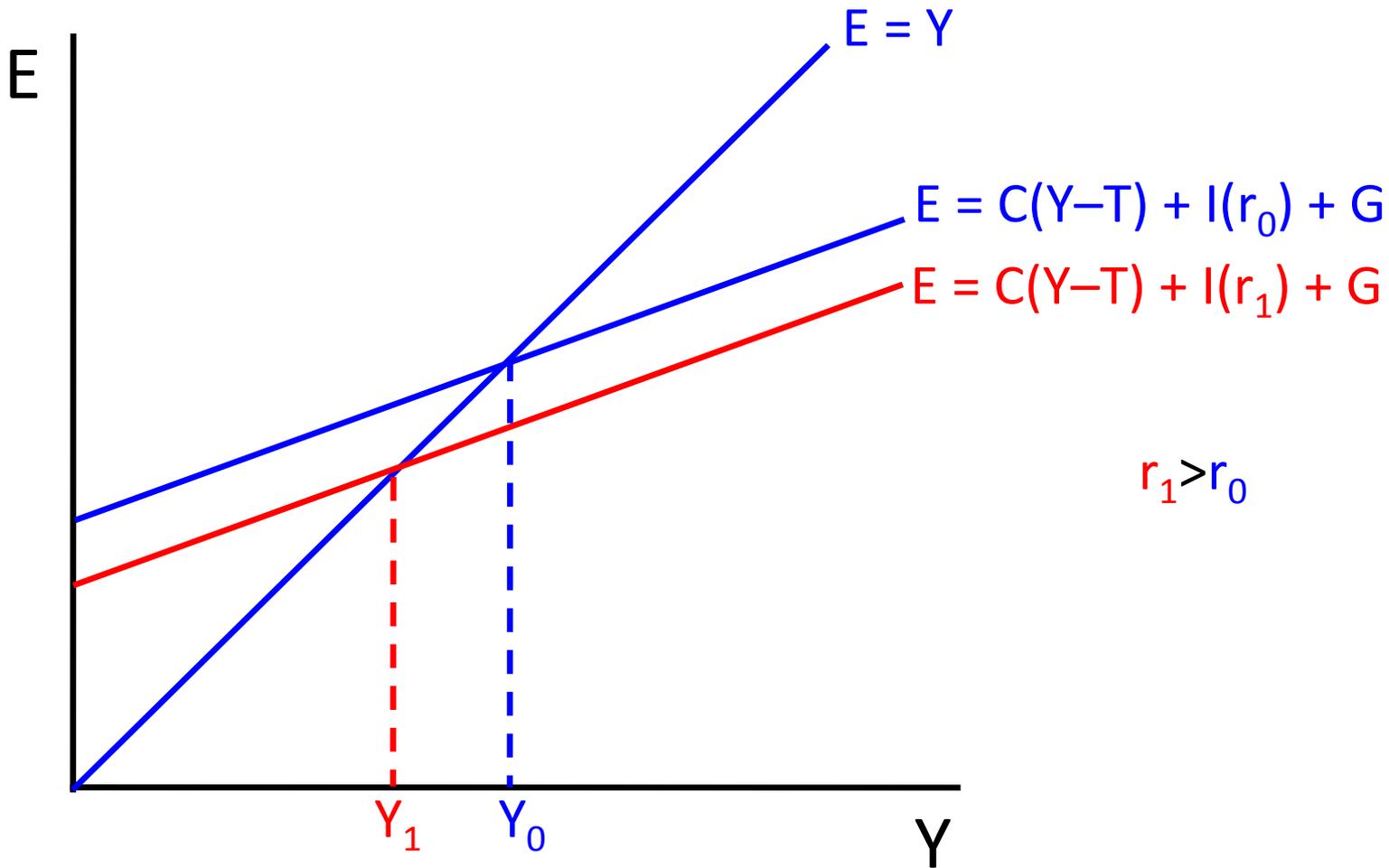
E shifts down for only one reason: $I = I(r)$.

A Rise in the Interest Rate in the Open Economy Keynesian Cross

$E = Y$

$E = C(Y-T) + I(r_0) + G + CF(r_0)$

$E = C(Y-T) + I(r_1) + G + CF(r_1)$

$r_1 > r_0$
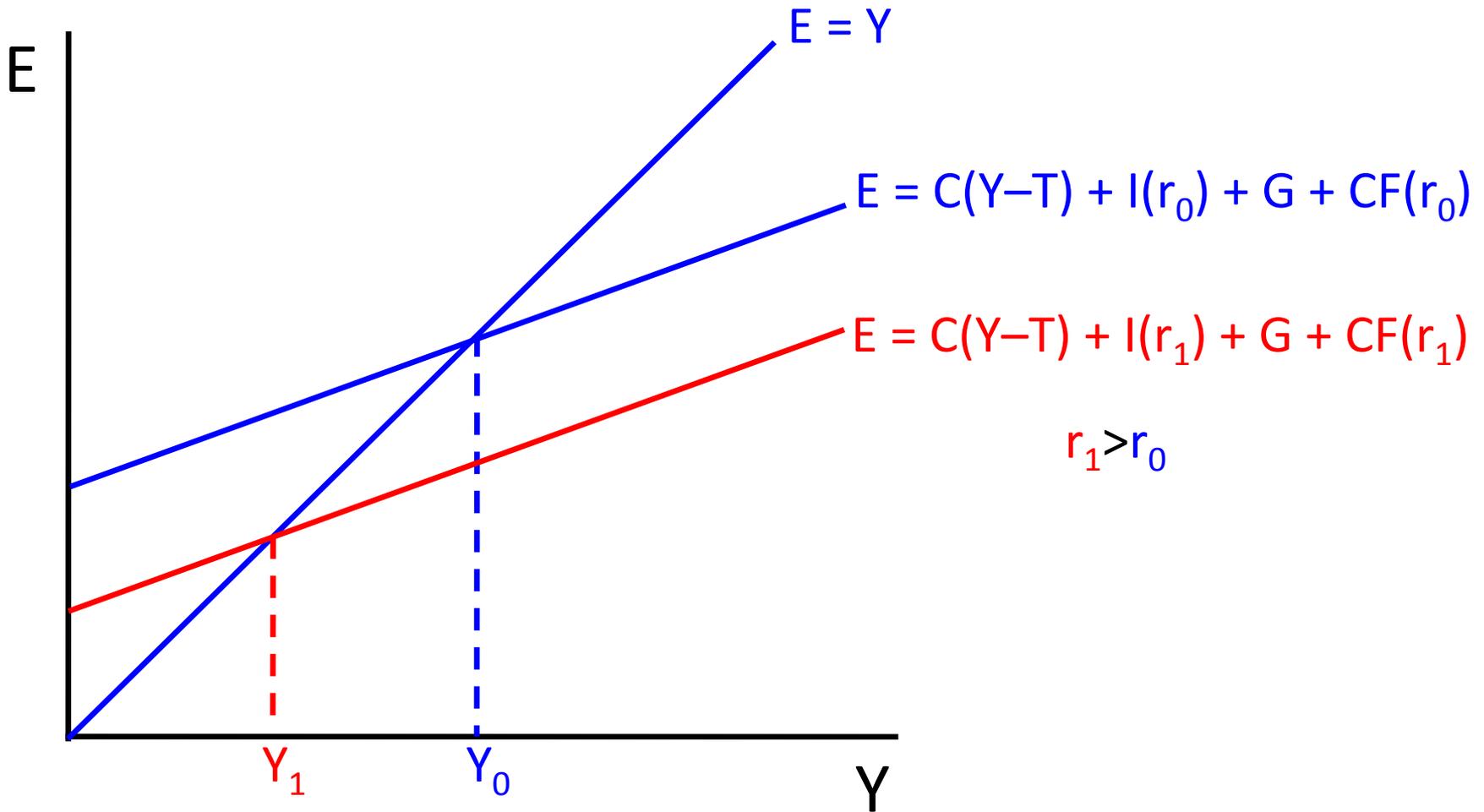
E shifts down for two reasons: $I = I(r)$ and $CF = CF(r)$.

Closed-Economy vs. Open-Economy IS
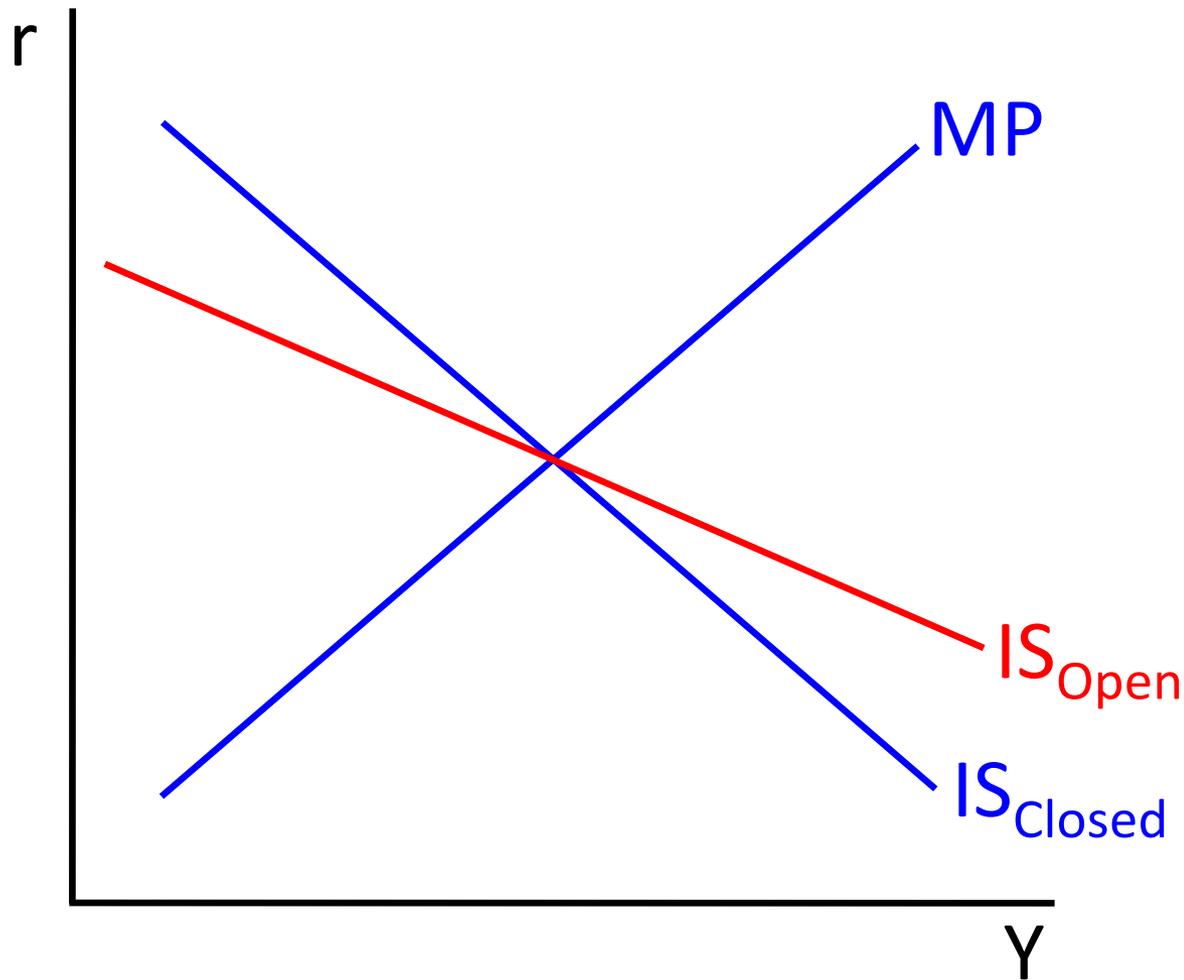
Open-economy IS is flatter because spending is more sensitive to r.
Question: What is happening to ε as we move down along IS_{Open}?

Expansionary Change in MP Rule in an Open Economy
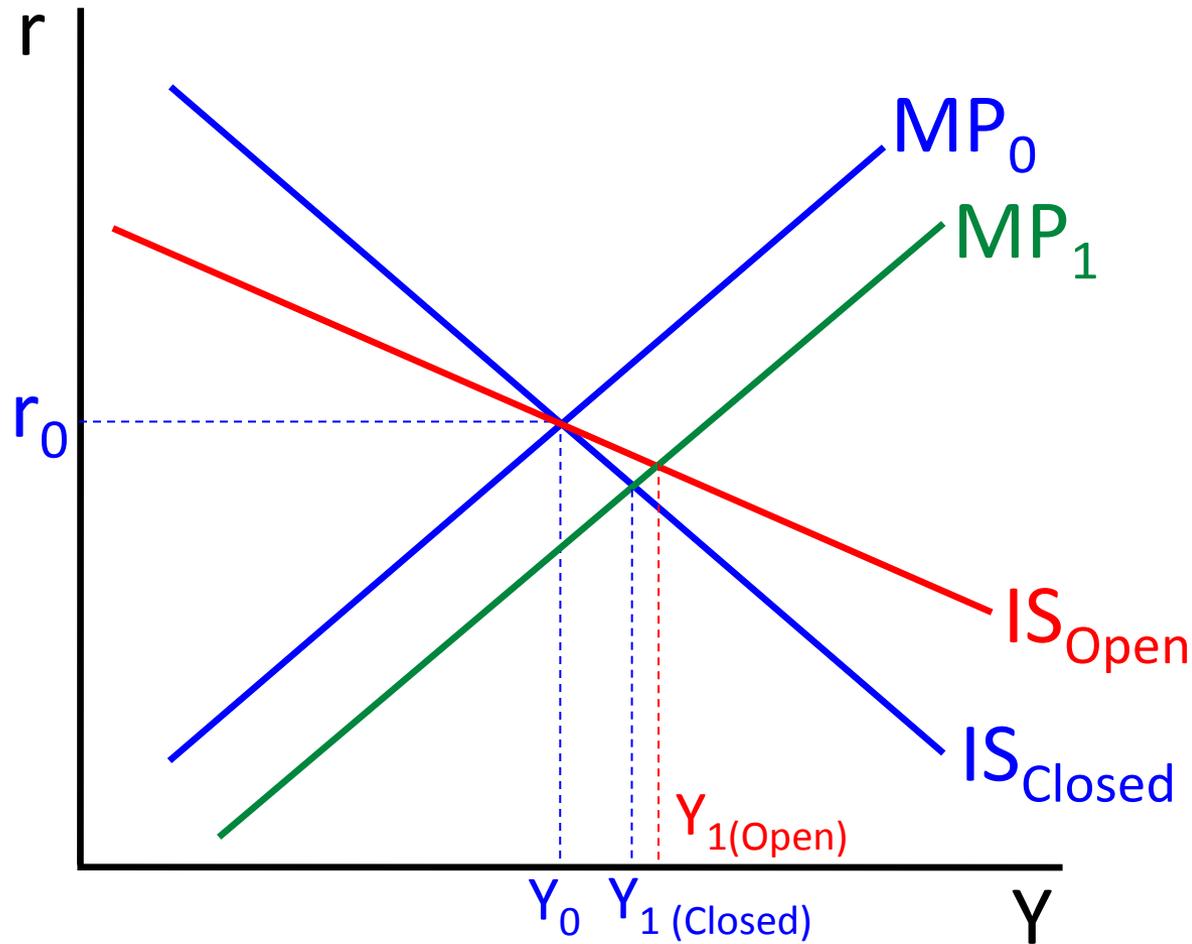
Monetary policy changes have more impact in an open economy.

What happens to the real exchange rate in response to the shift in MP?

- r fell, so CF(r) rises.

- CF = NX, so NX must rise as well.

- What makes NX rise? The real exchange rate falls.

- The dollar depreciates.

III. AGGREGATE DEMAND

Where we are headed: AD-IA
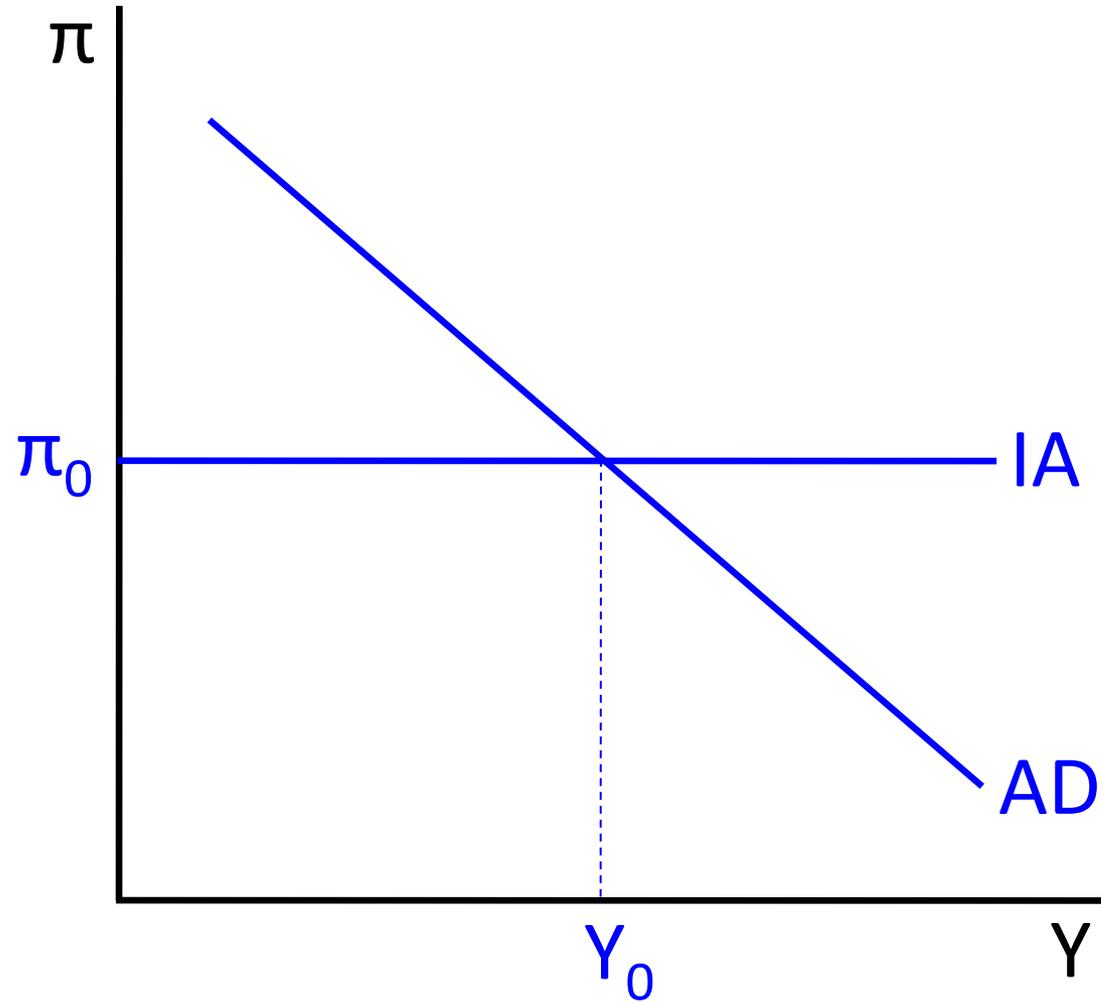
Impact of Inflation in IS-MP

- No impact on IS curve

- MP curve shows Fed's policy rule for the real interest rate.

- $r = r(Y, \pi)$, where π is inflation.

- $r(Y, \pi)$ is an increasing function of both arguments.

- Since we draw $r = r(Y)$, a change in π shifts the MP curve.

π is a shift variable for the MP Curve in (Y,r) space

$\pi_1 > \pi_0$
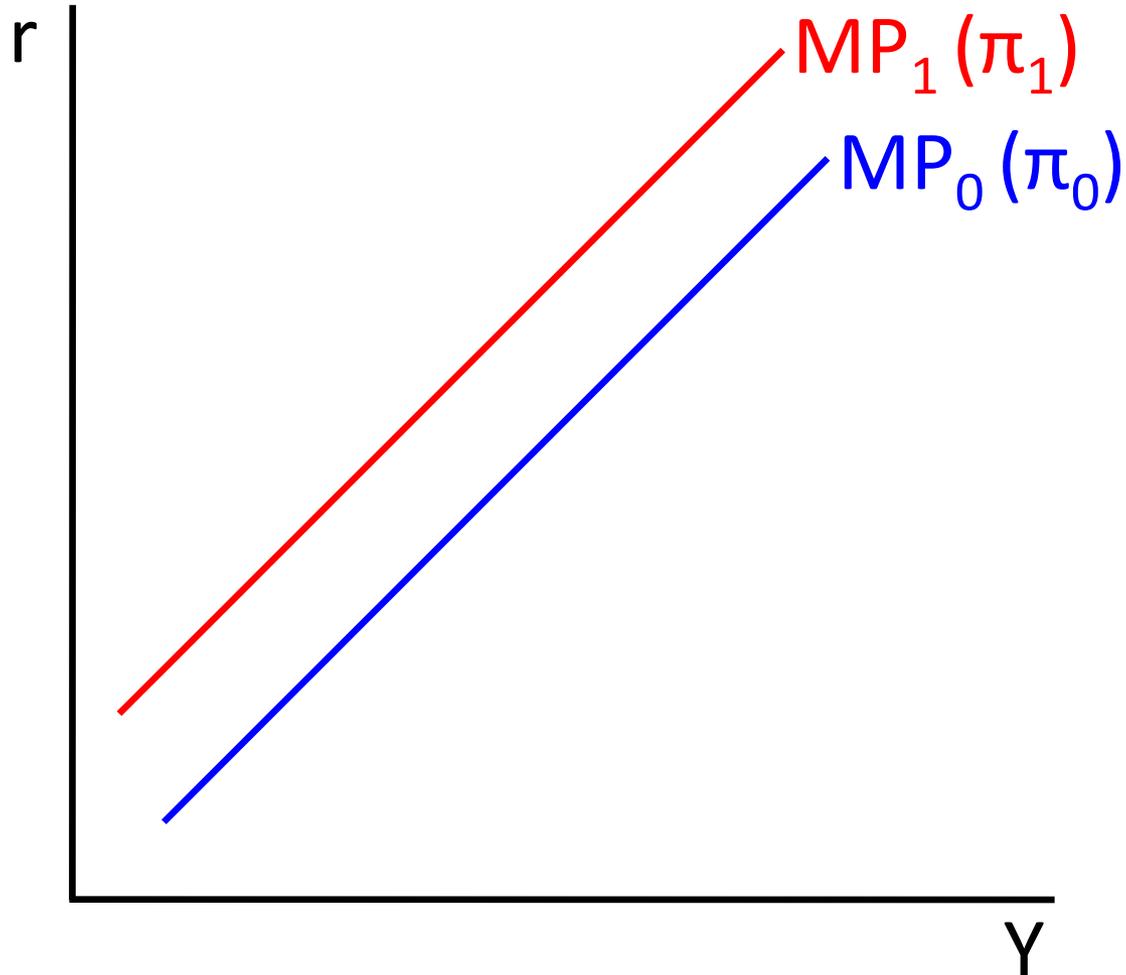
Derivation of the Aggregate Demand (AD) Curve
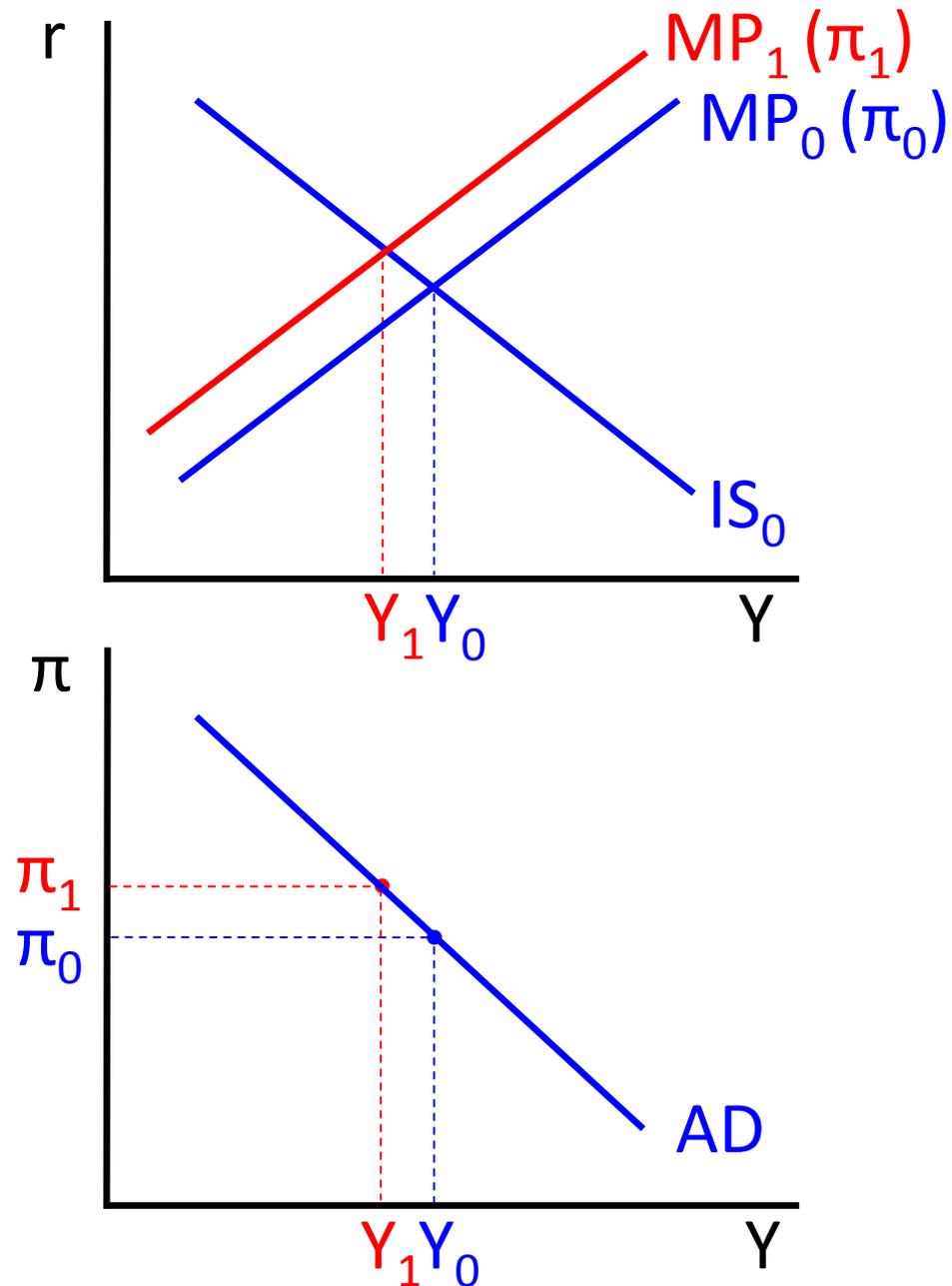
What Shifts the AD Curve?

- Anything other than inflation that shifts the IS or MP curves.

- A change in government spending (G) or taxes (T).

- Change in animal spirits.

- A change in Federal Reserve tastes.

IV. INFLATION ADJUSTMENT

Key Assumptions about Inflation Behavior

- At a point in time, inflation is given.

- When $Y > \overline{Y}$, inflation gradually rises.

- When $Y < \overline{Y}$, inflation gradually falls.

- When $Y = \overline{Y}$, inflation is constant.

- Note: $\overline{Y}$ is normal or potential output – the level of output that prevails when prices are fully flexible.
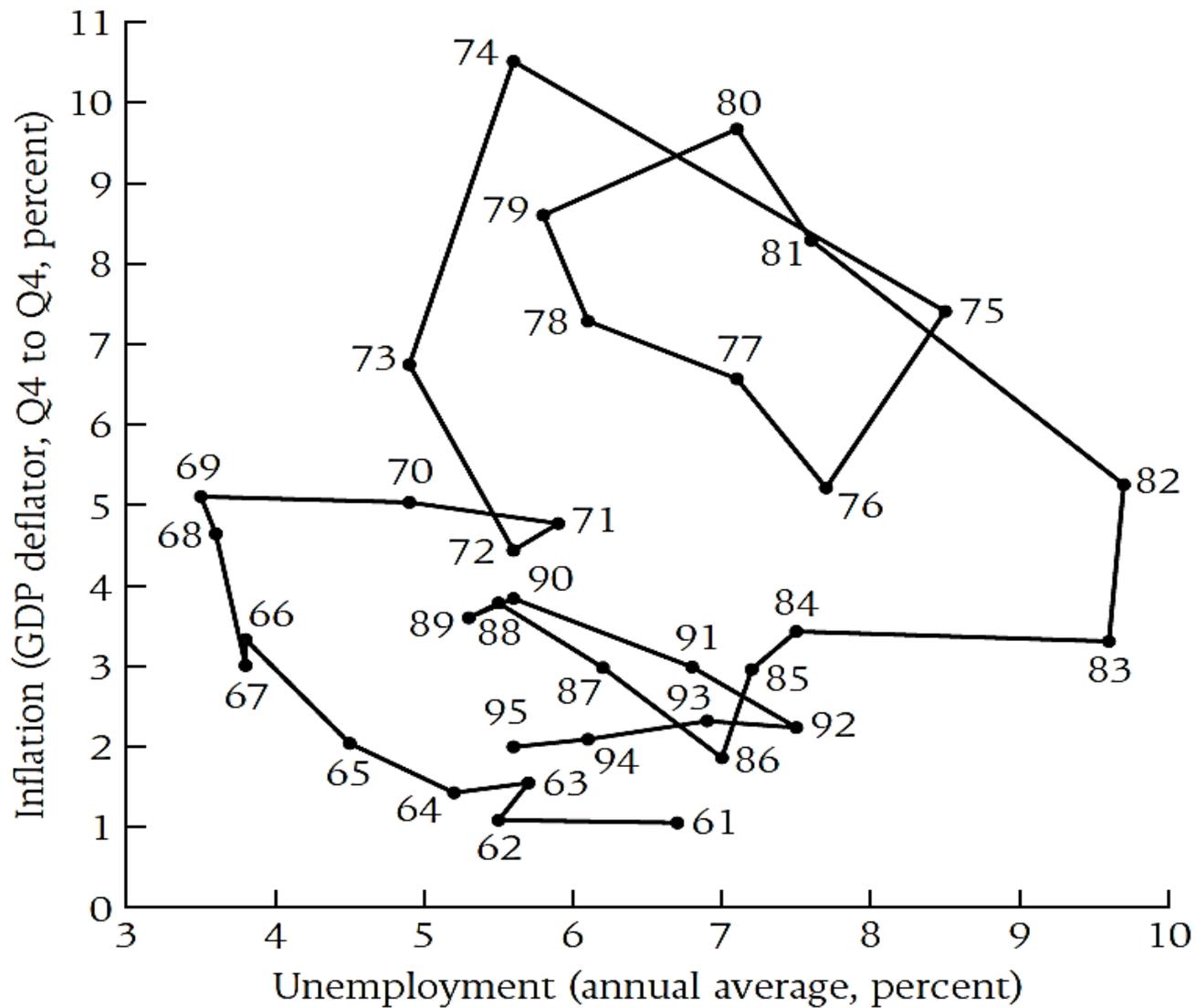
FIGURE 6.7 Unemployment and inflation in the United States, 1961–1995
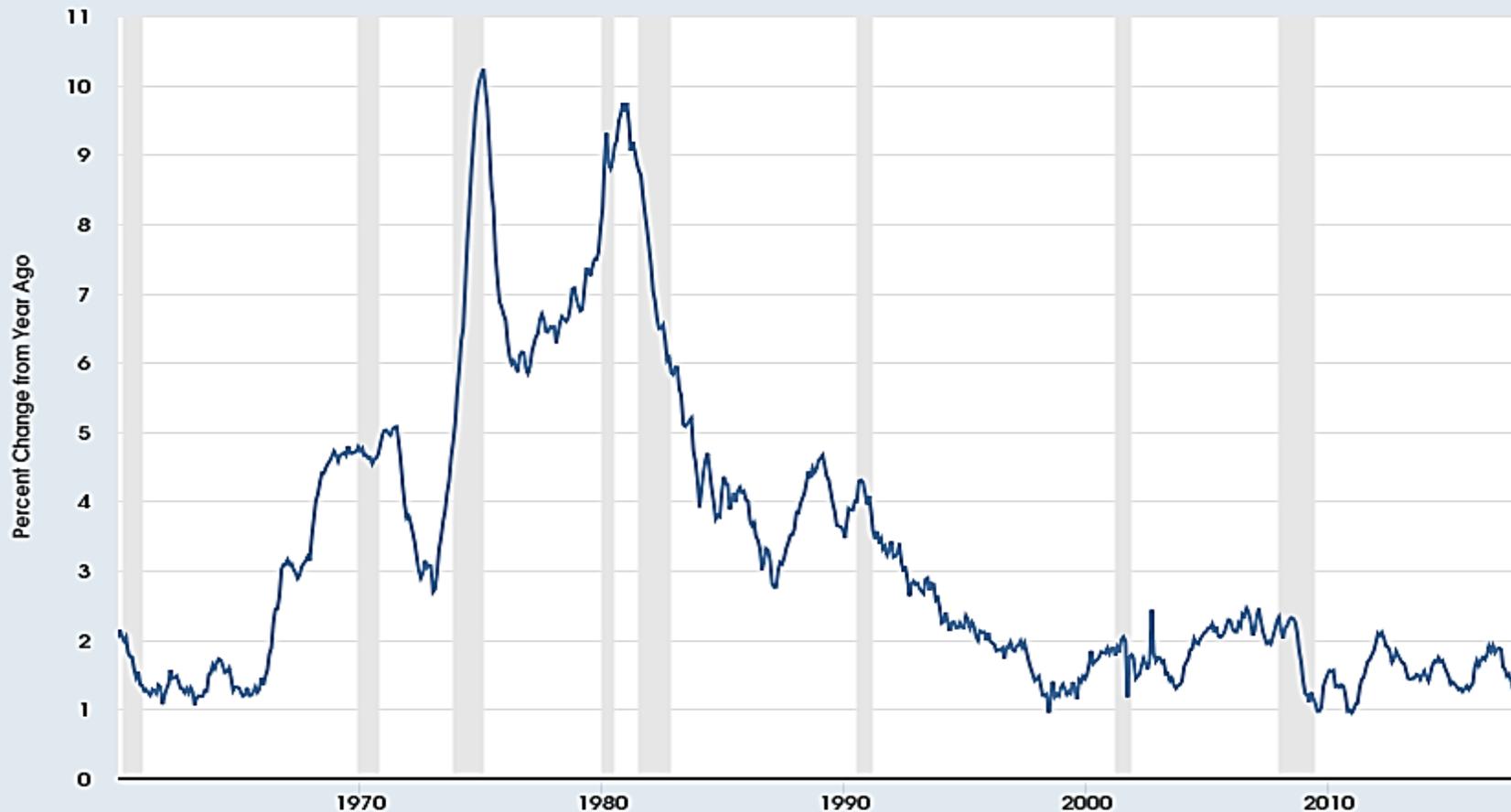
Inflation fell less in the Great Recession and the (subsequent period of continued high unemployment) than in previous recessions.

Two Important Points

- Inflation does not respond immediately to deviations of output from potential.

- We are talking about inflation, not prices. Output below potential causes the rate of inflation to fall from one positive number to a smaller positive number.

Inflation Adjustment Curve (IA)
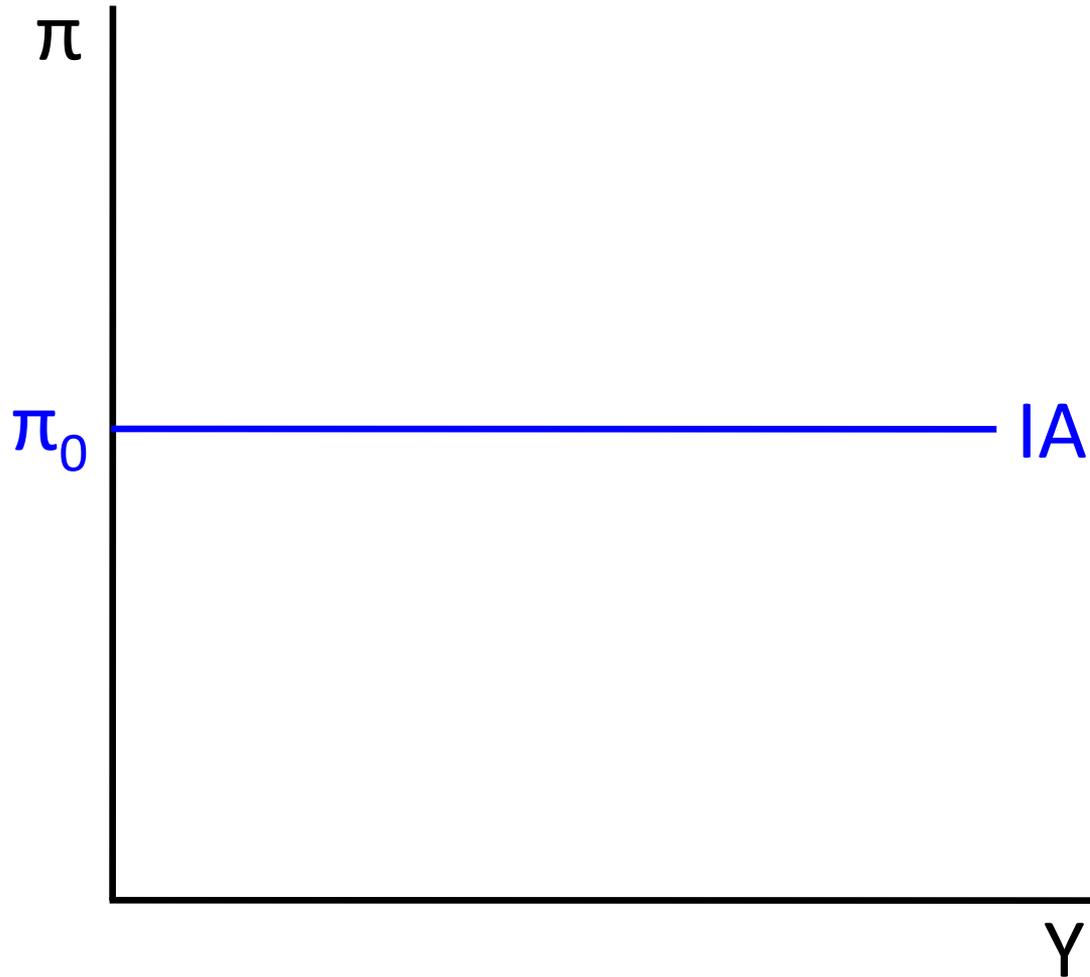
Short-Run Equilibrium
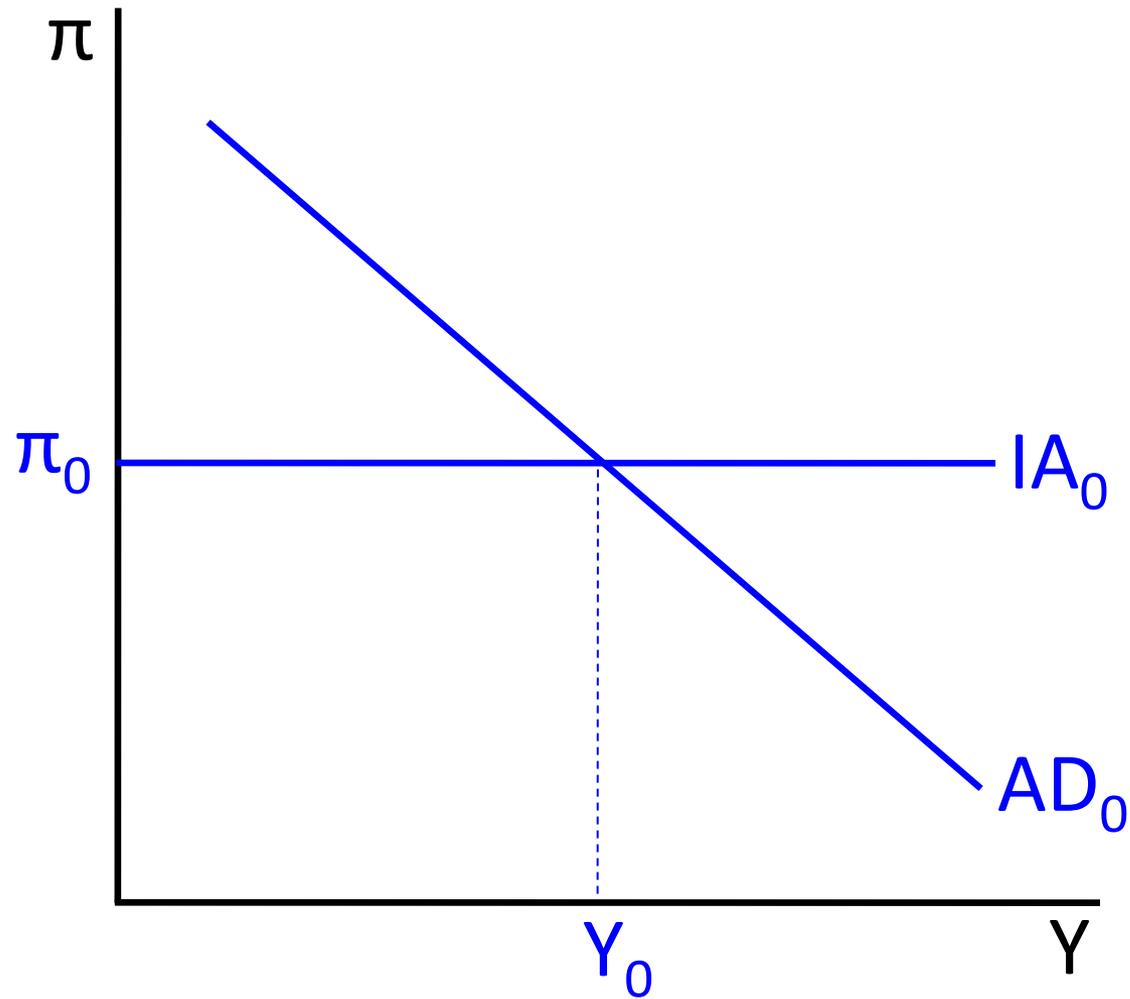
AD/IA Intersect below $\overline{Y}$
## IA will shift down.

π

π_0 IA$_0$

π_{LR} IA$_{LR}$

AD$_0$

Y_0 $\overline{Y}$ Y
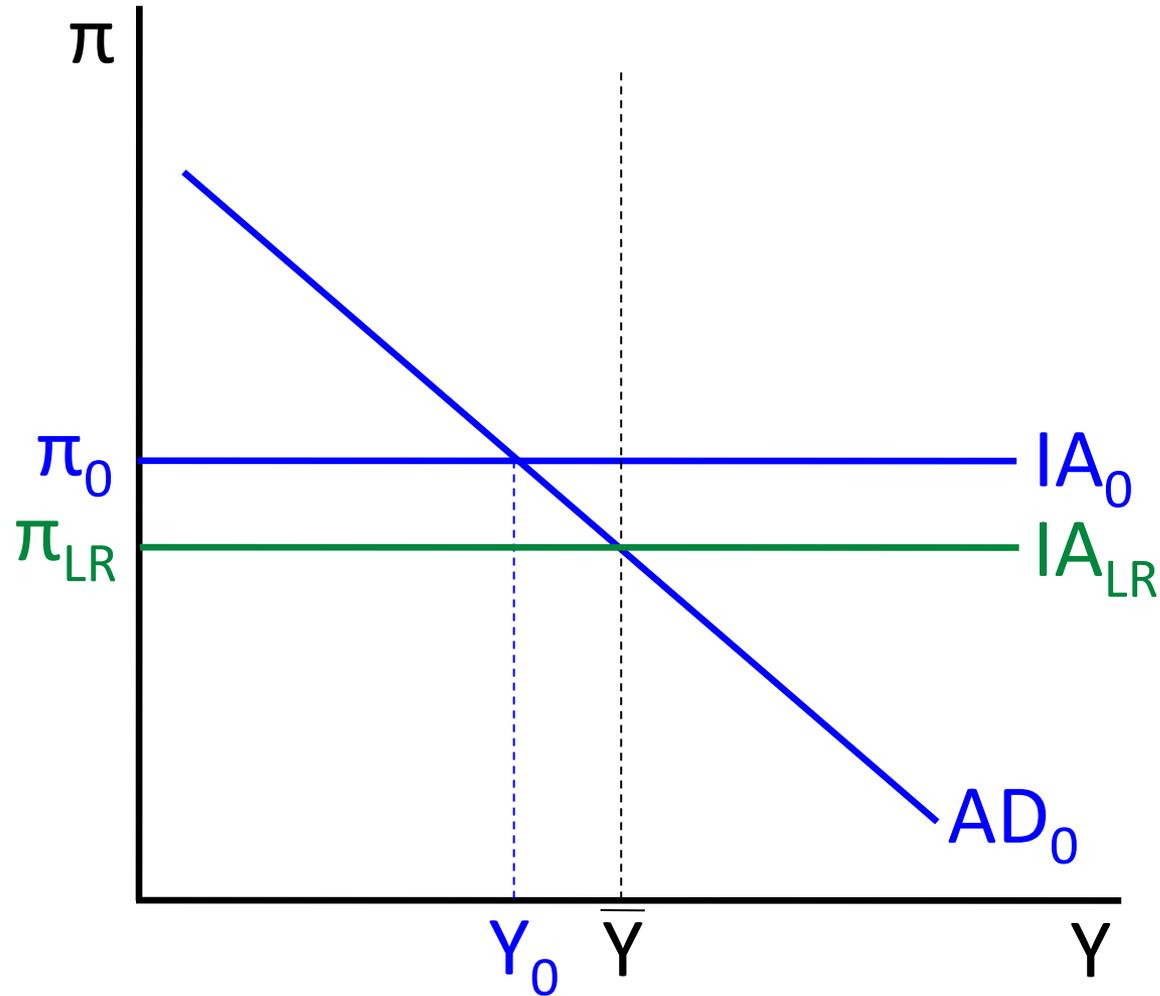
AD/IA Intersect above $\overline{Y}$
IA will shift up.
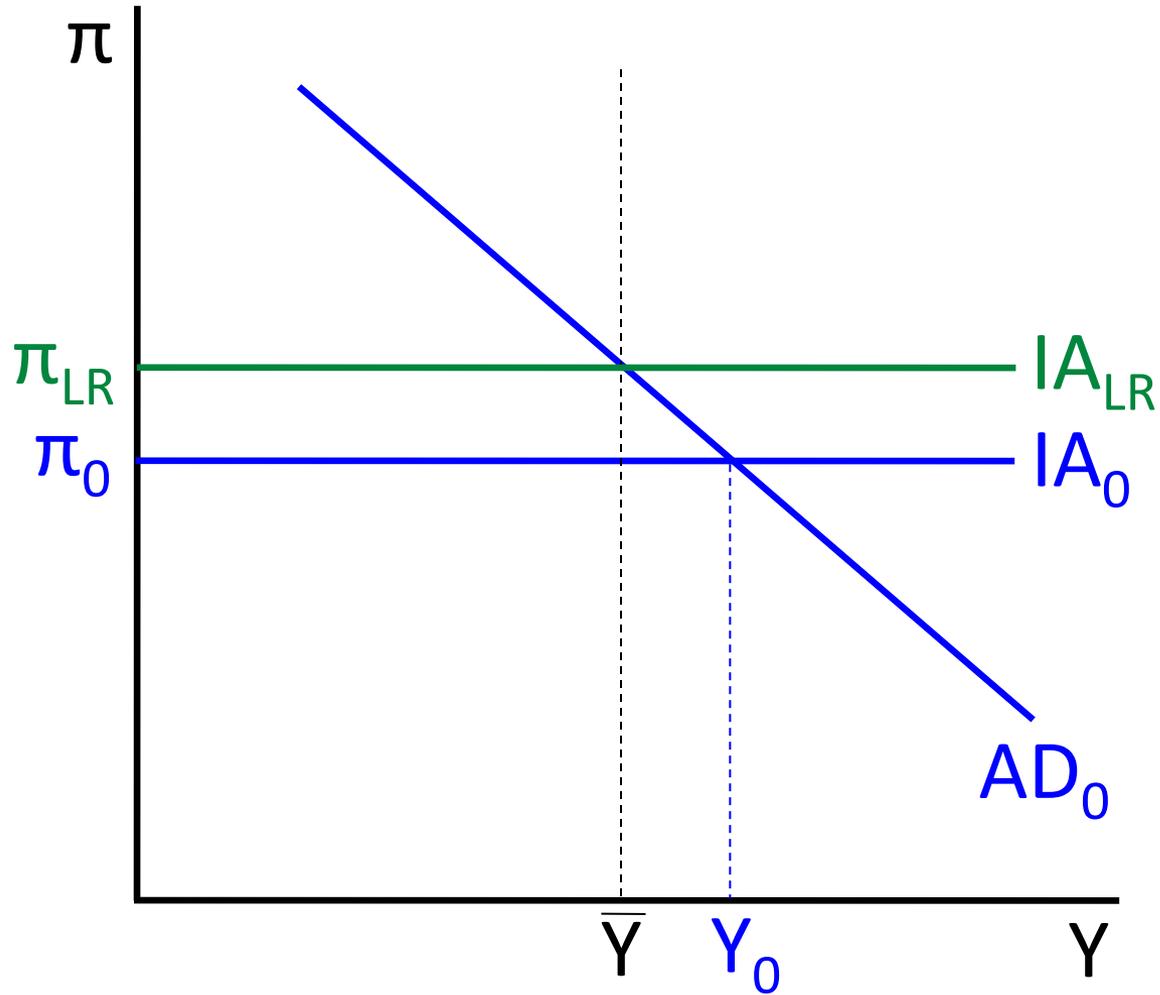
AD/IA Intersect at $\overline{Y}$
Long-Run Equilibrium

π

π_0 — IA$_0$

AD$_0$

Y_0
$\overline{Y}$

Y
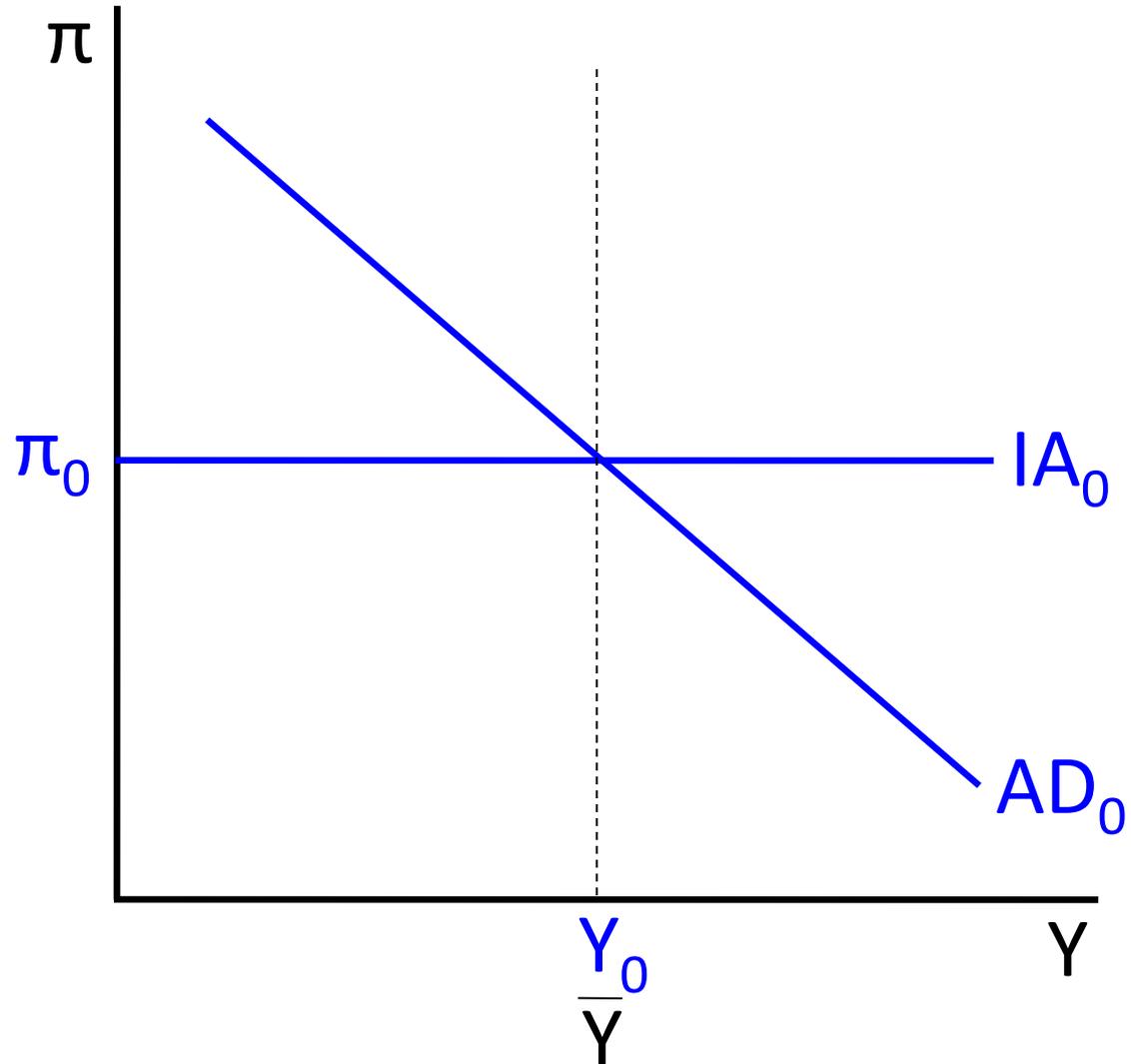
Long-Run Equilibrium r
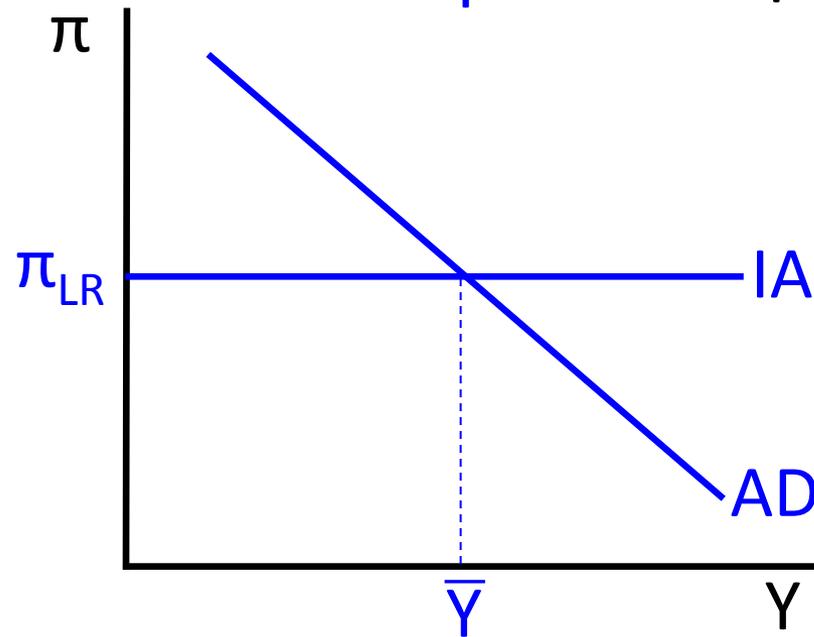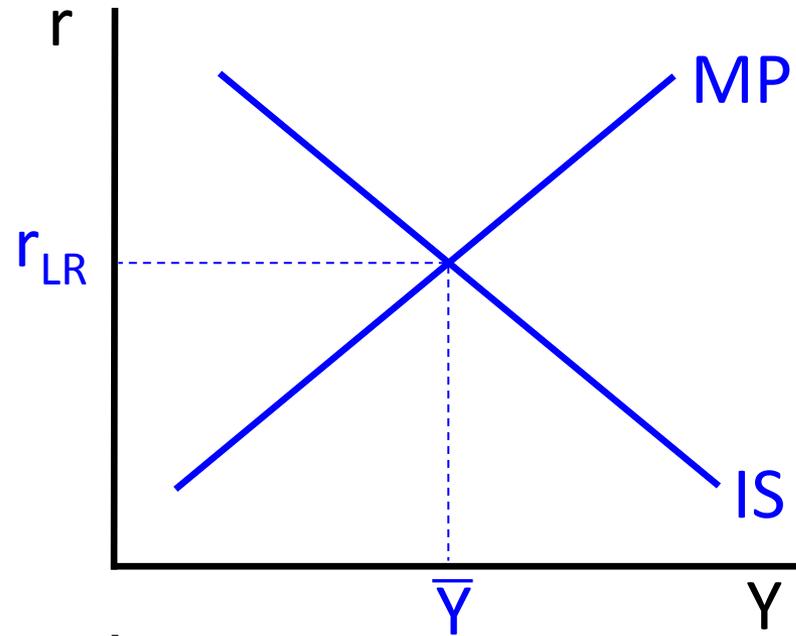
V. APPLICATION: RECENT CHANGES IN U.S. FISCAL POLICY

Recent U.S. Fiscal Developments

- Since last June, the projected deficit for fiscal year 2019 has risen from $700 billion (3% of GDP) to $1.2 trillion (6% of GDP).

- The change is entirely the result of changes in policy, not in the health of the economy: roughly $300 billion from the tax bill, and roughly $200 billion from the budget agreement.

- Most observers think that output is currently very close to potential ($Y \approx \bar{Y}$).

A Decrease in T and an Increase in G
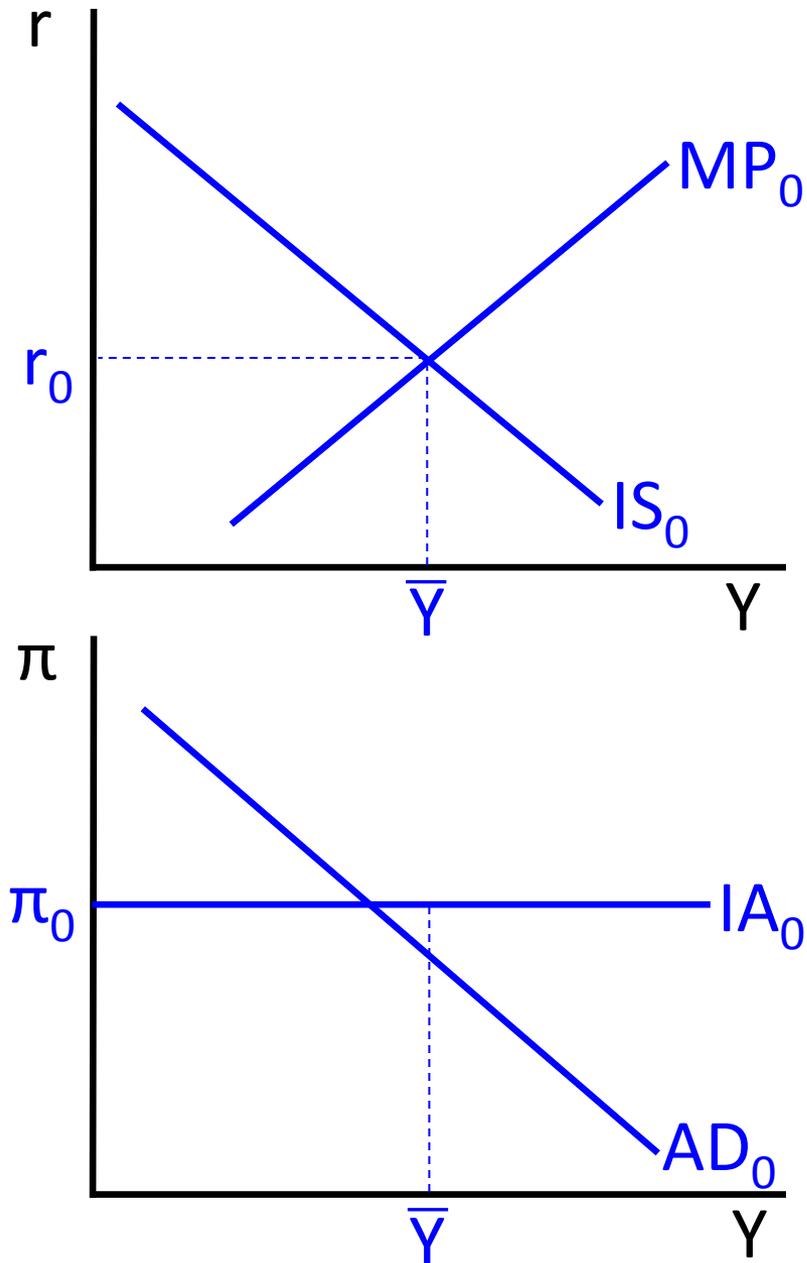
Impact of a Decrease in T and an Increase in G

What Happens to the Real Exchange Rate (ε)?

What Other Disadvantages Might There Be to the Fiscal Developments?

What Advantages Might There Be to the Fiscal Developments?