

EE432 Monetary Theory and Policy



Final Exam Recap II
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Chapter 21



Output, Inflation, and Monetary Policy

Output and Inflation in the Long Run

- **Fluctuations** in the *business cycle* are *deviations from long-run equilibrium level*.
- In the long run, **current output** equals *potential output* and the **inflation rate** equals the **level implied by the rate of money growth**.

Potential Output

- **Potential output** is the *level of output given existing technology and the normal use of resources*.
- If *the increase in demand is permanent*, firms will *change their scales of business*.
- *Technological improvements* allow them to *increase production* at given levels of *capital and labor*.

Potential Output

- **Potential output** *tends to rise* over time.
- **Unexpected events** can push current output away from *potential output* called an **output gap**
- For example, when ***current output*** is **above** ***potential***, it creates an **expansionary output gap**.

Long-Run Inflation and Money Growth

- Money growth plus the change in the velocity of money *equals* inflation plus real economic growth

$$\% \Delta M + \% \Delta V = \% \Delta P + \% \Delta Y$$

In the long run :

$$\% \Delta Y = \% \Delta Y^P$$

$$\% \Delta V = 0$$

Therefore :

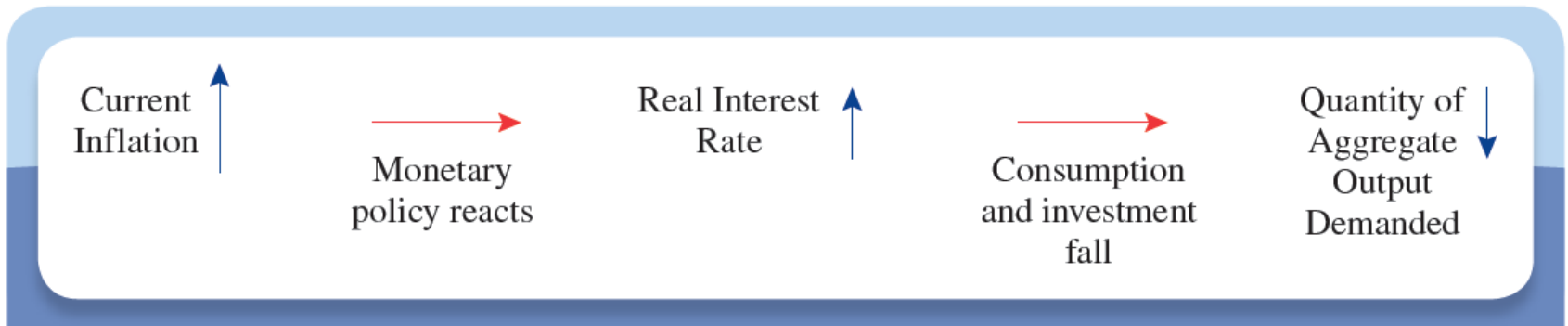
$$\% \Delta P = \% \Delta M - \% \Delta Y^P$$

- In the long run, inflation equals *money growth minus growth in potential output.*

Monetary Policy and the Dynamic Aggregate Demand Curve

Figure 21.1

Inflation, Monetary Policy, and Aggregate Demand



Monetary Policy and the Dynamic Aggregate Demand Curve

- 1. Aggregate expenditure and the real interest rate:**
 - There is a *downward sloping* relationship.
- 2. Inflation and the real interest rate, and the monetary policy reaction curve:**
 - There is an *upward sloping* relationship that we call the *monetary policy reaction curve*.
- 3. Inflation and aggregate output :**
 - This is a *downward sloping* relationship, which represents **the dynamic aggregate demand curve**.

Monetary Policy and the Dynamic Aggregate Demand Curve

- **Economic decisions** *depend on* the **real interest rate**, not the nominal interest rate.
- **Central banks** must therefore *influence the real interest rate*.

Monetary Policy and the Dynamic Aggregate Demand Curve

- Remember that $i = r + \pi^e$
solving for r :
 $r = i - \pi^e$
- **For a central bank that *effectively stabilize inflation and output*, **inflation expectations adjust slowly** to changes in economic conditions.**
- The ***changes in the nominal interest rate*** alter the ***real interest rate***.

Aggregate Expenditure and the Real Interest Rate

- The **components of aggregate expenditure:**

$$\text{Aggregate Expenditures} = \text{Consumption} + \text{Investment} + \text{Government Expenditures} + (\text{Exports} - \text{Imports})$$

$$Y = C + I + G + (X - M)$$

Aggregate Expenditure and the Real Interest Rate

- For investment, the **higher the cost of borrowing**, the *less likely* that an **investment will be profitable**.
- **Higher real interest rates lead to:**
 - *Lower* levels of *business and residential investment*
- For consumption, **higher real interest rates mean**
 - *Higher* inflation-adjusted *loan payments and saving* –thus, *less spending*.

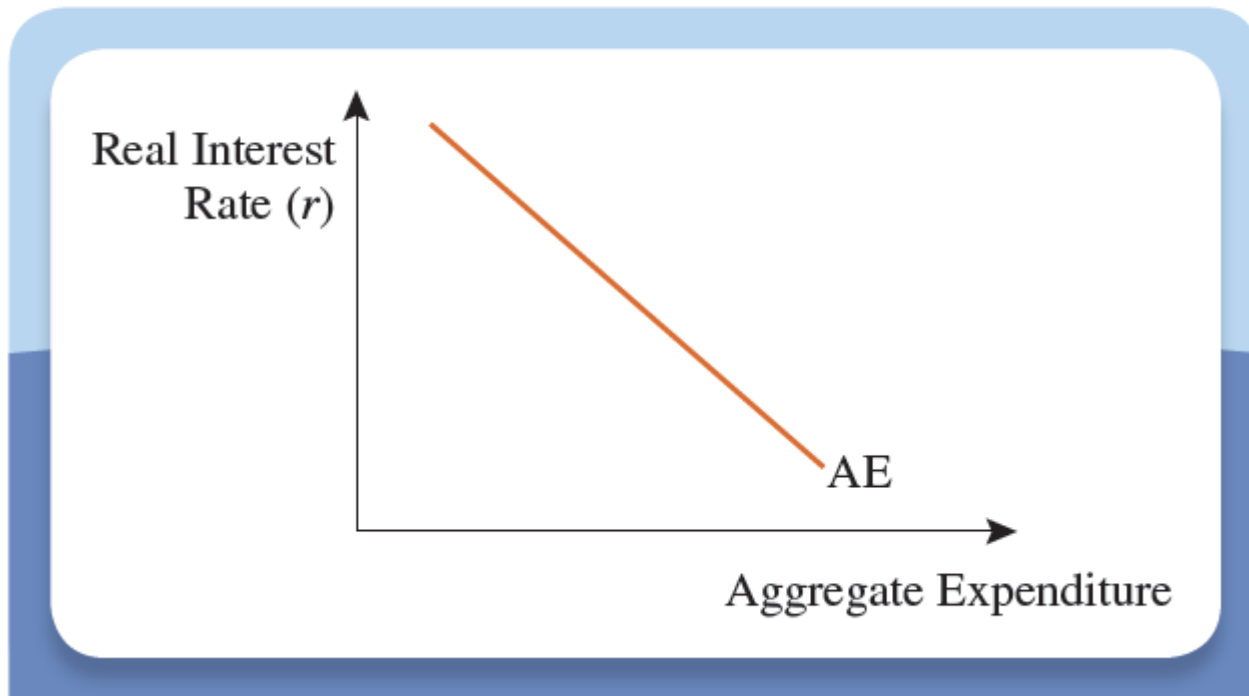
Aggregate Expenditure and the Real Interest Rate

- **Net exports *fall*** because the **domestic currency** has appreciated, making *imports cheaper* and *exports more expensive*.
- A rise in the real interest rate reduces the level of **aggregate expenditure**.
- This leads to a ***downward sloping aggregate expenditure (AE) curve***.

Aggregate Expenditure and the Real Interest Rate

Figure 21.3

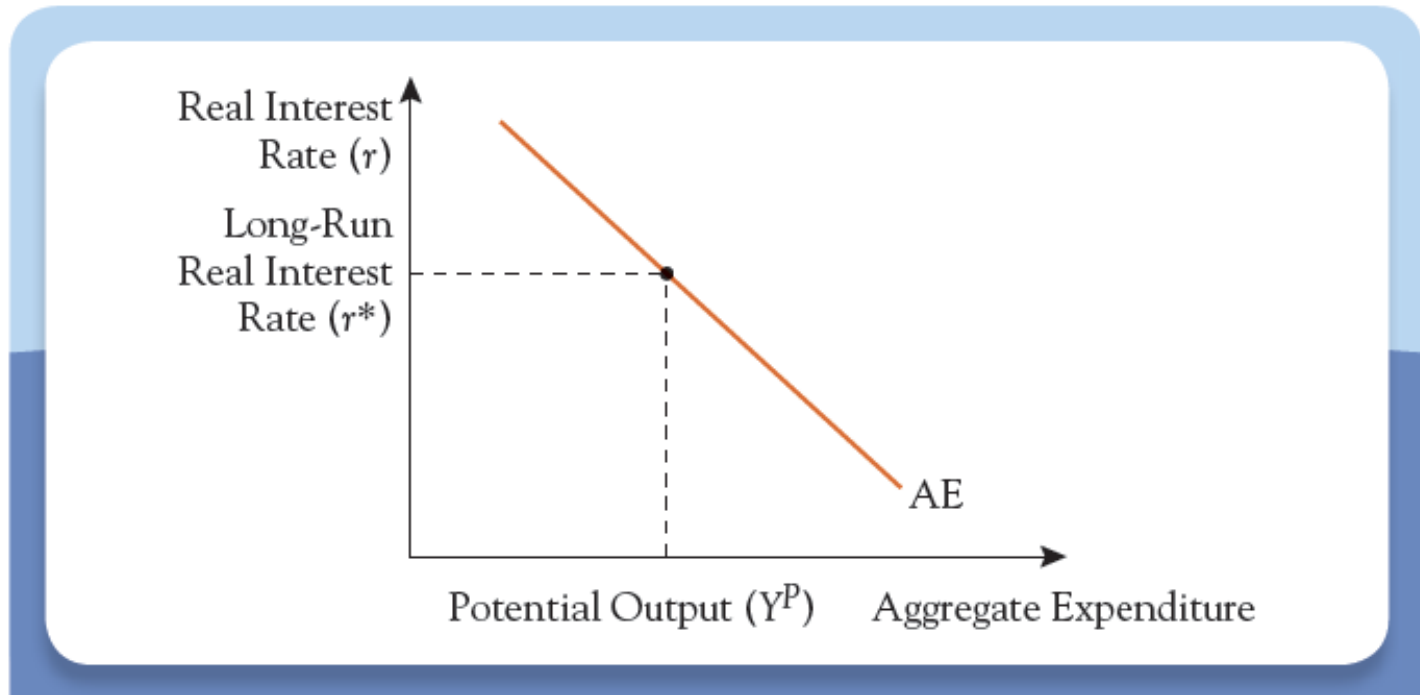
Aggregate Expenditure and the Real Interest Rate



The Long-Run Real Interest Rate

Figure 21.4

The Long-Run Real Interest Rate



*The **long run real interest rate** equates the **level of aggregate expenditure** to the **quantity of potential output**.*

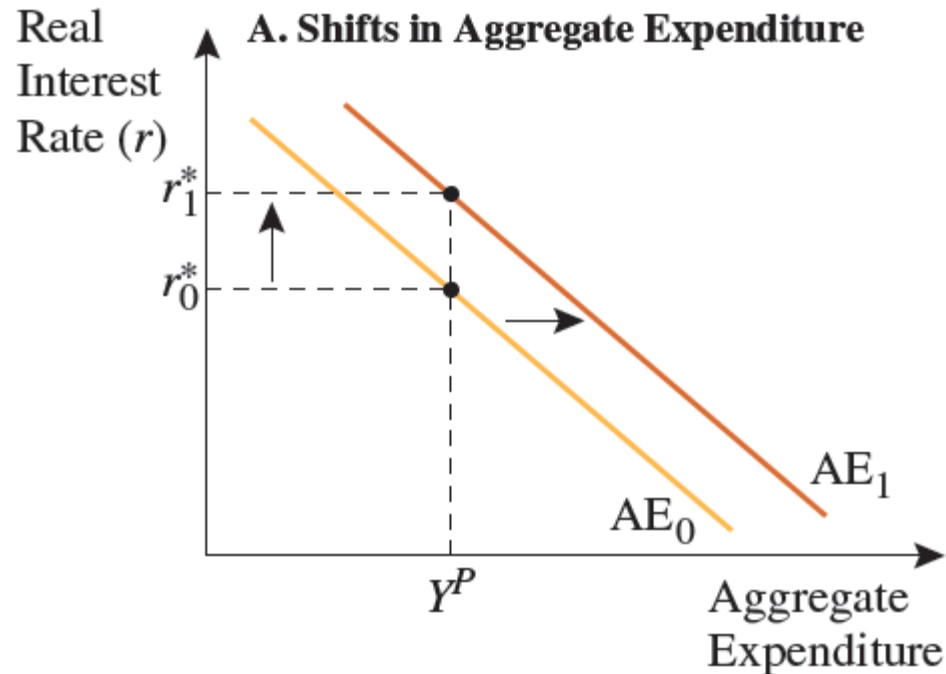
The Long-Run Real Interest Rate

- When there is a *rise in exogenous spending*, for example, **government purchases**:
 - The level of ***aggregate expenditure*** increases at every real interest rate.
 - This shifts ***aggregate expenditure curve*** to the right.
 - For the level of ***aggregate expenditure*** to remain equal to potential output, the interest-sensitive components of ***aggregate expenditure*** must fall.
 - That means the ***long-run real interest rate*** must rise.

The Long-Run Real Interest Rate

Figure 21.5

Change in the Long-Run Real Interest Rate



When aggregate expenditure shifts *right* from AE_0 to AE_1 , the long-run real interest rate *increases* from r_0^* to r_1^* .

Inflation, the Real Interest Rate, and the Monetary Policy Reaction Curve

- When **current inflation** is *high* or **current output** is *running above* potential output, central bankers will raise policy interest rate.
- **Changes** in the nominal policy interest rate will *translate into* a change in the real interest rate.

Deriving the Monetary Policy Reaction Curve

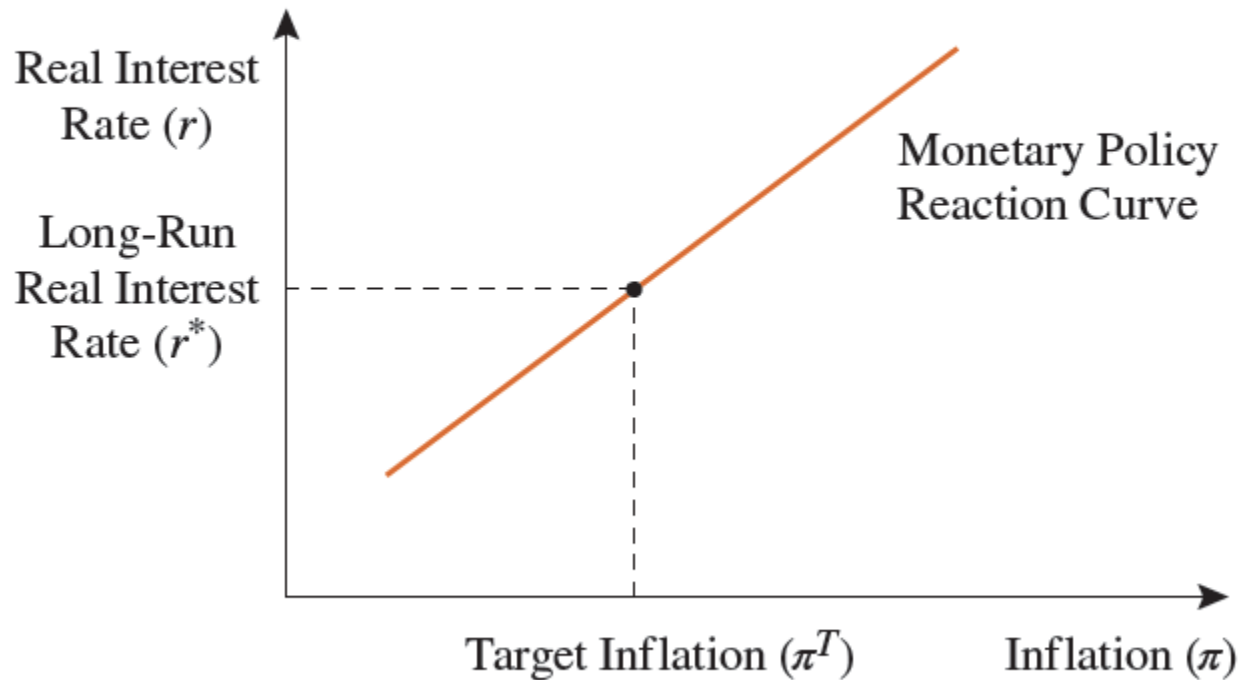
- The **monetary policy reaction curve** is *set* so that when **current inflation** equals **target inflation** (π^T), the **real interest rate** equals the **long-run real interest rate**.

$$r = r^* \text{ when } \pi = \pi^T$$

Deriving the Monetary Policy Reaction Curve

Figure 21.7

The Monetary Policy Reaction Curve

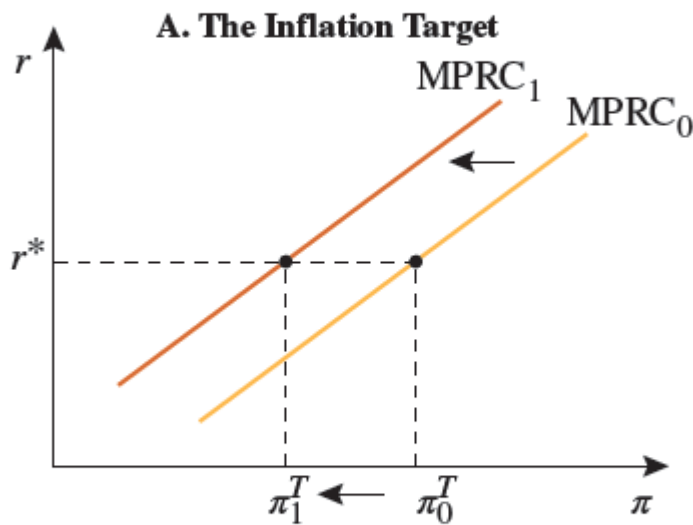


A movement along the curve is a reaction to a change in current inflation.

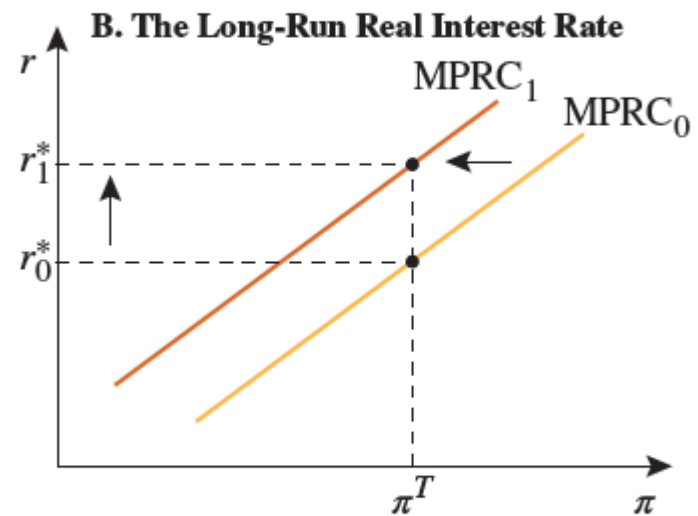
Shifting the Monetary Policy Reaction Curve

Figure 21.8

Shifting the Monetary Policy Reaction Curve



A decline in the inflation target from π_0^T to π_1^T shifts the monetary policy reaction curve to the left from $MPRC_0$ to $MPRC_1$.



An increase in the long-run real interest rate from r_0^* to r_1^* shifts the monetary policy reaction curve to the left from $MPRC_0$ to $MPRC_1$.

Deriving the Dynamic Aggregate Demand Curve

- The **dynamic aggregate demand curve** *relates inflation* and the level of **output**,
- Accounting for the fact that *monetary policymakers respond to* changes in current *inflation* by *changing the interest rate*.

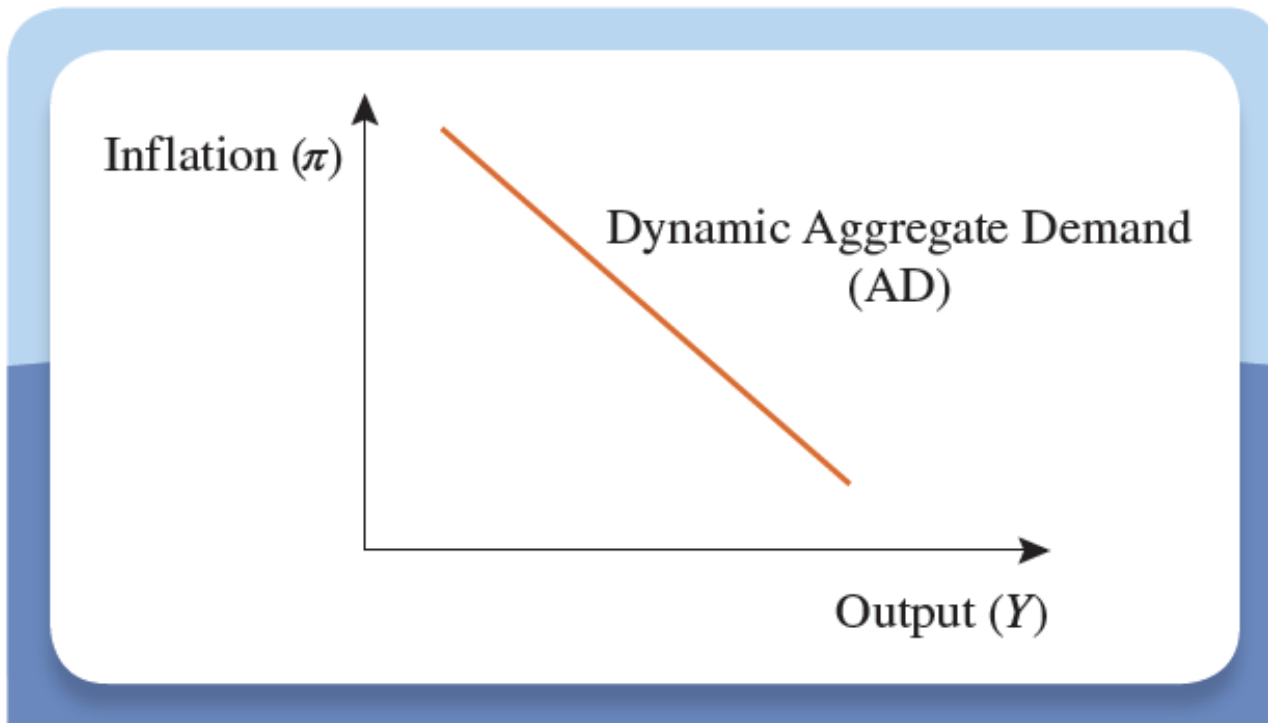
Deriving the Dynamic Aggregate Demand Curve

- When current **inflation rises**:
 - *Monetary policymakers raise the real interest rate*, moving the economy upward *along* the **monetary policy reaction curve**.
 - The **higher** real interest rate reduces the *interest-sensitive components* of **aggregate expenditure**.
 - This **causes** a fall in the quantity of **aggregate output**.
- Thus, *changes in current inflation move the economy along a downward-sloping dynamic aggregate demand curve*.

Deriving the Dynamic Aggregate Demand Curve

Figure 21.9

The Dynamic Aggregate Curve



Shifting the Dynamic Aggregate Demand Curve

- All of the following ***increase*** in **exogenous expenditure**, thereby ***shifting*** the ***dynamic aggregate demand curve*** to the ***right***:
 - Increased **consumer confidence**
 - Increased **optimism** about **future business prospects**
 - Increased **government spending** or **expansionary fiscal policy**
 - Increased **net exports**

Shifting the Dynamic Aggregate Demand Curve

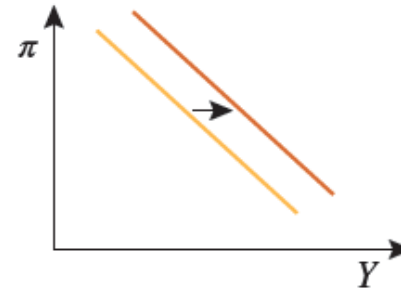
Figure 21.10

Shifting the Dynamic Aggregate Demand Curve

Changes in Components of Aggregate Expenditure

$C \uparrow, I \uparrow, G \uparrow, NX \uparrow$

Increases in consumption, investment, government expenditure, or net exports (all unrelated to the real interest rate) shift the dynamic aggregate demand curve to the *right*.



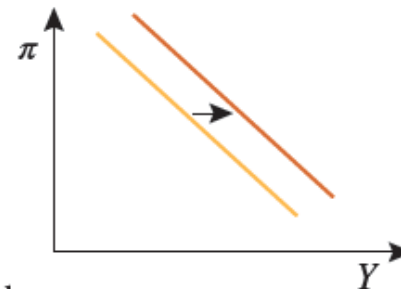
Shifts in the Monetary Policy Reaction Curve

$\pi^T \uparrow$

Increases in the central bank's inflation target shift the dynamic aggregate demand curve to the *right*.

$r^* \downarrow$

Decreases in the long-run real interest rate shift the dynamic aggregate demand curve to the *right*.



Shifting the Dynamic Aggregate Demand Curve

- Whenever the **monetary policy reaction curve** shifts, the **dynamic aggregate demand curve** shifts, too.
- Consider an increase in the **central bank's inflation target**.
 - The *monetary policy reaction curve* shifts right.
 - The *real interest rate* that policymakers *set* at every level of inflation falls.
 - The *lower real interest rate* increases the quantity of *aggregate output* demanded at every level of inflation.
 - The *dynamic aggregate demand curve* shifts right.

Shifting the Dynamic Aggregate Demand Curve

- Changes in the *long-run real interest rate* r^* shift the dynamic aggregate demand curve.
- Suppose the **level of potential output increases**.
 - The long-run real interest rate r^* must fall.
 - This *drives up* the interest-rate-sensitive components of **aggregate expenditure**.
 - This shifts the dynamic aggregate demand curve rightward.

Shifting the Dynamic Aggregate Demand Curve

- Any ***shift*** in the **monetary policy reaction curve** ***shifts*** the **dynamic aggregate demand curve** in the *same direction*.
- For example, **expansionary monetary policy** *shifts* the **dynamic aggregate demand curve** to the ***right***.

Aggregate Supply

- The **aggregate supply (AS) curve** tells us where along the **dynamic aggregate demand curve** the economy *ends up*.
- When *combined with the dynamic aggregate demand curve*, the **short-run AS curve** tells us **where the economy settles** at any particular time.
- The **long-run AS curve** together *with dynamic aggregate demand*, tells us the **levels of inflation** and the **quantity of output** that the economy is **moving toward in the long term**.

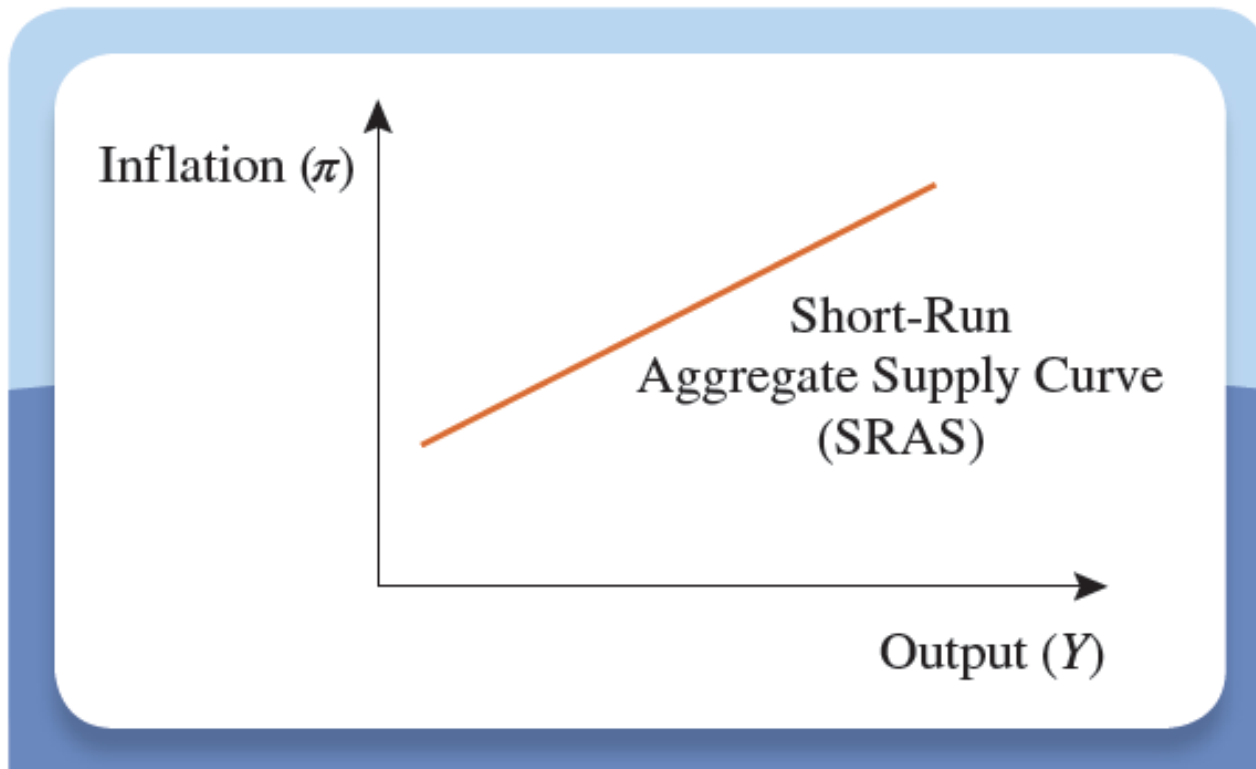
Short-Run Aggregate Supply

- In the short term, when product **prices rise**, firms **increase supply** in order to take advantage.
- The **short-run AS curve** is the **upward-sloping** relationship between current **inflation** and the quantity of **output**.

Short-Run Aggregate Supply

Figure 21.11

Short-Run Aggregate Supply Curve



Shifts in the Short-Run Aggregate Supply Curve

- When production costs *change*, the *short-run AS curve shifts*.
 1. *Changes* in expectations of future inflation.
 2. *Factors* that drive production costs up or down.

Shifts in the Short Run Aggregate Supply Curve

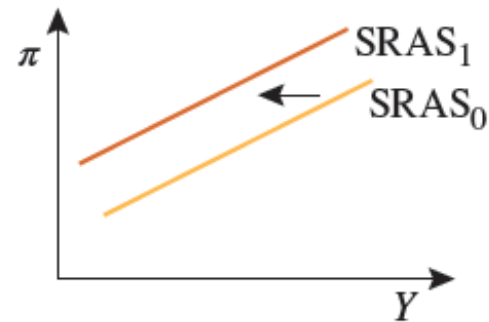
- An ***increase*** in **expected inflation** *increases* **production costs** lowering production at every level of current inflation.
 - This *shifts* the **short-run AS curve** to the *left*.
- An ***increase*** in the **oil price** or **labor wage** *shifts* the **short-run AS curve** *leftward*.

Shifts in the Short Run Aggregate Supply Curve

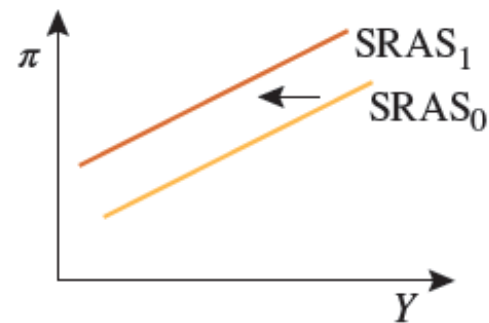
Figure 21.12

Shifting the Short-Run Aggregate Supply Curve

Expected $\pi \uparrow$
A rise in *expected future inflation* shifts the short-run aggregate supply curve to the *left* from $SRAS_0$ to $SRAS_1$.



Costs of Production Inputs \uparrow
A rise in costs of inputs into the production process, like energy, shifts the short-run aggregate supply curve to the *left* from $SRAS_0$ to $SRAS_1$.



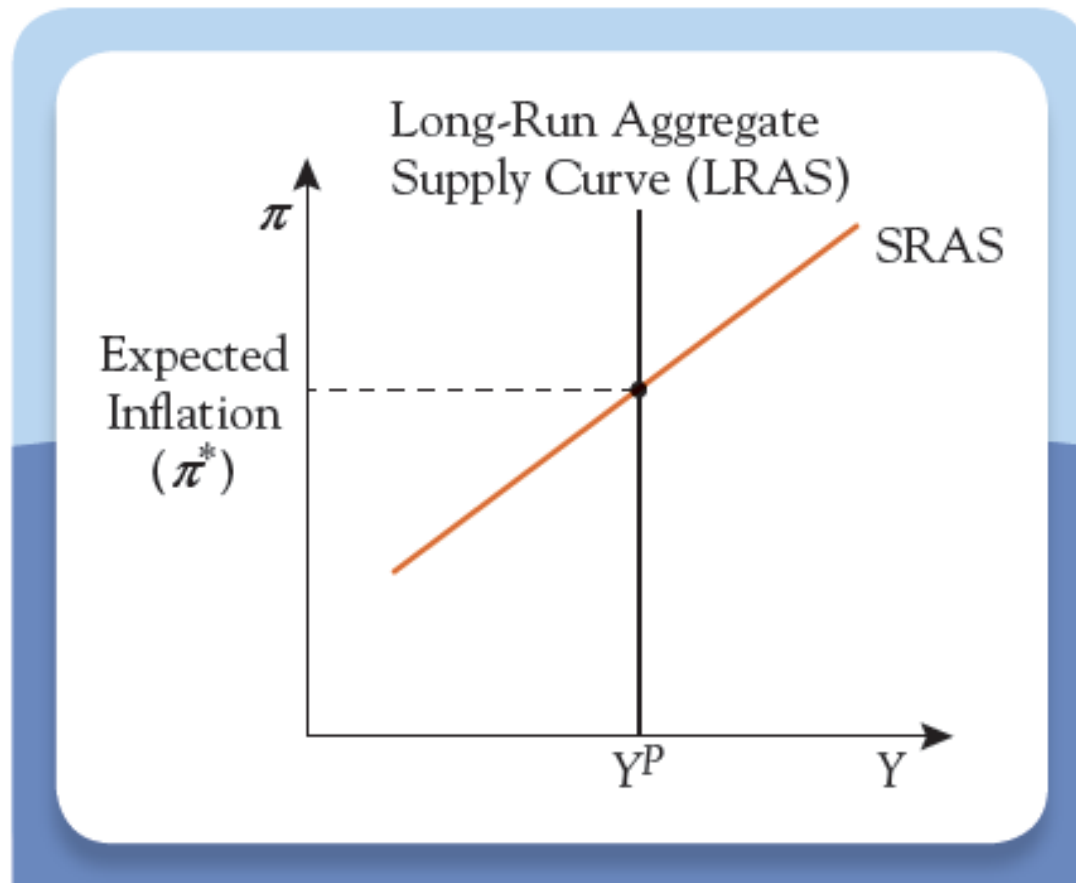
The Long-Run Aggregate Supply Curve

- In the *long run*, *output and inflation are unrelated* and the **long-run aggregate supply curve (LRAS)** is vertical at the point *where current output equals potential output*.
- In the long-run,
 - **Current output** must equal potential output
 - **Inflation** must be *determined by* monetary policy
- For the economy to be in long-run equilibrium, **current inflation** must equal expected inflation

Long-Run Aggregate Supply

Figure 21.14

Short- and Long-Run Aggregate Supply Curves



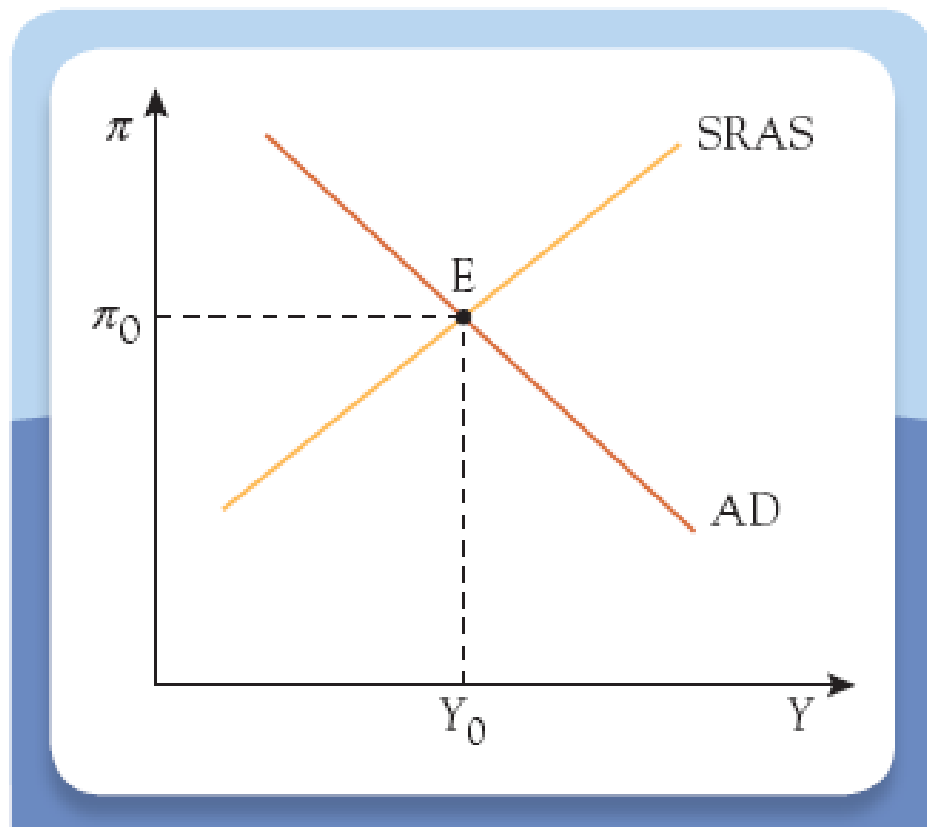
Equilibrium and the Determination of Output and Inflation

Short Run Equilibrium

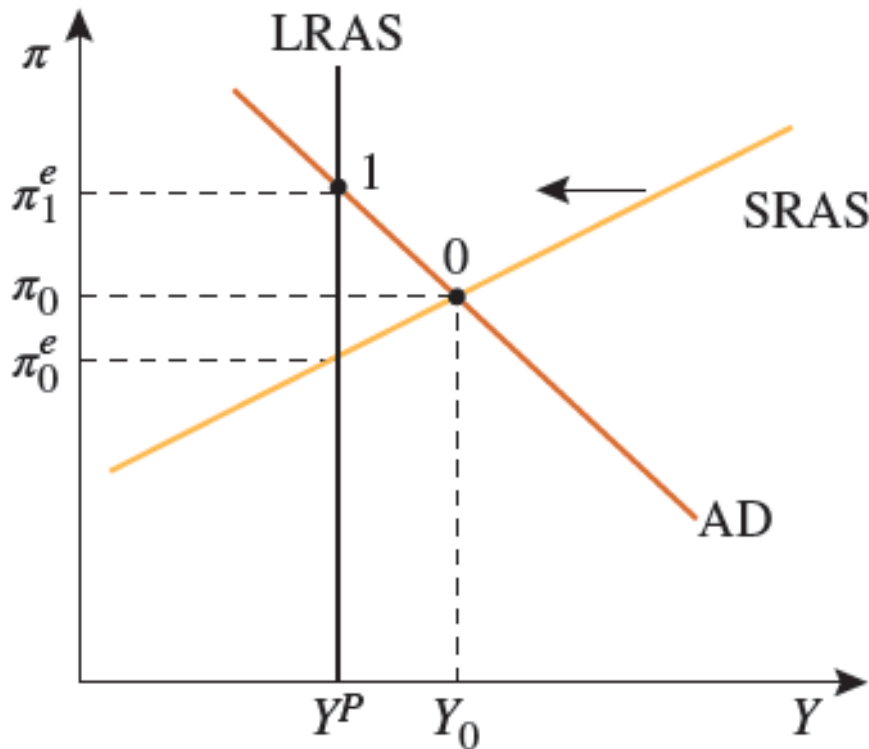
- SR equilibrium is *determined by the intersection* of:
 - The **dynamic aggregate demand curve (AD)** and
 - The **short-run aggregate supply curve (SRAS)**.

Figure 21.15

Short-Run Determination of Output and Inflation

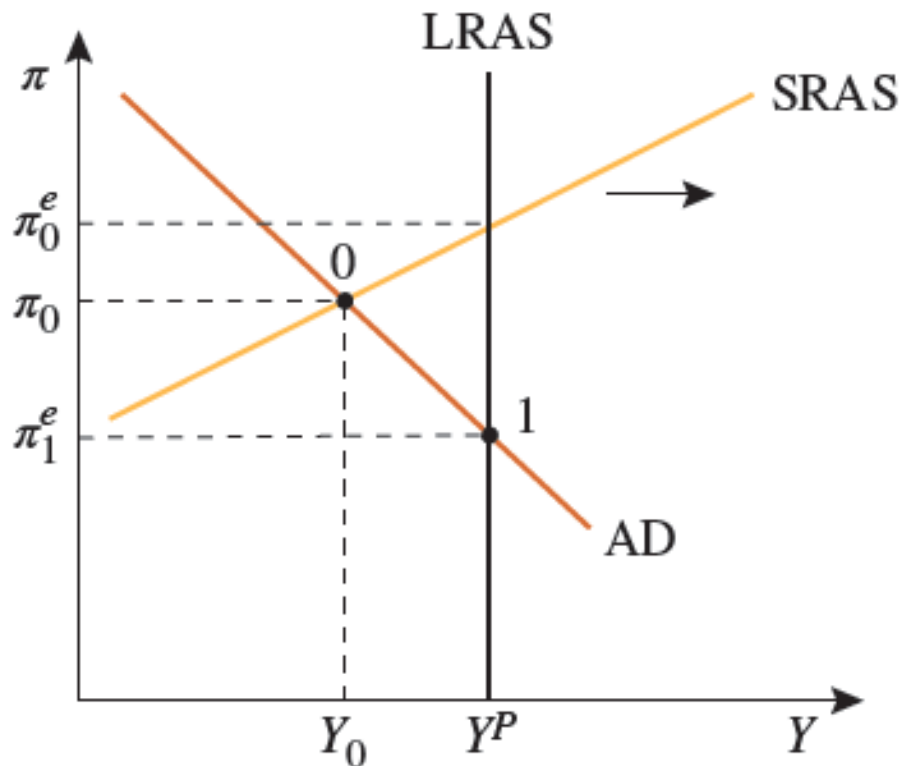


Adjustment to Long-Run Equilibrium



- Expansionary output gaps push **current inflation above expected inflation**
- **Current inflation is greater than expected inflation** so *expected inflation rises*
- **SRAS shifts left** until *current inflation and expected inflation are equal.*

Adjustment to Long-Run Equilibrium



- **Contractionary output gaps**
- **Current inflation is less than expected inflation so *expected inflation falls*.**
- ***SRAS shifts right until current inflation and expected inflation are equal.***

Adjustment to Long-Run Equilibrium

Implications

1. The economy has a *self-correcting mechanism*.
2. The fact that *inflation changes* whenever there is an *output gap*, so that the **long run output** returns to potential output.

Adjustment to Long-Run Equilibrium

There are **three conditions** for long run equilibrium:

1. **Current inflation *equals* expected inflation:** $\pi = \pi^e$.
2. **Current output *equals* potential output:**
 $Y = Y^P$.
3. **Current inflation is *steady* and *equal* to target inflation:** $\pi = \pi^T$

The Sources of Fluctuations in Output and Inflation

- **Inflation *in the long run*** will only change if policymakers have ***changed inflation target***.
- In the **short run fluctuations** can *come from*
 - Increases in exogenous spending (*shift of AD*)
 - A *permanent easing* of monetary policy (*shift of monetary policy reaction curve*)
 - Increases in the costs of production (*shift of SRAS*).

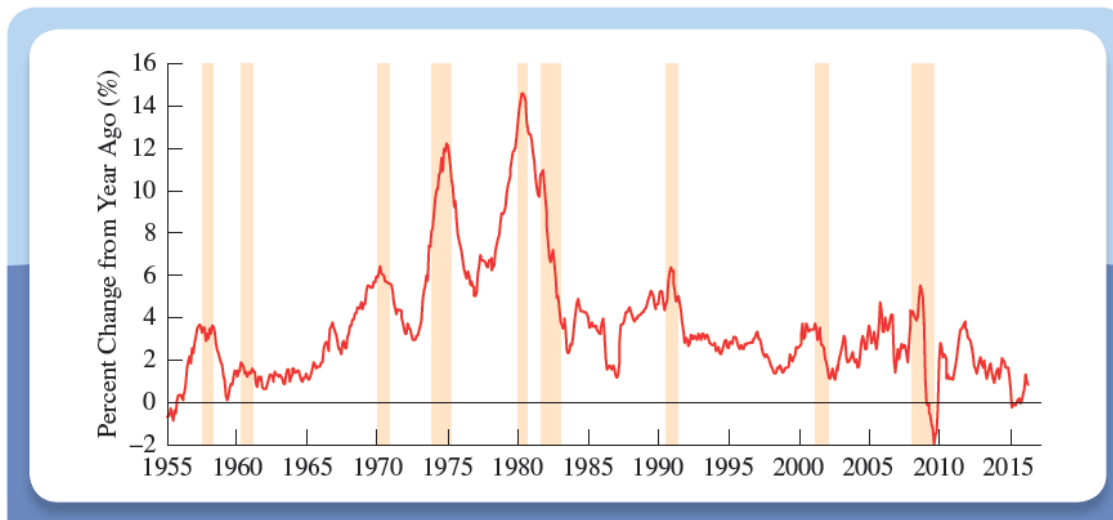
Chapter 22



Understanding Business Cycle Fluctuations

Sources of Fluctuations in Output and Inflation

Figure 22.1 Inflation and the Business Cycle, 1955–2016



There appears to be a *connection* between **growth** and **changes in inflation**.

While there is no apparent *relationship between the level of inflation and recessions*,

It does appear that; the **inflation rate**, either *falls* when the **economy is contracting**; or *rises* when it is **expanding**.

Sources of Fluctuations in Output and Inflation

Remember that **long-run equilibrium** means:

1. $Y = Y^P$ ***output = potential output.***
2. $\pi = \pi^T$ ***inflation = target inflation.***
3. $\pi = \pi^e$ ***inflation = expected inflation.***

Short-run equilibrium is:

The point where the ***dynamic aggregate demand curve*** (AD) **intersects** the ***short-run aggregate supply (SRAS) curve.***

Sources of Fluctuations in Output and Inflation

- Immediately after either the **SRAS curve** or **AD curve shift**, the economy will *move away from its long-run equilibrium* – so called, **short-run fluctuations**.
- Economists define ***shocks*** as *something unexpected*.

Sources of Fluctuations in Output and Inflation

- A **shock** *shifts* the *AD* or *SRAS* curve.
 - A **supply shock** affects *costs of production*
 - For example; an **oil price increase**.
 - A **demand shock** affects *exogenous spending and thus aggregate expenditure*
 - For example; **change in consumer confidence**

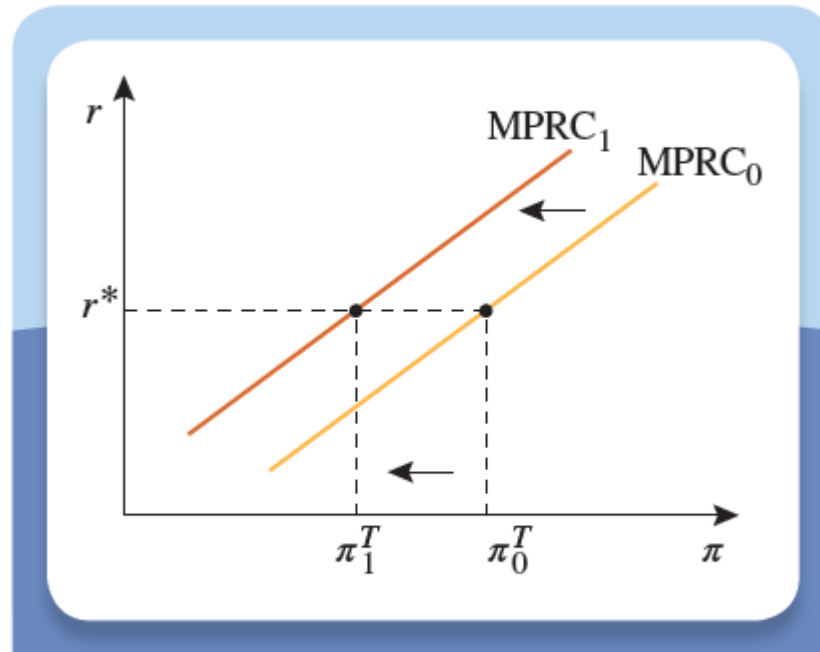
A Decline in the Central Bank's Inflation Target

- A fall in π^T shifts the **monetary policy reaction curve** to the *left*.
 - The **decrease** in the **inflation target** raises the **real interest rate** policymakers set at each level of inflation.
 - This reduces aggregate expenditure **shifting** the **AD curve** to the *left* as well.
 - The economy moves to a **new short-run equilibrium**.

A Decline in the Central Bank's Inflation Target

Figure 22.2

A Decline in the Central Bank's Inflation Target



A decline in the inflation target from π_0^T to π_1^T shifts the monetary policy reaction curve to the left from $MPRC_0$ to $MPRC_1$.

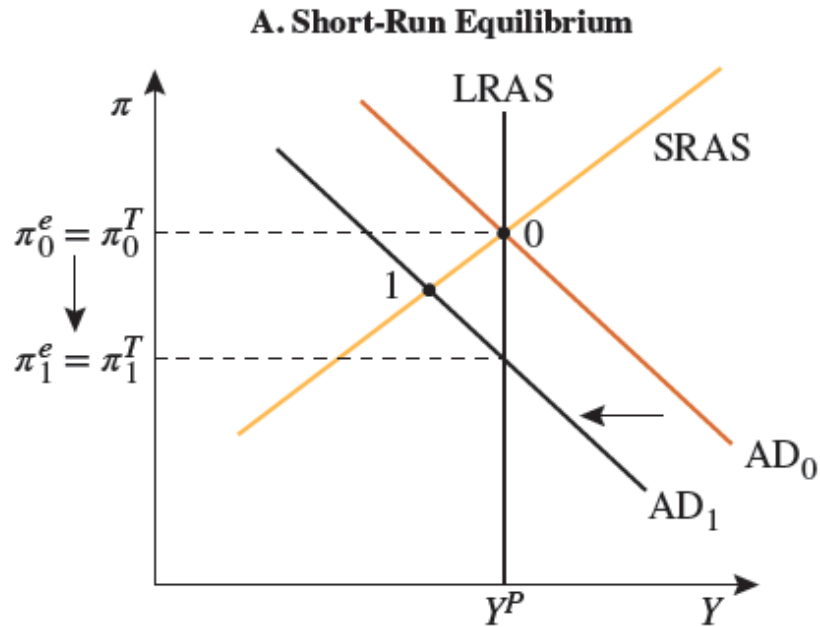
A Decline in the Central Bank's Inflation Target

- At the new short-run equilibrium point, ***inflation*** and ***current output*** are lower than they were *prior to the monetary policy tightening*.
 - The **dynamic aggregate demand curve** shifts left, moving the economy *along the SRAS*
- **Current inflation** is less than **expected inflation**
 - **Expected inflation** *falls*, shifting the SRAS right
- The **economy** will *move* along the new dynamic aggregate demand curve *to the* new long-run equilibrium where **inflation** equals the **new central bank's target**, and **output** equals **potential output**.

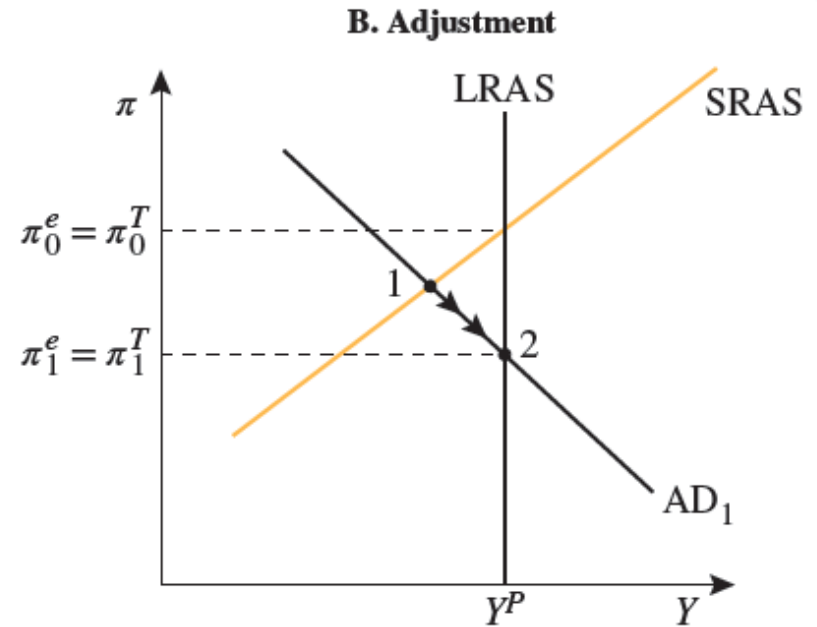
A Decline in the Central Bank's Inflation Target

Figure 22.3

A Decline in the Central Bank's Inflation Target



A decrease in the central bank's inflation target shifts the dynamic aggregate demand curve to the left from AD_0 to AD_1 , moving the economy from point 0 to point 1.



When the economy is at point 1, current inflation is less than the initial level of expected inflation (π_0^e). As a result, expected inflation falls, shifting the short-run aggregate supply curve to the right. The process continues until the economy reaches point 2, where expected inflation equals the new inflation target ($\pi_1^e = \pi_1^T$).

An Increase in Government Purchases

- An *increase* in **government spending** shifts the **AD curve** to the right.
- The *economy* moves from the original *short-run equilibrium* to a ***new short-run equilibrium***.
 - The immediate impact is to **raise** both **current output** and **inflation**.

An Increase in Government Purchases

- Because **current inflation exceeds expected inflation**, this can't be the long-run effect.
- **Expected inflation *rises*, shifting the SRAS curve to the left.**
 - As the economy travels along aggregate demand, **current inflation *rises* and current output *falls*** until the point at which the **dynamic aggregate demand curve crosses the LRAS curve**

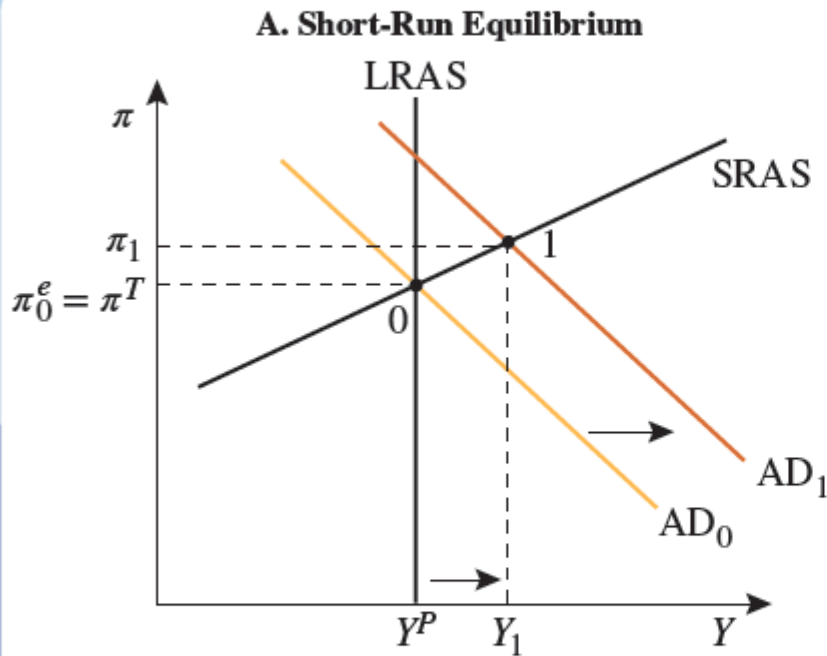
An Increase in Government Purchases

- Inflation is *higher* at the new equilibrium point than it at the original.
- This is *above* the policymakers' original inflation target, π^T
- Unless monetary policy adjusts, when the *dynamic aggregate demand curve* shifts to the *right*, inflation will *rise*.

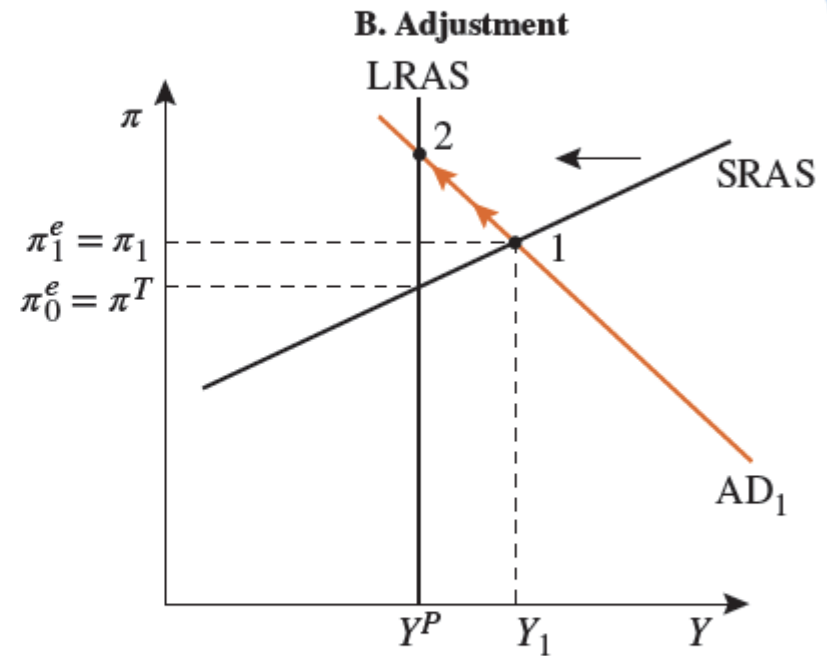
An Increase in Government Purchases

Figure 22.4

An Increase in Government Expenditure



An increase in government expenditure shifts the AD curve to the right from AD_0 to AD_1 . This moves the economy from point 0 to point 1. In the short run, output rises to Y_1 , while inflation increases to π_1 .



When the economy is at point 1, current inflation is initially above expected inflation ($\pi_1 > \pi_0^e$). As expected inflation rises in response, the short-run aggregate supply curve shifts to the left, moving the economy along AD_1 toward point 2.

An Increase in Government Purchases

- As long as monetary policymakers remain committed to their *original inflation target*, they need to do something to *get the economy back to the point where it began*.
- In this case, **tighter monetary policy shifts the AD curve to the left**.
 - This brings the economy back to the *long-run equilibrium* where **output equals potential output** and **inflation equals the central bank's target**.
- **Without a change in target inflation, *an increase in government purchases causes a temporary increase in both output and inflation***.

Shifts in *Short-Run Aggregate Supply*

- **Changes in production costs *shift* the SRAS curve.**
- A **negative supply shock** that ***increases production costs***; for example, *increase in the price of oil*, will **shift** the **SRAS curve** to the **left**, reducing the amount supplied at every level of inflation
 - **Higher inflation and lower growth**

Shifts in Short-Run Aggregate Supply

- The **short-run equilibrium** moves to where the **new SRAS curve *meets* AD**.
- This *creates* a condition referred to as **stagflation**.
 - Economic stagnation coupled with *increased* inflation.
- **Expected inflation *rises*** as well and because **current inflation is *below*** this level, the **SRAS curve shifts back to the right**

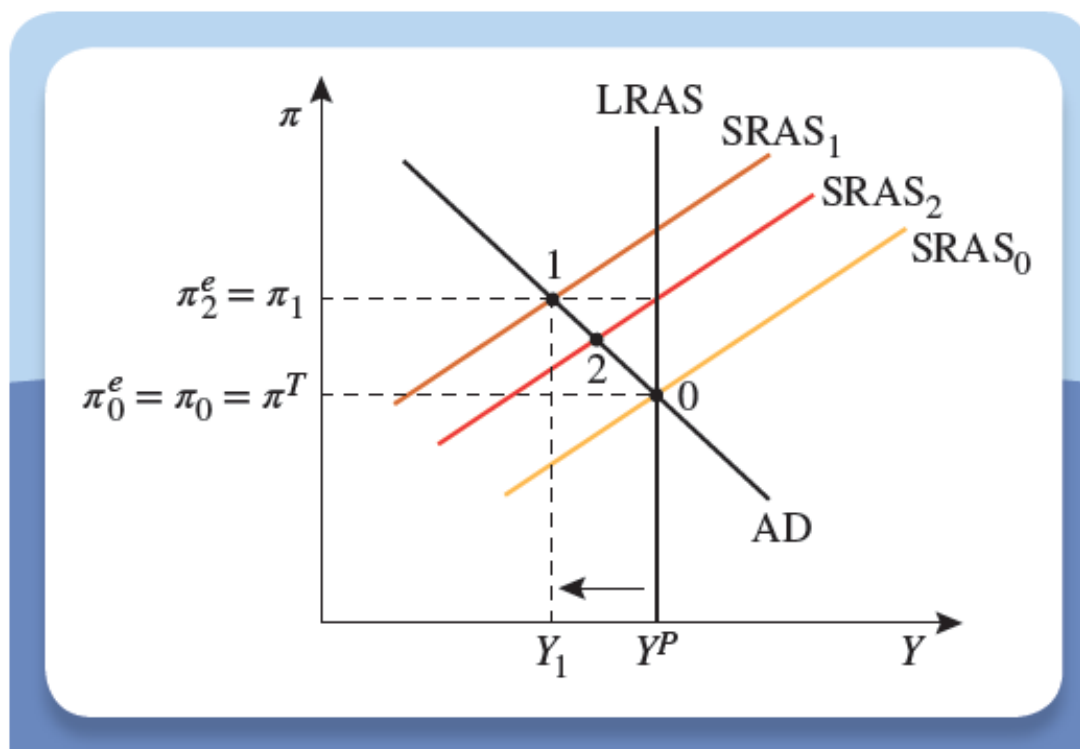
Shifts in Short-Run Aggregate Supply

- Inflation continues to *fall* and output *continues to rise* until **current inflation** and **expected inflation return** to the central bank's inflation target, and **output equals potential output**.
- *Inflation is at its highest and output at its lowest immediately, following a negative shock to SRAS*
- *Over time, **self-correcting** forces will unwind the shock, restoring long-run equilibrium*

Shifts in Short-Run Aggregate Supply

Figure 22.5

A Negative Supply Shock



A negative supply shock shifts the SRAS curve to the left, moving the short-run equilibrium from point 0 to point 1, raising inflation to $\pi_1 > \pi^T$. At point 1, current inflation is *below* the intersection of SRAS₁ and LRAS that marks expected inflation in the long run, so the SRAS curve shifts back right to SRAS₂, which intersects the LRAS at the point where expected inflation (π_2^e) equals π_1 . The SRAS curve continues to shift right until inflation and expected inflation again equal target inflation at point 0.

Shifts in Short-Run Aggregate Supply

- *As with an increase in government purchases, a **supply shock** has no effect on the economy's **long-run equilibrium point**.*
- **A supply shock causes inflation to *rise temporarily* and *then fall*.**
 - This happens at the same time that **current output *falls temporarily* and *then rises***.
- In the **long run**, the economy *returns* to the point where **output equals potential output** and **inflation equals the central bank's target**.

How Do Policymakers Achieve Their Stabilization Objectives?

- The aggregate demand-aggregate supply framework is useful *in understanding how **monetary and fiscal** policymakers seek to stabilize output and inflation using **stabilization policy**.*
- When shifting their reaction curve, **central bankers shift AD**.
 - They cannot shift the SRAS curve.
- This means **monetary policymakers can neutralize demand shocks, but cannot offset supply shocks.**

How Do Policymakers Achieve Their Stabilization Objectives?

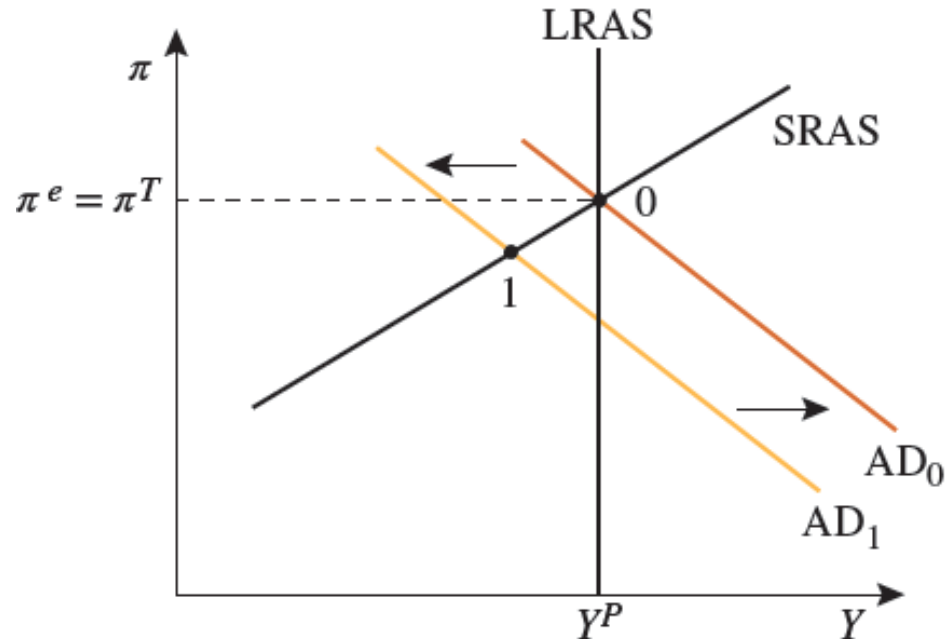
- **Positive supply shocks** that *raise output* and *lower inflation* provide policymakers with an *opportunity*.
 - Central bankers **can guide** the economy to a **new, lower inflation target** *without inducing a recessionary output gap*.
- **Fiscal policy can work** to **stabilize** the economy

Monetary Policy

- *A reduction in consumption and investment, shifts the dynamic aggregate demand curve to the left*
 - **Current inflation would fall below expected inflation and current output to fall below potential output.**

Monetary Policy

- **Drop in consumer or business confidence:**
 $AD_0 \rightarrow AD_1$
Economy: points $0 \rightarrow 1$
- ***Stabilization* requires shifting AD back to where it started.**



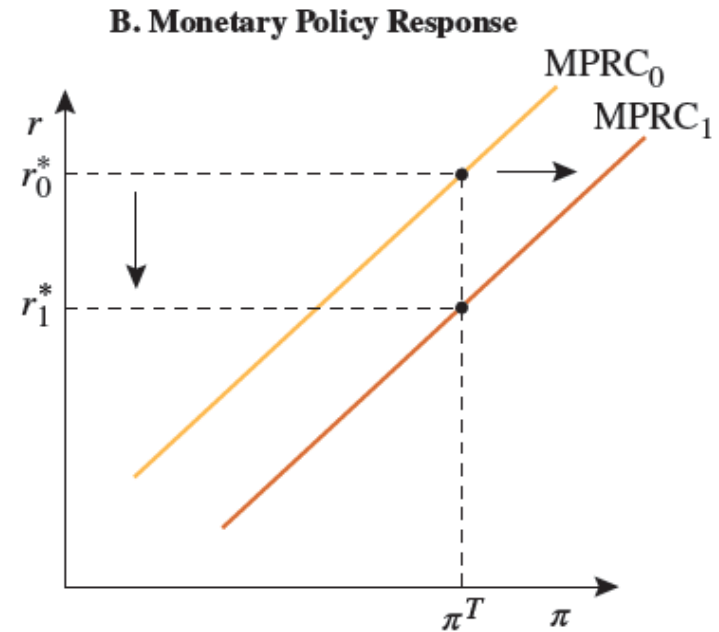
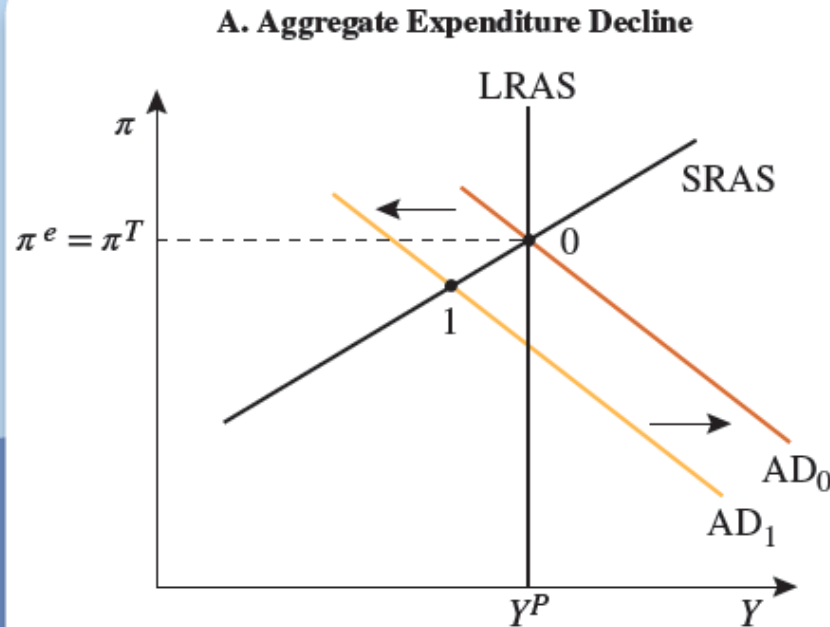
Monetary Policy

- Policymakers will conclude that the **long-run real interest rate** has *fallen*.
- If the *inflation target stays the same*, the **drop** in **aggregate expenditure** prompts them to *shift the monetary policy reaction curve* to the *right*.
 - This *reduces* the level of the **long-run real interest rate**.
- The **AD curve** now *shifts right*, **back to its original level**.
- The policy response means the **economy** will be **back at long run equilibrium**.

Monetary Policy

Figure 22.7

Stabilizing a Shift in Dynamic Aggregate Demand



Following a drop in consumer or business confidence the dynamic aggregate demand shifts to the left from AD_0 to AD_1 , moving the economy from point 0 to point 1. Realizing this, monetary policymakers shift their MPRC to the right, shifting the dynamic aggregate demand curve back to where it started and returning the economy to point 0.

Following a drop in consumer confidence, the long-run real interest rate falls from r_0^* to r_1^* . Policymakers respond by shifting their reaction curve from $MPRC_0$ to $MPRC_1$, shifting the AD curve back to its original position, AD_0 .

Monetary Policy

- *In practice, it is extremely **difficult to keep inflation and output from fluctuating** when aggregate expenditure changes.*
- There are two reasons:
 - It takes time to recognize *what has happened*.
 - **Changes in interest rates** do not have an **immediate impact** on the economy.

Discretionary Fiscal Policy

There are two types of **fiscal policy**:

1. Automatic stabilizers

- *Operate without any further actions on the part of the government.*
- *Examples: unemployment insurance and the proportional nature of the tax system.*

2. Discretionary policy

- *Relies on **fiscal policymakers' decisions.***
- ***Changes aggregate expenditures shifting the dynamic aggregate demand curve.***

Discretionary Fiscal Policy

- **Fiscal policy** *can* act just like monetary policy to offset *shifts in the dynamic aggregate demand curve* and stabilize *inflation and output*.
- Two shortcomings:
 1. Discretionary fiscal policy **works slowly**
 2. It is almost **impossible to implement effectively**

Discretionary Fiscal Policy

- Because **economic data** only become *available several months after they are collected*, the economy is *often halfway through a recession before* there is a consensus that a downturn has actually started.
- This means that **discretionary fiscal policy** is *likely to have its biggest impact* when it is no longer needed.

Discretionary Fiscal Policy

- Economics clearly come into *conflict with politics* where *fiscal stimulus* is concerned.
 - For economists, the ***best policies*** are the ones that **influence a few key people** to ***change their behavior***, avoiding rewarding people who do what they would *have done* anyway.
 - For politicians, the ***best policies*** are programs that **reward the largest number of people** possible.
- Discretionary fiscal policy is a ***poor stabilization tool***.

Positive Supply Shocks and the Opportunity They Create

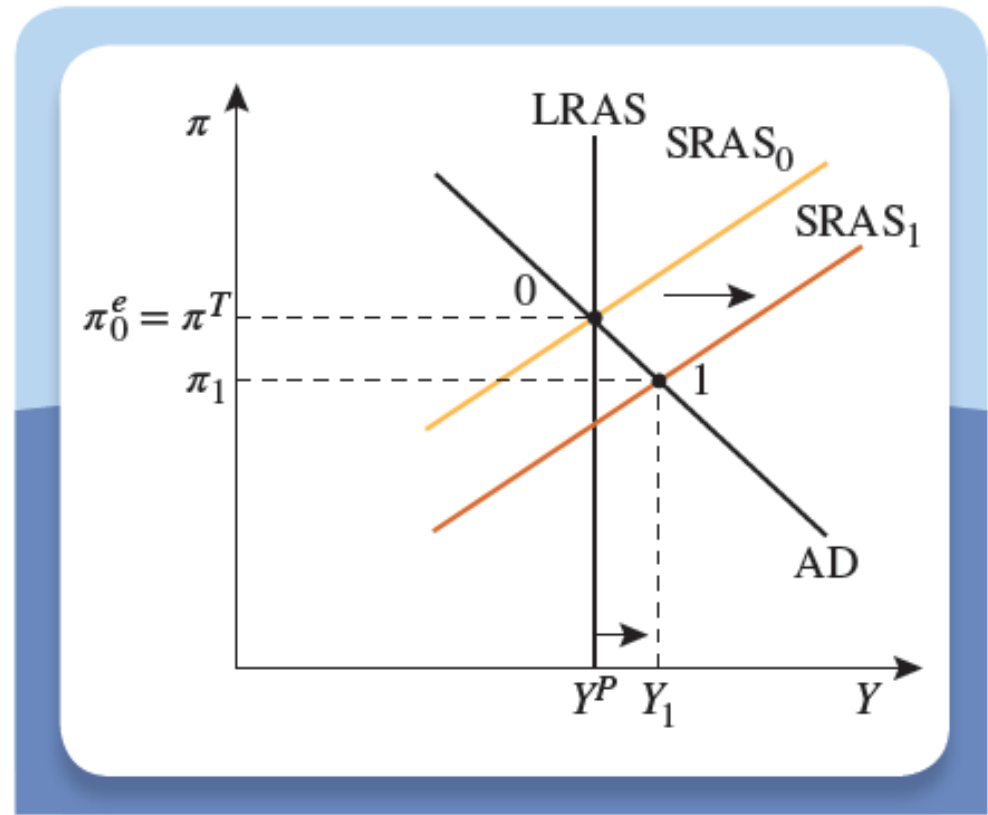
- When **production costs *fall*** - a ***positive* supply shock**
- The **SRAS curve shifts** to the **right**.
 - This ***drives up*** inflation and **output** immediately.
 - **Current inflation is *below* expected inflation** and **expectations initially *fall***.
- This leads to **inflation *above* expected inflation** so ***expectations start to rise*** and the **SRAS curve shifts** to the **left**.
 - This continues **until the economy returns to the *original* long-run equilibrium**.

Positive Supply Shock

- **Fall in production costs shifts SRAS Right.**
 - Economy 0→1
- **Current inflation is *above* expected inflation** (given by the intersection between LRAS and $SRAS_1$), then **SRAS moves back to original level.**
 - Economy 1→0

Figure 22.8

A Positive Supply Shock



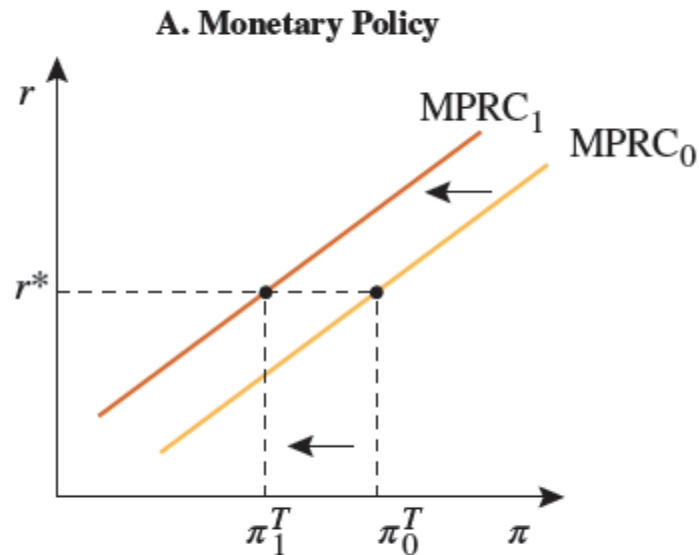
Positive Supply Shocks and the Opportunity They Create

- A **positive supply shock** *creates an opportunity* for policymakers to **guide the economy to a new, lower inflation target** without inducing a recession.
 - Central bankers will shift the **monetary policy reaction curve** to the **left**.
 - The **AD** shifts **left** as well.
 - This **continues until** it reaches the point where the **new SRAS curve intersects** the **LRAS curve**.

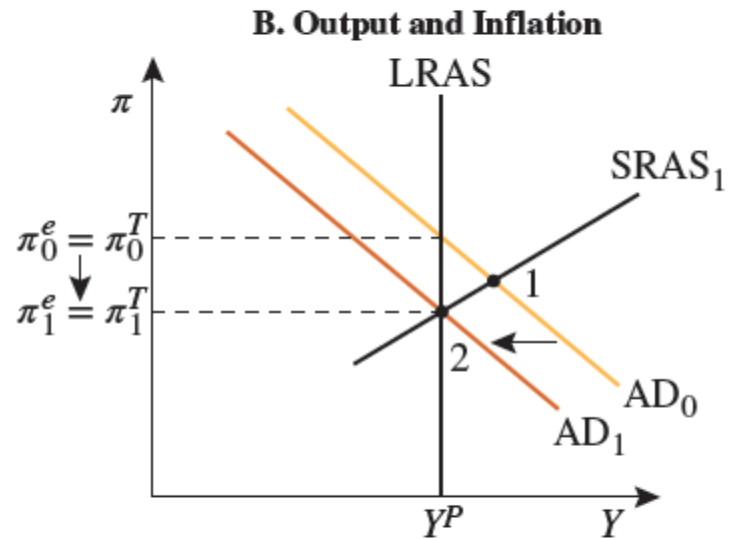
Positive Supply Shocks and the Opportunity They Create

Figure 22.9

Lowering the Inflation Target



A decline in the inflation target from π_0^T to π_1^T shifts the monetary policy reaction curve to the left from $MPRC_0$ to $MPRC_1$.



Following a positive supply shock, policymakers can reduce their inflation target by shifting the dynamic aggregate demand curve from AD_0 to AD_1 . This lowers expected inflation from π_0^e to π_1^e . Instead of going to point 1, the economy moves to point 2.

What Accounts for the Great Moderation

- The **1990s** brought **unprecedented economic stability** - the “**Great Moderation**” in the volatility of real growth.
 - From 1991 to 2001 *there were 10 years of solid growth and inflation fell steadily.*
 - The *volatility* of inflation and growth *dropped by more than half.*
- This **prosperity** and **stability** was *shared across the industrialized world.*

What Accounts for the Great Moderation

There are **three possible explanations** for this worldwide economic performance:

1. Everyone was *extremely lucky*.
2. Economies have *become more flexible* in absorbing external economic disturbances.
3. **Monetary policymakers** have figured out *how to do their job more effectively*.

What Accounts for the Great Moderation

- Difficult to argue that the stability was just good fortune—*financial markers* were not *calm*.
- Advances in *information technology* have increased **manufactures' flexibility** in *responding to changes in demand*.
 - Resulting in *dramatic declines in inventories* at every stage of the production process.
- **Innovations** in *mortgages* and *other forms of personal credit* made it *easier* for households and businesses **to borrow**.
 - **Rising levels of risky debt** eventually **led to** record **defaults** *during the financial crisis*.

What Accounts for the Great Moderation

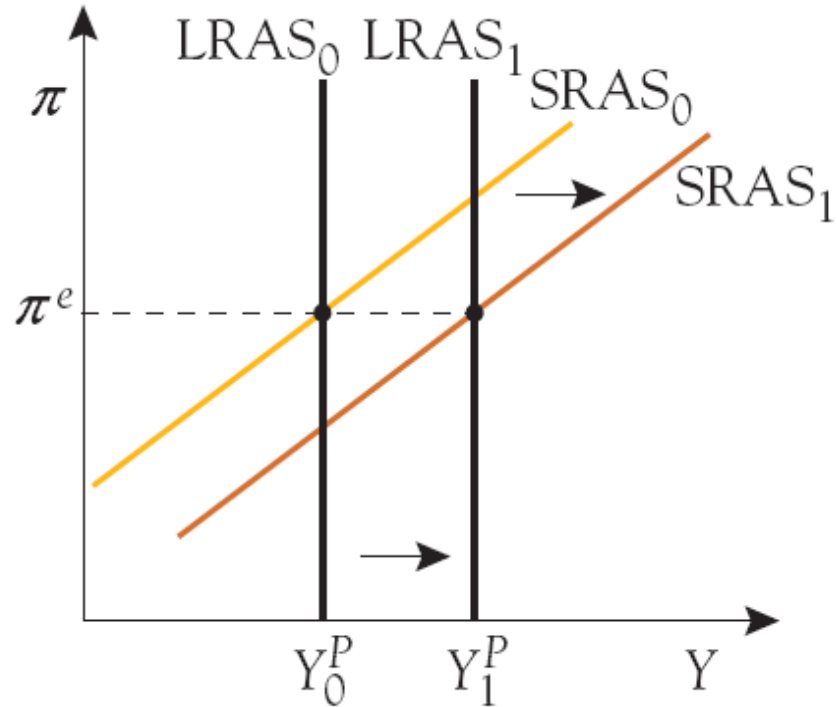
- That leaves **monetary policy** as the **only remaining explanation**.
- **Central bankers** must focus on **raising real interest rates** *when* **inflation goes up** and **lowering them** *when* **inflation goes down**.
- **Keeping inflation low and stable** is **necessary** for **reducing economic volatility**, the deep recession that began in December 2007 shows that it is **not sufficient**.

What Happens When Potential Output Changes?

- *What happens when Y^P increases due to an increase in productivity?*
 - The long-run aggregate supply curve will shift to the right as Y^P increases.
 - An *increase in productivity* reduces costs of production, so it is a positive supply shock as well.
 - The **SRAS** curve will shift right.
 - Remember that the **SRAS** curve intersects the **LRAS** curve at the point *where current inflation equals* expected inflation.

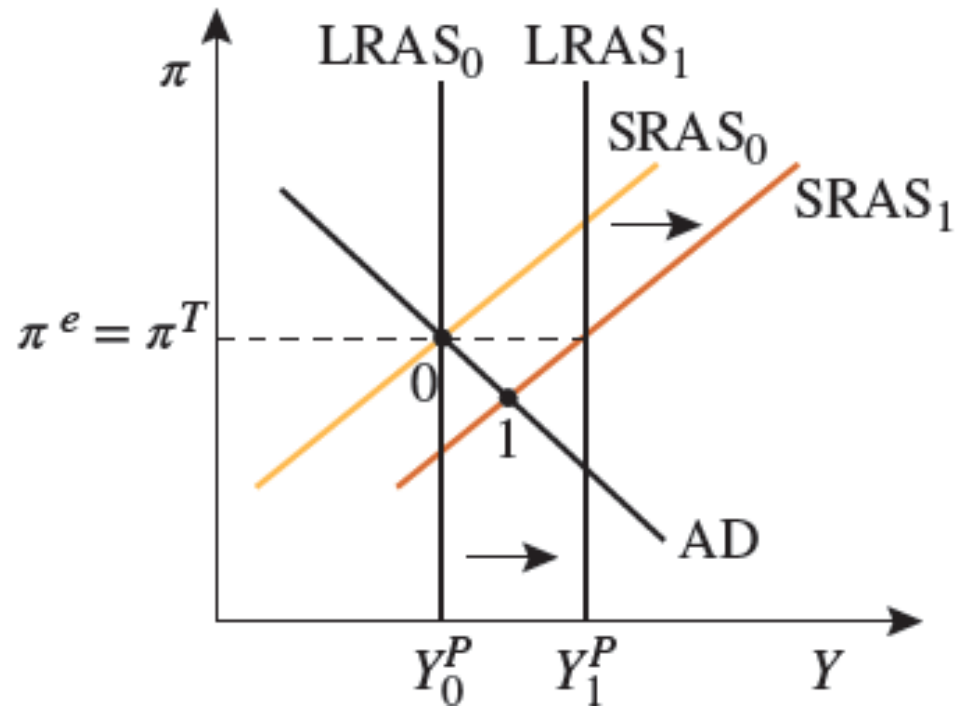
What Happens When Potential Output Changes?

- An increase in Y^P shifts **SRAS right** and shifts **LRAS right**.
- But **SRAS** still *crosses* **LRAS** where $\pi = \pi^e$.
- **SRAS** shifts the *same distance* as **LRAS**.



What Happens When Potential Output Changes?

- *In the short-run, **output and inflation** are determined by the intersection of SRAS and AD.*
- Since **AD is unchanged**, the *economy is at point 1* in the short-run.



What Happens When Potential Output Changes?

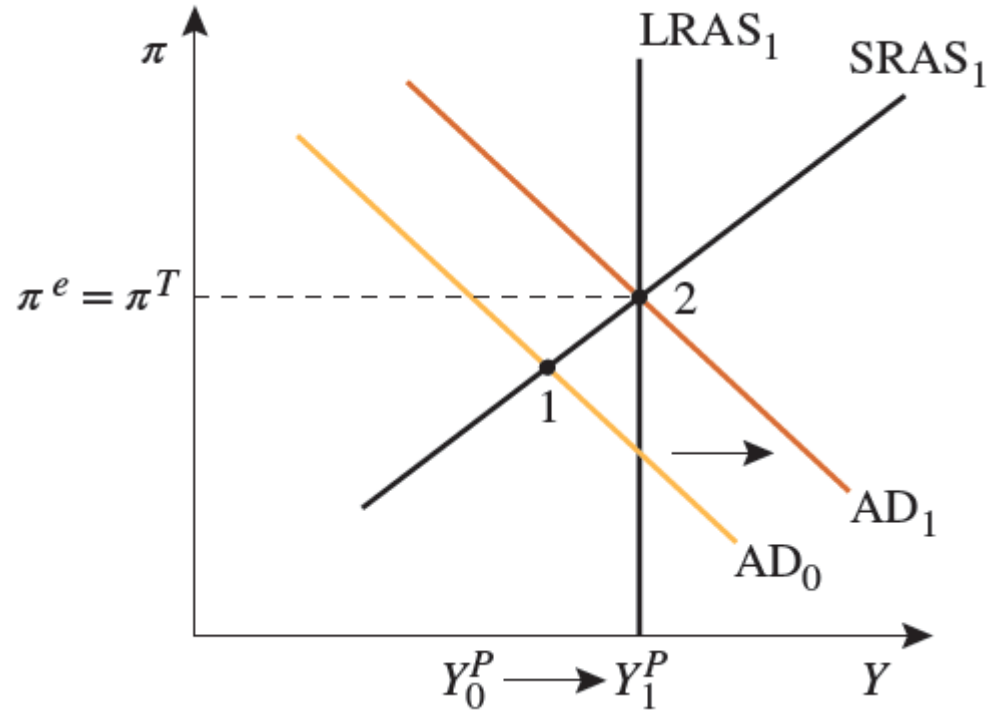
- In the **long run**, **output** must *go to the new level of potential output*, Y^P_1 .
- *How it gets there depends on what monetary policymakers do.*
- *If policymakers are happy with their **inflation target**, they will **work to move the economy** to the point on the **LRAS curve consistent with their target.***

What Happens When Potential Output Changes?

- But the **higher** level of **potential output** *comes along with a lower long-run real interest rate.*
 - **Returning inflation** to its *higher level* means shifting the **MPC** to the **right**.
 - This shifts **AD** to the **right**.
 - The policy adjustment will *drive output and inflation up* until they reach their new LR equilibrium level at the *original inflation target* and Y^P_1 .

What Happens When Potential Output Changes?

- With π^T unchanged, policymakers shift AD right.
- The economy *moves to the new level of potential output and the original π^T at point 2*.

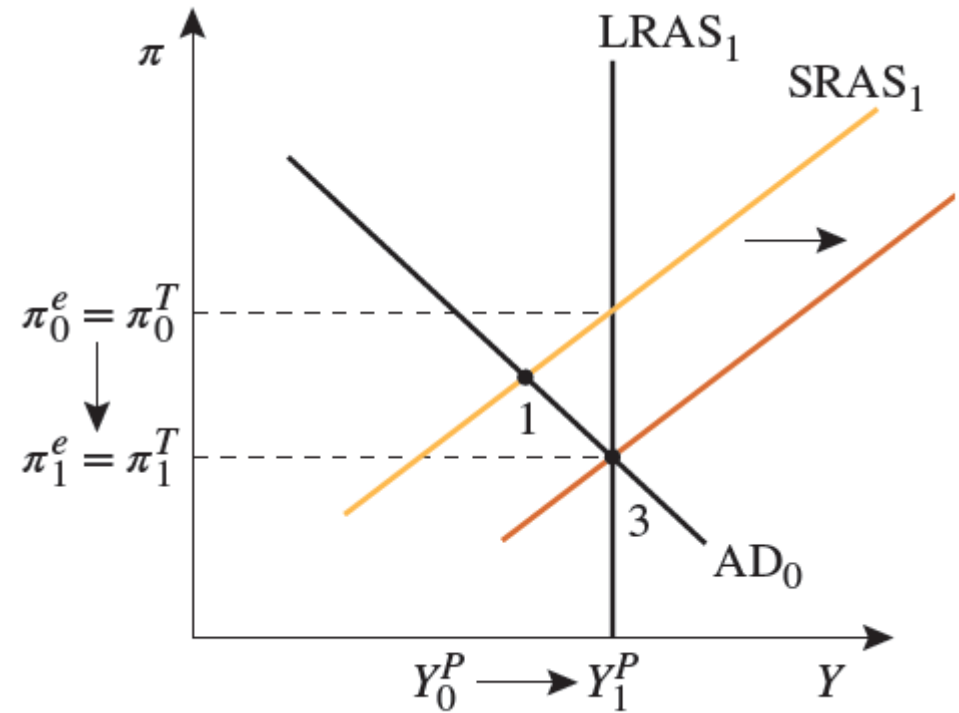


What Happens When Potential Output Changes?

- If policymakers now do nothing, expected inflation *exceeds* current inflation
 - The SRAS curve to the *right*.
 - Inflation *falls* even *further*
- Long run in this case is at a **new lower inflation target** at the *new potential output*.

What Happens When Potential Output Changes?

- With a **new, lower π^T** : policymakers *allow the economy to move to point 3*.
- They do this by *leaving the monetary policy reaction curve alone*.



What Happens When Potential Output Changes?

- *In the 1990s the LRAS curve shifted to the right, and the Fed took the opportunity to reduce their implicit inflation target.*
- *At the time, this was referred to as “**opportunistic disinflation**”.*
 - Declines in inflation
- **Real-business cycle theory:** *prices and wages are flexible, so inflation adjusts rapidly, current output always equals potential output, and all **business-cycle fluctuations** arise from changes in potential output*

What Are the Implications of Globalization for Monetary Policy?*

- Shifting the factors of production *from domestic to foreign factories* is the same as U.S. producers **finding a *new, cheaper technology*** to produce domestically.
 - Improvements in technology *increase* potential output
- Our conclusion is that ***globalization and trade do reduce inflation in the short run.***
 - And *just like* any **positive supply shock** they provide an **opportunity to reduce inflation permanently.**

Can Policymakers Stabilize Output and Inflation Simultaneously?*

- **Short run** fluctuations in output and inflation are **caused by** either **demand shifts** or **supply shifts**.
- By **shifting** their monetary policy reaction curve, policymakers **offset demand shocks**.
- **Unfortunately, *supply shocks*** are a *different* story.
 - There is **no way to neutralize** them.

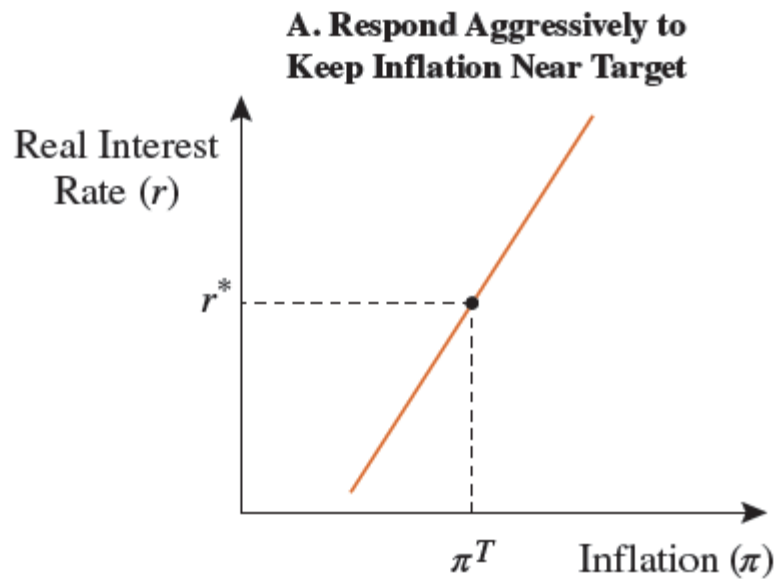
Can Policymakers Stabilize Output and Inflation Simultaneously?*

- Monetary policymakers can shift the **AD curve**, but cannot move the **SRAS curve**.
- Central bankers can *choose how aggressively they react to deviations of inflation from their target* caused by **supply shocks**.
 - *Picking the slope of their MPRC, which determines the slope of the AD curve.*

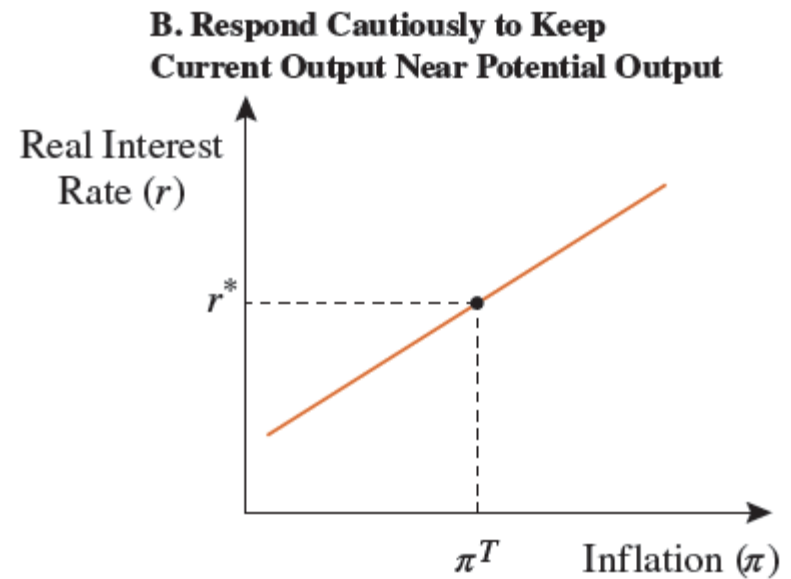
Can Policymakers Stabilize Output and Inflation Simultaneously?*

Figure 22.12

The Slope of the Monetary Policy Reaction Curve



Central bankers who are intent on keeping inflation close to the target will move interest rates aggressively when inflation rises.



Central bankers more concerned about keeping output close to potential will move interest rates by less in reaction to an inflation increase.

Can Policymakers Stabilize Output and Inflation Simultaneously?*

- The *more aggressively* policymakers are **keeping** current inflation *close to target*, the *steeper* their monetary policy reaction curve,
 - The *flatter* the AD curve.
 - By **controlling the slope of AD**, policymakers *choose the extent* to which **supply shocks translate into changes in output or changes in inflation**.
- The *more* central bankers **stabilize inflation**, the **more volatile output** will be, and vice versa.
 - There is a **tradeoff**.

Can Policymakers Stabilize Output and Inflation Simultaneously?*

- A *relatively* flat AD curve implied by the *steep* monetary policy reaction curve means:
 - A negative supply shock prompts a *large decline* in current output and a *small increase* in current inflation.
- By reacting aggressively, policymakers *ensure* that inflation (and inflation expectations) *remain* close to their target.
- Stable inflation *means* volatile output.

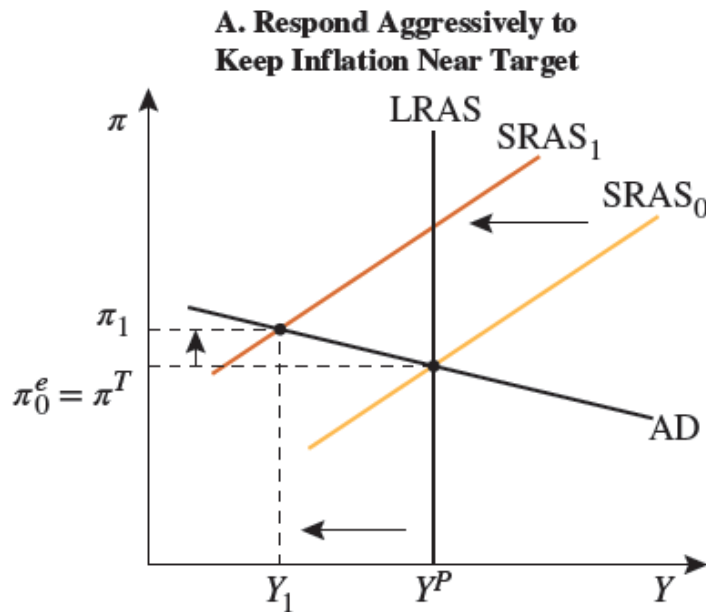
Can Policymakers Stabilize Output and Inflation Simultaneously?*

- When policymakers **worry about *more short-run fluctuations in output* than about *temporary movements in inflation***, they will choose a relatively *flat* monetary policy reaction curve.
 - The result is a **steep AD curve**.
- **Inflation *rises* and output *falls***
 - The **output gap** is *small* while the **deviation of inflation from expected inflation** is *large*
- **Expected inflation *rises significantly* and *slowly adjusts back to target*.**
- **Stable output *means* volatile inflation.**

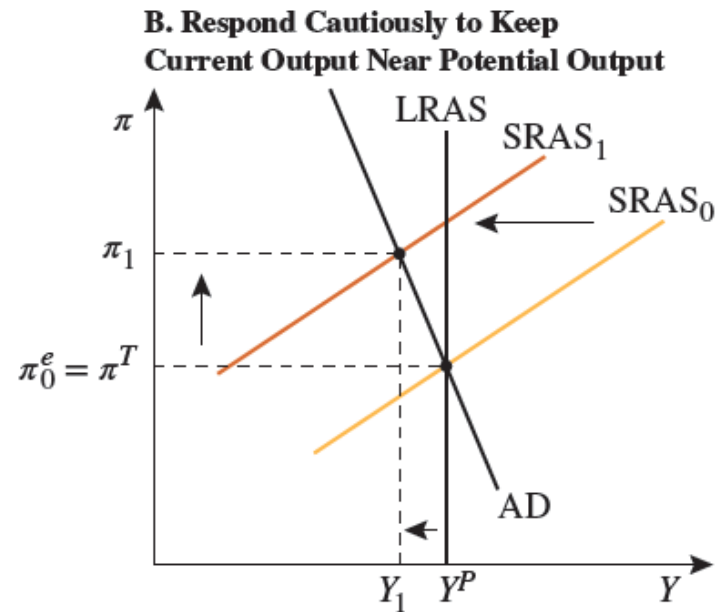
Can Policymakers Stabilize Output and Inflation Simultaneously?*

Figure 22.13

The Policymaker's Choice



Central bankers intent on keeping inflation close to the target will move interest rates aggressively when inflation rises and create bigger fluctuations in output.



Policymakers more concerned about keeping output close to potential will move interest rates by less in reaction to an inflation change, resulting in bigger fluctuations in inflation.