Inflation, Spending, and Output: The Aggregate Demand Curve

- Inflation, the Fed, and the AD Curve
  - The Keynesian model assumes output adjusts to demand at preset prices in the short run.
  - Prices do not remain fixed indefinitely.
  - The Keynesian model does not explain the behavior of inflation.

Inflation, Spending, and Output: The Aggregate Demand Curve

Effect of An Increase In Exogenous Spending

- Inflation, the Fed, and the AD Curve
  - The Fed can reduce autonomous expenditure by raising the interest rate.
    - $\pi$ increases $r$ increases autonomous spending decreases $Y$ decreases (AD curve)
A Shift In The Fed’s Policy Reaction Function

Fed “tightens” monetary policy – shifting reaction curve

New policy reaction function

Old policy reaction function

AD

AD’

Inflation, Spending, and Output: The Aggregate Demand Curve

• Movements Along the AD Curve
  • \( \pi \) and \( Y \) are inversely related
  • Changes in \( \pi \) cause a change in \( Y \) or a movement along the AD curve
  • \( \pi \) increases \( r \) increases \( \)planned spending decreases \( Y \) decreases

Inflation, Spending, and Output: The Aggregate Demand Curve

• Shifts of the AD Curve
  • Any factor that changes \( Y \) at a given \( \pi \) shifts the AD curve.
  • Shifts of the AD curve can be caused by:
    • Changes in exogenous spending.
    • Changes in the Fed’s policy reaction function.

Inflation and Aggregate Supply

• Three factors that can increase the inflation rate
  • Output gap
  • Inflation shock
  • Shock to potential output

Inflation and Aggregate Supply

• Inflation Inertia
  • In industrial economies (U.S.), inflation tends to change slowly from year to year.
  • The inflation inertia occurs for two reasons:
    • Inflation expectations
    • Long-term wage and price contracts

A Virtuous Circle of Low Inflation and Low Expected Inflation

Low inflation

Slow increase in wages and other production costs

Low expected inflation
Inflation and Aggregate Supply

- Long-term Wage and Price Contracts
  - Union wage contracts set wages for several years.
  - Contracts setting the price of raw materials and parts for manufacturing firms also cover several years.
  - These long-term contracts reflect the inflation expectations at the time they are signed.

The Output Gap and Inflation

<table>
<thead>
<tr>
<th>Relationship of output to potential output</th>
<th>Behavior of inflation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No output gap ( Y = Y^* )</td>
<td>Inflation remains unchanged</td>
</tr>
<tr>
<td>2. Expansionary gap ( Y &gt; Y^* )</td>
<td>Inflation rises ( \pi \uparrow )</td>
</tr>
<tr>
<td>3. Recessionary gap ( Y &lt; Y^* )</td>
<td>Inflation falls ( \pi \downarrow )</td>
</tr>
</tbody>
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Inflation and Aggregate Supply

- The Output Gap and Inflation
  - If \( Y^* = Y \)
    - An increase in exogenous spending creates and expansionary gap \( (Y > Y^*) \) – inflation increases
    - A decrease in exogenous spending creates a recessionary gap \( (Y < Y^*) \) and inflation decreases

Inflation and Aggregate Supply

- The Aggregate Demand—Aggregate Supply Diagram
  - Long-run aggregate supply (LRAS)
    - A vertical line showing the economy’s potential output \( Y^* \)

Inflation and Aggregate Supply

- The Aggregate Demand—Aggregate Supply Diagram
  - Short-run Aggregate Supply (SRAS)
    - A horizontal line showing the current rate of inflation, as determined by past expectations and pricing decisions

Inflation and Aggregate Supply

- The Aggregate Demand—Aggregate Supply Diagram
  - Short-run Equilibrium
    - A situation in which inflation equals the value determined by past expectations and pricing decisions and output equals the level of short-run equilibrium output that is consistent with that inflation rate
    - Graphically, short-run equilibrium occurs at the intersection of the AD curve and the SRAS line
The Aggregate Demand-Aggregate Supply (AD-AS) Diagram

Output
Nominal interest rate 
\( i \)

Aggregate demand, \( AD \)

Long-run aggregate supply, LRAS

Short-run aggregate supply, SRAS

The Adjustment of Inflation When a Recessionary Gap Exists

\( Y \)
\( Y^* \)
\( \pi \)
\( \pi^* \)

The Adjustment of Inflation When an Expansionary Gap Exists

\( Y \)
\( Y^* \)
\( \pi \)
\( \pi^* \)

Inflation and Aggregate Supply

- The Aggregate Demand—Aggregate Supply Diagram
  - Long-run Equilibrium
    - A situation in which actual output equals potential output and the inflation rate is stable
    - Graphically, long-run equilibrium occurs when the AD curve, the SRAS line, and the LRAS line all intersect at a single point

A Review of the Adjustment Process to a Recessionary Gap

- Firms that are selling less than they want to will start to lower prices.
- As \( \pi \) falls the Fed lowers \( r \) and \( AD \) increases.
- Falling \( \pi \) reduces uncertainty which also increases \( AD \)

A Review of the Adjustment Process to a Recessionary Gap

- As \( Y \) increases, cyclical unemployment falls (Okun’s Law)
- Adjustment continues until long-run equilibrium is reached.
The Self-Correcting Economy

- In the long-run the economy tends to be self-correcting.
- The Keynesian model does not include a self-correcting mechanism.

The Self-Correcting Economy

- A slow self-correcting mechanism
  - Fiscal and monetary policy can help stabilize the economy.
- A fast self-correcting mechanism
  - Fiscal and monetary policy are not effective and may destabilize the economy.

The speed of correction will depend on:

- The use of long-term contracts.
- The efficiency and flexibility of labor markets.
- Fiscal and monetary policy are most useful when attempting to eliminate large output gaps.

**War and Military Buildup As A Source of Inflation**

- Increase in military spending causes $AD$ to increase
- Creates an expansionary gap $Y > Y^*$
- Increases shifting $SRAS$ to $SRAS'$
- Long-run equilibrium back to $Y^*$ with $\pi^*$

**Sources of Inflation**

Economic Naturalist

- How did inflation get started in the United States in the 1960s?
  - 1959-63 inflation averaged about 1%
  - By 1970 inflation was 7%
Sources of Inflation

- **Inflation Shock**
  - A sudden change in the normal behavior of inflation, unrelated to the nation’s output gap

**Examples**

- OPEC embargo of 1973
- Drop in oil prices in 1986

Sources of Inflation

- **Aggregate Supply Shock**
  - Either an inflation shock or a shock to potential output
  - Adverse aggregate supply shocks of both types reduce output and increase inflation

**Economic Naturalist**

- Why did inflation escalate in the United States in the 1970s?

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**The Effects of An Adverse Inflation Shock**

- **Equilibrium** at \( A \) -- \( Y^* = Y \)
- **Inflation shock** -- \( \pi \) increases to \( \pi' \)
- **Recessionary gap** and higher inflation (stagflation)
- **With policy** -- \( AD \) shifts to \( AD' \), \( Y = Y^* \), \( \pi \) rises to \( \pi' \)

**The Effects of a Shock To Potential Output**

- **Equilibrium** at \( B \) -- \( Y > Y^* \)
- **Expansionary gap**
- **Increase** in \( \pi \)
- **SRAS** rises to \( SRAS' \)
- **Equilibrium** at \( B' \) -- \( Y = Y^* \)
- **Decline** in output is permanent

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**Sources of Inflation**

- **Inflation Shock -- Examples**
  - OPEC embargo of 1973
  - Drop in oil prices in 1986

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**Sources of Inflation**

- **Aggregate Supply Shock**
  - Either an inflation shock or a shock to potential output
  - Adverse aggregate supply shocks of both types reduce output and increase inflation
Sources of Inflation

- Shocks to Potential Output
  - Aggregate supply shock
    - Inflation shocks
      - Stagflation
    - Temporary reduction in output
  - Potential output shocks
    - Stagflation
    - Permanent reduction in output

From: Economic Naturalist

- Equilibrium at $B$ -- $Y^* = Y$
- Productivity increases
- $Y^*$ shifts to $Y''$
- Recessionary gap -- $Y < Y''$
- $\pi$ falls to $\pi$
- Equilibrium at $A$
- Lower inflation; higher output

Short-Run Effects of an Anti-inflationary Monetary Policy

- Fed shifts $AD$ to $AD'$
- Short run eq. At $B$
- $Y < Y^*$ -- recessionary gap
- Long run correction occurs

Long-Run Effects of an Anti-inflationary Monetary Policy

- Short-run eq. at $B$
- Recessionary gap -- $Y < Y''$
- $\pi$ falls to 3% and $Y$ rises to $Y''$
- Long-run eq. -- lower prices @ $Y''$

Summary

- AD downward sloping (inflation vs output)
- SRAS (Inflation Adjustment Line) level of inflation in SR
- SR Equil: $AD=SRAS$
- LRAS potential output
- LR Equil: $AD=SRAS=LRAS$
- Rec Output Gap: Inflation falls
- Exp Output Gap: Inflation rises
- Shifts of AD (Fed Policy Shifts, Exogenous Spending Change)
- Shifts of SRAS (inflation shock)
- Shift of LRAS (potential output shock)
- Economy self-corrects in LR. If slow/big gap, stabilize

Exchange Rates

- Some Definitions
  - $e = \text{nominal exchange rate}$
  - $e = \text{the number of units of foreign currency that the domestic currency will buy}$
  - If $e$ increases, it is an appreciation of the domestic currency.
  - If $e$ decreases, it is a depreciation of the domestic currency.
Exchange Rates

- **Appreciation**
  - An increase in the value of a currency relative to other currencies

- **Depreciation**
  - A decrease in the value of a currency relative to other currencies

Exchange Rates

- **Flexible Exchange Rate**
  - An exchange rate whose value is not officially fixed but varies according to the supply and demand for the currency in the foreign exchange market
  - Foreign Exchange market: currencies of various nations are traded for one another

Exchange Rates

- **Fixed Exchange Rate**
  - An exchange rate whose value is set by official government policy

Exchange Rates

- **The Real Exchange Rate**
  - Nominal exchange rate
    - The price of the domestic currency in terms of a foreign currency
  - Real exchange rate
    - The price of the average domestic good or service relative to the price of the average foreign good or service, when the prices are expressed in terms of a common currency

Exchange Rates

- **Example**
  - Should you buy a Japanese or American computer for your company?
    - Price of U.S. computer = $2,400
    - Price of Japanese computer = 242,000 yen
    - Exchange rate = 110 yen/dollar
  - Price in yen = price in dollars x value of dollar in terms of yen
  - Price in dollars = price in yen/yen-dollar exchange rate
    - Price in dollars = 242,000 yen/110 = $2,200
    - Real exchange rate = ______________
    - buy _________________

Exchange Rates

- **Example**
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Exchange Rates

- Real Exchange Rate

\[
\text{Real Exchange Rate} = \frac{\text{Price of domestic good (P)}}{\text{Price of foreign good, in dollars (P')}}
\]

\[
\text{Real Exchange Rate} = \frac{P}{P'/e}
\]

\[
\text{Real Exchange Rate} = \frac{eP}{P'}
\]

The Real Exchange Rate

- A high real exchange rate implies that domestic producers will have difficulty exporting to other countries.
- A high real exchange rate will attract imports.
- \(NX\) will tend to be low when the real exchange rate is high.
- Real and nominal exchange rates tend to move in the same direction

Economic Naturalist

- Does a strong currency imply a strong economy?

The Determination of the Exchange Rate

- Law of One Price

- If transportation costs are relatively small, the price of an internationally traded commodity must be the same in all locations

Example

- How many Indian rupees equal to one Australian dollar?
  - Bushel of grain cost 5 Australian dollars or 150 rupees
  - 5 Australian dollars = 150 rupees
  - Nominal exchange should equal 30 rupees/Australian dollar

Purchasing Power Parity (PPP) THEORY

- The theory that nominal exchange rates are determined as necessary for the law of one price to hold
The Determination of the Exchange Rate

- Purchasing Power Parity (PPP)
- **PREDICTION OF THEORY**
  - In the long run, the currencies of countries that experience significant inflation will tend to depreciate.

The Determination of the Exchange Rate

- Limits to the PPP Theory
  - Not all goods and services are traded internationally.
    - The greater the share of non-traded goods, the less precise the PPP theory
  - Not all internationally traded goods and services are perfectly standardized commodities.
  - PPP Theory more valid in LR than (not in SR)

The Supply and Demand for Dollars In The Yen-Dollar Market

- The equilibrium exchange rate ($e^*$) or fundamental exchange rate equals the quantity of dollars supplied and demanded

The Determination of the Exchange Rate

- Changes in the Supply of Dollars
  - Factors that increase the supply of dollars
    - An increase in the preference for Japanese goods
    - An increase in U.S. real GDP
    - An increase in the real interest rate on Japanese assets

The Determination of the Exchange Rate

- Changes in the Demand for Dollars
  - Factors that increase the demand for dollars
    - Increased preference for U.S. goods
    - Increase in real GDP abroad
    - An increase in the real interest rate on U.S. assets
A Tightening of Monetary Policy Strengthens the Dollar

- Tighter monetary policy raises the domestic real interest rate.
- Foreign demand for U.S. assets increase.

The demand for dollars rises.
- Exchange rate appreciates from \( e^* \) to \( e^*' \).

Monetary Policy and the Exchange Rate

- The Exchange Rate as a Tool of Monetary Policy
  - When the exchange rate is flexible:
    - Tighter monetary policy reduces net exports.
    - Easier monetary policy stimulates net exports.
    - Monetary policy is more effective in an open economy with flexible exchange rates.

An Overvalued Exchange Rate

- The peso’s official value is greater than the fundamental value; the peso is overvalued.
- To maintain the value, the government must purchase a quantity of pesos (A-B).

Fixed Exchange Rates

- International Reserves
  - Foreign currency assets held by a government for the purpose of purchasing the domestic currency in the foreign exchange market.

A Speculative Attack on the Peso

- Peso overvalued at 0.125.
- Central bank buys pesos.
- Investors launch a speculative attack – sell peso dominated assets.

Fixed Exchange Rates

- Can a speculative attack occur under flexible exchange rates?
A Tightening of Monetary Policy Eliminates An Overvaluation

- Pesos overvalued at 0.125
- Tightening monetary policy increases $D$ to $D'$
- Official value = fundamental value

Fixed Exchange Rates

- Observation
  - The conflict monetary policymakers face, between stabilizing the exchange rate and stabilizing the domestic economy, is most severe when the exchange rate is under a speculative attack.

Should Exchange Rates Be Fixed or Flexible?

- Monetary Policy
  - Flexible exchange rates can strengthen the impact of monetary policy.
  - Fixed exchange rates prevent the use of monetary policy to stabilize the economy.