Chapter 13

Aggregate Demand and Aggregate Supply
Output and Price Level

**Figure 1** Two-Way Relationship Between Output and Price Level

- Aggregate Demand Curve
- Real GDP
- Aggregate Supply Curve
- Price Level
The Aggregate Demand Curve

- A curve that indicates equilibrium GDP at each price level
- Not a demand curve
  - Resembles a demand curve
- How do changes in price level affect economy?
  - Relationship between price level and money demand
- A rise in the price level
  - Money demand curve – shift rightward
  - Higher interest rate
  - Aggregate expenditure line – shift downward
  - Decrease in equilibrium GDP
Deriving the Aggregate Demand Curve

**Figure 2** Deriving the Aggregate Demand Curve (a, b)

As the price level rises, money demand increases and interest rate rises.

The rise in the interest rate causes real GDP to fall.

- **Figure:** Deriving the Aggregate Demand Curve (a, b)

- **Money ($ Billions):**
  - Ms
  - Md

- **Interest Rate:**
  - 9%
  - 6%

- **Money ($ Billions):**
  - 500

- **Real Aggregate Expenditure ($ Trillions):**
  - AE

- **Real GDP ($ Trillions):**
  - 6
  - 10
Deriving the Aggregate Demand Curve

On the $AD$ curve, a higher price level is associated with a lower real GDP.

Figure 2 Deriving the Aggregate Demand Curve (c)
Movements Along the AD Curve

- **Increase in the price level**
  - Money demand – increase
  - Interest rate – increase
  - Autonomous consumption - decrease
  - Investment spending - decrease
  - Equilibrium real GDP – decrease

- **Decrease in the price level**
  - Money demand – decrease
  - Interest rate – decrease
  - Autonomous consumption - increase
  - Investment spending - increase
  - Equilibrium real GDP - increase
Shifts of the AD Curve

- Anything other than price level causes equilibrium GDP to change, AD curve shifts
- AD curve shifts rightward
  - Increase in
    - Government purchases
    - Investment spending
    - Autonomous consumption spending
    - Net exports
    - Money supply
  - Decrease in
    - Net taxes
A Spending Change Shifts the AD Curve

**Figure 3** A Spending Change Shifts the AD Curve

At any given price level, an increase in government purchases shifts the AE line upward, raising real GDP.

Since real GDP is higher at the given price level, the AD curve shifts rightward.
Effects of Key Changes on the AD Curve

Figure 4 Effects of Key Changes on the AD Curve (a)

Price level ↑ moves us leftward along the AD curve

Price level ↓ moves us rightward along the AD curve
Effects of Key Changes on the AD Curve

Figure 4 Effects of Key Changes on the AD Curve (b)

Entire $AD$ curve shifts rightward if:
- $a$, $I^p$, $G$, or $NX$ increases
- Net taxes decrease
- The money supply increases
Effects of Key Changes on the AD Curve

Figure 4 Effects of Key Changes on the AD Curve (c)

Entire AD curve shifts leftward if:
• $a$, $I^P$, $G$, or $NX$ decreases
• Net taxes increase
• The money supply decreases
The AS Curve: Costs and Prices

- How do changes in output affect price level?
  - Simple model that focuses on link between prices and costs
  - The effects of macroeconomic events on all firms’ prices
- Assumption
  - Price - markup over cost per unit
- Interested in: Average percentage markup
  - Determined by competitive conditions in the economy
  - Stable from year to year
- Stable price level
  - must have stable unit costs
- Short run
  - Price level rises when unit costs rise
  - Price level falls when unit costs decrease
The AS Curve: GDP and Price Level

- **Primary concern**
  - Impact of total output (real GDP) on unit costs, thus on price level

- **As total output increases:**
  - More input is needed to produce a unit of output
    - Greater amounts of labor, capital, land, raw materials are needed to produce each unit of output
  - Prices of nonlabor inputs rise
    - Inputs that are available only in limited quantities in S/R
  - Nominal wage rate rises
    - Due to higher employment

- **As total output decreases:**
  - Opposite results
The AS Curve: GDP and Price Level

- Short run vs. long run
- When total output increases
  - New, less productive workers are hired rather quickly
  - Prices of non-labor inputs rise within a few weeks/months
  - Nominal wages change very slowly
- Assumption
  - Changes in output - no effect on the nominal wage rate in the short run
    - Wage changes have a very important role in the economy’s adjustment over the long run
The AS Curve: GDP and Price Level

- **Rise in real GDP -- short run**
  - Unit costs increase
    - Input requirements per unit of output ↑
    - Price of non-labor inputs ↑
  - Price level increases

- **Fall in real GDP -- short run**
  - Unit costs decrease
    - Input requirements per unit of output ↓
    - Price of non-labor inputs ↓
  - Price level decreases
Deriving the Aggregate Supply Curve

- Aggregate supply curve
  - Indicates the price level consistent with
  - Unit costs, markups
  - For any level of output
  - Short run

- S/R price level at each level of output
  - Resembles a supply curve
The Aggregate Supply Curve

**Figure 5** The Aggregate Supply Curve

Starting at point A, an increase in output raises unit costs. Firms raise prices, and the overall price level rises.

Starting at point A, a decrease in output lowers unit costs. Firms cut prices, and the overall price level falls.
Movements Along the AS Curve

Real GDP ↑

Input requirements per unit of output ↑

Prices of nonlabor inputs ↑

Unit costs ↑

Price level ↑

Real GDP ↓

Input requirements per unit of output ↓

Prices of nonlabor inputs ↓

Unit costs ↓

Price level ↓
Shifts of the AS Curve

- Change in unit costs (thus price level) occur because of reasons other than a change in output
  - If anything other than real GDP changes the price level, AS curve shifts
- AS shifts – changes in
  - World oil prices
  - Weather
  - Technology
  - Nominal wage
    - Nom. wage increase, shifts AS curve upward
    - Nom. wage decrease, shifts AS curve downward
Shifts of the AS Curve

Figure 6  Shifts of the Aggregate Supply Curve

When unit costs rise at any given real GDP—e.g., from an increase in world oil prices or bad weather for farm production— the AS curve shifts upward.
Effects of Key Changes on the AS Curve

**Figure 7** Effects of Key Changes on the AS Curve (a)

Real GDP ↑ moves us rightward along the AS curve

Real GDP ↓ moves us leftward along the AS curve
Effects of Key Changes on the AS Curve

**Figure 7** Effects of Key Changes on the AS Curve (b)

Entire AS curve shifts upward if unit costs ↑ for any reason besides an increase in real GDP.
Effects of Key Changes on the AS Curve

**Figure 7** Effects of Key Changes on the AS Curve (c)

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Entire AS curve shifts downward if unit costs ↓ for any reason besides an decrease in real GDP
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Price Level

Real GDP

$AS_1$, $AS_2$
AD and AS: Short-Run Equilibrium

- **AS curve**
  - Shows the price level if we know the output level

- **AD curve**
  - Shows the output level if we know the price level

- **Short-run macroeconomic equilibrium**
  - Combination of price level and GDP
  - Consistent with the AD and AS curves
Short-Run Macroeconomic Equilibrium

**Figure 8** Short-Run Macroeconomic Equilibrium

- Price Level
- Real GDP ($ Trillions)
- AS
- AD
- E
- B
- F

The graph illustrates the short-run macroeconomic equilibrium with the intersection of the aggregate supply (AS) and aggregate demand (AD) curves at point E, representing the equilibrium price level and real GDP.
What Happens When Things Change?

- Demand shock
  - Any event
  - Causes the AD curve to shift

- Supply shock
  - Any event
  - Causes the AS curve to shift
Demand Shocks in the Short Run

Figure 9 The Effect of a Demand Shock

![Graph showing the effect of a demand shock on price level and real GDP.](image)
Demand Shocks in the Short Run

- Increase in government purchases
  - GDP increases - by less due to the increase in price level

\[ G \uparrow \rightarrow AD \text{ curve shifts rightward} \rightarrow GDP \uparrow \]

\[ Unit \ costs \uparrow \rightarrow P \uparrow \rightarrow Money \ demand \uparrow \rightarrow Interest \ rate \uparrow \rightarrow a \ and \ {\bar{p}} \downarrow \rightarrow GDP \downarrow \]
Demand Shocks in the Short Run

- Decrease in government purchases
  - GDP decreases - by less due to the decrease in price level
Demand Shocks in the Short Run

- Increase in money supply
  - GDP increases - by less due to the increase in price level
Demand Shocks in the Short Run

- Positive demand shock
  - Shifts the AD curve rightward
  - Real GDP increases
  - Price level increases

- Negative demand shock
  - Shifts the AD curve leftward
  - Real GDP decreases
  - Price level decreases

- Example: Great Depression
  - 1929 through 1933
  - Price level fell as GDP fell
    - Adverse demand shock
Demand Shocks: Adjusting to the Long-Run

- Demand shock
  - Pulls the economy away from full employment in short run
  - Wage rate and price level will change
  - Eventually, the economy returns to full-employment
  - Self-correcting mechanism
    - Price and wage changes return the economy back to full employment
Demand Shocks: Adjusting to the Long-Run

- Output - above full employment
  - Employment unusually high
  - Wage rate increases
  - AS curve shifts upward
  - Price level increases
  - GDP decreases
  - Until full employment is restored
Demand Shocks: Adjusting to the Long-Run

Figure 10 Long-Run Adjustment After a Positive Demand Shock

![Diagram showing AS and AD curves]

- **Price Level**: $P_4$, $P_3$, $P_2$, $P_1$
- **Real GDP**: $Y_{FE}$, $Y_3$, $Y_2$
- **AS Curves**: $AS_1$, $AS_2$
- **AD Curves**: $AD_1$, $AD_2$
Demand Shocks: Adjusting to the Long-Run

- Output - below full employment
  - High unemployment
  - Wage rate falls
  - AS curve shifts downward
  - Price level decreases
  - GDP increases
  - Until full employment is restored
Demand Shocks: Adjusting to the Long-Run

Figure 11 Long-Run Adjustment After a Negative Demand Shock
The Long-Run AS Curve

- A vertical line
- All possible output and price-level combinations that the economy can end up in the long-run
The Long-Run AS Curve

**Figure 12** The Long-Run AS Curve
Short Run Supply Shocks

- Negative supply shock
  - AS curve shifts upward
  - Output decreases
  - Price level increases
  - Stagflation
    - Combination of falling output & rising prices

- Positive supply shock
  - AS curve shifts downward
  - Output increases
  - Price level decreases
Short Run Supply Shocks

Figure 13 The Effect of a Negative Supply Shock
Long-Run Effects of Supply Shocks

- Supply shocks are mostly temporary
- If supply shocks persist
  - The economy self-corrects
  - Output is not at full employment level
    - Wage rate changes
    - AS curve shifts back to its initial position
    - Price level and GDP change
    - Until full employment is restored