

AGGREGATE SUPPLY

- The aggregate supply behaves very differently in the short run than in the long run
- Economists disagree about how best to explain AS in the SR
- A common theme about what makes the SR and LR AS curves differ
- A common conclusion that the SRAS curve is upward sloping b/c frictions of macroeconomics

1. Two Models of Aggregate Supply

- Some market imperfection (friction) causes the output of the economy to deviate from the classical benchmark
- SRAS is upward sloping rather than vertical
- Shifts in SRAS cause the level of output to deviate temporarily from the natural rate

$$AS: Y = \bar{Y} + \alpha(P - P^e), \quad \alpha > 0,$$

where p^e : the expected price level

α : how much output responds to unexpected change in the price level

(1) *The Sticky Wage Model*

- Friction: the sluggish adjustment of nominal wage
 - e.g., long-term contracts, implicit agreements on limited wage changes
 - If the nominal wage () is stuck and $P \uparrow$
 - real wage (W / P) \downarrow
 - Firms hire more workers
 - The additional labor produces more output
- AS curve (fig. 13-1)
 - Firms and workers set W based on the target real wage (ω) and on their expectation of the price level (P^e)
 - $W = \omega \times P^e$
 - Real wage: $W / P = \omega \times (P^e / P)$
 - the real wage deviates from its target if $P^e \neq P$
 - Labor demand: $L = L^d(W / P)$
 - Production function: $Y = F(L)$
 - AS: $Y = \bar{Y} + \alpha(P - P^e)$

(2) *The Sticky-Price Model*

- Friction: The prices of goods and services adjust slowly
 - e.g., long-term contract, menu cost
- Firm's pricing decision rule:
 - firm's desired price (p) depends on the price level (P) and the aggregate income (Y)
 - e.g., $P \uparrow \rightarrow p \uparrow$ (b/c production cost \uparrow)
 - $Y \uparrow \rightarrow p \uparrow$ (b/c demand \uparrow)
 - $p = P + \beta(Y - \bar{Y})$,
 - where β measures how much the firm's desired price responds to the level of aggregate output
- Two types of firms
 - a) flexible prices (1-s): $p = P + \beta(Y - \bar{Y})$
 - b) sticky prices (s): they announce their prices in advance based on their expectations
 - $p = P^e + \beta(Y^e - \bar{Y}^e)$
 - $p = P^e$ assuming $Y^e = \bar{Y}^e$ for simplicity
- The overall price level:
 - $P = sP^e + (1-s)[P + \beta(Y - \bar{Y})]$
 - AS: $Y = \bar{Y} + \alpha(P - P^e)$ where $\alpha = s/[(1-s)\beta]$

(3) Implications

- Although the two models of aggregate supply differ in their assumptions and emphasis, their implications for aggregate output are similar
 - AS: $Y = \bar{Y} + \alpha(P - P^e)$
- If $P > P^e \rightarrow Y > \bar{Y}$ and if $P < P^e \rightarrow Y < \bar{Y}$ (fig. 13-3)
- How shifts in AD lead to SR fluctuations (fig. 13-4)
 - The unexpected expansion in AD causes the economy to boom in the SR
 - However, the economy returns the natural level of output in the LR at a much higher price level
- LR monetary neutrality and SR monetary non-neutrality are perfectly compatible in this model

2. New Keynesian Economics

- Keynes: abandon the classical presumption that wages and prices adjust quickly to equilibrate market
- Aggregate demand is a primary determinant of national income in the short run
- New Keynesian economists develop more fully the Keynesian approach to economic fluctuations
 - Accept IS-LM model as the theory of aggregate demand and try to refine the theory of aggregate supply
 - How wages and prices behave in the short run by identifying more precisely the market imperfections that make wages and prices sticky and that cause the economy to deviate from its natural rate
 - Stickiness makes the SRAS curve upward sloping
 - Fluctuations in aggregate demand cause SR fluctuations in output and employment
- Examining the microeconomics behind SR price adjustment

1) Small Menu Costs and Aggregate-Demand Expenditure

- Menu cost: costs of price adjustment that lead firms to adjust prices intermittently rather than continuously
 - Even though menu costs are small for the individual firm, they can have large effects on the economy as a whole

- Aggregate-demand externality: macroeconomic impact of one firm's price adjustment on the demand for all other firms' products
 - Price reduction by one firm \rightarrow lowers $P \rightarrow$ raises real money balances \rightarrow expands aggregate income \rightarrow raises aggregate demand
- Small menu costs can make prices sticky in the presence of aggregate-demand externality
 - Stickiness can have a large cost to society
 - However, the firm ignore the externality when making its decision
 - \rightarrow Sticky prices may be optimal for those setting prices, even though they are undesirable for the economy as a whole

2) Recessions as Coordination Failure

- In recession, output is low, workers are unemployed, and factories sit idle
 - \rightarrow It is possible to imagine allocations of resources in which everyone is better off
- Coordination problem can arise in setting of wages and prices because those who anticipate the actions of other wage and price setters
- Example
 - A fall in money supply
 - Decide whether to cut its price
 - Each firm's profit depends not only on its pricing decision but also on the decision made by other firms

		Firm 2	
		Cut price	Keep high price
Firm 1	Cut price	Firm 1 makes \$30 Firm 2 makes \$30	Firm 1 makes \$5 Firm 2 makes \$15
	Keep high price	Firm 1 makes \$15 Firm 2 makes \$5	Firm 1 makes \$15 Firm 2 makes \$15

- Outcomes

- If each firm expects the other to cut its price, both will cut prices, resulting in the preferred outcome
 - If each firm expects the other to maintain its prices, both will maintain their prices, resulting in the inferior outcome → “Coordination Failure”
 - Coordination is often difficult because the number of firms setting prices is large
- Prices can be sticky simply because people expect them to be sticky, even though stickiness is in no one’s interest

3) The Staggering Wages and Prices

- Not everyone in the economy sets new wages and prices at the same time (→ Staggering)
 - Staggering slows the process of coordination and price adjustment
- makes the overall level of wages and prices adjust gradually, even when individual wages and prices changes frequently

3. Inflation, Unemployment, and the Phillips Curve

- The goals of economic policy makers
 - low inflation and low unemployment
 - However, tradeoff b/t inflation and unemployment
 - “SR Phillips curve” (fig. 13-6)

$$\pi = \pi^e - \gamma(u - u^n) + v$$

inflation = expected inflation
- $\gamma \times$ cyclical unemployment
+ supply shock

γ : a parameter measuring the response of inflation to cyclical unemployment rate

- The causes of rising and falling inflation
 - Demand-pull inflation: cyclical unemployment exerts upward or downward pressure on inflation
 - Low unemployment pulls the inflation rate up
 - Cost-push inflation: Adverse supply shocks are typically push up the costs of production