**Introduction**

- In previous chapters, we assumed the price level $P$ was “stuck” in the short run.
  - This implies a horizontal SRAS curve.

- Now, we consider a prominent model of aggregate supply in the short run:
  - “Sticky-price” model
Introduction

Both models imply:

\[ Y = \bar{Y} + \alpha(P - EP) \]

- Other things equal, \( Y \) and \( P \) are positively related, so the SRAS curve is upward sloping.
The sticky-price model

- **Reasons for sticky prices:**
  - long-term contracts between firms & customers
  - menu costs
  - firms not wishing to annoy customers with frequent price changes

- **Assumption:**
  - Firms set their own prices (e.g., as in monopolistic competition).
The sticky-price model

- An individual firm’s desired price is:

\[ p = P + a(Y - \bar{Y}) \]

where \( a > 0 \).

Suppose two types of firms:
- firms with flexible prices, set prices as above
- firms with sticky prices, must set prices in advance:

\[ p = EP + a(EY - E\bar{Y}) \]
The sticky-price model

\[ P = s[EP] + (1-s)[P + a(Y - \bar{Y})] \]

price set by sticky-price firms

price set by flexible-price firms

• Subtract \((1-s)P\) from both sides:

\[ sP = s[EP] + (1-s)[a(Y - \bar{Y})] \]

• Divide both sides by \(s\):

\[ P = EP + \frac{(1-s)a}{s}(Y - \bar{Y}) \]
The sticky-price model

\[ P = EP + \frac{(1-s)\alpha}{s}(Y - \bar{Y}) \]

Finally, derive AS equation by solving for \( Y \):

\[ Y = \bar{Y} + \alpha(P - EP), \]

where \( \alpha = \frac{s}{(1-s)\alpha} > 0 \)
The "sticky price" model implies an upward sloping SRAS curve.

\[ Y = \bar{Y} + \alpha (P - EP) \]
The **Phillips curve** states that $\pi$ depends on:

- expected inflation, $E\pi$
- cyclical unemployment: the deviation of the actual rate of unemployment from the natural rate
- supply shocks, $\nu$

\[
\pi = E\pi - \beta(u - u^n) + \nu
\]

where $\beta > 0$ is an exogenous constant.
Comparing SRAS and the Phillips curve

SRAS: \[ Y = \bar{Y} + \alpha(P - EP) \]

Phillips curve: \[ \pi = E\pi - \beta(u - u^*) + \nu \]

- **SRAS curve:**
  Output is related to unexpected movements in the price level.

- **Phillips curve:**
  Unemployment is related to unexpected movements in the inflation rate.
In the short run, policymakers face a tradeoff between $\pi$ and $u$. 

The short-run Phillips curve is given by:

$$\pi = E\pi - \beta(u - u^n) + \nu$$
People adjust their expectations over time, so the tradeoff only holds in the short run.

\[ \pi = E\pi - \beta(u - u^n) + \nu \]

*E.g.,* an increase in \(E\pi\) shifts the short-run P.C. upward.
The sacrifice ratio

- To reduce inflation, policymakers can contract AD causing unemployment to rise above the natural rate.
- The *sacrifice ratio* measures the percentage of a year’s real GDP that must be forgone to reduce inflation by 1 percentage point.
- A typical estimate of the ratio is 5.
Expectations and the Sacrifice Ratio

Ways of forming expectations:

- **adaptive expectations:**
  People base expectations of future inflation on recently observed inflation. Policymakers can continually manipulate public to reach desired outcome.

- **rational expectations:**
  People base expectations on all available information, including current and possible future policies. Implies painless disinflation and a small sacrifice ratio.
Calculating the sacrifice ratio for the Volcker disinflation

1981: $\pi = 9.7\%$
1985: $\pi = 3.0\%$

Total disinflation = 6.7%

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Total 9.5%
Calculating the sacrifice ratio for the Volcker disinflation

- Inflation fell by 6.7%, total cyclical unemployment was 9.5%.
- Okun’s law: 1% of unemployment = 2% of lost output.
- Thus, 9.5% cyclical unemployment = 19.0% of a year’s real GDP.
- **Sacrifice ratio** = 19%/6.7% = 2.8 percentage points of GDP were lost for each percentage point reduction in inflation.
The natural-rate hypothesis

Changes in aggregate demand affect output and employment only in the short run (Chaps. 10-12).

In the long run, the economy returns to the levels of output, employment, and unemployment described by the classical model (Chaps. 3–9).