Review from last time

- Started talking about the AD-AS model in the short run

- Examples:
  - *Temporary* increase in consumer spending from hot new product
  - *Permanent* increase in a government spending program
  - *Temporary* spike in international oil prices
  - *Permanent* increase in educational attainment of workers in the USA
Short Run vs. Long Run

- Remember from last time: the difference between the *short run* and the *long run* is the time it takes to adjust price expectations.

- Also, remember from last time:

  \[ Y = Y_N + a(P - P_E) \]

- If \( P > P_E \) in the short run and stays there, then in the long run \( P_E \) increases.

- If \( P < P_E \) in the short run and stays there, then in the long run \( P_E \) decreases.

- Remember that SRAS *shifts* when \( P_E \) changes.
Temporary vs. Permanent

- A *temporary* shock to the economy is one that subsides before price expectations adjust.

- A *permanent* shock is one that is still present in the long run.

- Absent anything else happening, the economy returns to its initial equilibrium in the long run following a temporary shock, but not following a permanent shock.
Back to our examples

- Now what happens in the long run of each of these?
- Examples:
  - *Temporary* increase in consumer spending from hot new product
  - *Permanent* increase in a government spending program
  - *Temporary* spike in international oil prices
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What can the government do?

- Government can intervene in two ways:
  - Monetary policy: Fed can cut interest rates to increase AD
  - Government spending: Gov’t can increase G to increase AD
- Raising interest rates or cutting spending have the opposite effects
- Suppose the government decides to stabilize GDP by using monetary/fiscal policy to keep Y on the LRAS curve
Two types of shocks

- Consider each of these two cases:
  - The economy goes into a recession because the stock market has crashed and spending is down
  - The economy goes into a recession because an earthquake has critically damaged power grids

- Assume both of these are temporary shocks

- What happens if the government does or does not intervene for each?
Basic Tradeoff

- In response to temporary shocks to the economy:
  - If the shock is a *demand* shock, then if the government intervenes they shorten the recession
  - If the shock is a *supply* shock, then if the government intervenes it shortens the recession, but increases inflation permanently
- Demand shocks and supply shocks are difficult to tell apart in the short run
The Phillips Curve

- Until now, our treatment of unemployment has been loose; want to formalize this
- **Phillips curve**: shows the short-run trade-off between inflation and unemployment
- 1958: A.W. Phillips showed that nominal wage growth was negatively correlated with unemployment in the U.K.
- 1960: Paul Samuelson & Robert Solow found a negative correlation between U.S. inflation & unemployment, named it “the Phillips Curve.”
Suppose $P = 100$ this year.

The following graphs show two possible outcomes for next year:

A. Agg demand low, small increase in $P$ (i.e., low inflation), low output, high unemployment.

B. Agg demand high, big increase in $P$ (i.e., high inflation), high output, low unemployment.
Deriving the Phillips Curve

A. Low agg demand, low inflation, high u-rate

B. High agg demand, high inflation, low u-rate
The Phillips Curve: A Policy Menu?

- Since fiscal and monetary policy affect aggregate demand, the *Phillips Curve* appeared to offer policymakers a menu of choices:
  - low unemployment with high inflation
  - low inflation with high unemployment
  - anything in between

- 1960s: U.S. data supported the Phillips curve. Many believed the *Phillips Curve* was stable and reliable.
Evidence for the Phillips Curve?

During the 1960s, U.S. policymakers opted for reducing unemployment at the expense of higher inflation.

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The Vertical Long-Run Phillips Curve

- 1968: Milton Friedman and Edmund Phelps argued that the tradeoff was temporary.

- **Natural-rate hypothesis**: the claim that unemployment eventually returns to its normal or “natural” rate, regardless of the inflation rate.

- Based on the classical dichotomy and the vertical LRAS curve.
In the long run, faster money growth only causes faster inflation.
Reconciling Theory and Evidence

- Evidence (from ’60s):
  \textit{Phillips Curve} slopes downward.

- Theory (Friedman and Phelps):
  \textit{Phillips Curve} is vertical in the long run.

- To bridge the gap between theory and evidence, Friedman and Phelps introduced a new variable: \textit{expected inflation} – a measure of how much people expect the price level to change.
The Phillips Curve Equation

\[
\text{Unemp. rate} = \text{Natural rate of unemp.} - a \left( \text{Actual inflation} - \text{Expected inflation} \right)
\]

**Short run**
Fed can reduce u-rate below the natural u-rate by making inflation greater than expected.

**Long run**
Expectations catch up to reality, u-rate goes back to natural u-rate whether inflation is high or low.
Recall: Equation for SRAS

$Y$ deviates from $Y_N$ when $P$ deviates from $P_E$.

\[ Y = Y_N + \alpha (P - P_E) \]

- Output
- Natural rate of output (long-run)
- $\alpha > 0$, measures how much $Y$ responds to unexpected changes in $P$
- Actual price level
- Expected price level
How Expected Inflation Shifts the PC

Initially, expected & actual inflation = 3%, unemployment = natural rate (6%).

Fed makes inflation 2% higher than expected, u-rate falls to 4%.

In the long run, expected inflation increases to 5%, PC shifts upward, unemployment returns to its natural rate.