MACROECONOMICS I

The Short-Run Trade-off between Inflation and Unemployment

Lecture 11

May 13, 2022

LOOK FOR THE ANSWERS TO THESE QUESTIONS:

How are inflation and unemployment related in the short run? In the long run?

What factors alter this relationship?

What is the short-run cost of reducing inflation?

Why were U.S. inflation and unemployment both so low in the 1990s?

INTRODUCTION

In the long run, inflation & unemployment are unrelated:

- The inflation rate depends mainly on growth in the money supply.
- Unemployment (the "natural rate") depends on the minimum wage, the market power of unions, efficiency wages, and the process of job search.

In the short run, society faces a trade-off between inflation and unemployment.

THE PHILLIPS CURVE

Phillips curve, PC:

- Short-run trade-off between inflation and unemployment

1958: A.W. Phillips

- Nominal wage growth was negatively correlated with unemployment in the U.K.

1960: Paul Samuelson & Robert Solow

- Negative correlation between U.S. inflation & unemployment
- Named it "the Phillips Curve."

DERIVING THE PHILLIPS CURVE, PC

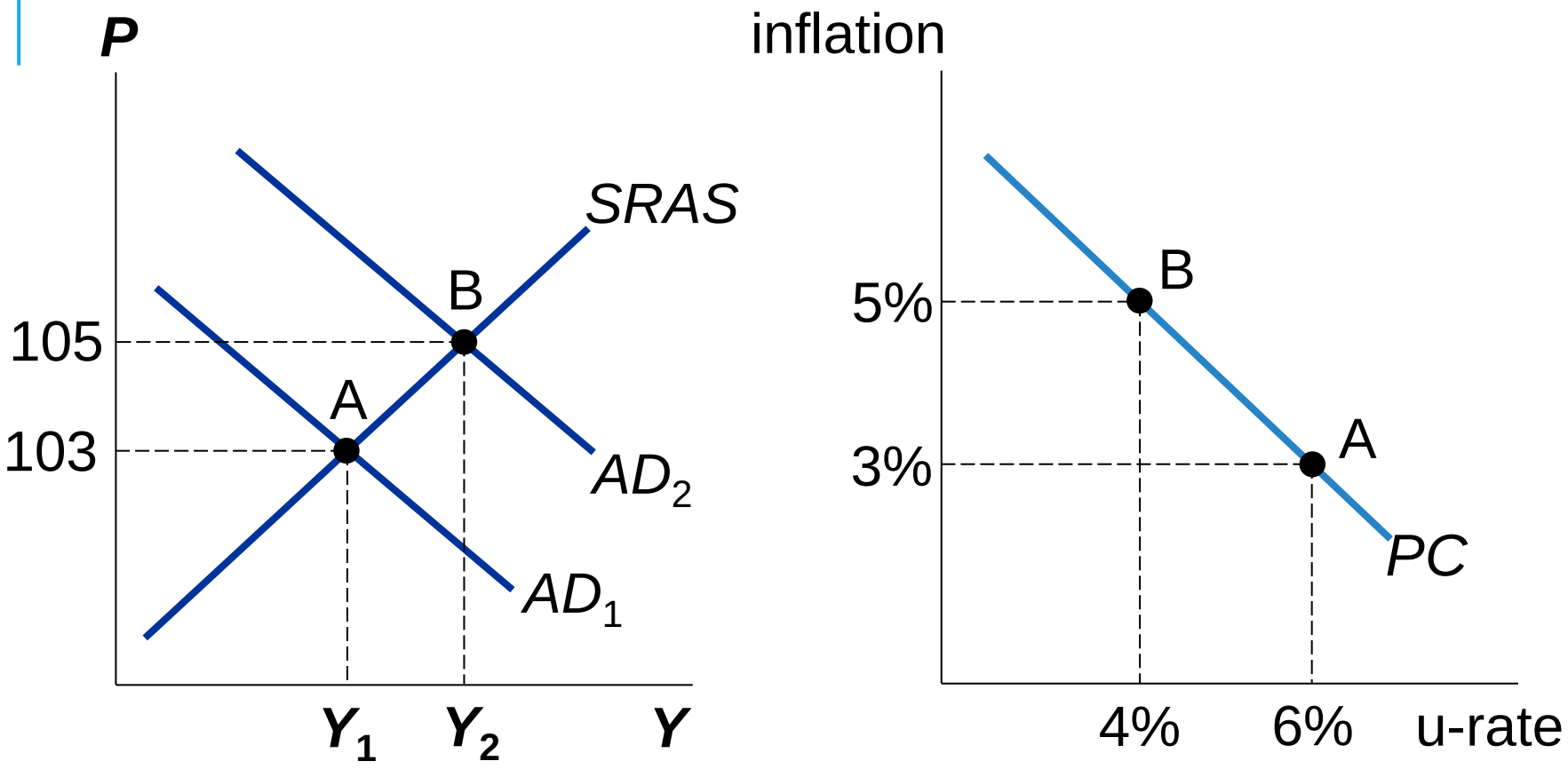
Suppose P = 100 this year.

The following graphs show two possible outcomes for next year:

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

B. Aggregate demand high,
big increase in P (i.e., high inflation),
high output, low unemployment.

DERIVING THE PHILLIPS CURVE



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

B. High aggregate demand, high inflation, low u-rate

THE PHILLIPS CURVE: A POLICY MENU?

Since fiscal and monetary policy affect aggregate demand,

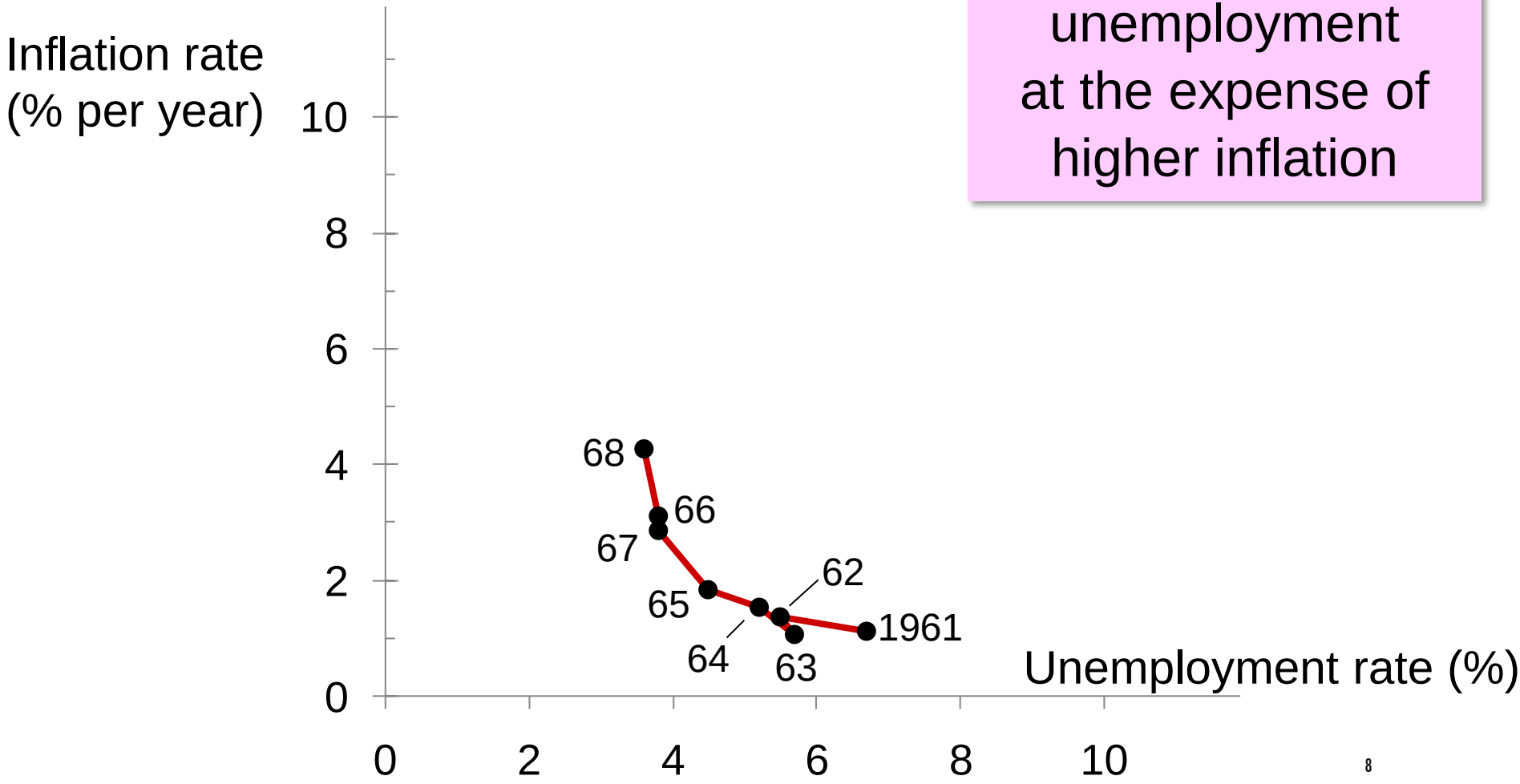
- The PC appeared to offer policymakers a menu of choices:
  - Low unemployment with high inflation
  - Low inflation with high unemployment
  - Anything in between

1960s: U.S. data supported the PC

- Many believed the PC 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



THE VERTICAL LONG-RUN PHILLIPS CURVE

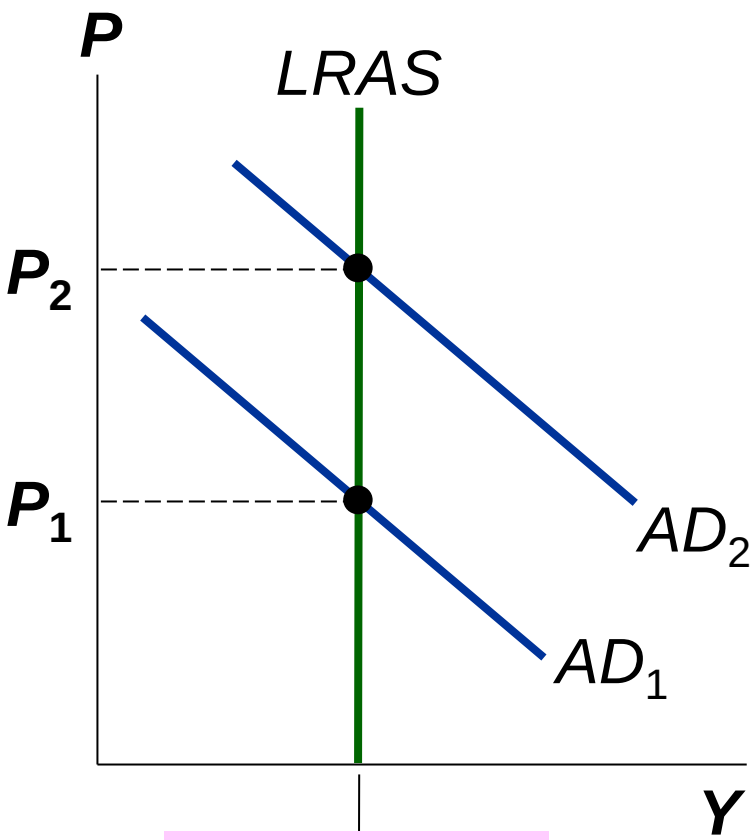
1968: Milton Friedman and Edmund Phelps

- Argued that the tradeoff was temporary
- Based on the classical dichotomy and the vertical LRAS curve

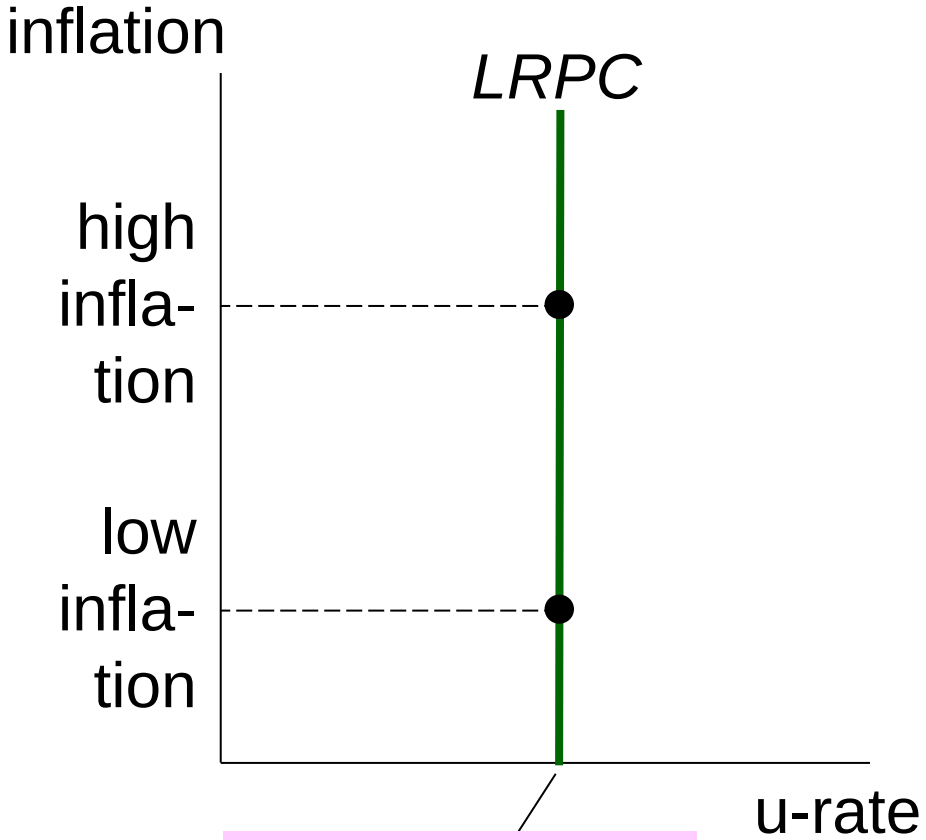
Natural-rate hypothesis:

- The claim that unemployment eventually returns to its normal or "natural" rate, regardless of the inflation rate

THE VERTICAL LONG-RUN PHILLIPS CURVE



Natural rate of output



Natural rate of unemployment

In the long run, faster money growth only causes faster inflation.

RECONCILING THEORY AND EVIDENCE

Evidence (from 1960s):

- PC slopes downward

Theory (Friedman and Phelps):

- PC is vertical in the long run.

Friedman and Phelps, bridge the gap between theory and evidence

- Introduced a new variable: 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

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

Long run

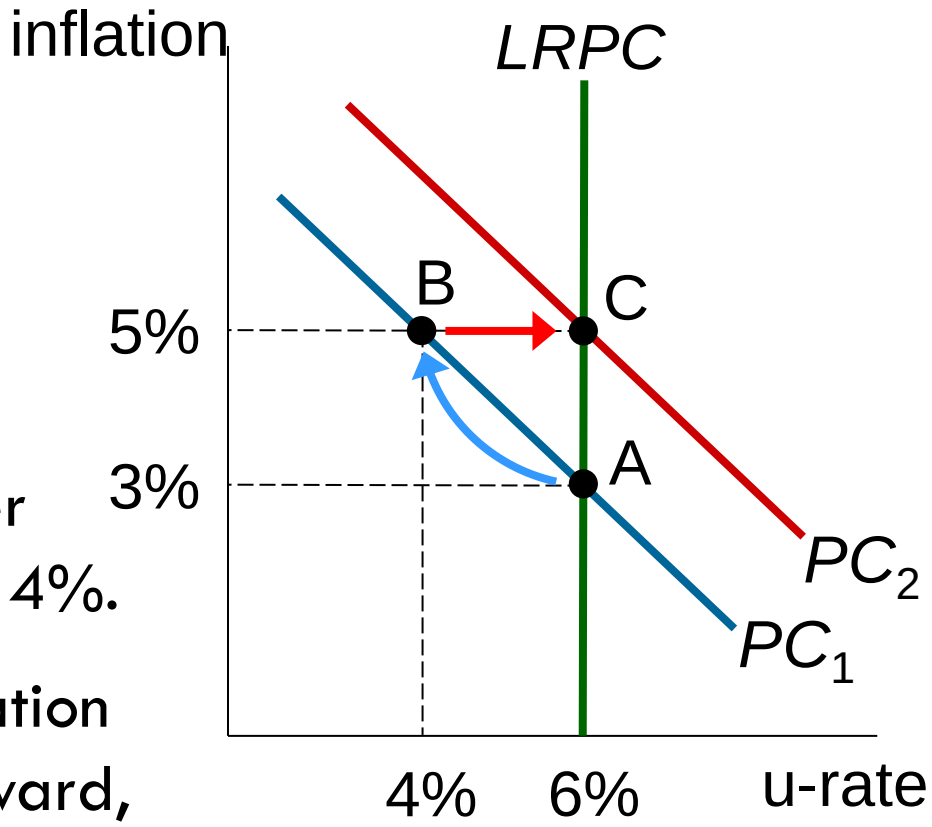
- Expectations catch up to reality, u-rate goes back to natural u-rate whether inflation is high or low.

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.



ACTIVE LEARNING 1 A NUMERICAL EXAMPLE

Natural rate of unemployment = 5%
Expected inflation = 2%
In PC equation, $a = 0.5$

A. Plot the long-run Phillips curve.

B. Find the u-rate for each of these values of actual inflation: 0%, 6%. Sketch the short-run PC.

C. Suppose expected inflation rises to 4%.
Repeat part B.

D. Instead, suppose the natural rate falls to 4%.

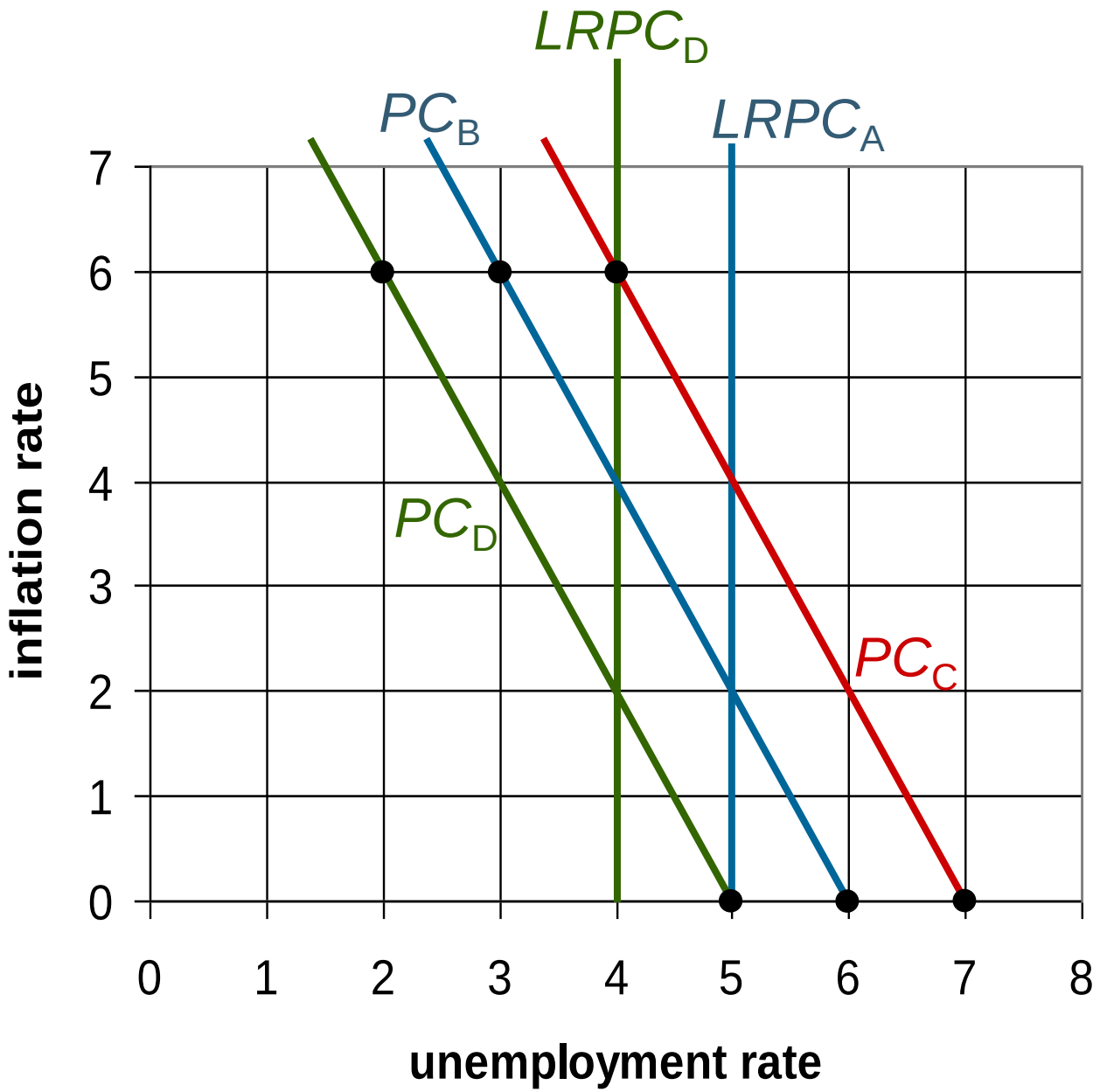
Draw the new long-run Phillips curve, then repeat part B.

ACTIVE LEARNING 1

ANSWERS

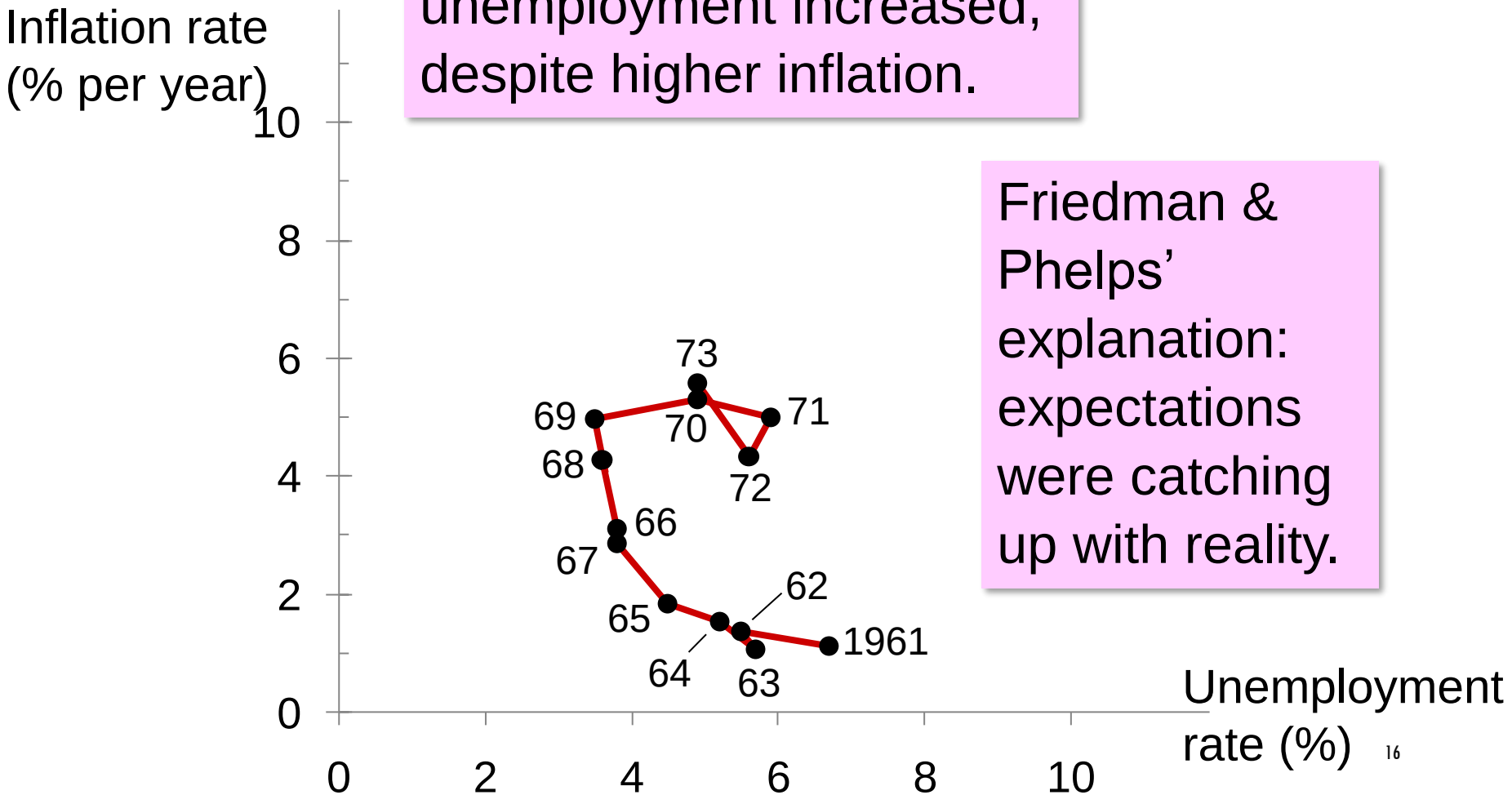
An increase in expected inflation shifts *PC* to the right.

A fall in the natural rate shifts both curves to the left.



THE BREAKDOWN OF THE PHILLIPS CURVE

Early 1970s: unemployment increased, despite higher inflation.



Friedman & Phelps' explanation: expectations were catching up with reality.

ANOTHER PC SHIFTER: SUPPLY SHOCKS

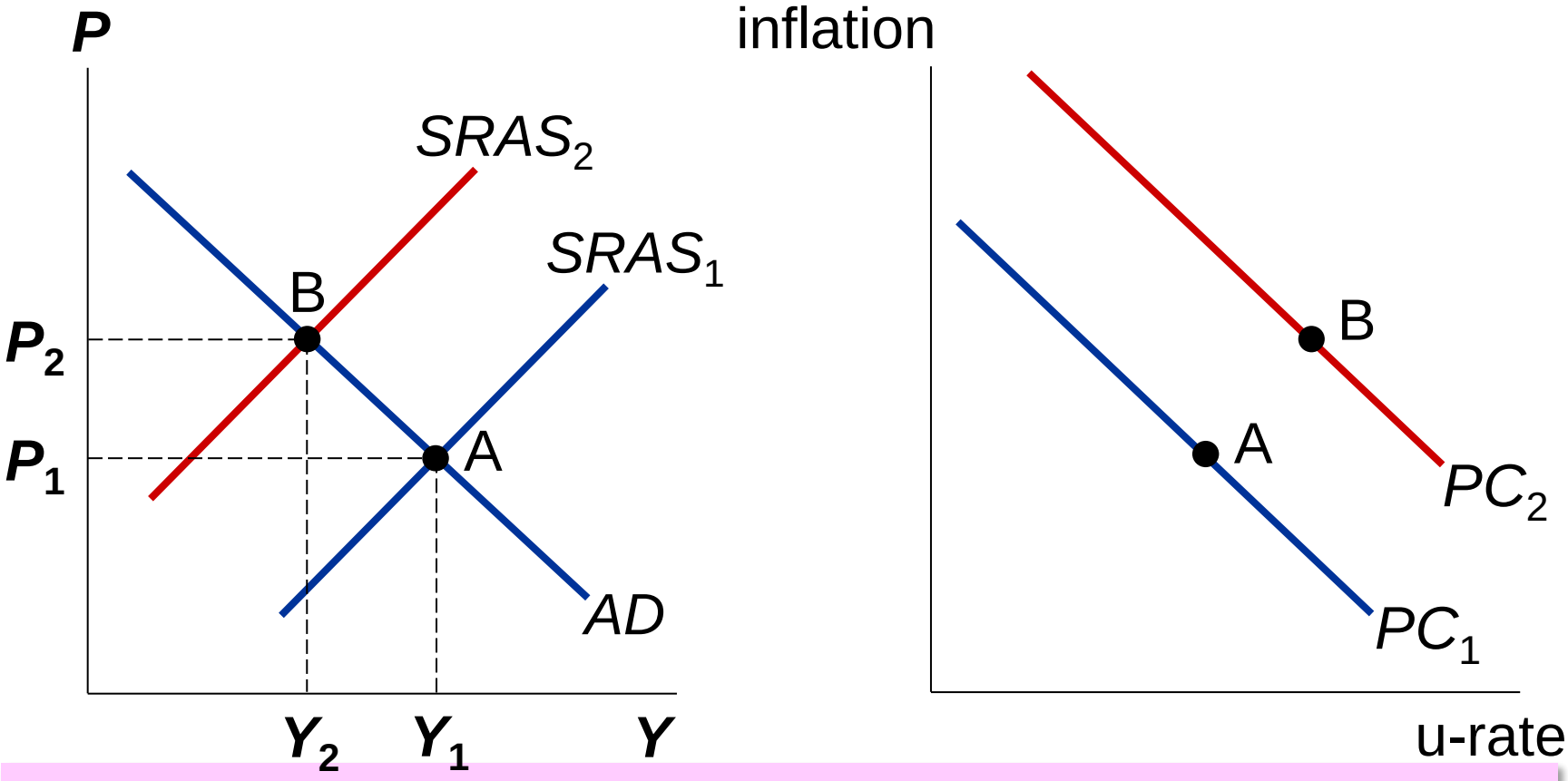
Supply shock:

- An event that directly alters firms' costs and prices
- Shifting the AS and PC curves

Example: large increase in oil prices

HOW AN ADVERSE SUPPLY SHOCK SHIFTS THE *PC*

SRAS shifts left, prices rise, output & employment fall.



Inflation & u-rate both increase as the *PC* shifts upward.

THE 1970S OIL PRICE SHOCKS

Oil price per barrel	
1/1973	$ 3.56
1/1974	10.11
1/1979	14.85
1/1980	32.50
1/1981	38.00

Source: Dow Jones & Company

The Fed chose to accommodate the first shock in 1973 with faster money growth.

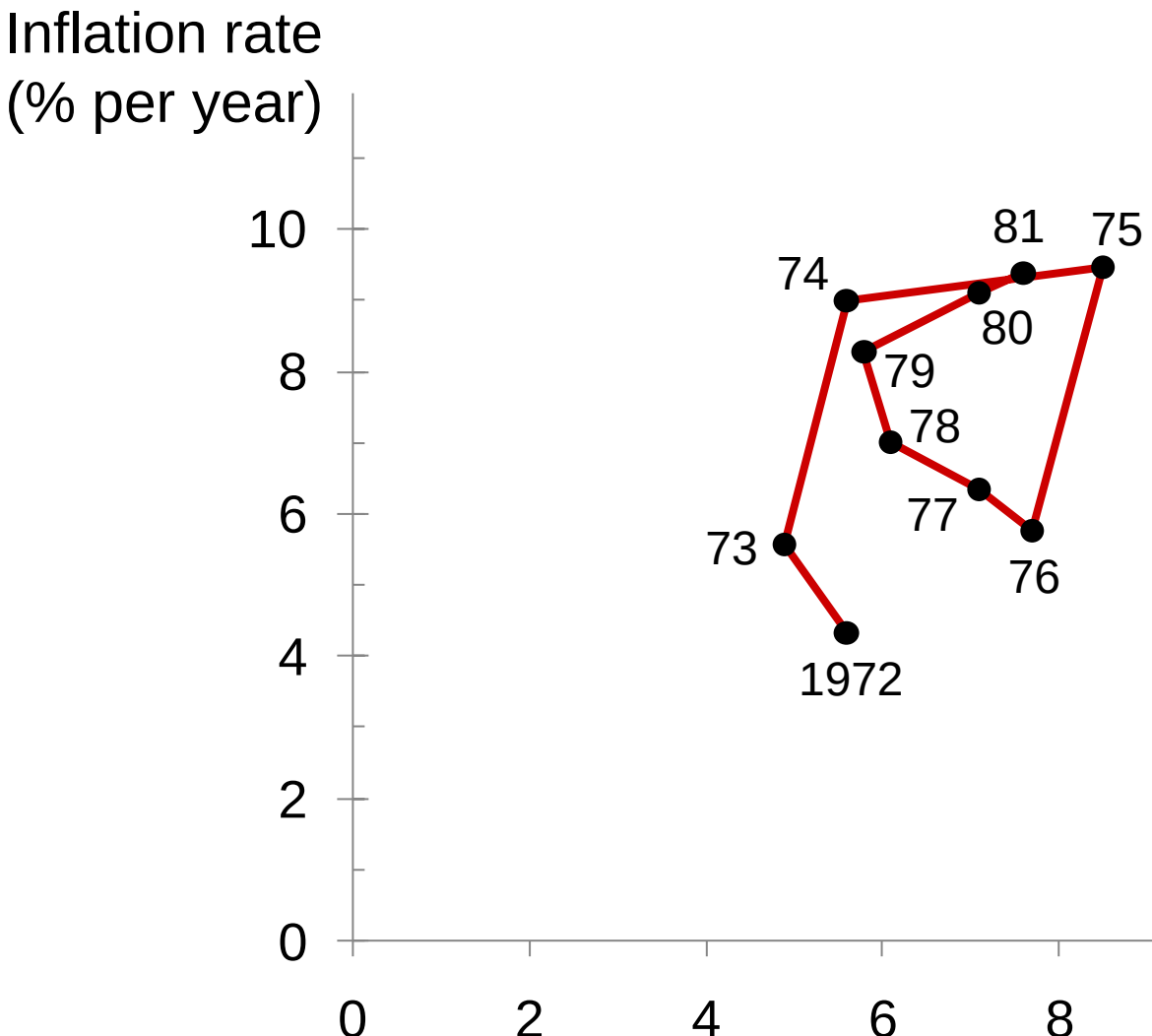
Result:

Higher expected inflation, which further shifted *PC*.

1979:

Oil prices surged again, worsening the Fed's tradeoff.

THE 1970S OIL PRICE SHOCKS



Supply shocks & rising expected inflation worsened the *PC* tradeoff.

THE COST OF REDUCING INFLATION

Disinflation:

- A reduction in the inflation rate

To reduce inflation,

- The Fed must slow the rate of money growth, which reduces aggregate demand

Short run:

- Output falls and unemployment rises.

Long run:

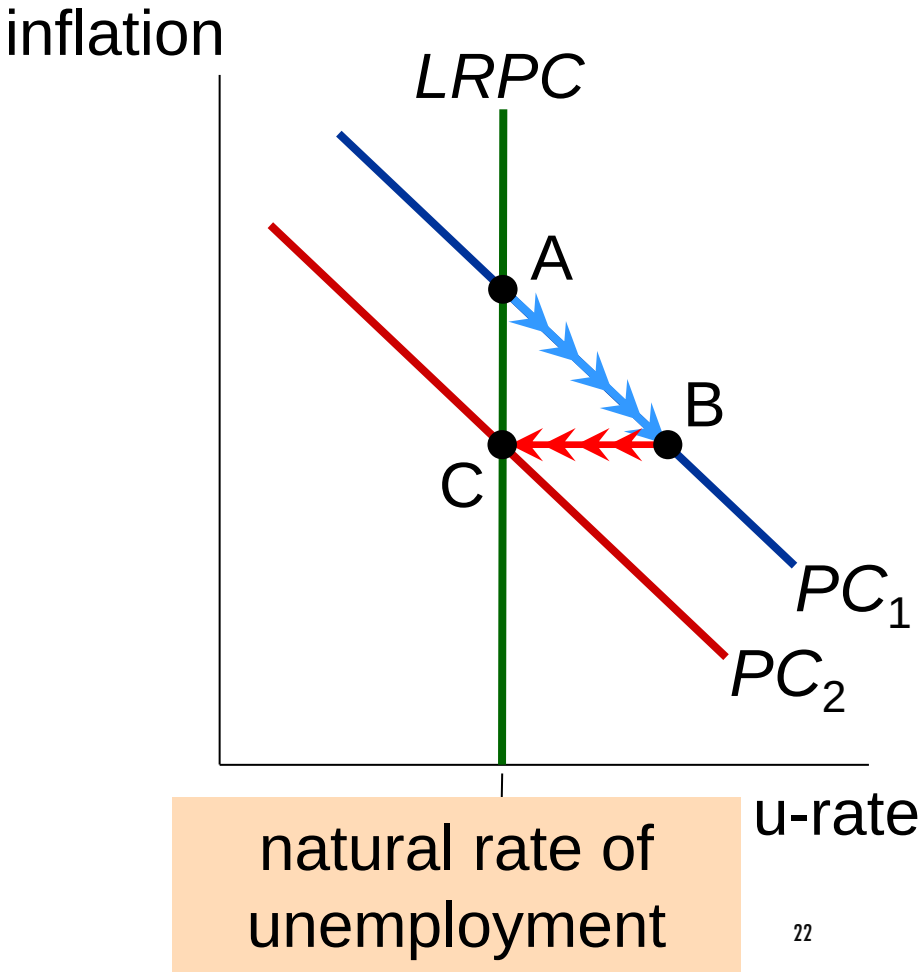
- Output & unemployment return to their natural rates.

DISINFLATIONARY MONETARY POLICY

Contractionary monetary policy moves economy from A to B.

Over time, expected inflation falls, *PC* shifts downward.

In the long run, point C: the natural rate of unemployment, lower inflation.



THE COST OF REDUCING INFLATION

Sacrifice ratio:

- Percentage points of annual output lost per 1 percentage point reduction in inflation
- Typical estimate: *5*
  - To reduce inflation rate 1%, must sacrifice 5% of a year's output.
- Can spread cost over time: to reduce inflation by 6%, can either
  - sacrifice 30% of GDP for one year
  - sacrifice 10% of GDP for three years

RATIONAL EXPECTATIONS, COSTLESS DISINFLATION?

Rational expectations:

- Theory according to which people optimally use all the information they have
  - Including info about government policies, when forecasting the future
- Early proponents: Robert Lucas, Thomas Sargent, Robert Barro
- Implied that disinflation could be much less costly…

RATIONAL EXPECTATIONS, COSTLESS DISINFLATION?

Suppose the Fed convinces everyone it is committed to reducing inflation.

- Then, expected inflation falls, the short-run PC shifts downward.
- Result: disinflations can cause less unemployment than the traditional sacrifice ratio predicts.

THE VOLCKER DISINFLATION

Fed Chairman Paul Volcker

- Appointed in late 1979 under high inflation & unemployment
- Changed Fed policy to disinflation

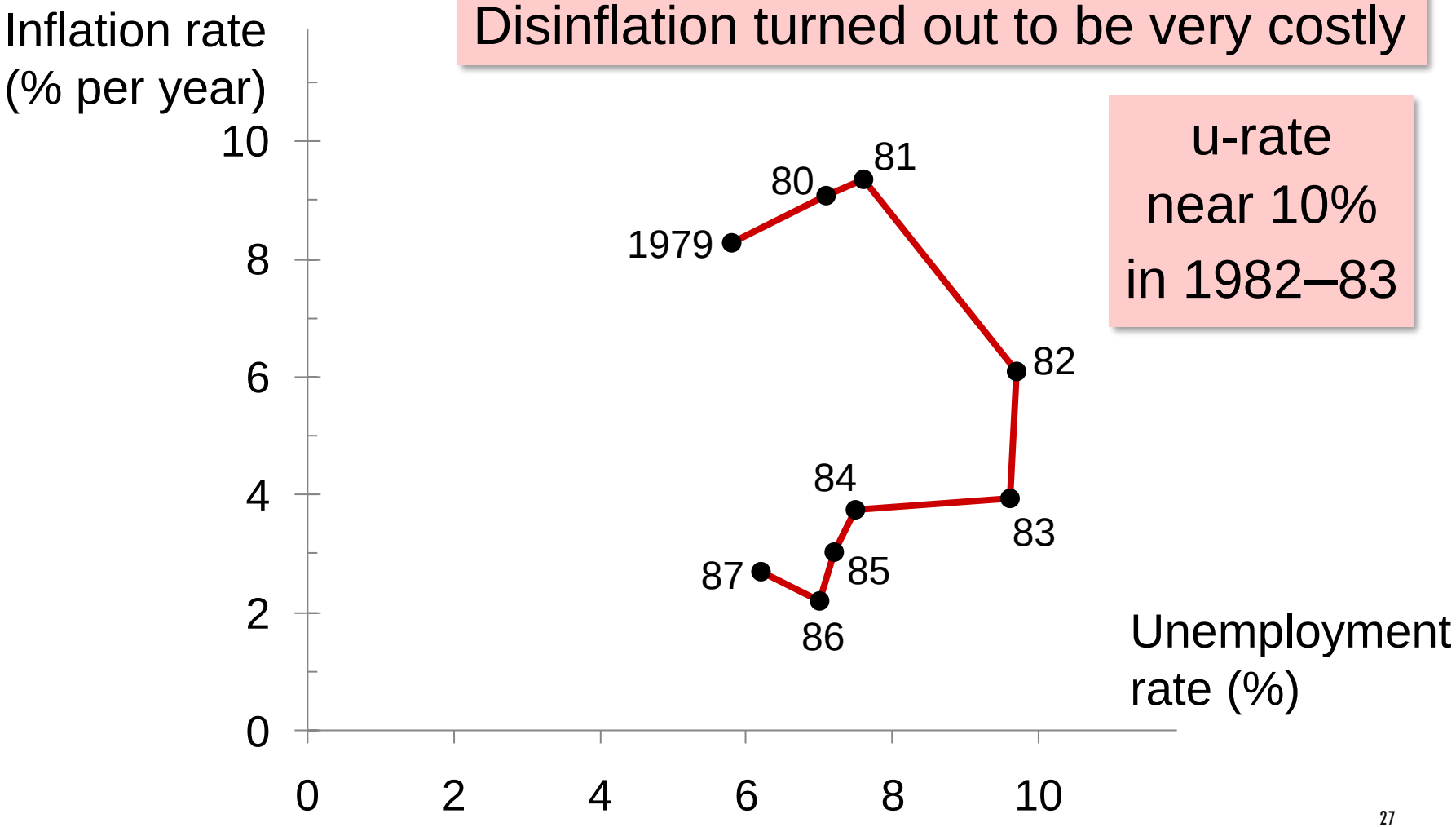
1981–1984: Fiscal policy was expansionary

- So Fed policy had to be very contractionary to reduce inflation.
- Success: Inflation fell from 10% to 4%, but at the cost of high unemployment…

THE VOLCKER DISINFLATION

Disinflation turned out to be very costly

u-rate near 10% in 1982–83



THE GREENSPAN ERA

1986: Oil prices fell 50%.

1989–90: Unemployment fell, inflation rose.

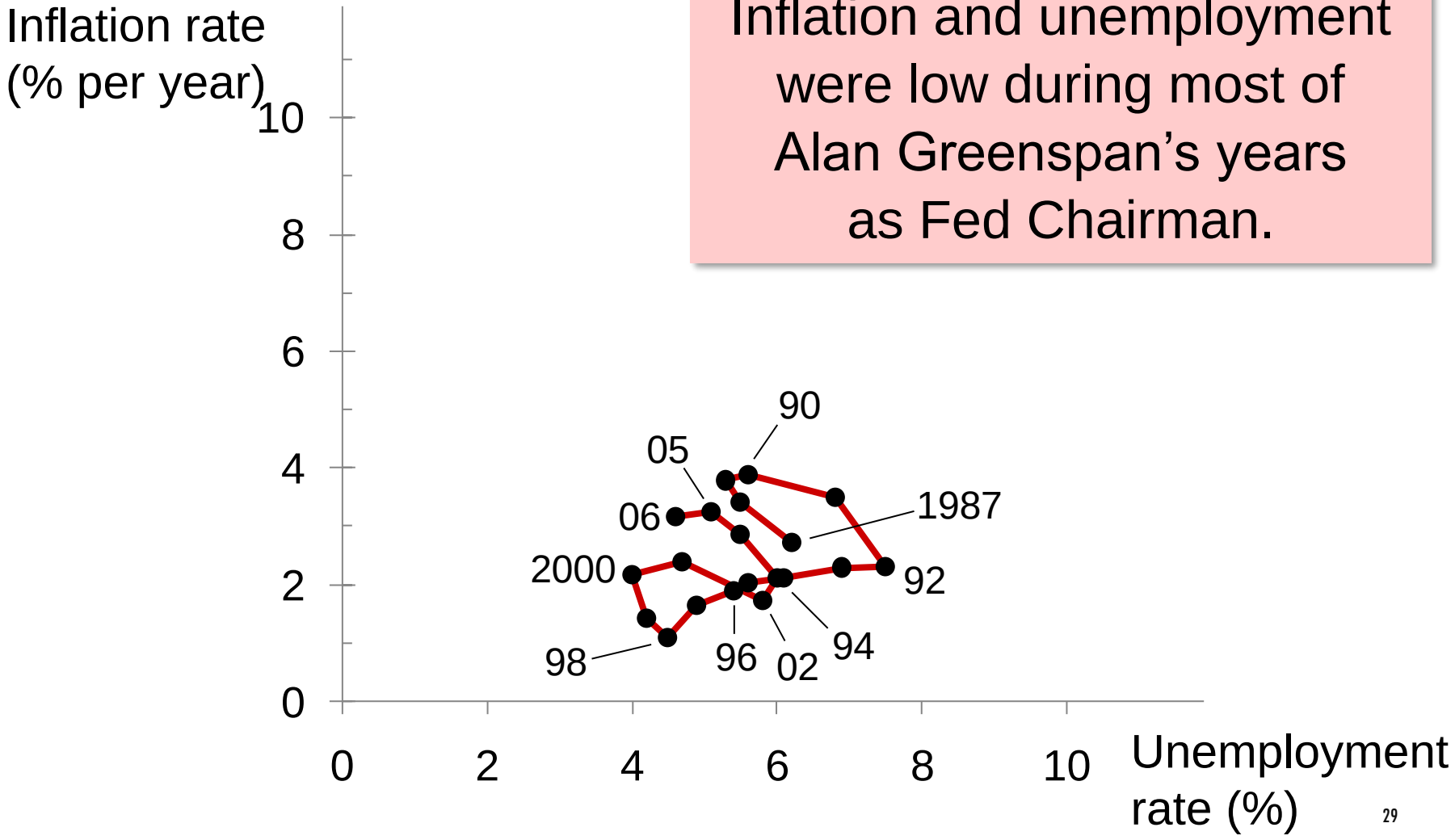
- Fed raised interest rates, caused a mild recession

1990s: Unemployment and inflation fell.

2001:

- Negative demand shocks created the first recession in a decade.
- Policymakers responded with expansionary monetary and fiscal policy.

THE GREENSPAN ERA



Inflation and unemployment were low during most of Alan Greenspan's years as Fed Chairman.

THE PHILLIPS CURVE DURING THE FINANCIAL CRISIS

The early 2000s

- Housing market boom turned to bust in 2006
- Household wealth fell,
- Millions of mortgage defaults and foreclosures
- Heavy losses at financial institutions

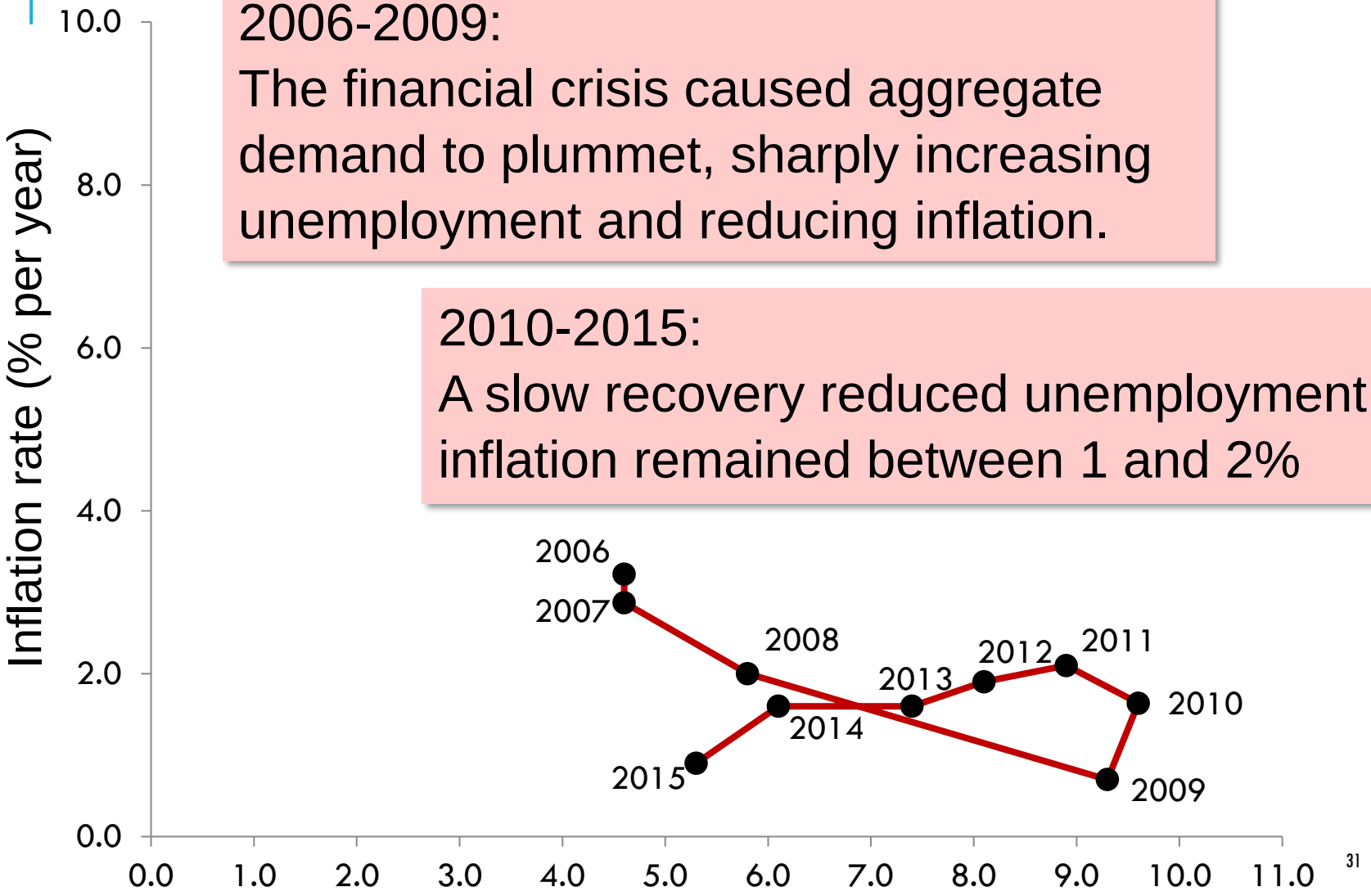
Result:

- Sharp drop in aggregate demand, steep rise in unemployment

PHILLIPS CURVE DURING AND AFTER THE FINANCIAL CRISIS

2006-2009:
The financial crisis caused aggregate demand to plummet, sharply increasing unemployment and reducing inflation.

2010-2015:
A slow recovery reduced unemployment; inflation remained between 1 and 2%



CONCLUSION

Theories in this chapter teach us that inflation and unemployment are:

- Unrelated in the long run
- Negatively related in the short run
- Affected by expectations, which play an important role in the economy's adjustment from the short-run to the long run

SUMMARY

- The Phillips curve describes the short-run tradeoff between inflation and unemployment.
- In the long run, there is no tradeoff: inflation is determined by money growth, while unemployment equals its natural rate.
- Supply shocks and changes in expected inflation shift the short-run Phillips curve, making the tradeoff more or less favorable.

SUMMARY

- The Fed can reduce inflation by contracting the money supply, which moves the economy along its short-run Phillips curve and raises unemployment. In the long run, though, expectations adjust and unemployment returns to its natural rate.
- Some economists argue that a credible commitment to reducing inflation can lower the costs of disinflation by inducing a rapid adjustment of expectations.