

CHAPTER 35

# The Short-Run Trade-off Between Inflation and Unemployment

PRINCIPLES OF  
**Economics**  
N. Gregory Mankiw

Premium PowerPoint Slides  
by Ron Cronovich

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**In this chapter, 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?

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### Introduction

- § In the long run, inflation & unemployment are unrelated:
  - § The inflation rate depends mainly on
  - § Unemployment (the "natural rate") depends on
- § One of the Ten Principles:  
***In the short run, society faces a trade-off between inflation and unemployment.***

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## The Phillips Curve

### § Phillips curve:

§ 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."

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## Deriving 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.

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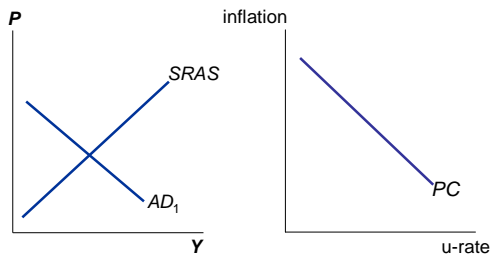
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## Deriving the Phillips Curve

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



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

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### The Phillips Curve: A Policy Menu?

§ Since fiscal and mon policy affect agg demand, the *PC* appeared to offer policymakers a menu of choices:

§

§

§ anything in between

§ 1960s: U.S. data supported the Phillips curve. Many believed the *PC* was stable and reliable.

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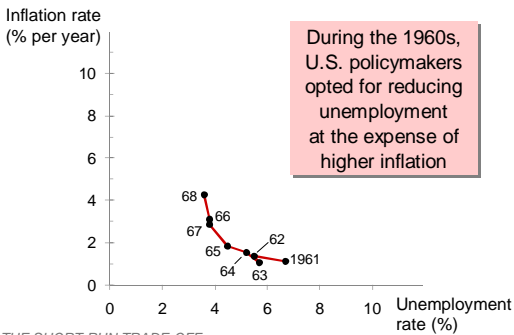
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### Evidence for the Phillips Curve?



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### The Vertical Long-Run Phillips Curve

§ 1968: Milton Friedman and Edmund Phelps argued that

§ **Natural-rate hypothesis:** the claim that

§ Based on the classical dichotomy and the vertical *LRAS* curve

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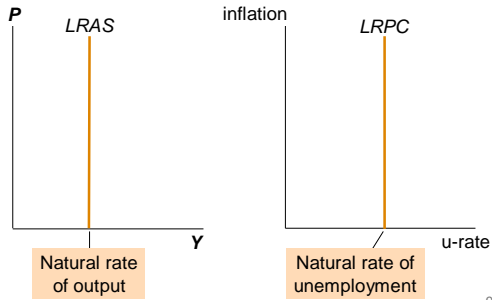
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## The Vertical Long-Run Phillips Curve

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




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## Reconciling Theory and Evidence

- § Evidence (from '60s):  
PC slopes downward.
- § Theory (Friedman and Phelps):  
PC is vertical in the long run.
- § To bridge the gap between theory and evidence, Friedman and Phelps introduced a new variable: **expected inflation** –

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## The Phillips Curve Equation

Unemp.  
rate =

### Short run

Fed can reduce u-rate below the natural u-rate by

### Long run

Expectations catch up to reality,

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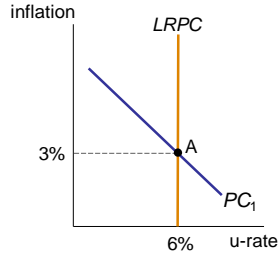
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### How Expected Inflation Shifts the PC

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



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### ACTIVE LEARNING 1

#### A numerical example

Natural rate of unemployment = 5%

Expected inflation = 2%

In PC equation,  $\alpha = 0.5$

- 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.

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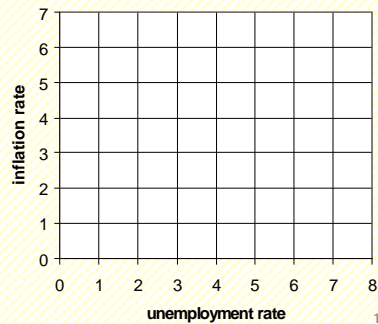
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### ACTIVE LEARNING 1

#### Answers



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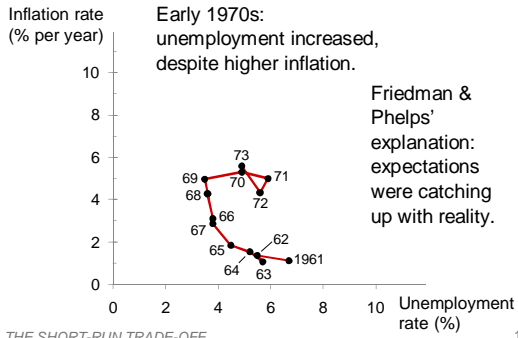
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### The Breakdown of the Phillips Curve




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### Another PC Shifter: Supply Shocks

§ Supply shock:

§ Example: large increase in oil prices

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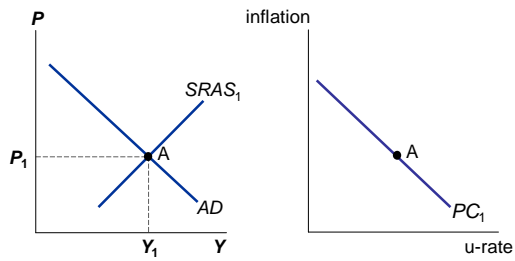
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### How an Adverse Supply Shock Shifts the PC




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### 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

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

Result:

1979:  
Oil prices surged again, worsening the Fed's tradeoff.

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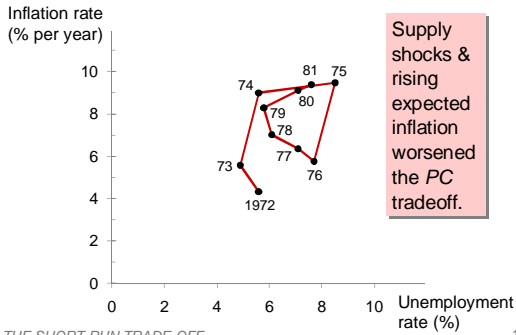
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### The 1970s Oil Price Shocks



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### The Cost of Reducing Inflation

§ **Disinflation:**

§ To reduce inflation,

§ Short run:

§ Long run:

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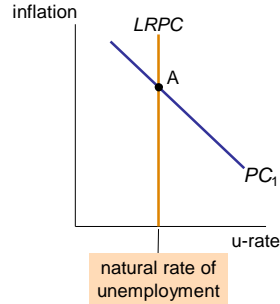
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## Disinflationary Monetary Policy

Contractionary monetary policy moves economy from A to B.  
Over time,



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## The Cost of Reducing Inflation

§ Disinflation requires enduring a period of

§ **Sacrifice ratio:**

§ Typical estimate of the sacrifice ratio: 5

§ To reduce inflation rate 1%, must sacrifice

§ Can spread cost over time, e.g. To reduce inflation by 6%, can either

§ sacrifice

§ sacrifice

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## Rational Expectations, Costless Disinflation?

§ **Rational expectations:** a theory according to which

§ Early proponents: Robert Lucas, Thomas Sargent, Robert Barro

§ Implied that disinflation could be

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### Rational Expectations, Costless Disinflation?

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

§ Then,

§ Result:

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### 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:

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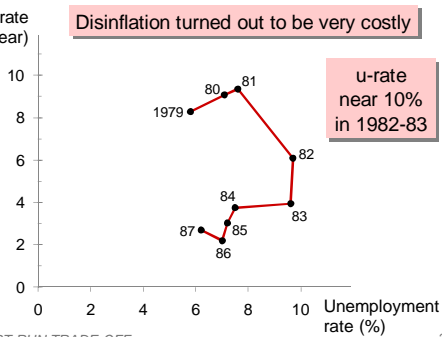
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### The Volcker Disinflation

Inflation rate (% per year)



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## 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.



**Alan Greenspan**  
Chair of FOMC,  
Aug 1987 – Jan 2006

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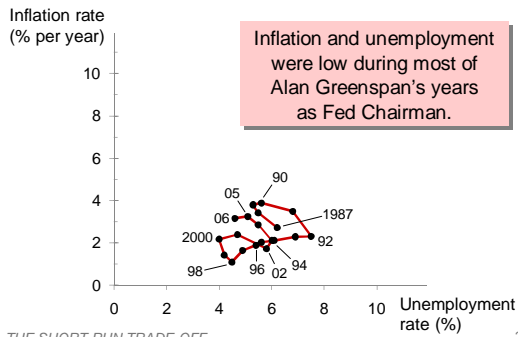
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## The Greenspan Era



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## Ben Bernanke's challenges

§ Aggregate demand shocks:

§ Aggregate supply shocks:

§

Corn per bushel: \$2.10 in 2005-06, \$5.76 in 5/2008

§

Oil per barrel: \$35 in 2/2004, \$134 in 6/2008

§ From 6/2007 to 6/2008,

§ unemployment rose from 4.6% to 5.5%

§ CPI inflation rose from 2.6% to 4.9%

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## CONCLUSION

§ The theories in this chapter come from some of the greatest economists of the 20<sup>th</sup> century.

§ They teach us that inflation and unemployment are

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§

§ affected by expectations, which play an important role in

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