

Winners and Losers from Inflation

Americans who took out mortgages in the early 1970s quickly found their real payments reduced by higher-than-expected inflation.

(Due to Oil Crisis in the 70s, Inflation rate suddenly shoot up to double digit; and Home Loans in the 70s are “Fixed” rather “Adjustable” rate that we know now.)



Austin Powers: Money illusion

Forgetting Inflation

Austin Powers (1997)

After being frozen for 30 years, Dr. Evil wants to hold the world hostage but forgets about inflation.

**Check BLS.gov for:
CPI 1967 and 1997
CPI of food, oil, etc.
CPI in selected cities.**

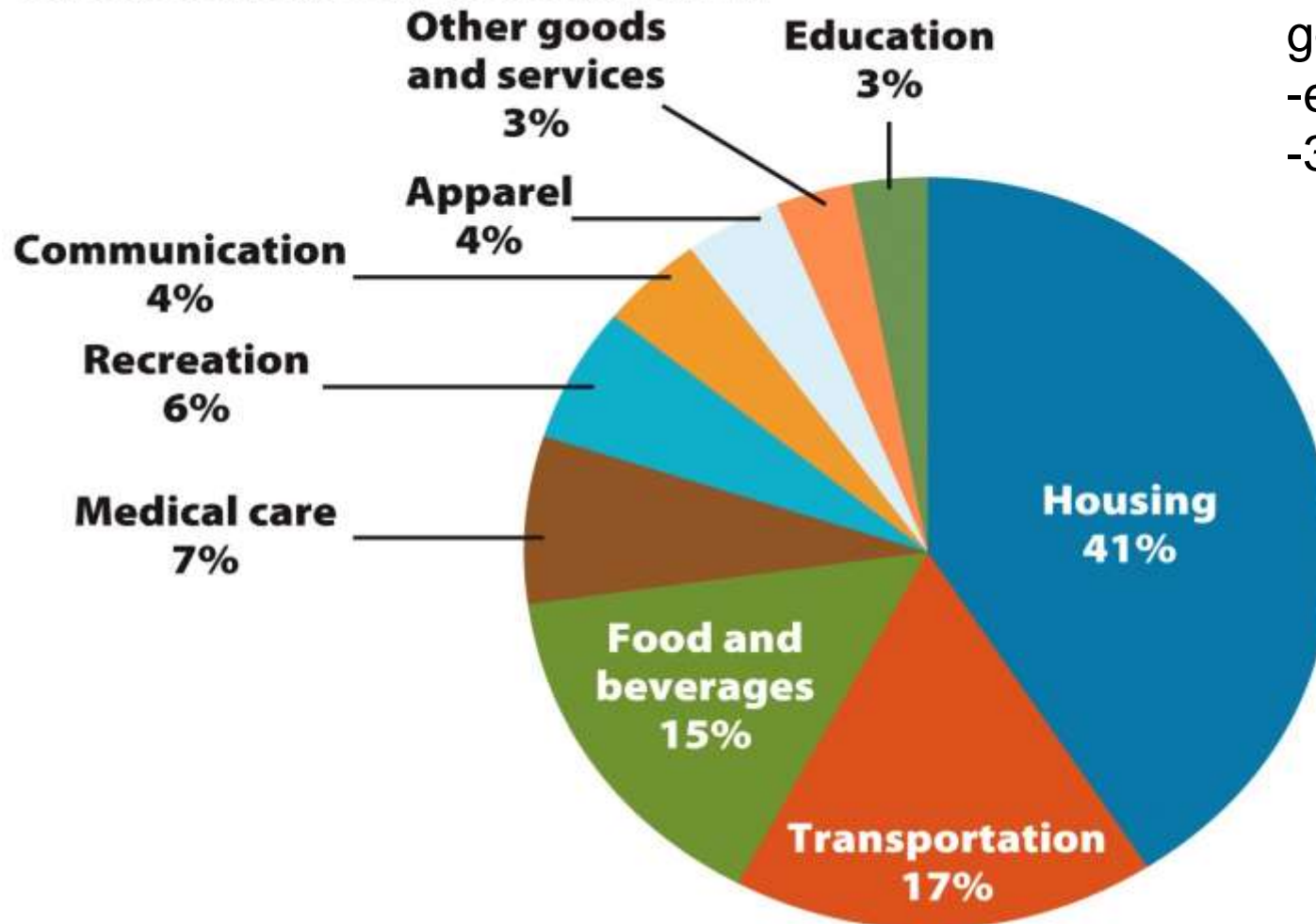


What Prices Are Included in the CPI?

BLS surveys

- over 8,000 goods/services
- each month
- 38 locations

The Pieces of the Consumer Price Index, March 2012



Prices Don't All Move Together

Clearly, most prices rise over time

Travel

Education

Health care

However, some prices fall over time

Consumer electronics

(technological advancements)


Flat panel TV, 1997: \$7,000

Flat panel TV 2012: \$500



- › Hyper-Inflation and Inflation tax : printing money → high inflation
- › Phillips curve : short-run trade-off between inflation & unemployment
- › Okun's Law: unemployment and output gap
- › Debt Deflation is a problem ; policy makers prefer a low, positive inflation rate, rather than deflation
- › The zero bound on nominal interest rate
- › The danger a liquidity trap

Money and Prices

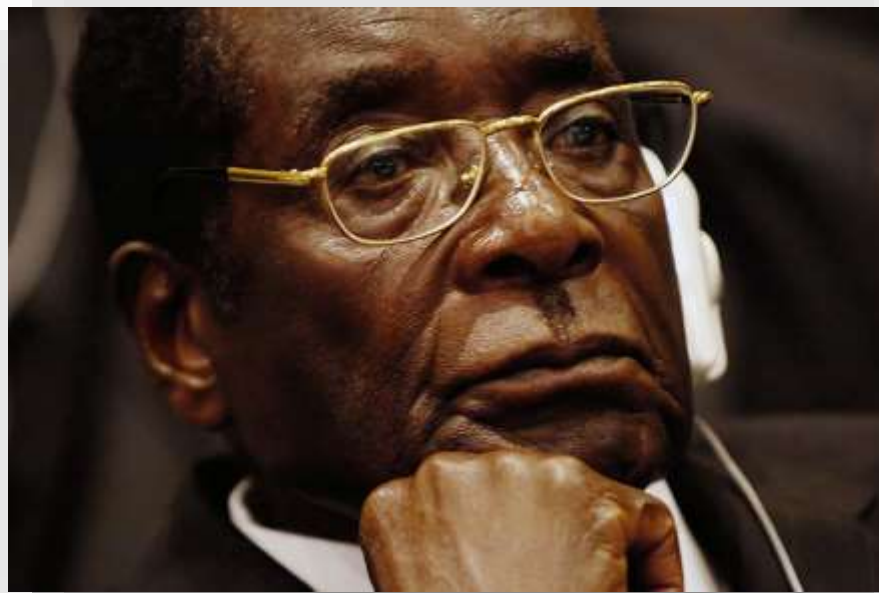


Episodes of 500 billion percent inflation in Zimbabwe (2008) and Germany (1922–1923), Armenia (27,000%) and Nicaragua (60,000%): Why did it spiral out of control in?

The Inflation Tax

What prevents a government from paying for its expenses by printing money?

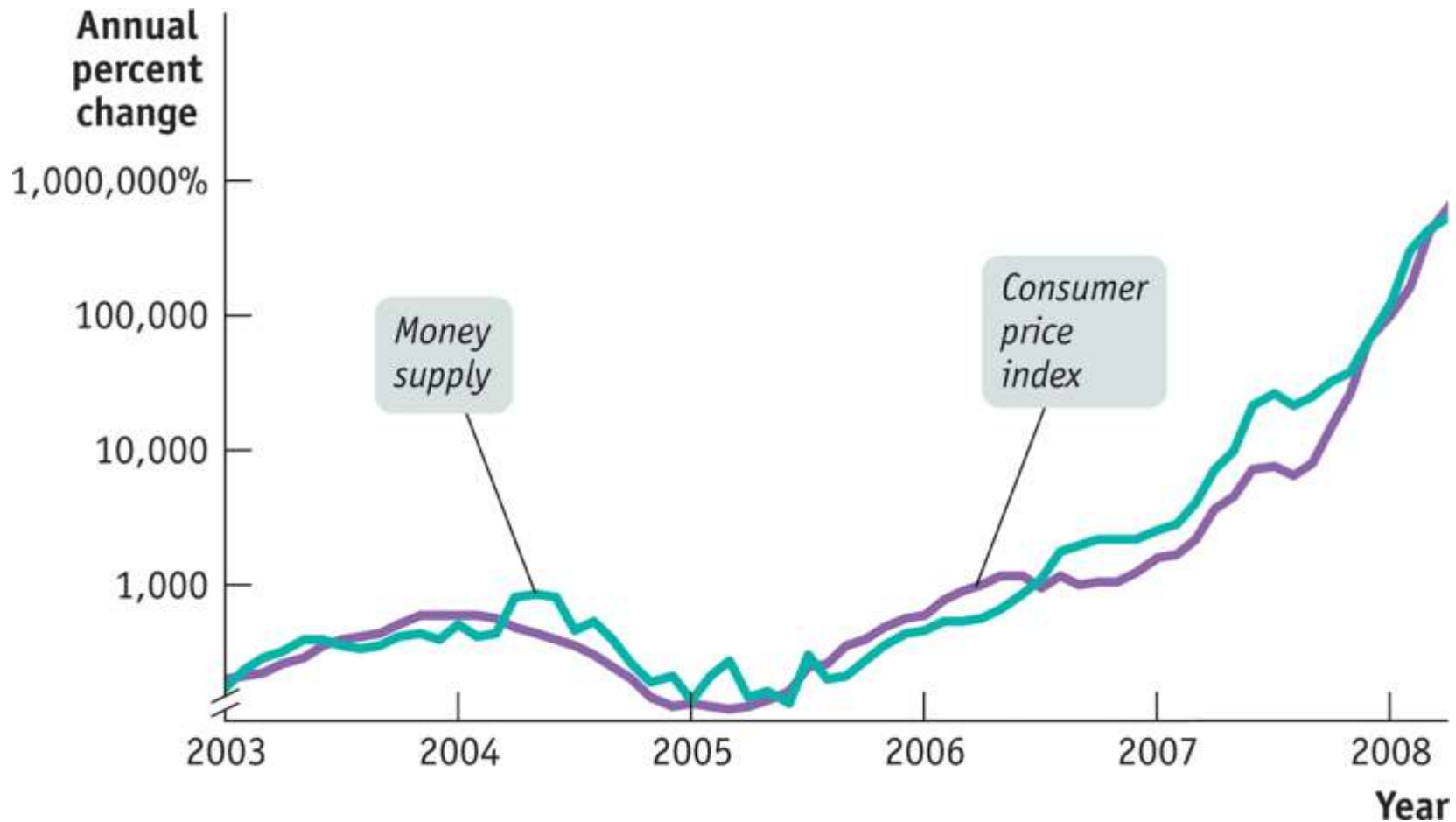
Nothing. Just ask Robert Mugabe, Zimbabwe's leader (and cause of its hyperinflation).



Zimbabwe's Robert Mugabe:
A penny **billion pennies** for his thoughts.

Money Supply Growth and Inflation in Zimbabwe

During periods of high inflation, money supply and inflation move together → the growth of money supply = inflation rate



The Inflation Tax: the old days

Seignorage:

the revenue generated by a government's right to print money.

During the Civil War, 1860-65, both sides, North and South, printed money to finance the costs of war.



Seignorage = Inflation Tax

The inflation tax

(the cost of inflation):

the reduction in the real value of money held by the public caused by inflation.

= the inflation rate \times the money supply.

$$\text{Seignorage} = \Delta M$$

where M = money supply
and Δ = monthly change.

(It's more useful to look at real seignorage, the revenue created by printing money divided by the price level, P .)

$$\text{Real seignorage} = \Delta M / P$$

Rewritten to:

$$\text{Real seignorage} = (\Delta M / M) \times (M / P)$$

or

Real seignorage =
rate of growth of the money supply
 \times real money supply.



The Logic of Hyperinflation

During high inflation, as money lose its value by large and fast.

People (consumers and businesses) avoid money holdings.

It forces the government to print more money.

It then increases even more inflation to capture the same amount of real inflation tax (to finance govt expenses)

People lose money, and look for other alternatives

Government print more and more money.

... → *vicious cycle*

Hyperinflation



In 1923, Germany's money was worth so little that children used stacks of banknotes as building blocks or built kites with them.



Hyper-Inflation in Hungary

Hungary's hyperinflation is the highest on record.

What cost 1 Hungarian pengo in 1945 cost 1.3 septillion pengos at the end of 1946. (how many zeros is a septillion?)

Prices doubled every 15 hours.

100,000,000,000,000,000,000 Pengo



**World's highest-denomination banknote:
Hungary (1946), 100 quintillion pengo**

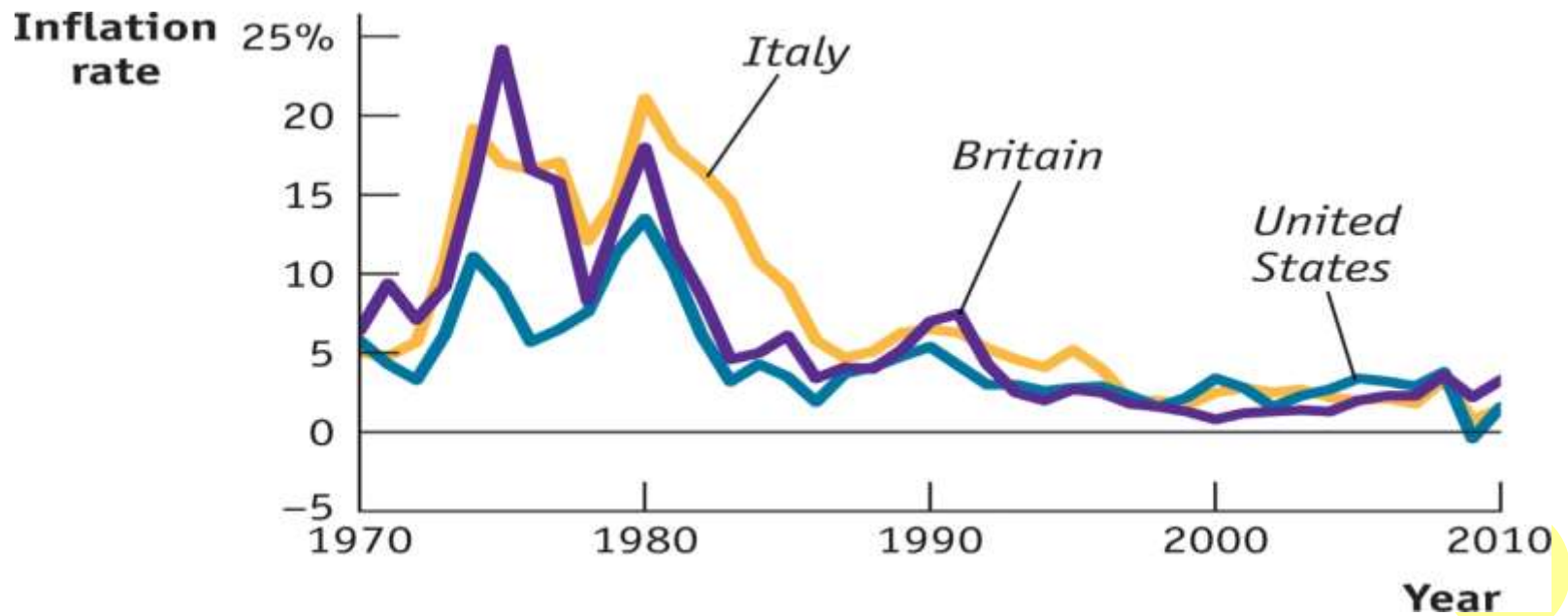
The worthless Hungarian pengo, 1946



Moderate Inflation and Disinflation

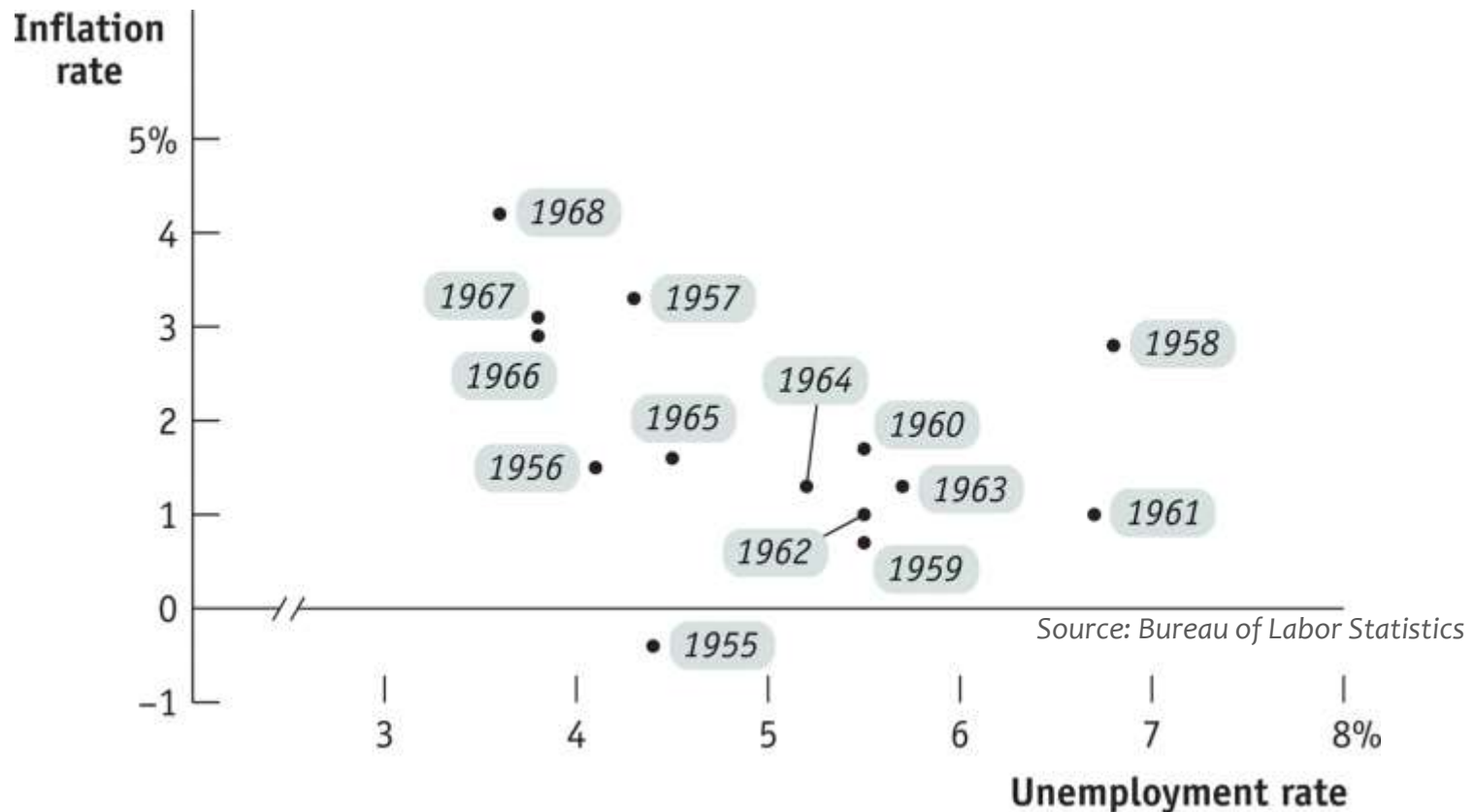
The governments of more-advanced, politically-stable countries like the United States and Britain don't find themselves forced to print money to pay their bills.

Yet over the past 40 years both countries, along with a number of other nations, have had uncomfortable episodes of inflation.



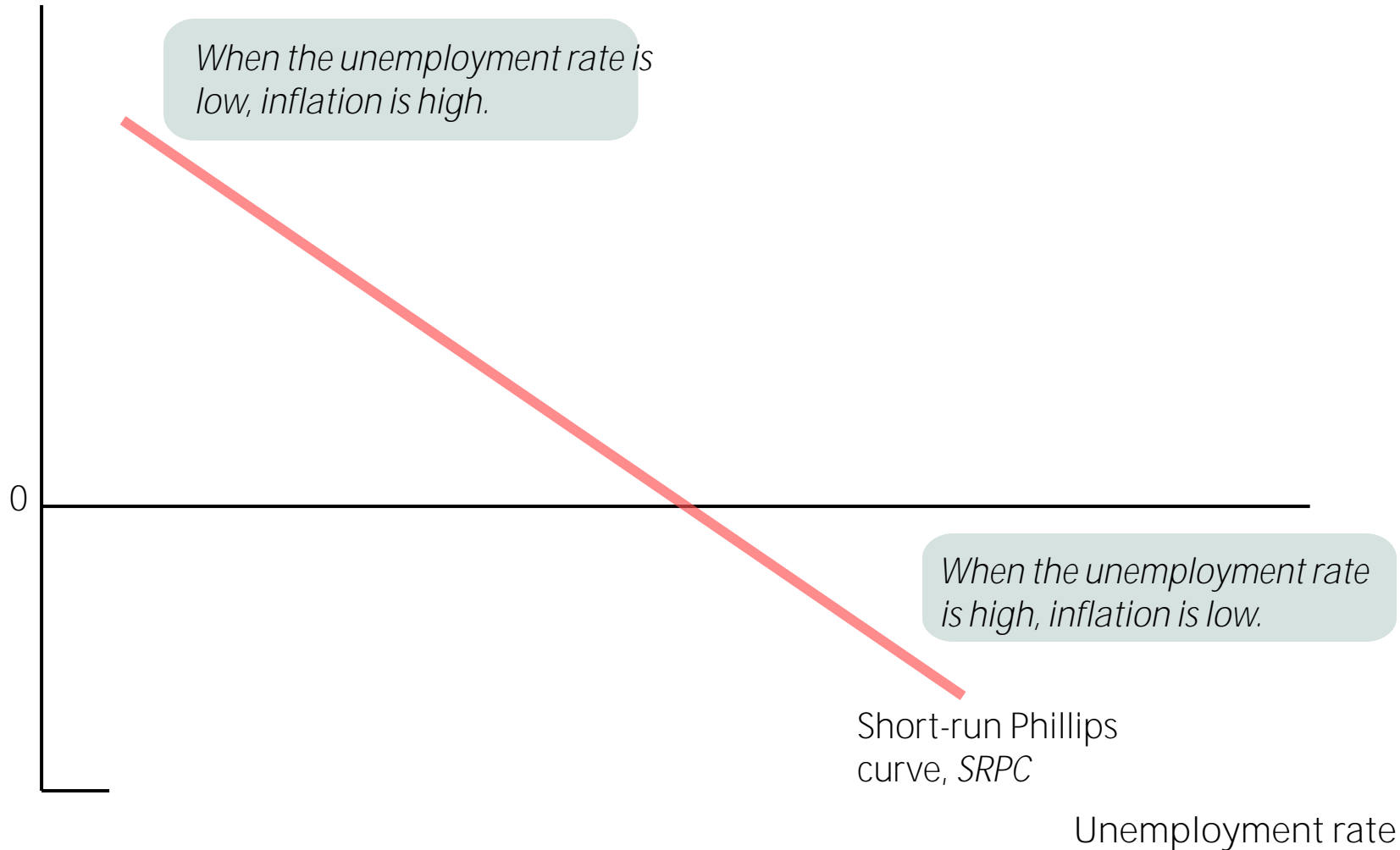
Short-Run Phillips Curve

The *short-run Phillips curve*: the negative short-run relationship between the unemployment rate and the inflation rate.



The Short-Run Phillips Curve

Inflation rate



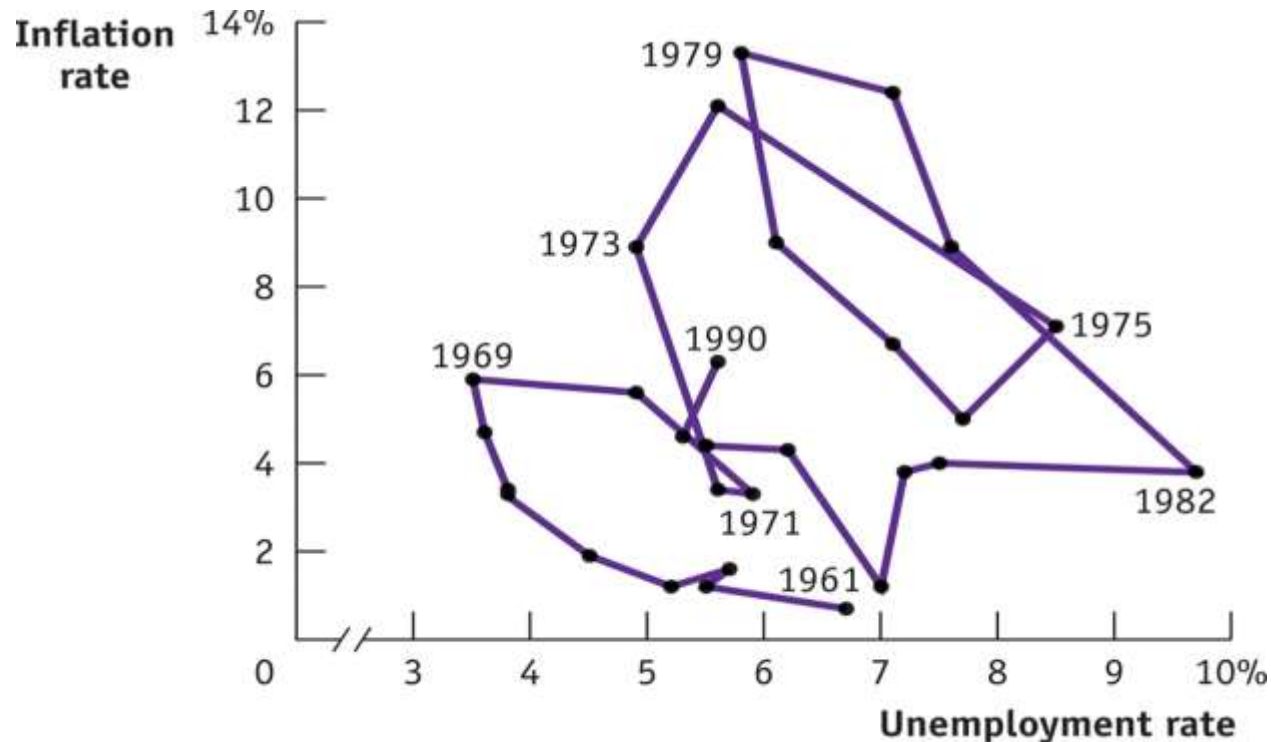
Unemployment and Inflation, 1955–1968

The Phillips curve explained fluctuations very well in the 1950s and 1960s. Then along came **stagflation**. **Oil shocks and rising inflationary expectations created real problems.**

Phillips Curve does not explain well when:

- high inflation due to Oil shocks
- hyperinflation due to Money Printing

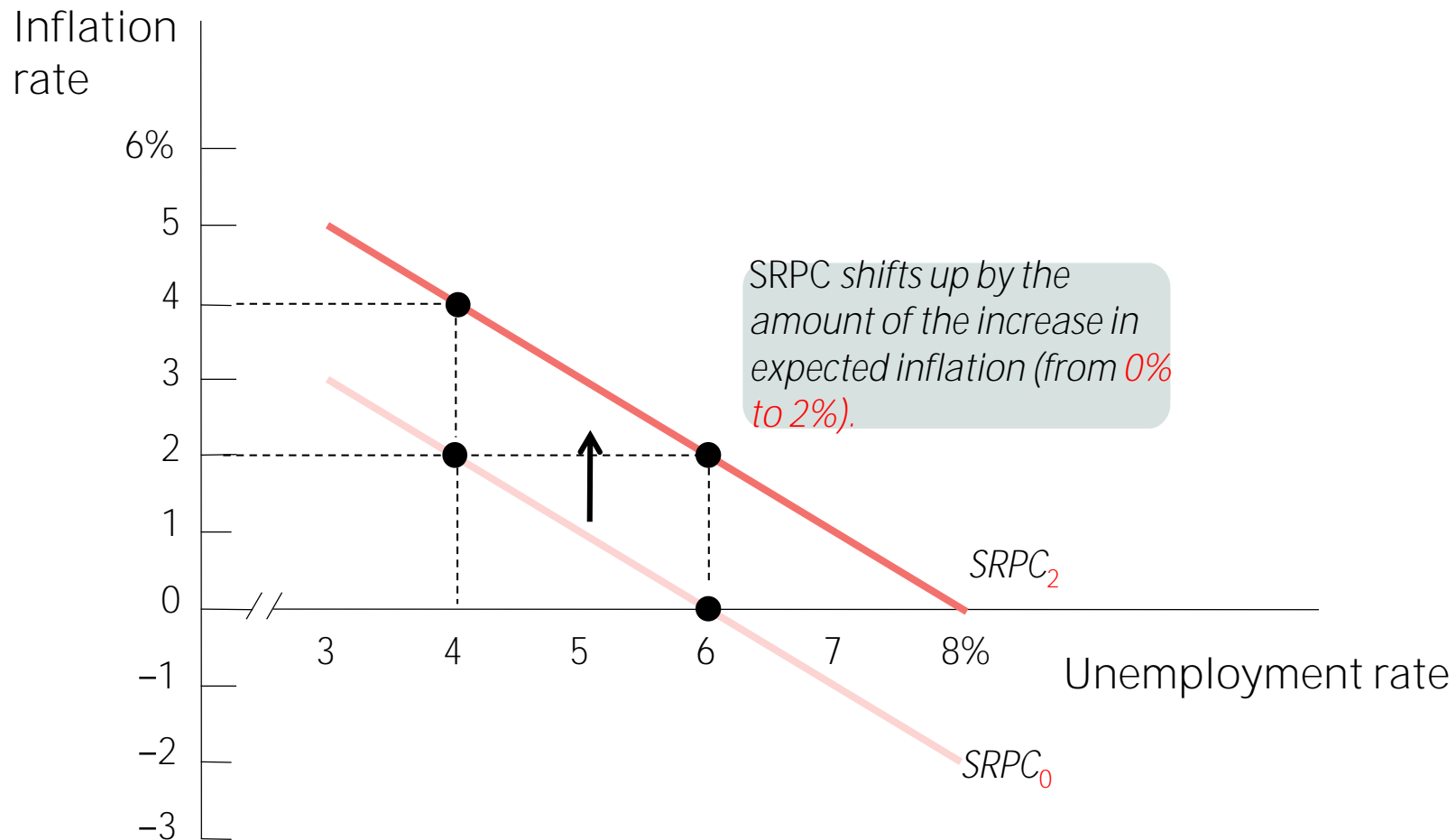
Other than these two events, the Philips Curve helped explain the Inflation-Unemployment trade-off.



Source: Bureau of Labor Statistics.

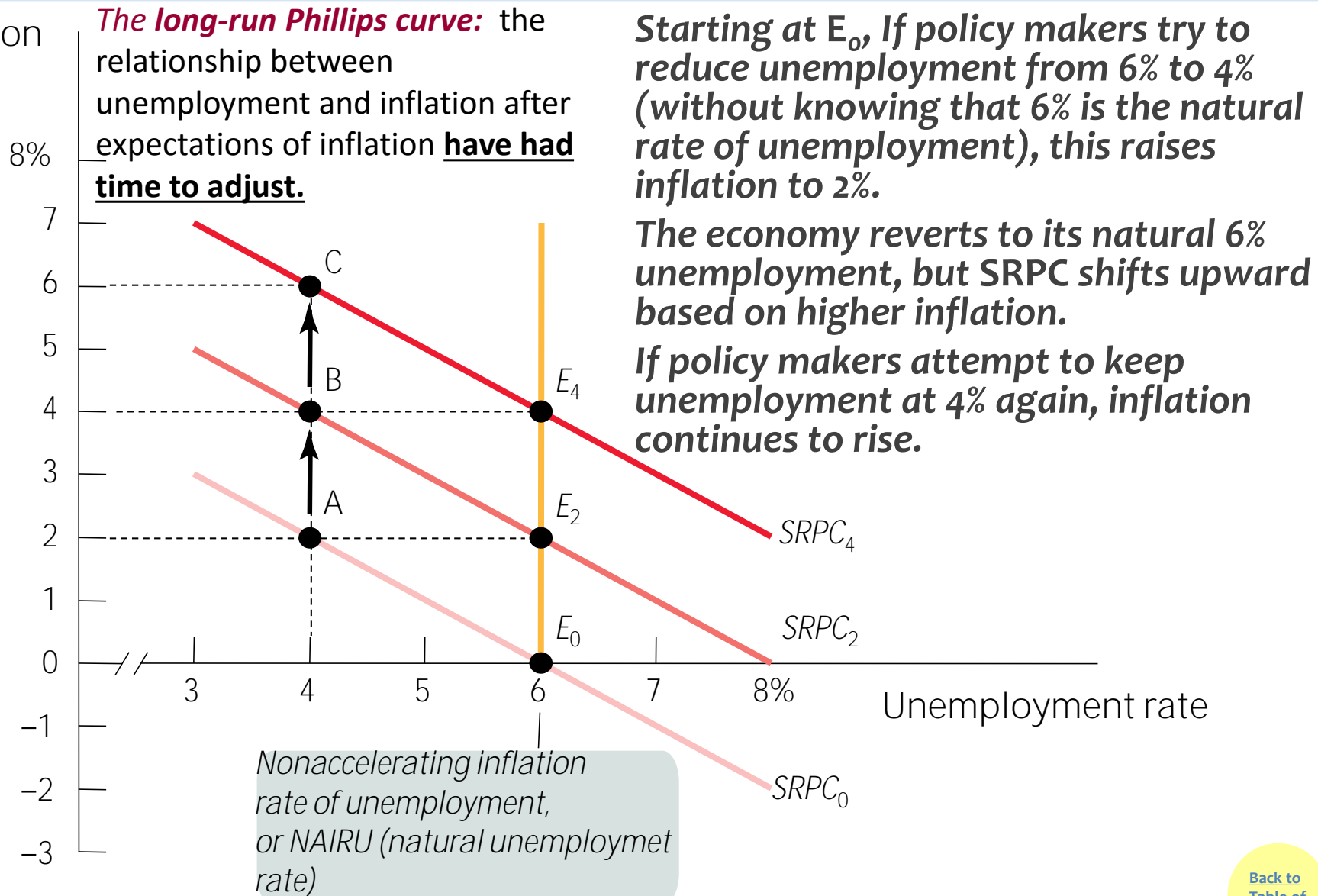
Inflation Expectations and the Short-Run Phillips Curve

One of the crucial discoveries of modern macroeconomics:
Changes in the expected rate of inflation affect the trade-off between unemployment and inflation and **shift the SRPC**

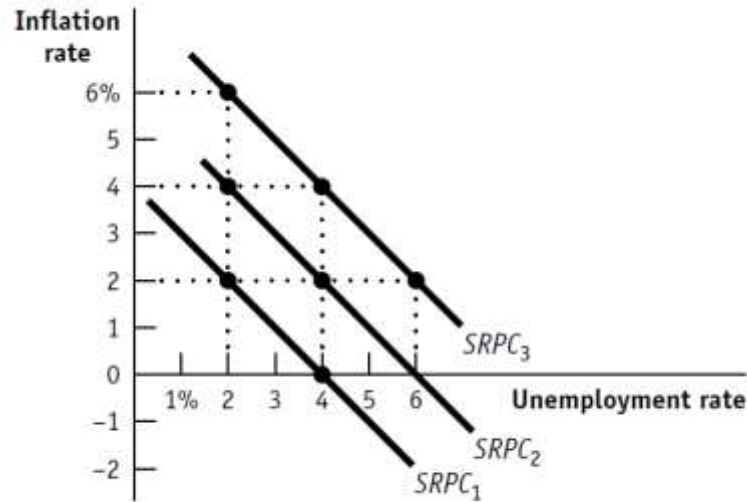


The NAIRU and the Long-Run Phillips Curve

Inflation rate



Active Learning: Practice



Based on the above graph, suppose the policy makers decide to pursue an unemployment rate of 2%. This will:

- a) cause accelerating inflation in the long run.
- b) lead to rightward shifts in the $SRPC$, with each shift reflecting the expected inflation rate.
- c) cause equilibrium wage rates to fall.
- d) Answers (a), (b), and (c) are correct.
- e) Answers (a) and (b) are correct.

Inflation and Unemployment in the Long Run

The nonaccelerating inflation rate of unemployment, or NAIRU, is the unemployment rate at which inflation does not change over time (the natural rate of unemployment).

As of April 2012, the CBO estimate of the U.S. natural rate was 5.5%.

To avoid accelerating inflation over time, the unemployment rate must be *close to the NAIRU) so that the actual rate of inflation matches the expected rate of inflation.*

Disinflation is the process of bringing down inflation that is embedded in expectations. *Once inflation has become embedded in peoples' expectations, getting it back down can be difficult.*

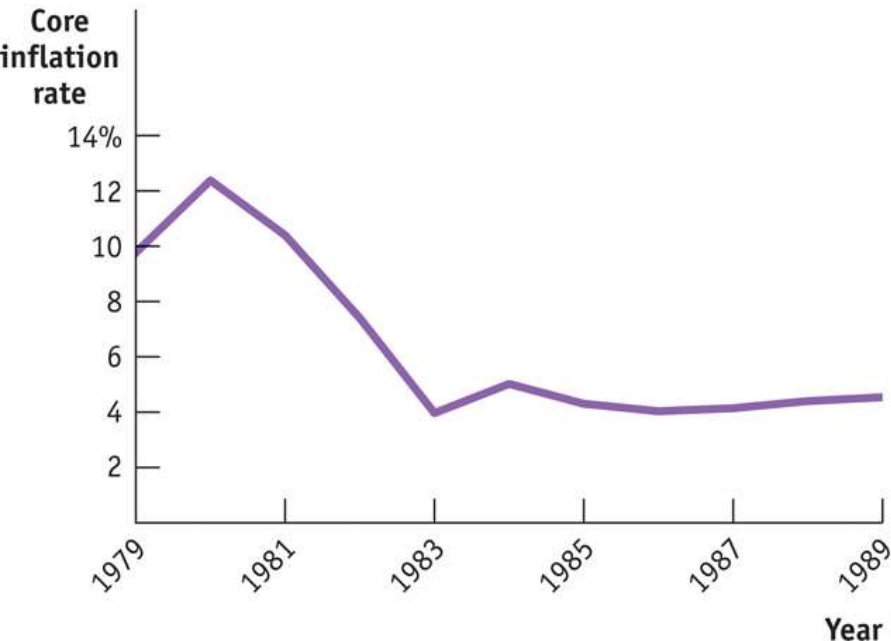
Disinflation can require a recession (as in the 1970s-1980s), and high unemployment.

However, policy makers in the United States and other wealthy countries were willing to pay that price to bring down the high inflation of the 1970s.

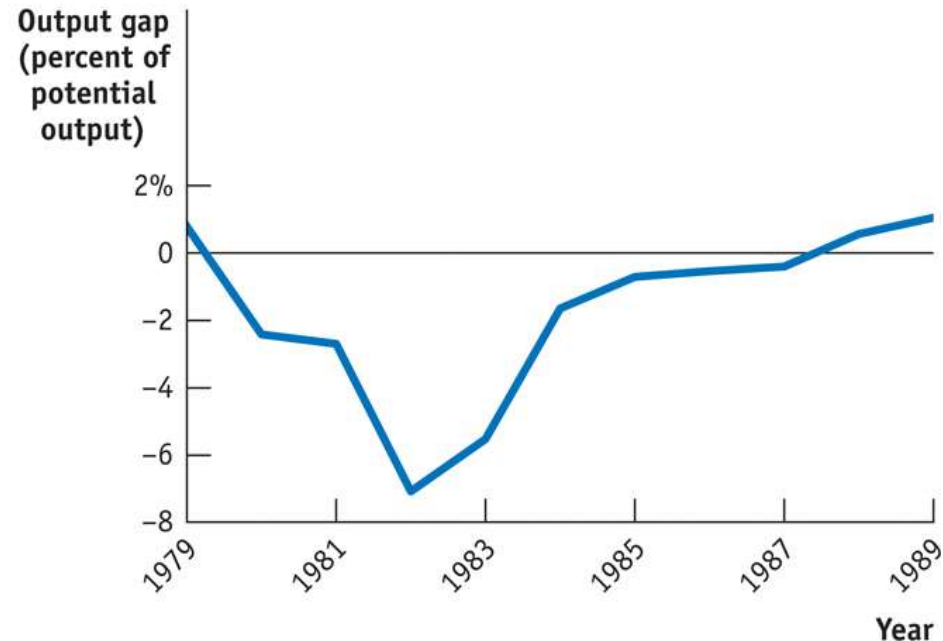
The Great Disinflation of the 1980s

Beginning in late 1979, the **Federal Reserve imposed strongly contractionary monetary policies (reducing money supply)**, which pushed the economy into its worst recession since the Great Depression. It cost 18% of our annual output.

(a) The Core Inflation Rate in the United States Came Down in the 1980s . . .

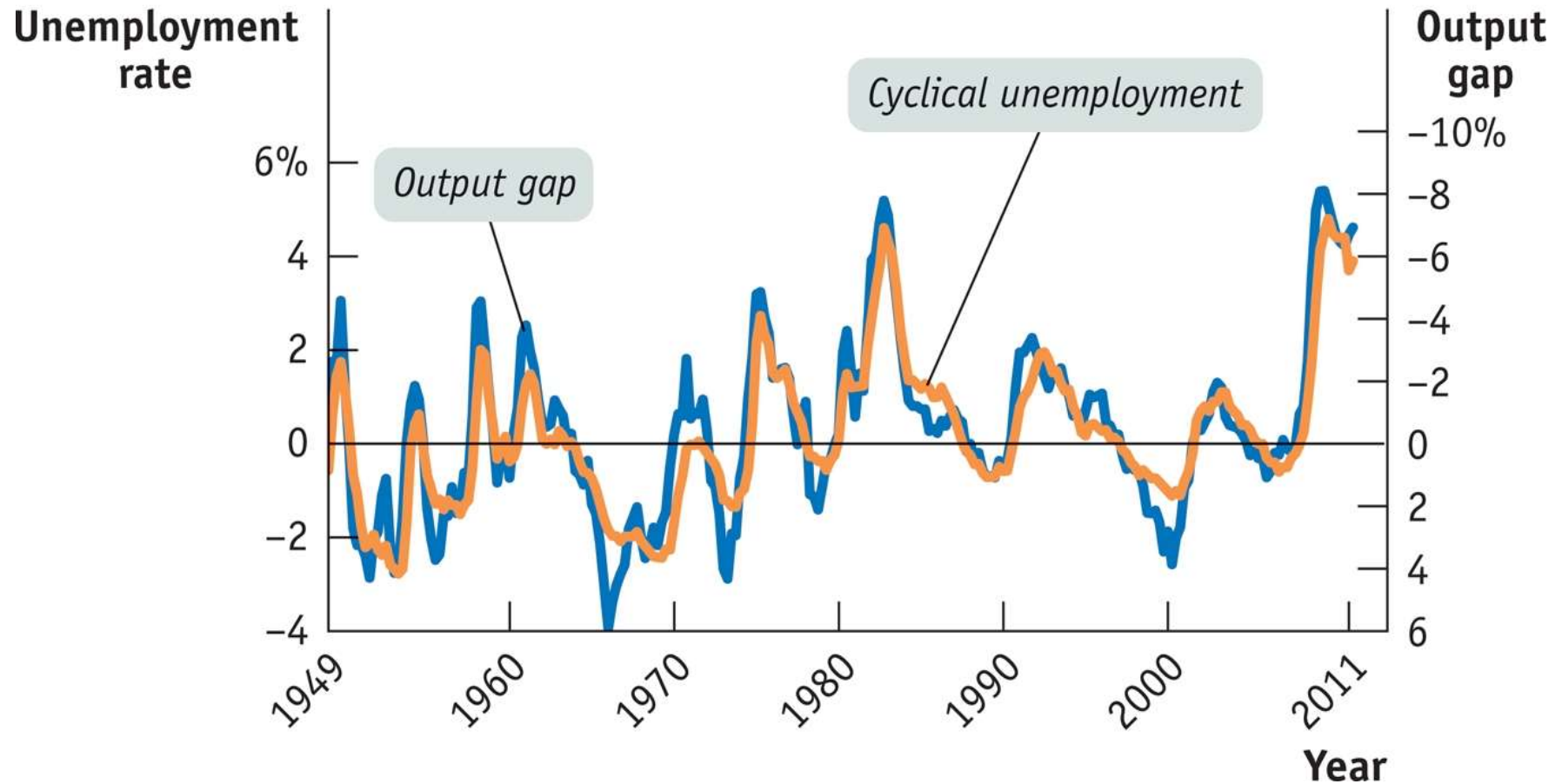


(b) . . . but Only at the Expense of a Huge Sacrifice of Output and High Unemployment.



Cyclical Unemployment and the Output Gap

(b) . . . and These Fluctuations Correspond to the Output Gap.



Okun's Law

Cyclical unemployment seems to move **less (by half)** than the output gap. **Ex:** The output gap reached -8% in 1982, but cyclical unemployment reached only 4% . **Arthur Okun**, John F. Kennedy's chief economic adviser, discovered this.

If the natural rate of unemployment is 5.2% and the economy is producing at only 98% of potential output (the output gap is -2%), and Okun's law predicts an unemployment rate of:
 $5.2\% - 0.5 \times (-2\%) = 6.2\%$.

Okun's law: there is a predictable negative relationship between the output gap and the unemployment rate. Modern estimates find that a **rise in the output gap of 1%** reduces the **unemployment rate by about 0.5%** .

Unemployment rate =
natural rate of unemployment $- 0.5 \times$ (output gap)



If the total unemployment rate is 9.5% , and the economy operates at 90% of its potential output,
-what is the cyclical rate of unemployment?
-what is the natural rate of unemployment?

Debt Deflation

If Inflation is a problem, Deflation brings another problem:

For those who have debt (home loans, credit card loans, student loans), a deflation means the real interest rates the borrower has to pay will be higher.

Nominal interest rate - Real interest rate = inflation rate

Or

Real interest rate = Nominal interest - inflation

During the housing crisis, deflation is 2%, and mortgage (nominal) rate was 6%,

The Real mortgage rate = 6% - (-2%) = 8%

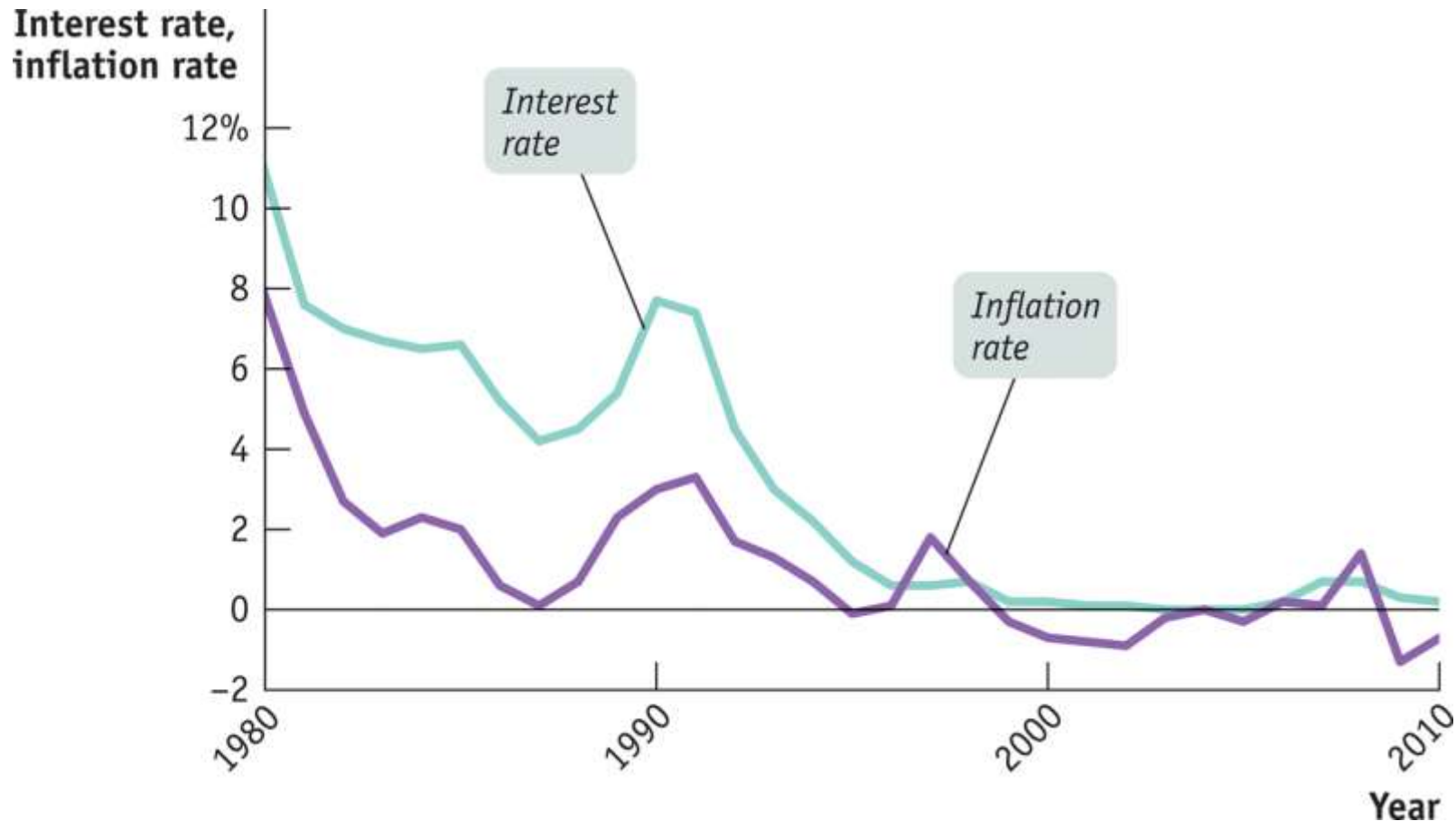
Since **deflation is a negative inflation**, Real interest rate is higher; purchasing power is lower, thus households reduced spending on Consumption, and Total Output (GDP) reduced.

Debt deflation: the reduction in GDP arising from the **increase in the real burden of outstanding debt** caused by deflation.



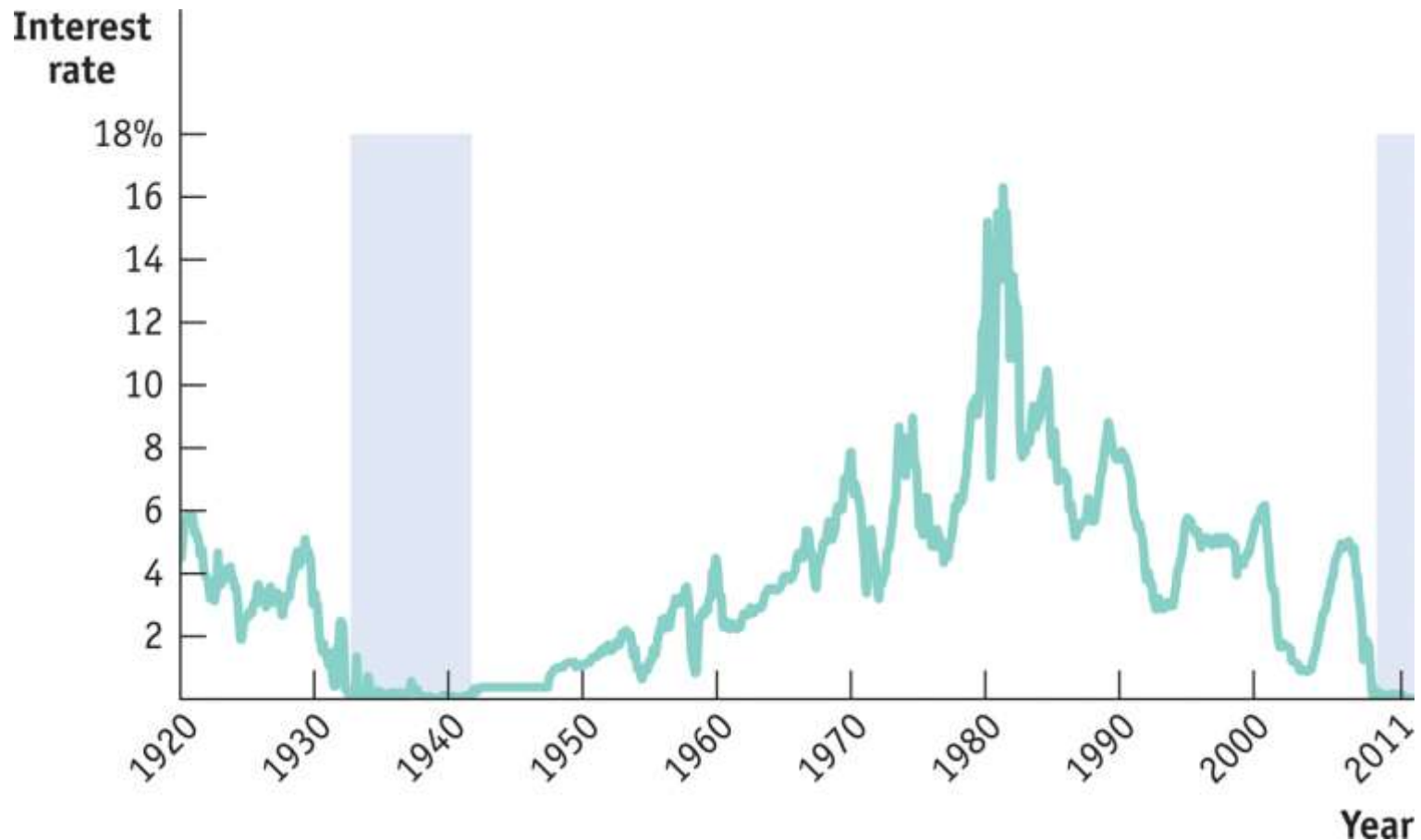
Japan's Lost Decade & Deflation

After the 1980s housing and property boom went bust, Japan fell into persistent deflation. Monetary policy (Money supply and interest rates policy) can go only so far. A period of “liquidity trap” and zero interest rate (even negative at times).



The Zero Bound in U.S. History

In the aftermath of the 2008 financial crisis, the Federal Reserve found itself up against the zero bound (3-month T-bill rate shown). Click [here](#) for current data.



In-Class Exercise

1. Winners and Losers from Inflation/Deflation

a) Suppose inflation is predicted at 2% in the coming years. When inflation turns out to be 12%, there are winners and losers. A loan agreement is fixed at 5% for the next 5 years.

Who's the winner? Who's the loser?

Sam the lender

Suzy the borrower

b) Change the scenario: instead of expected inflation of 2%, it turns out to be a deflation of 5%.

Who's the winner? Who's the loser?



2. Suppose you live in an economy that is currently experiencing hyperinflation. At the start of the year (Jan 1st), the cost of a loaf of bread is \$2.00.

- a) If the inflation rate is 100% a month, what will be the price of the bread at the end of 12 months (Dec 31st)? Calculate the price increase month by month.**
- b) What is the total price increase in percentage terms for the year?**

In-Class Exercise



Unemployment rate = natural rate of unemployment – 0.5 x (output gap)

3. Use Okun's Law to estimate the following:

- a) The current US unemployment rate is around 6%, and level of inflation is close to 0%. If the natural rate of unemployment is 4%, what can we say about the output gap (or at what production capacity is the economy is operating relative to the potential output?)?**
- b) The current US unemployment rate is around 15%, and the GDP Deflator falls by 4% (→ deflation). If the production capacity is currently at 85% of its potential output, what is the approximate natural rate of unemployment?**