University of Macerata
Economics - A.Y. 2022/2023
Dr. Mattia Tassinari

Inflation

REF. Chapter 30

Inflation

- **Inflation** consists of an increase in the general price level
- The **inflation rate** is calculated using a price index: weighted averages of the prices of thousands of individual products
- Example: **Consumer Price Index (CPI)**, measures the cost of a basket of consumer goods and services relative to the cost of that basket in a particular base year / month.

Basket of two goods (same weight)

month	price A	price B	Average price	Price Index
January	40	20	30	**100,0**
February	40,5	22	31,25	104,2
March	43	21,2	32,1	107,0
April	42	23	32,5	108,3

Inflation

The price index provides an indication of the price level in a given year, and is useful for calculating the **inflation rate**:

Inflation rate (year *t*) =

$$\frac{\text{Price level (year t)} - \text{Price level (year t-1)}}{\text{Price level (year t-1)}} \times 100$$

Average price	Price INDEX	Rate of INFLATION
30	100,0	
31,25	104,2	4,2
32,1	107,0	2,7
32,5	108,3	1,2

Inflation control is assigned to the Central Bank (for Europe, the ECB) which is independent from governments and has the task of containing inflation to minimum levels.

It is necessary to understand:

- Why is inflation bad beyond certain levels?
- What are the causes of inflation?
- What can be done to reduce inflation?

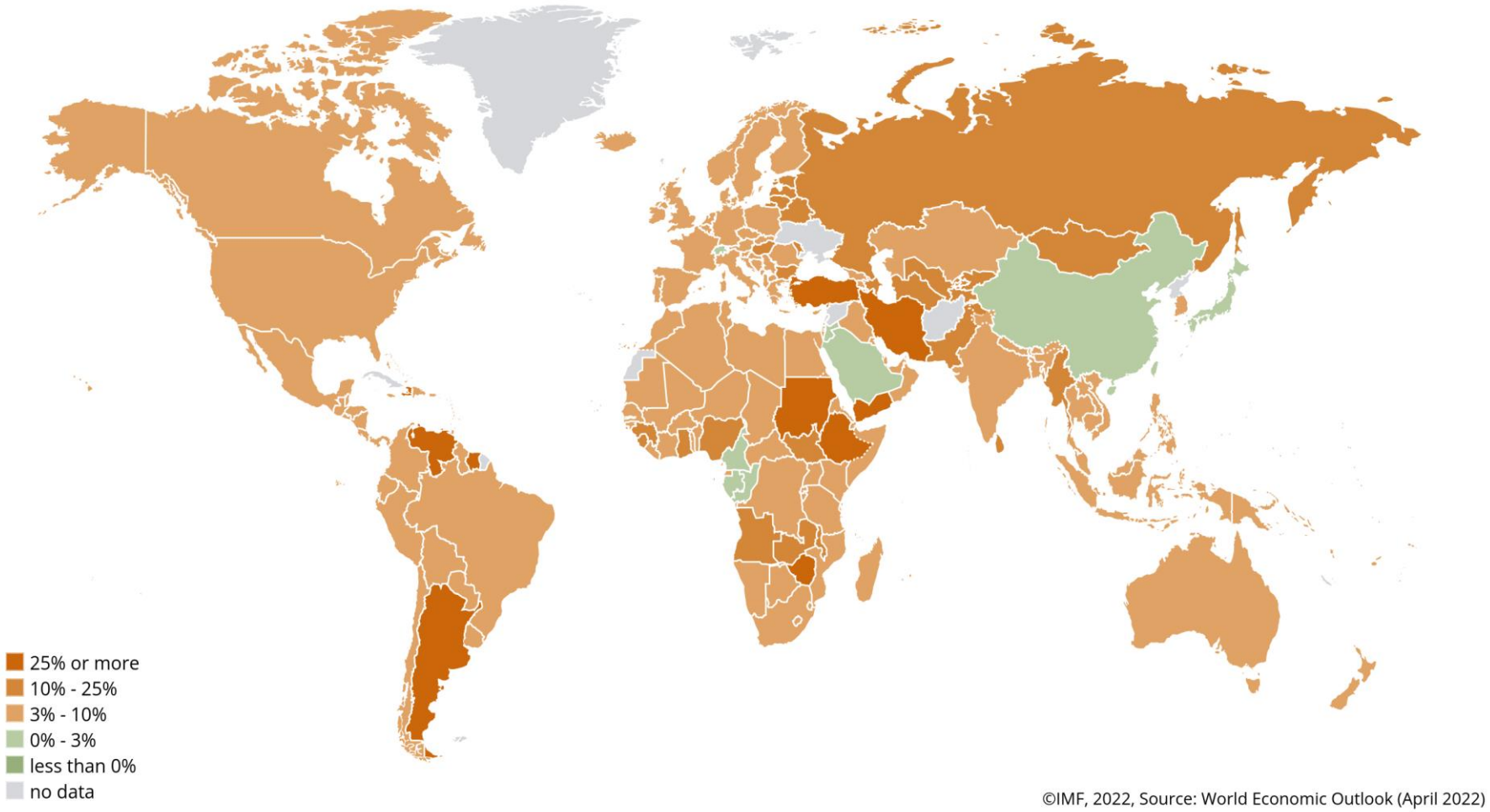
Inflation: historical trends

FIGURE 30-2. Consumer Prices in the United States, 1776–2008

Until World War II, prices fluctuated trendlessly—rising rapidly with each war and then drifting down afterward. But since then, the trend has been upward.

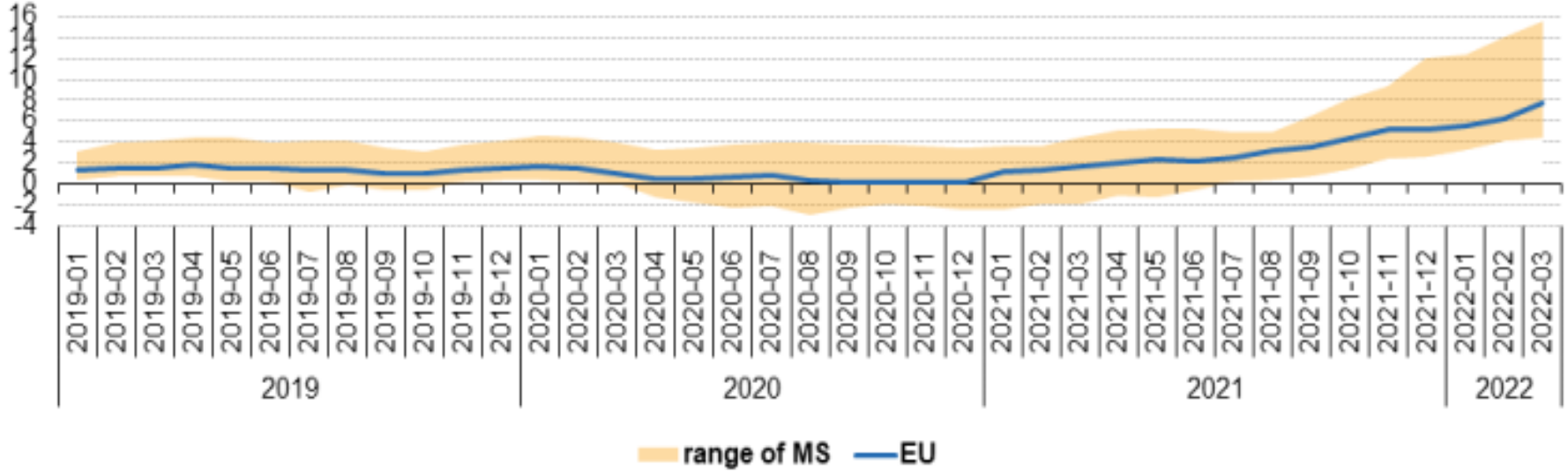
IMF DataMapper

Inflation rate, average consumer prices (Annual percent change, 2022)



Inflation rate, EU, 2019-2022

(annual rate of change in % between the current month and the same month of the previous year)

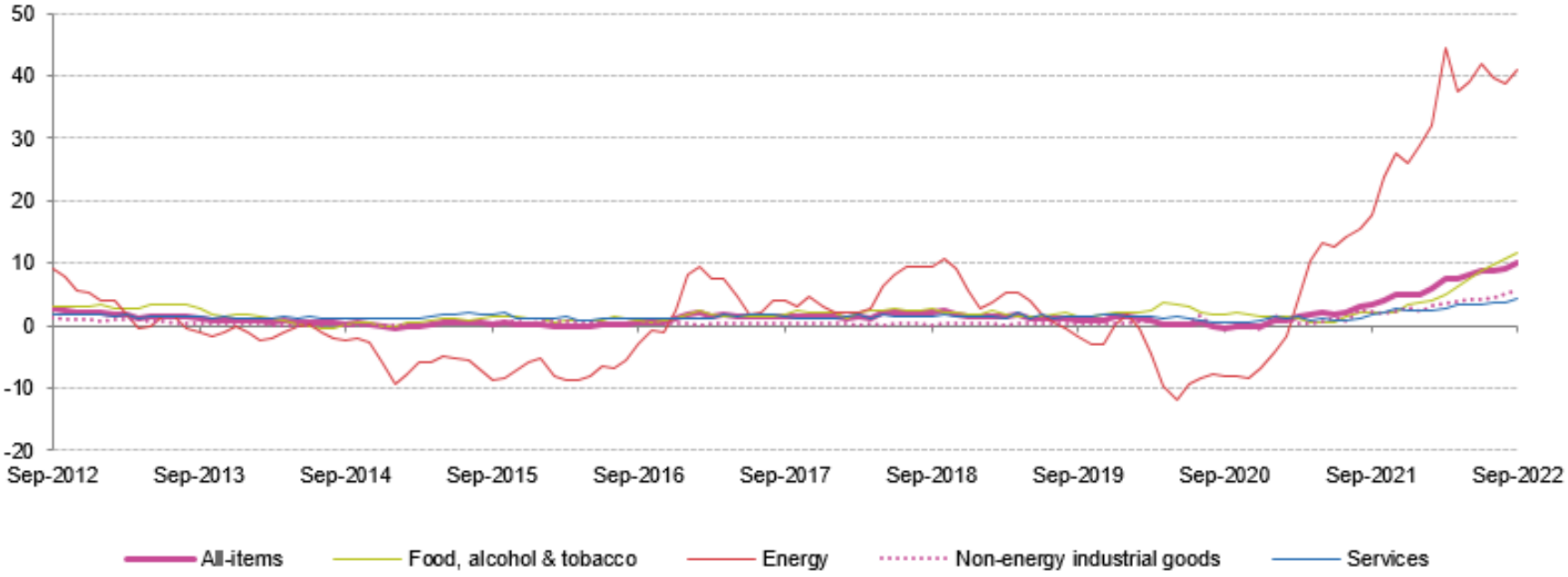


Source: Eurostat (online data code: PRC_HICP_MANR)

eurostat

Euro area annual inflation and its main components, September 2012 - September 2022 (estimated)

(%)



Source: Eurostat (online data code: prc_hicp_manr)

eurostat

Three kinds of Inflation

- **Low Inflation**. Low inflation is characterized by prices that rise slowly and predictably. We might define this as single-digit annual inflation rates. It is normal.
- **Galloping Inflation**. Inflation in the double-digit or triple-digit range of 20, 100, or 200 percent per year is called galloping inflation or "very high inflation." Generally, most contracts get indexed to a price index or to a foreign currency like the dollar. In these conditions, money loses its value very quickly, so people hold only the minimum amount of money needed for daily transactions.
- **Hyperinflation**. Prices are rising a million or even a trillion percent per year. Eg, the Weimar Republic of Germany in the 1920s.

Eg Germany 1922-23 (hyperinflation generated by the massive supply of money to pay war debts)

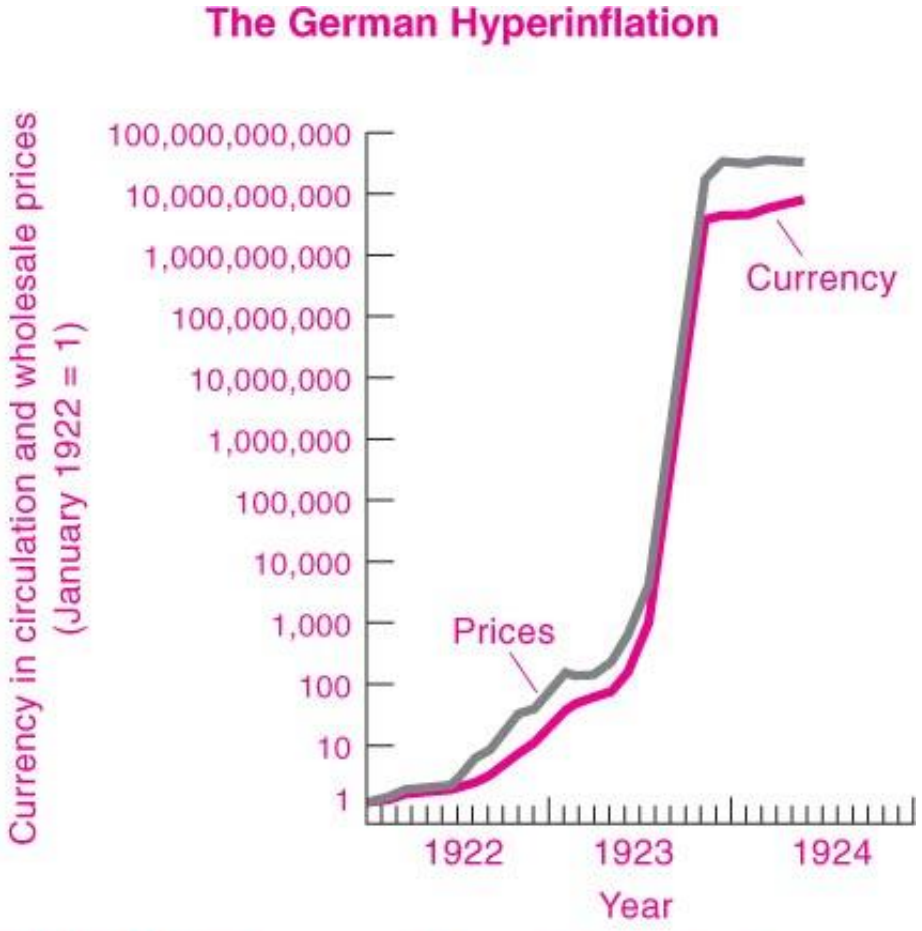


FIGURE 30-4. Money and Hyperinflation in Germany, 1922–1924

In the early 1920s, Germany could not raise enough taxes, so it used the monetary printing press to pay the government's bills. The stock of currency rose astronomically from January 1922 to December 1923, and prices spiraled Upward.

NEUE BERLINER
ZEITUNG.
«DAS 12UHR BLATT»

Donnerstag, den 25. Juli 1923

Der Dollar in Newyork = 1 Million Mark.

Markpanik.

Heftige Angriffe gegen die Regierung.

- **Anticipated inflation**. Most citizens expect a given inflation rate (e.g. 3%) and it is therefore incorporated, for example, into trade union agreements on wage levels and labor contract, which in turn give rise to price increases (*expected rate of inflation*). Economists generally believe that anticipated inflation at low rates has little effect on economic efficiency or on the distribution of income and wealth. People would simply be adapting their behavior to a changing monetary yardstick.

- **Unanticipated inflation**. It alters the comparison between supply and demand, with heavy effects on (1) income distribution and (2) the economic system. Shock is caused by demand (demand grows more than productive potential and unemployment decreases) or supply, i.e. *cost inflation*, present even with high unemployment (e.g. increase in prices for each level of supply due to variations oil prices, poor harvests, etc… AS goes up!)

The effects of inflation:
1. the redistribution of income and wealth

- Involuntary and unpredictable redistribution of wealth, from lender (creditors) to borrower (debtors)
- Uncertainty. For companies it is more difficult to make financial forecasts and therefore investment is discouraged

Disadvantaged

- those who receive a **fixed income** (pensioners and employees) because when prices increase their real income decreases;
- **creditors** because the money that will be returned to the lender will have a lower purchasing power represented by the inflation rate;
- **savings** because in the future it will be possible to purchase a smaller quantity of goods than the present use;
- **international competitiveness**. The prices of domestic products will be higher than foreign goods. Exports will be lower and imports higher, thus creating imbalances in the international balance of payments.

Advantaged.

- **debtors** because they return money that is worth less (inflation also lightens the burden of public debt)
- **variable income earners** (traders, freelancers). At first they do not suffer damage from the increase in prices because they adjust the fees and price lists to the inflation rate, leaving their real income unchanged.
- **entrepreneurs**, who gain an initial advantage because sales prices adjust before production costs and the difference represents an increase in income for them.

The effects of inflation:
2. The effects on the economic system

- affects (allocative) efficiency

=> Prices lose their "signal value" in regulating demand and supply and the use of money is distorted

- affects the total output (GDP)

=> GDP growth is negative with high inflation
=> a slightly and predictably rising price level is the ideal climate for growth

Inflation rate (% per year)	Growth of per capita GDP (% per year)
−20–0	0.7
0–10	2.4
10–20	1.8
20–40	0.4
100–200	−1.7
1,000+	−6.5

TABLE 30-1. Inflation and Economic Growth

The causes of inflation

1. Demand-Pull Inflation (demand-shock inflation). The AD grows faster than the nation's **potential output** (e.g., excess liquidity or expansionary fiscal policies can be the causes). The closer you get to the potential product, the more prices go up: firms react to increases in demand with products sold at higher prices.

E.G.: Inflation due to **excess liquidity** is determined by an excessive increase of money in circulation (money supply) with respect to the goods and services available: the increase in the money supply reduces interest rates, stimulates consumption in durable goods and investments, shifts the DA to right, but if we are beyond potential GDP this generates inflation!

2. Cost-Push Inflation (supply-shock inflation). Especially in periods of high unemployment and modest use of productive resources, Cost-Push Inflation is due to increasing costs of production factors (e.g. increase in the price of oil, poor harvests, increasing wages due to "rigid" regulations).

Demand-pull inflation: excessive spending "collides" with too little quantity of goods => increasing spending creates competition for limited goods.

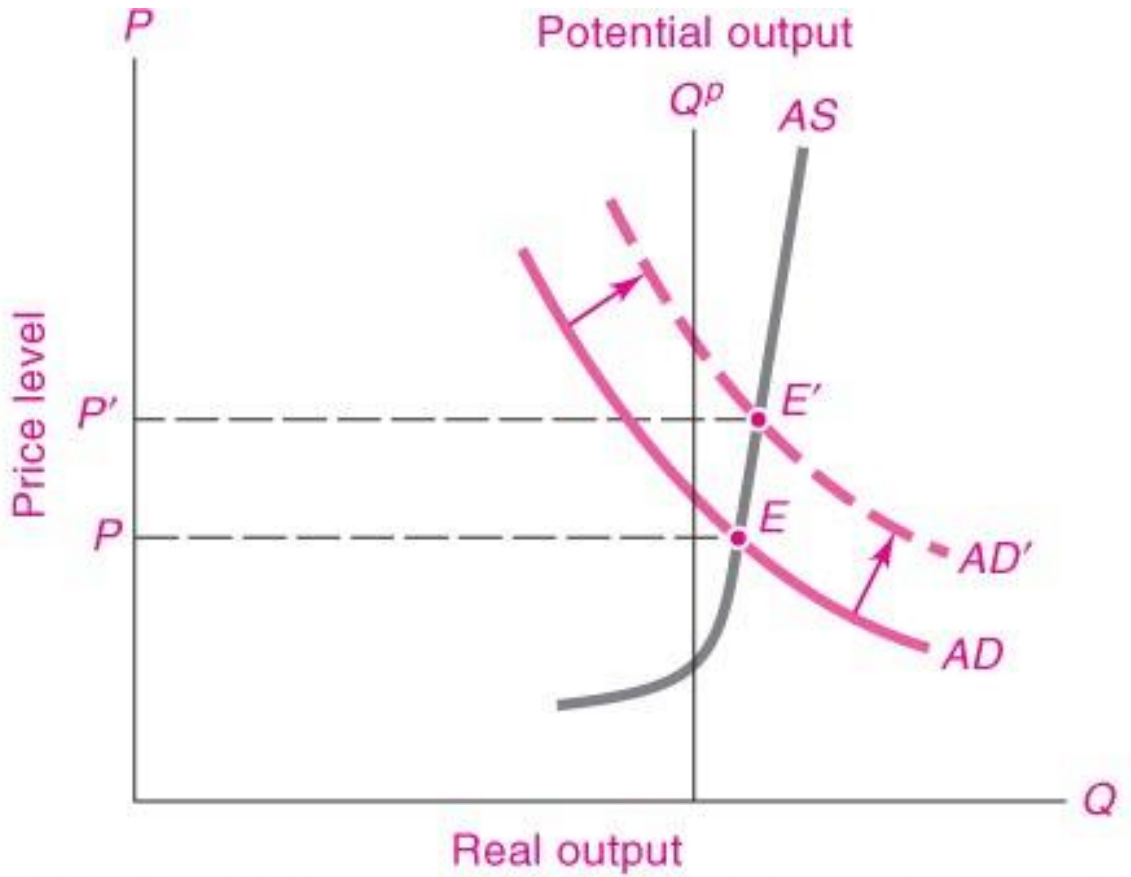


FIGURE 30-5. Demand-Pull Inflation Occurs When Too Much Spending Chases Too Few Goods

Cost-push inflation: in periods marked by rapid increases in production costs, such as with the oil-price shocks, countries can experience the dilemma of rising inflation along with falling output, the combination of which is called stagflation. Policies to affect aggregate demand can cure one problem or the other but not both simultaneously.

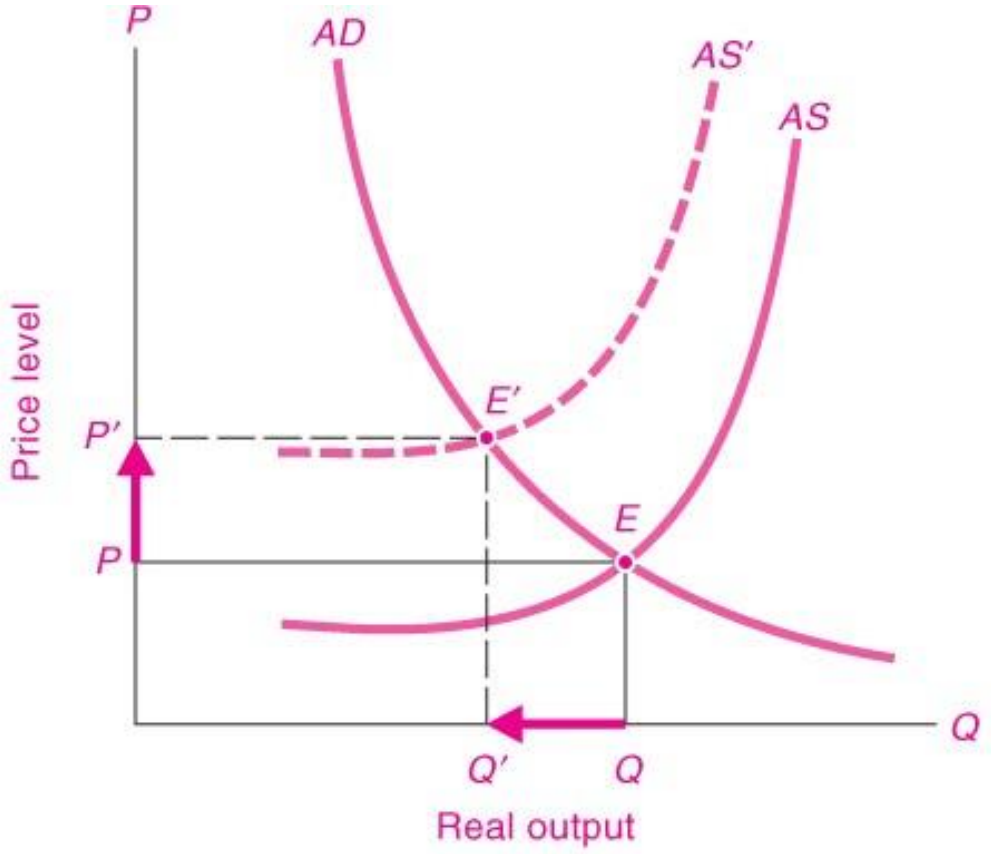


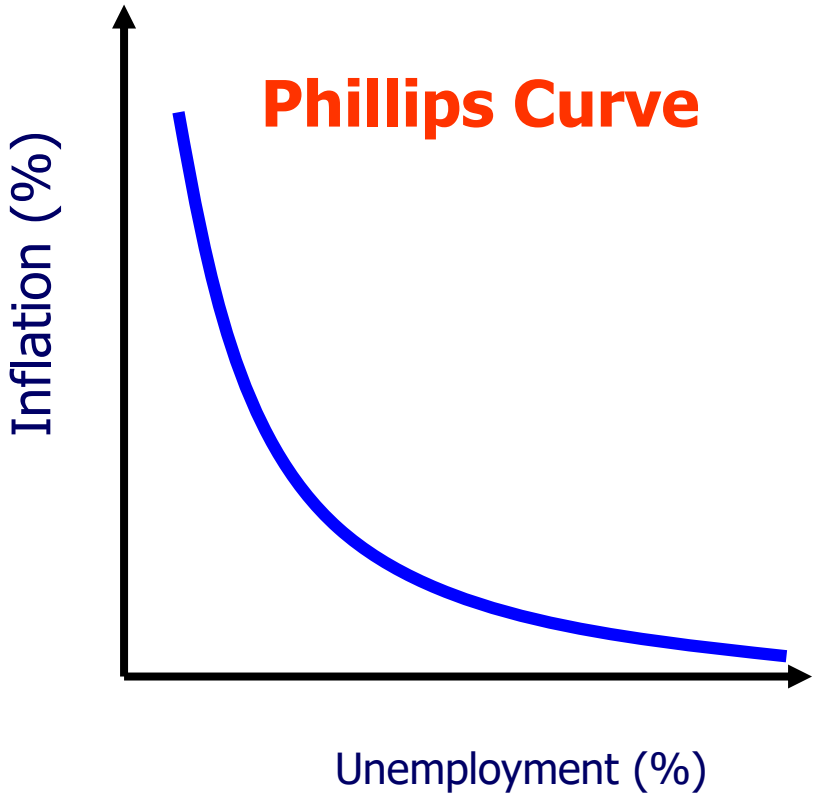
FIGURE 30-6. Increases in Production Costs Can Cause Stagflation, with Falling Output and Rising Prices

Inflation and Unemployment: Phillips Curve

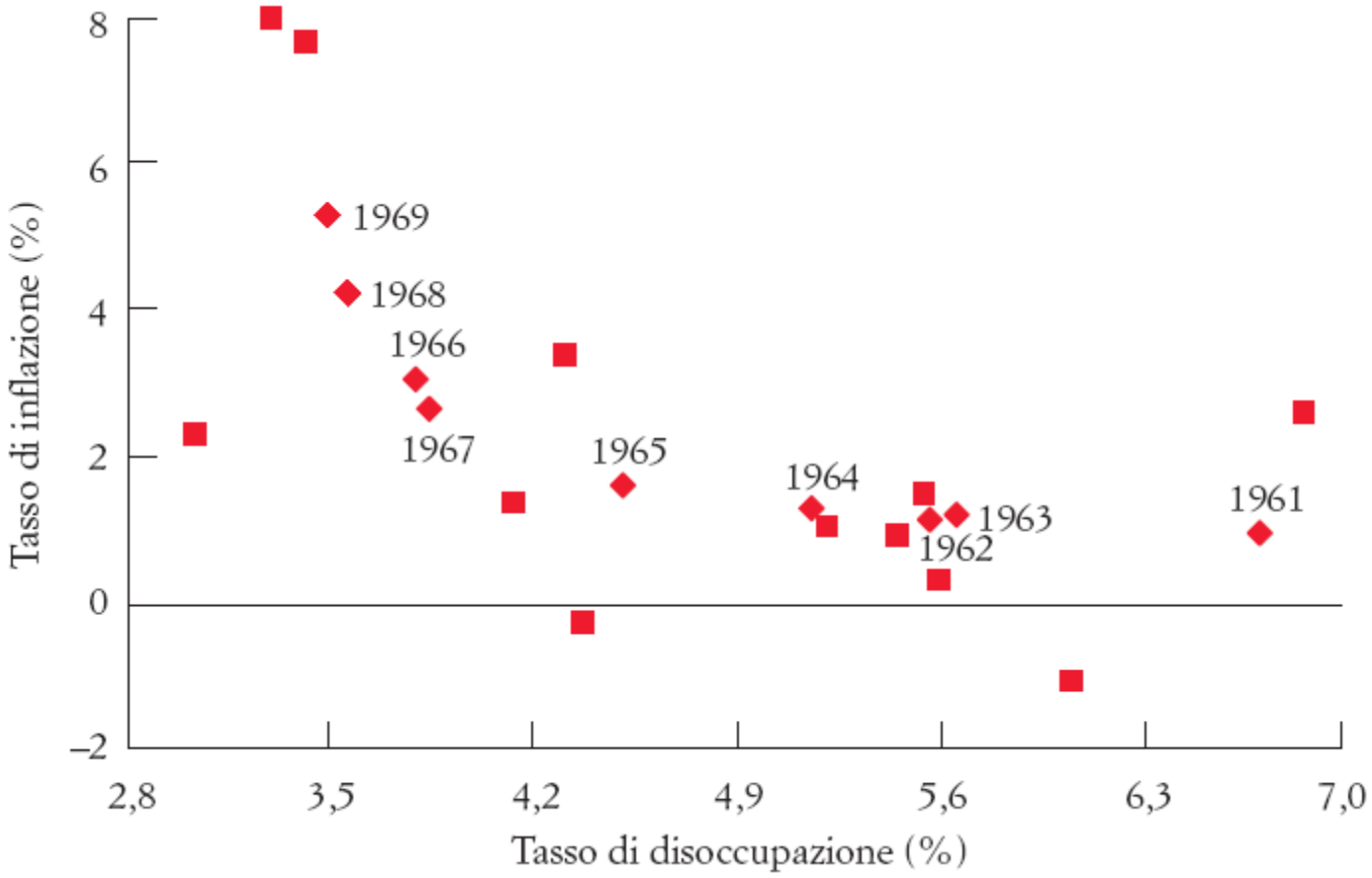
Depicts the tradeoff between Inflation and Unemployment:

When inflation is high, unemployment is low and vice versa

Intuition: a decrease in the level of unemployment generates higher nominal wages (eg the demand for labor increases). A wage increase leads to an increase in the price level. Consequently, a reduction in unemployment generates inflation



Phillips Curve



Until 1970s, the relationship is evident

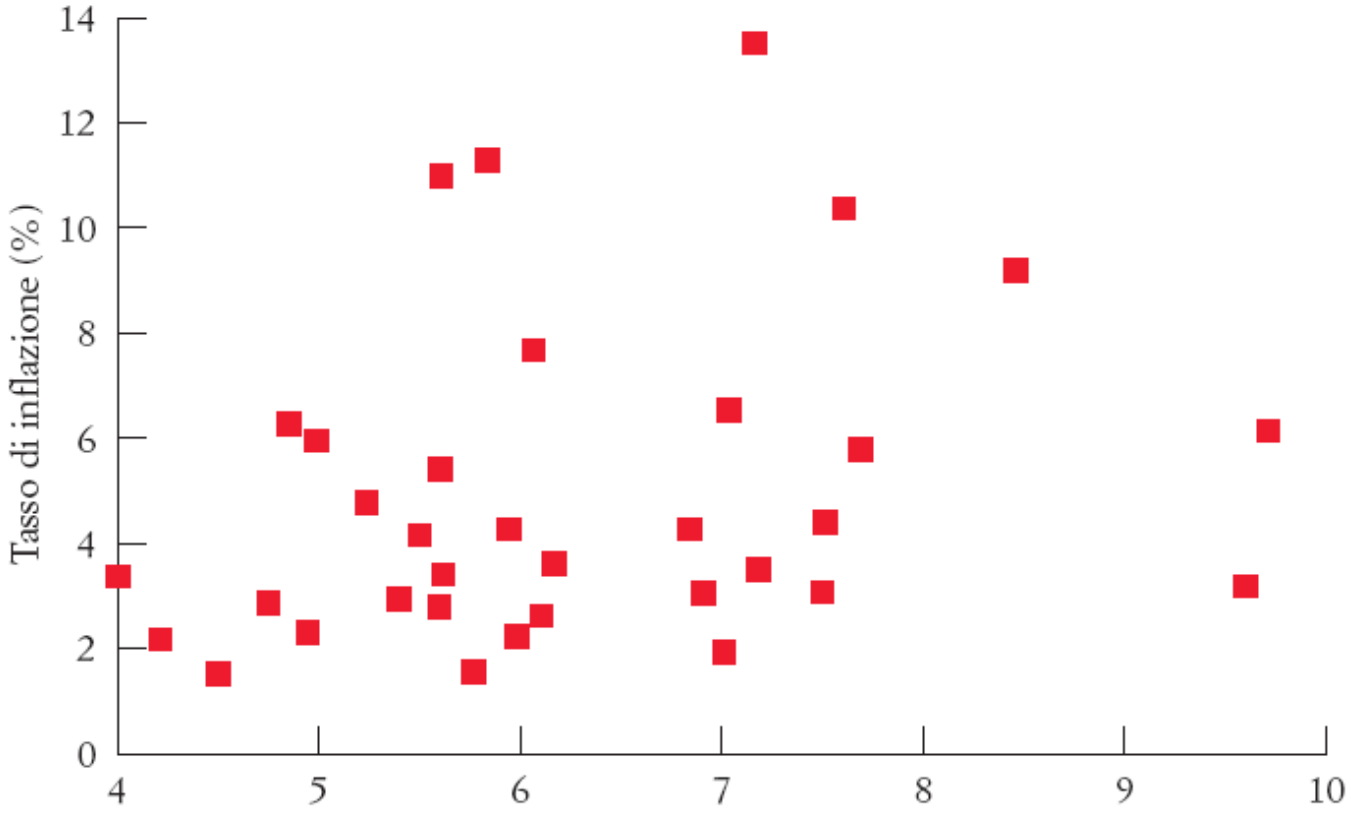
Phillips Curve

In the 1960s, several economists in major industrialized countries were convinced that Phillips' results indicated a stable, permanent relationship between inflation and unemployment.

Implication of this conclusion for economic policy: if Phillips' relation was valid, governments could control inflation and unemployment, through a public intervention (i.e. Keynesian policies), solving the problem of the trade-off between the two objectives of economic policy (employment and price stability), choosing a point on the Phillips curve.

The Crisis of the Phillips Model

- The Phillips curve well explained the trend in unemployment and inflation in the US and the UK up to the 1970s.
- From 1970 onwards, no significant relationship seems to emerge between unemployment and inflation (=> stagflation).



After 1970, the relationship collapsed

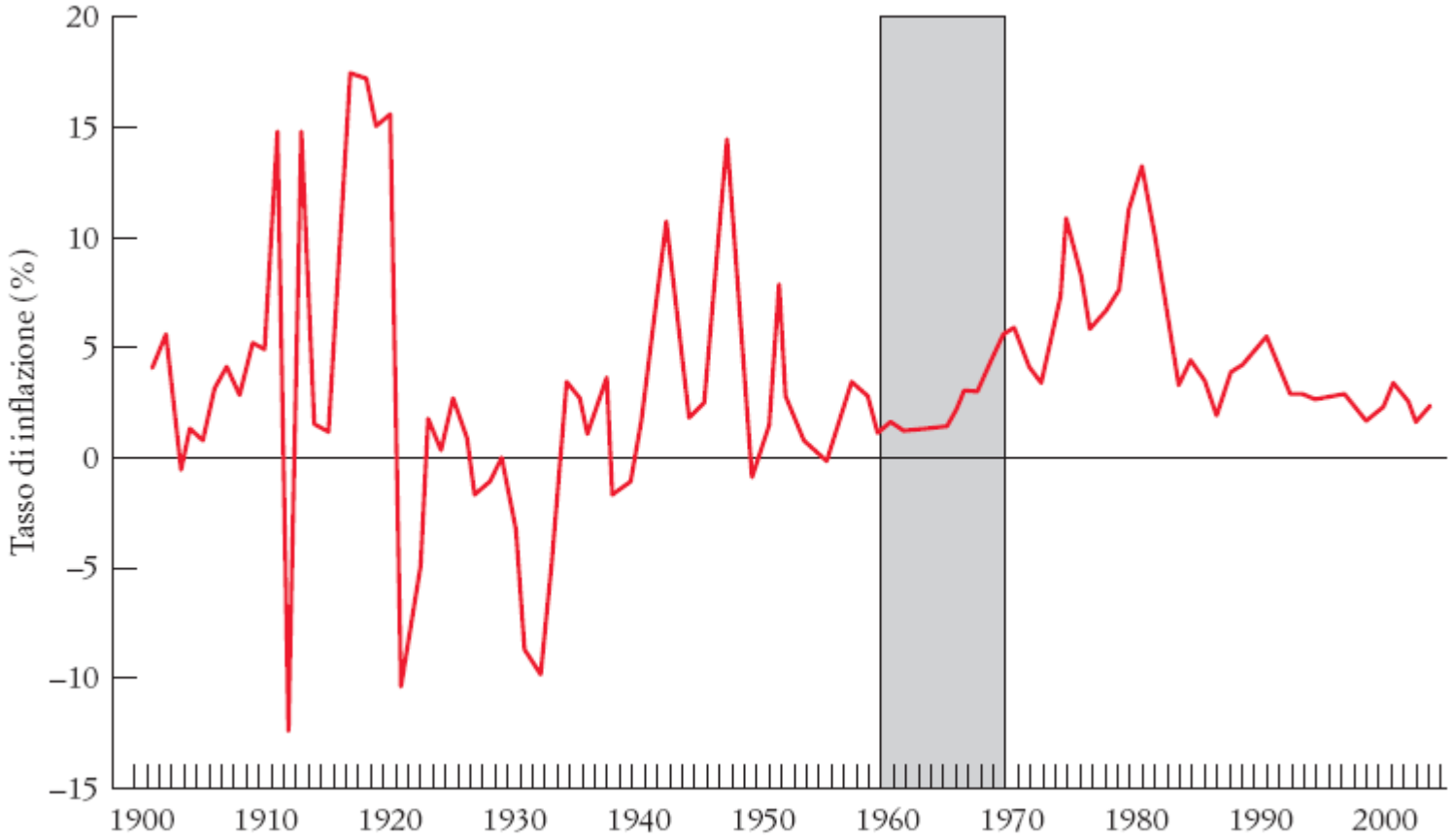
The Crisis of the Phillips Model

Since 1970, many countries have experienced high levels of inflation and unemployment (stagflation).

The theories based on the Phillips were not working anymore and were under attack by the economists M. Friedman and E. Phelps.

According to Friedman, the evident failure of Keynesian policies based on the Phillips curve required in 1970s a return to non-interventionist, free-market economic policies.

The Crisis of the Phillips Model



After the 1970s, inflation has always been positive and persistent: high inflation in one year will probably be followed by high inflation also the following year

Why does the Phillips curve change?

a) The oil crisis of the 1970s provoked a new phenomenon: a major increase in production costs, an increase in prices, an increase in inflation and the unemployment rate (i.e., Cost-Push Inflation or supply-shock inflation)

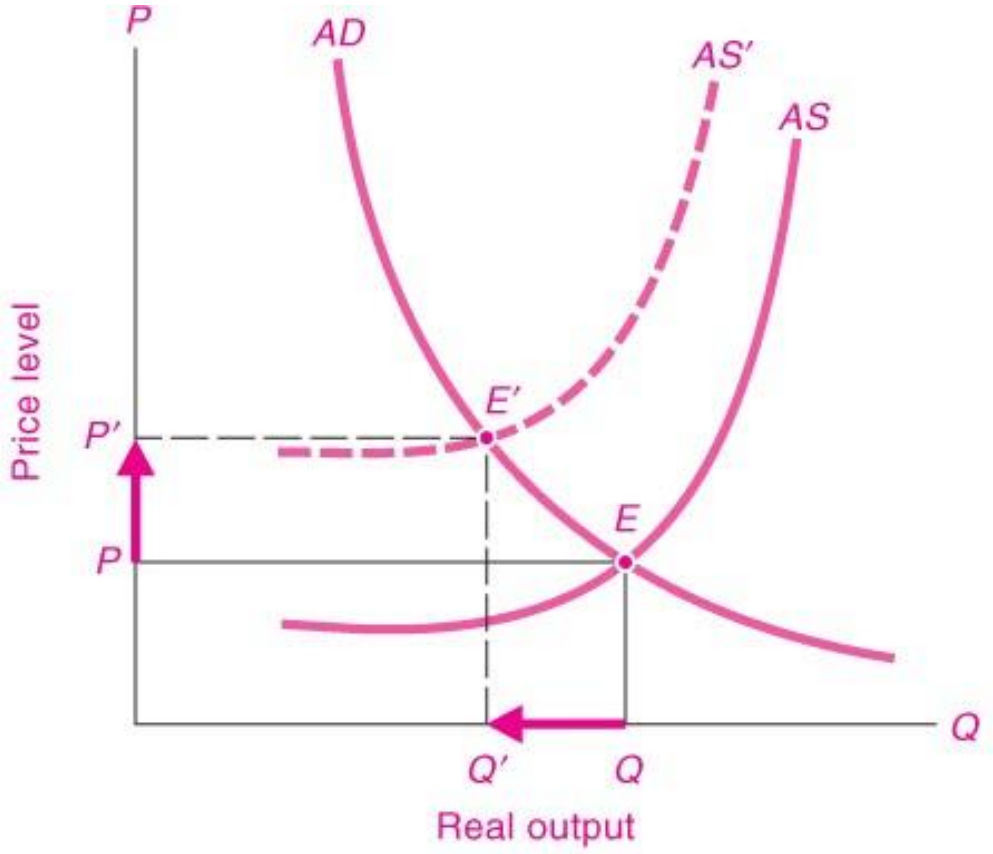


FIGURE 30-6. Increases in Production Costs Can Cause Stagflation, with Falling Output and Rising Prices

Why does the Phillips curve change?

b) The cost-push inflation that occurred in the 1970s generates a new behavior of economic operators: in the face of persistent inflation, a new way of forming **expectations** by companies and workers is spreading => they expect inflation to persist also the following year and adjust prices accordingly => with **expected inflation**, prices increase at a constant rate every year regardless of the level of unemployment: if all the operators of the economic system (firms and workers) adjust their prices for the **predicted inflation** rate (e.g. **indexed wages**, whereby inflation is incorporated into trade union agreements on wage levels) AD and AS move upwards with an increase in prices but without causing changes in real GDP and in the level of unemployment.

=> inflation remains at a constant positive rate without increasing unemployment because the increase in price that generate a shift upwards of the AS are **predicted by consumers**, resulting in a shift upwards of the AD (aggregate supply and demand move upwards together).

This change in the **formation of expectations** changes the nature of the relationship between unemployment and inflation as described by Phillips.

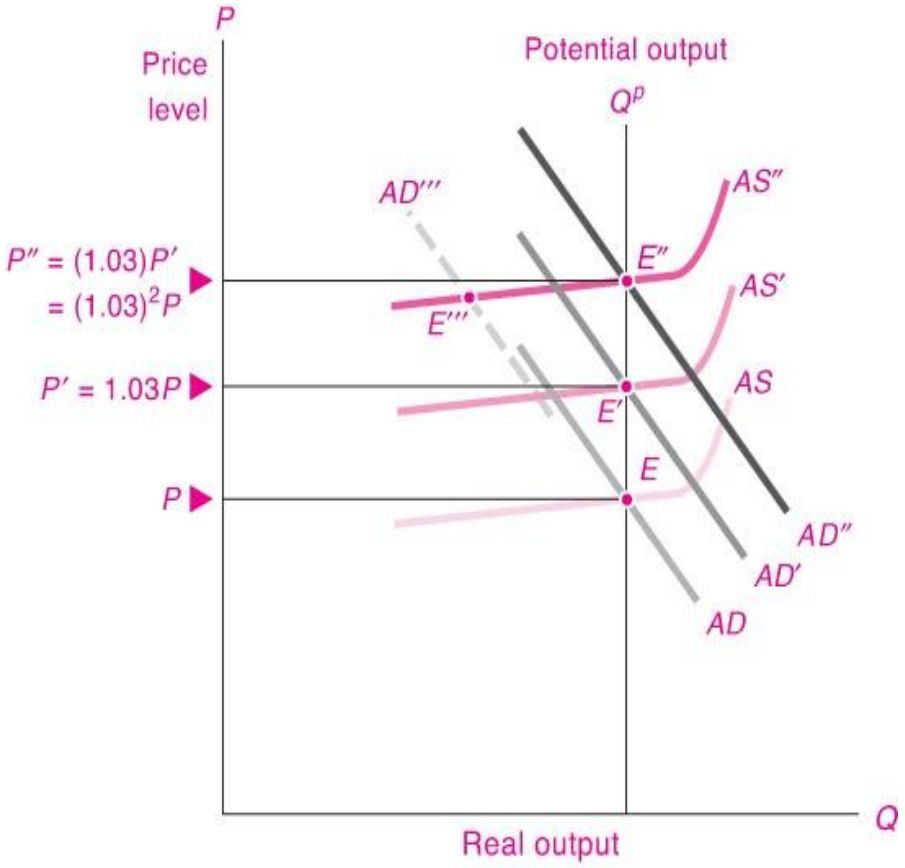
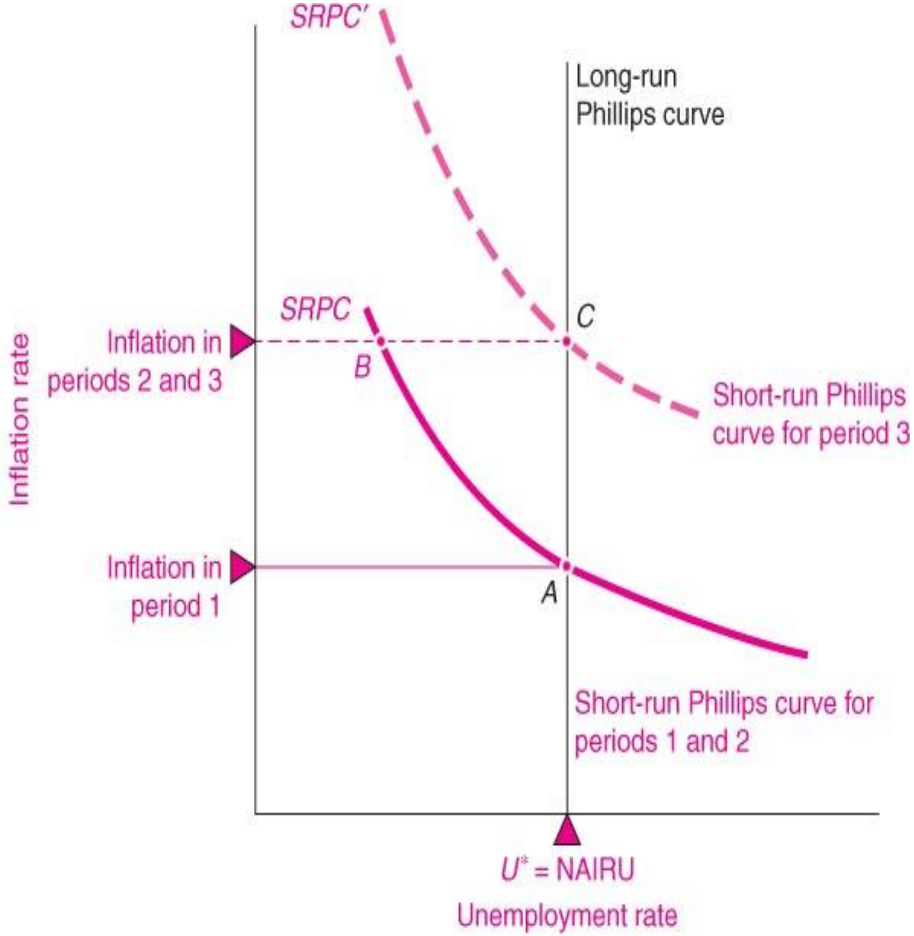


FIGURE 30-7. An Upward Spiral of Prices and Wages Occurs When Aggregate Supply and Demand Shift Up Together



E 30-9. The Shifting Phillips Curve

Friedman and Phelps' modifications

Friedman and **Phelps** argued that the Phillips curve would gradually shift as firms and workers predicted and adjusted to **persistent inflation** rates (=> role of **expectations**).

Based on these theoretical arguments, they drew the conclusion that in the **long run** (situation in which **wages are flexible**) there is **no trade-off** between unemployment and inflation: in the long run the economy always operates at the **nonaccelerating inflation rate of unemployment (or NAIRU)** (natural level of unemployment of an economic system, minimum unemployment rate that can be maintained without upward pressure on inflation)

The nonaccelerating inflation rate of unemployment (or NAIRU)

The nonaccelerating inflation rate of unemployment (or NAIRU) is that unemployment rate consistent with a constant inflation rate.

The NAIRU is the lowest unemployment rate that can be sustained without upward pressure on inflation.

It is the unemployment rate compatible with the **equilibrium on the labor market**. If the unemployment rate is higher than NAIRU, then there are more people on the market looking for a job.

Excess unemployment should push wages down:

- businesses find it convenient to employ new workers;
- some potential workers leave the labor market.

Both of these factors tend to lead unemployment rate towards NAIRU

How reducing inflation

- In the long run, low inflation can only be obtained with a low growth rate of the quantity of money in circulation (controlled by the CB) => increase in the interest rate => reduction in consumption of durable goods and investments (the DA shifts to left creating unemployment but containing inflation => trade-off).
- The transition from high to low inflation can be very painful (the economic system needs to be braked sharply), especially if expectations change slowly (if traders continue to expect inflation from the previous year then prices and wages will increase accordingly => the restrictive monetary policy maneuver is less effective).
- A credible money supply control policy implemented by the CB can speed up the adjustment process