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Money Growth and Inflation

The Meaning of Money

- Money is the set of assets in an economy that people regularly use to buy goods and services from other people.

THE CLASSICAL THEORY OF INFLATION

- Inflation is an increase in the overall level of prices.
- Hyperinflation is an extraordinarily high rate of inflation.

THE CLASSICAL THEORY OF INFLATION

- Inflation: Historical Aspects
 - Over the past 60 years, prices have risen on average about 5 percent per year.
 - Deflation, meaning decreasing average prices, occurred in the U.S. in the nineteenth century.
 - Hyperinflation refers to high rates of inflation such as Germany experienced in the 1920s.

THE CLASSICAL THEORY OF INFLATION

- Inflation: Historical Aspects
 - In the 1970s prices rose by 7 percent per year.
 - During the 1990s, prices rose at an average rate of 2 percent per year.

THE CLASSICAL THEORY OF INFLATION

- The *quantity theory of money* is used to explain the long-run determinants of the price level and the inflation rate.
- Inflation is an economy-wide phenomenon that concerns the value of the economy's medium of exchange.
- When the overall price level rises, the value of money falls.

Money Supply, Money Demand, and Monetary Equilibrium

- The money supply is a policy variable that is controlled by the Fed.
 - Through instruments such as open-market operations, the Fed directly controls the quantity of money supplied.

Money Supply, Money Demand, and Monetary Equilibrium

- Money demand has several determinants, including interest rates and the average level of prices in the economy.

Money Supply, Money Demand, and Monetary Equilibrium

- People hold money because it is the medium of exchange.
 - The amount of money people choose to hold depends on the prices of goods and services.

Money Supply, Money Demand, and Monetary Equilibrium

- In the long run, the overall level of prices adjusts to the level at which the demand for money equals the supply.

Figure 1 Money Supply, Money Demand, and the Equilibrium Price Level

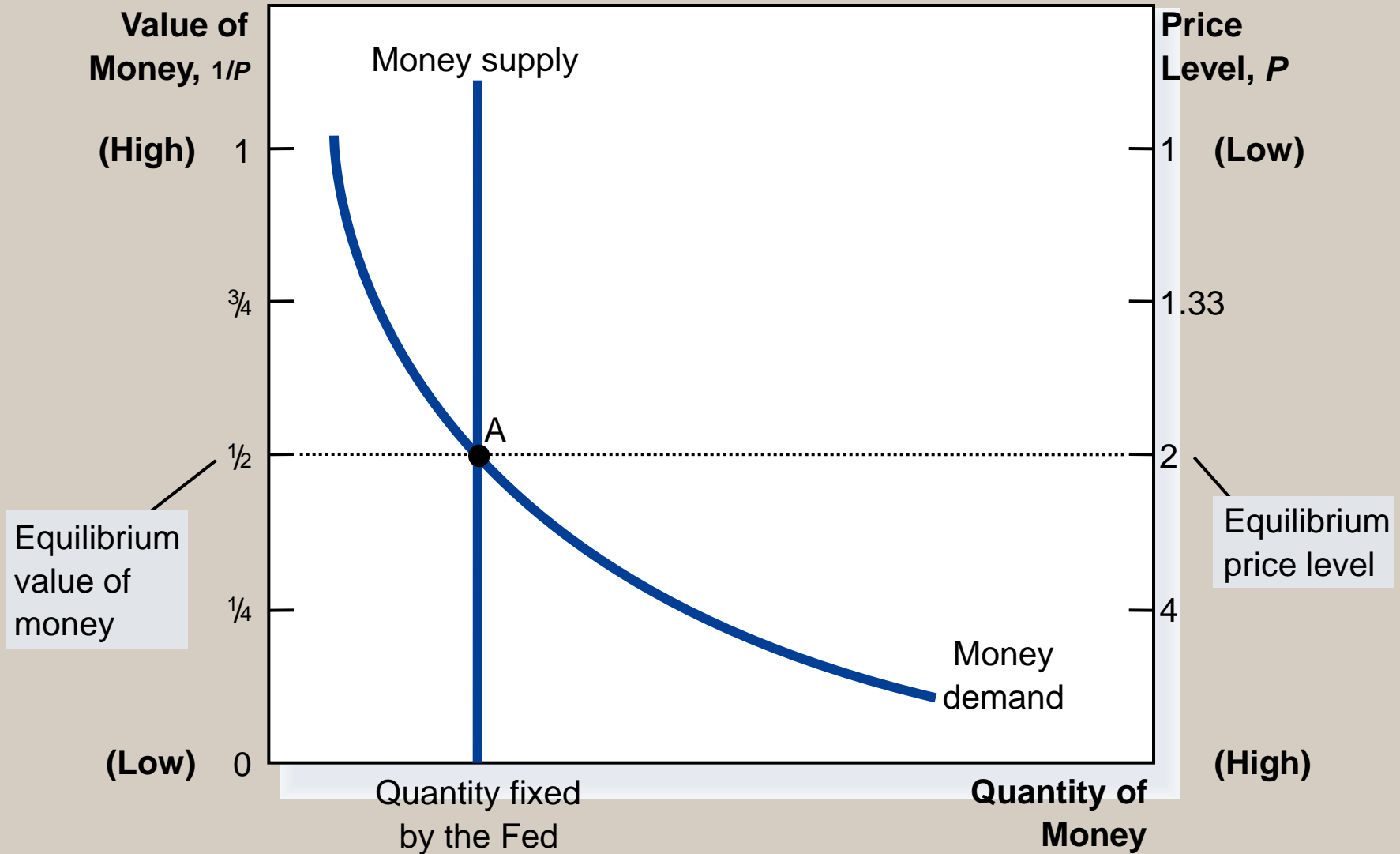
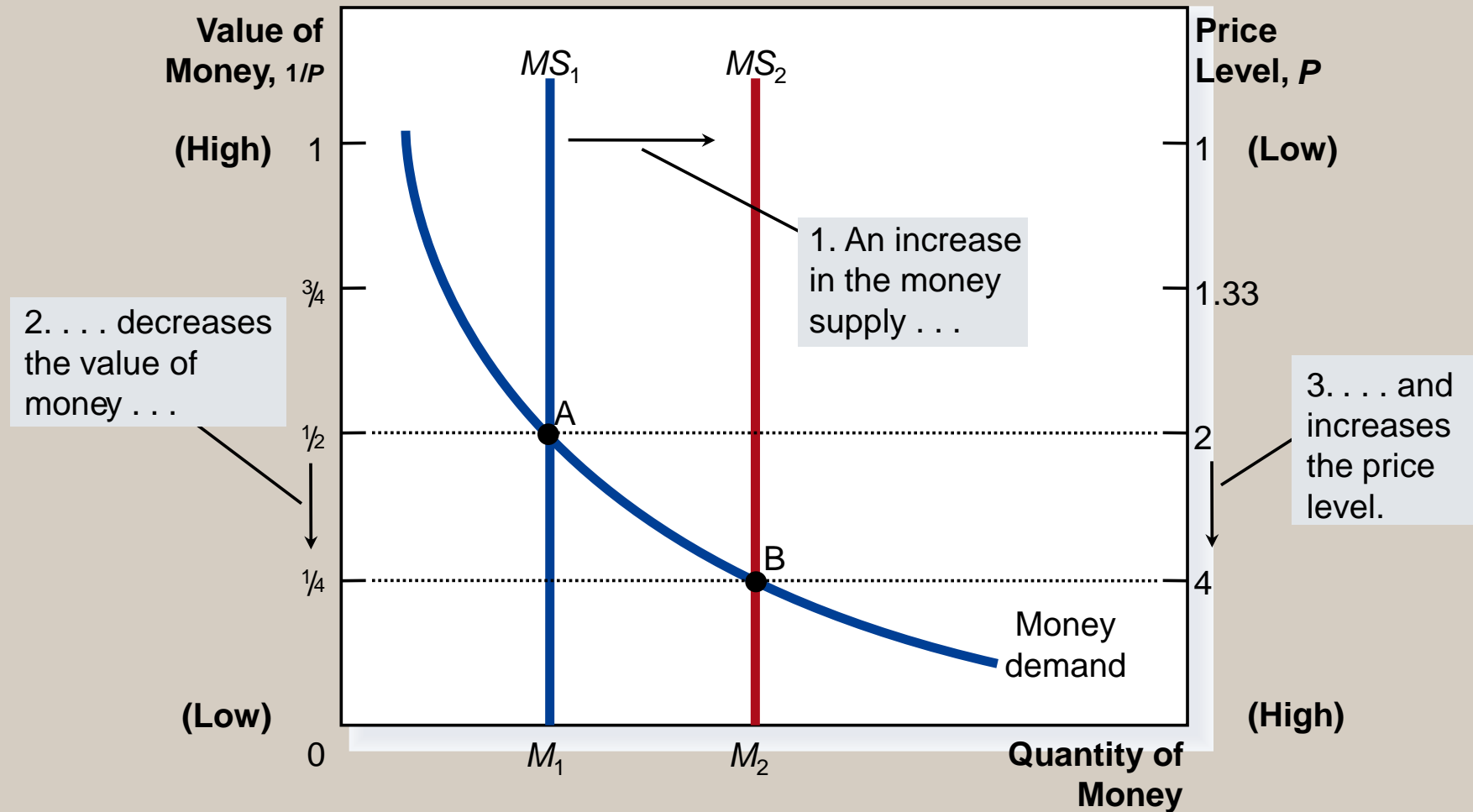


Figure 2 The Effects of Monetary Injection



THE CLASSICAL THEORY OF INFLATION

- The Quantity Theory of Money
 - How the price level is determined and why it might change over time is called the quantity theory of money.
 - The quantity of money available in the economy determines the value of money.
 - The primary cause of inflation is the growth in the quantity of money.

The Classical Dichotomy and Monetary Neutrality

- *Nominal variables* are variables measured in monetary units.
- *Real variables* are variables measured in physical units.

The Classical Dichotomy and Monetary Neutrality

- According to Hume and others, real economic variables do not change with changes in the money supply.
 - According to the *classical dichotomy*, different forces influence real and nominal variables.
- Changes in the money supply affect nominal variables but not real variables.

The Classical Dichotomy and Monetary Neutrality

- The irrelevance of monetary changes for real variables is called *monetary neutrality*.

Velocity and the Quantity Equation

- The *velocity of money* refers to the speed at which the typical dollar bill travels around the economy from wallet to wallet.

Velocity and the Quantity Equation

$$V = (P \times Y)/M$$

- Where: V = velocity
 - P = the price level
 - Y = the quantity of output
 - M = the quantity of money

Velocity and the Quantity Equation

- Rewriting the equation gives the quantity equation:

$$M \times V = P \times Y$$

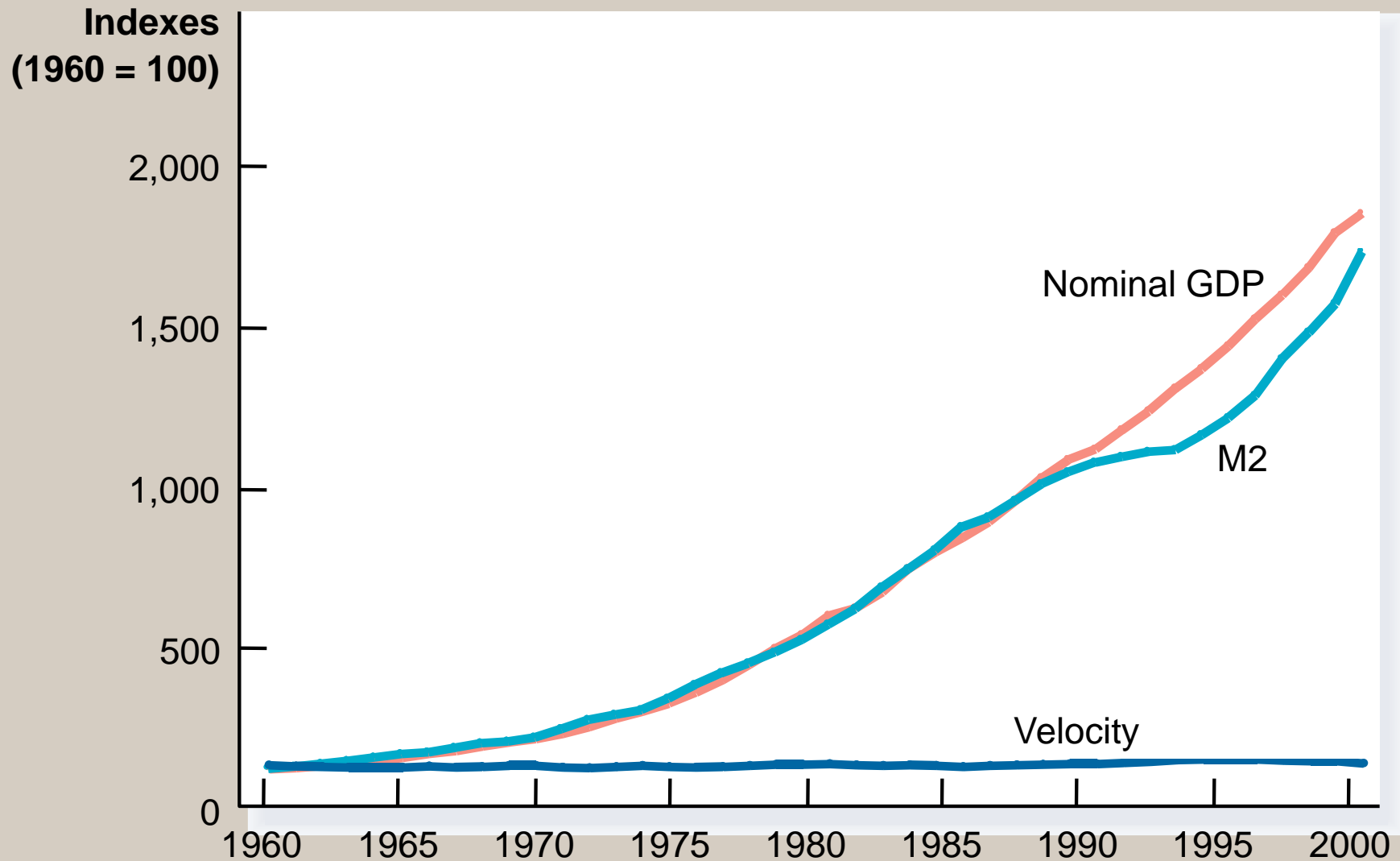
Velocity and the Quantity Equation

- The *quantity equation* relates the quantity of money (M) to the nominal value of output ($P \times Y$).

Velocity and the Quantity Equation

- The quantity equation shows that an increase in the quantity of money in an economy must be reflected in one of three other variables:
 - the price level must rise,
 - the quantity of output must rise, or
 - the velocity of money must fall.

Figure 3 Nominal GDP, the Quantity of Money, and the Velocity of Money



Velocity and the Quantity Equation

- The Equilibrium Price Level, Inflation Rate, and the Quantity Theory of Money
 - The velocity of money is relatively stable over time.
 - When the Fed changes the quantity of money, it causes proportionate changes in the nominal value of output ($P \times Y$).
 - Because money is neutral, money does not affect output.

CASE STUDY: Money and Prices during Four Hyperinflations

- Hyperinflation is inflation that exceeds 50 percent per month.
- Hyperinflation occurs in some countries because the government prints too much money to pay for its spending.

Figure 4 Money and Prices During Four Hyperinflations

(a) Austria

(b) Hungary

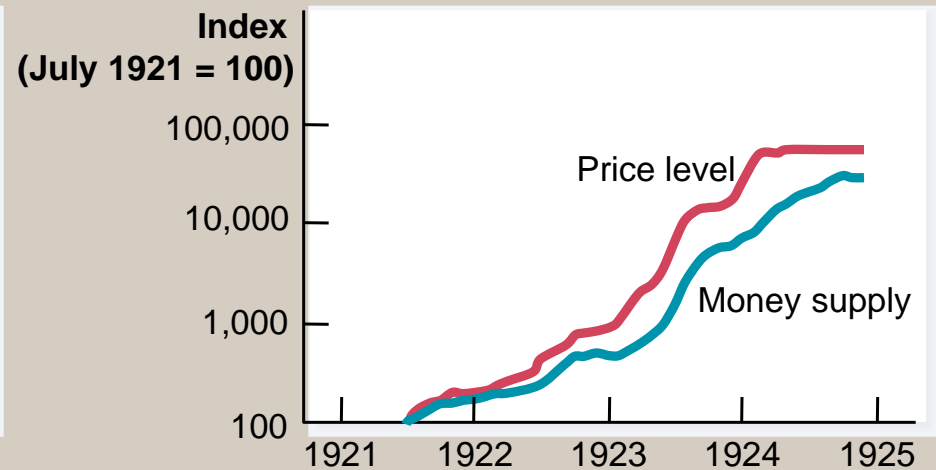
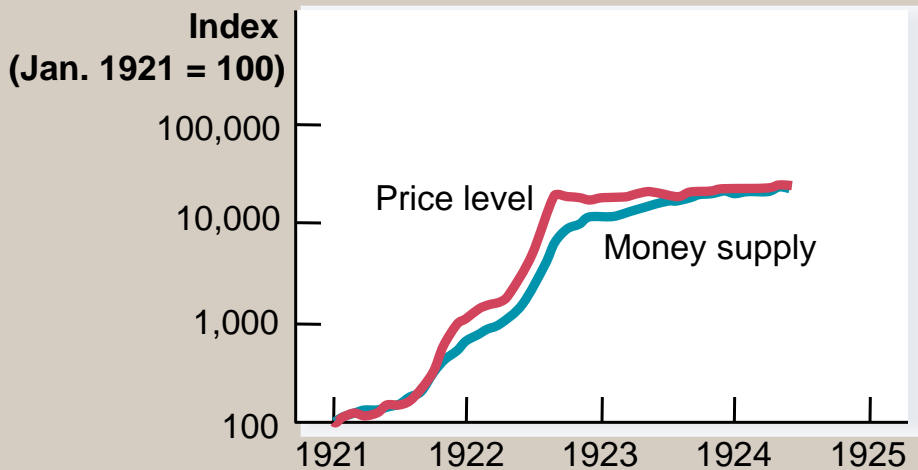
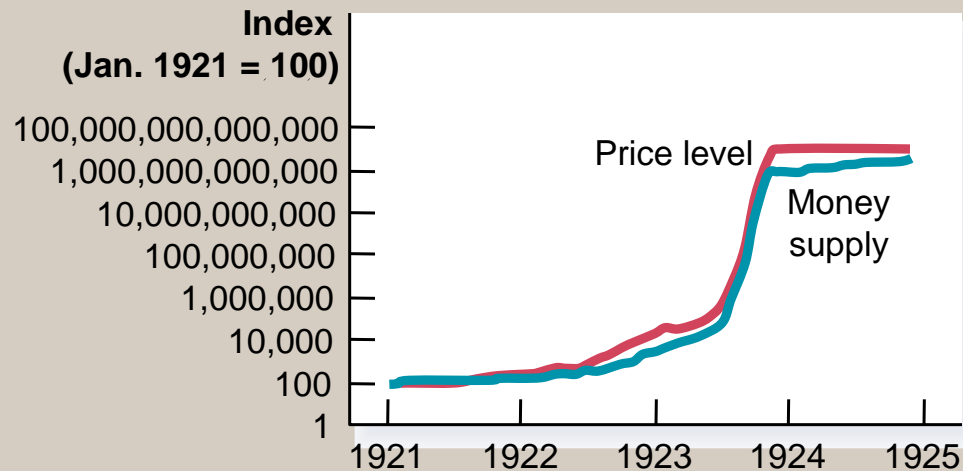
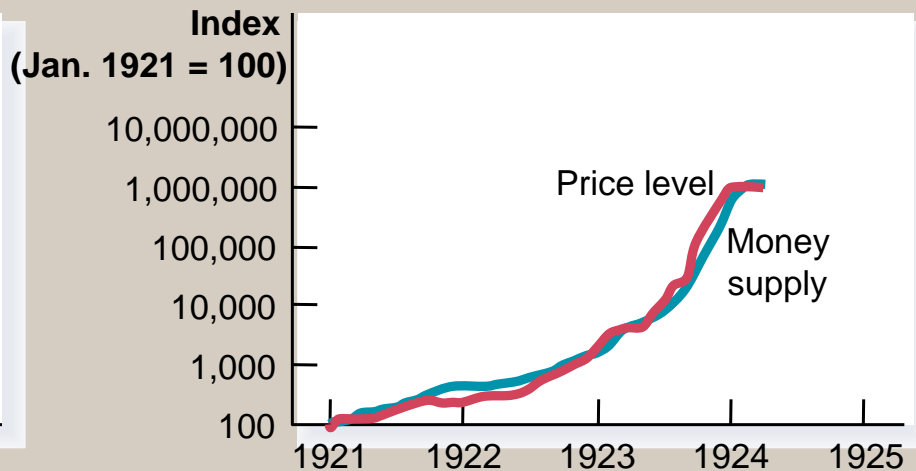


Figure 4 Money and Prices During Four Hyperinflations

(c) Germany



(d) Poland



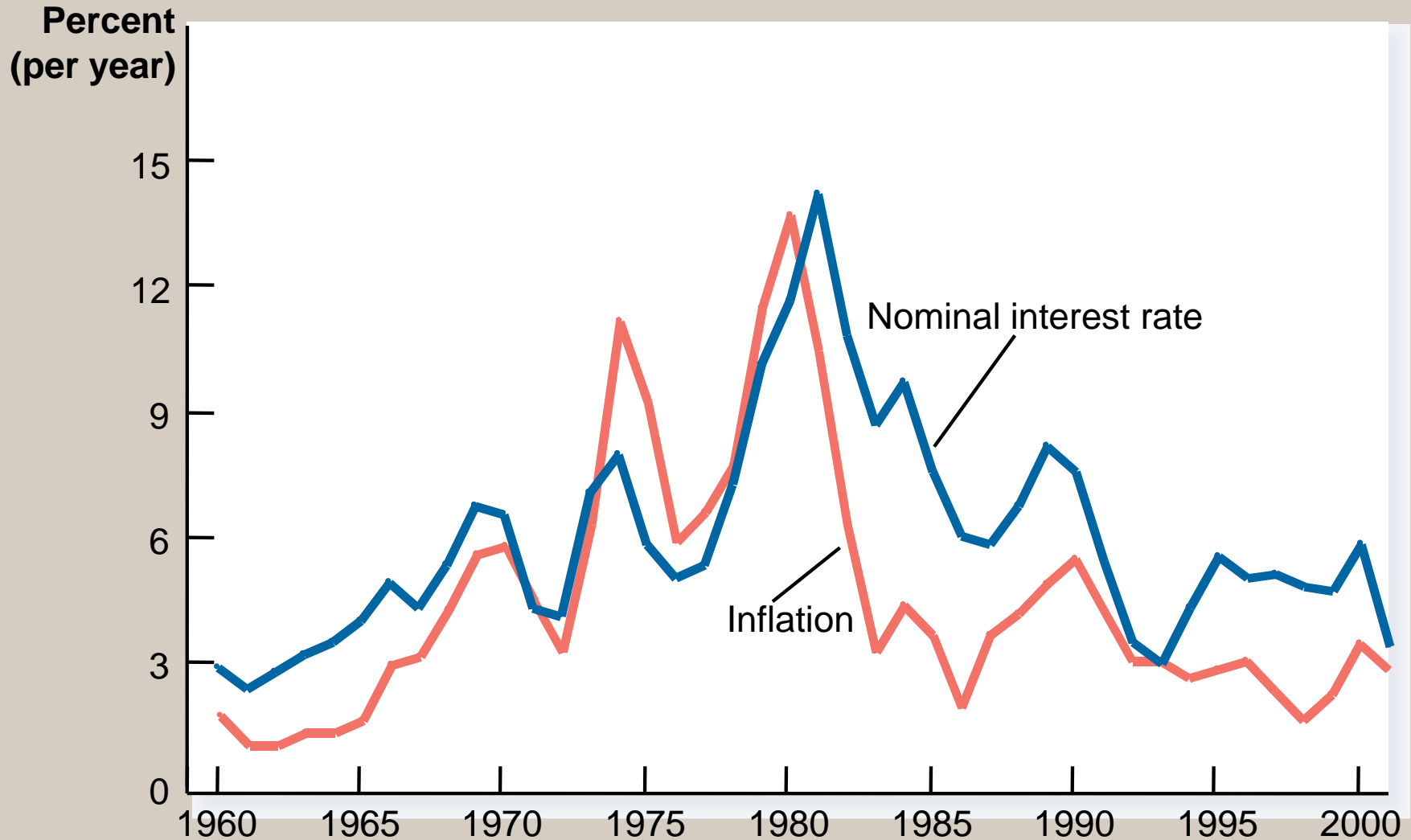
The Inflation Tax

- When the government raises revenue by printing money, it is said to levy an *inflation tax*.
- An inflation tax is like a tax on everyone who holds money.
- The inflation ends when the government institutes fiscal reforms such as cuts in government spending.

The Fisher Effect

- The *Fisher effect* refers to a one-to-one adjustment of the nominal interest rate to the inflation rate.
- According to the Fisher effect, when the rate of inflation rises, the nominal interest rate rises by the same amount.
- The real interest rate stays the same.

Figure 5 The Nominal Interest Rate and the Inflation Rate



THE COSTS OF INFLATION

- A Fall in Purchasing Power?
 - Inflation *does not* in itself reduce people's real purchasing power.

THE COSTS OF INFLATION

- Shoeleather costs
- Menu costs
- Relative price variability
- Tax distortions
- Confusion and inconvenience
- Arbitrary redistribution of wealth

Shoeleather Costs

- *Shoeleather costs* are the resources wasted when inflation encourages people to reduce their money holdings.
- Inflation reduces the real value of money, so people have an incentive to minimize their cash holdings.

Shoeleather Costs

- Less cash requires more frequent trips to the bank to withdraw money from interest-bearing accounts.
- The actual cost of reducing your money holdings is the time and convenience you must sacrifice to keep less money on hand.
- Also, extra trips to the bank take time away from productive activities.

Menu Costs

- *Menu costs* are the costs of adjusting prices.
- During inflationary times, it is necessary to update price lists and other posted prices.
- This is a resource-consuming process that takes away from other productive activities.

Relative-Price Variability and the Misallocation of Resources

- Inflation distorts relative prices.
- Consumer decisions are distorted, and markets are less able to allocate resources to their best use.

Inflation-Induced Tax Distortion

- Inflation exaggerates the size of capital gains and increases the tax burden on this type of income.
- With progressive taxation, capital gains are taxed more heavily.

Inflation-Induced Tax Distortion

- The income tax treats the nominal interest earned on savings as income, even though part of the nominal interest rate merely compensates for inflation.
- The after-tax real interest rate falls, making saving less attractive.

Table 1 How Inflation Raises the Tax Burden on Saving

	Economy A (price stability)	Economy B (inflation)
Real interest rate	4%	4%
Inflation rate	0	8
Nominal interest rate (real interest rate + inflation rate)	4	12
Reduced interest due to 25 percent tax (.25 × nominal interest rate)	1	3
After-tax nominal interest rate (.75 × nominal interest rate)	3	9
After-tax real interest rate (after-tax nominal interest rate – inflation rate)	3	1

Confusion and Inconvenience

- When the Fed increases the money supply and creates inflation, it erodes the real value of the unit of account.
- Inflation causes dollars at different times to have different real values.
- Therefore, with rising prices, it is more difficult to compare real revenues, costs, and profits over time.

A Special Cost of Unexpected Inflation: Arbitrary Redistribution of Wealth

- Unexpected inflation redistributes wealth among the population in a way that has nothing to do with either merit or need.
- These redistributions occur because many loans in the economy are specified in terms of the unit of account—money.

Summary

- The overall level of prices in an economy adjusts to bring money supply and money demand into balance.
- When the central bank increases the supply of money, it causes the price level to rise.
- Persistent growth in the quantity of money supplied leads to continuing inflation.

Summary

- The principle of money neutrality asserts that changes in the quantity of money influence nominal variables but not real variables.
- A government can pay for its spending simply by printing more money.
- This can result in an “inflation tax” and hyperinflation.

Summary

- According to the Fisher effect, when the inflation rate rises, the nominal interest rate rises by the same amount, and the real interest rate stays the same.
- Many people think that inflation makes them poorer because it raises the cost of what they buy.
- This view is a fallacy because inflation also raises nominal incomes.

Summary

- Economists have identified six costs of inflation:
 - Shoeleather costs
 - Menu costs
 - Increased variability of relative prices
 - Unintended tax liability changes
 - Confusion and inconvenience
 - Arbitrary redistributions of wealth

Summary

- When banks loan out their deposits, they increase the quantity of money in the economy.
- Because the Fed cannot control the amount bankers choose to lend or the amount households choose to deposit in banks, the Fed's control of the money supply is imperfect.