



Money Growth and Inflation

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Inflation

Inflation is an increase in the overall level of prices.

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Inflation: Historical Aspects

- ◆ **Over the past sixty 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.

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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.**

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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.

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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.

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Money Supply, Money Demand, and Monetary Equilibrium

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

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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.**

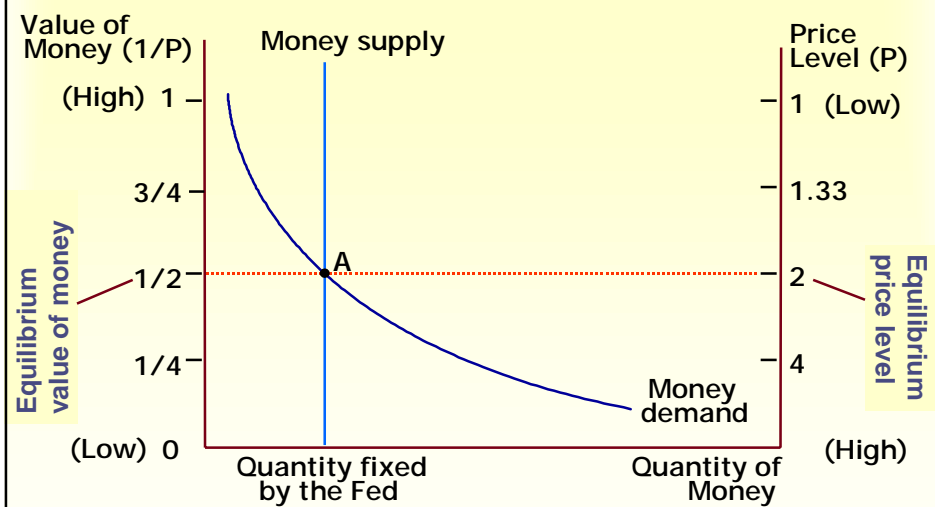
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Money Supply, Money Demand, and Monetary Equilibrium

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

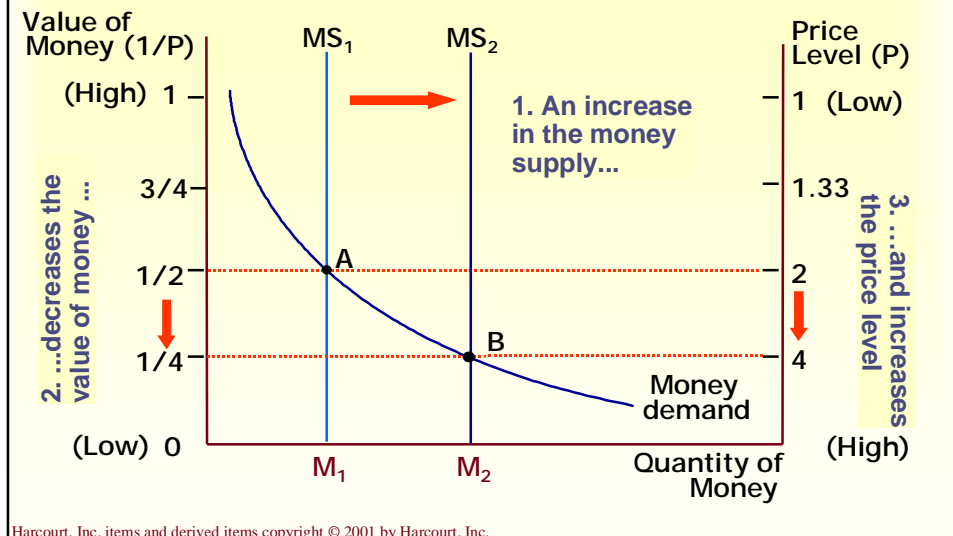
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Money Supply, Money Demand, and the Equilibrium Price Level



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The Effects of Monetary Injection



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.

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The Classical Dichotomy and Monetary Neutrality

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

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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.

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The Classical Dichotomy and Monetary Neutrality

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

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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.**

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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

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Velocity and the Quantity Equation

- ◆ **Rewriting the equation gives the quantity equation:**

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

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Velocity and the Quantity Equation

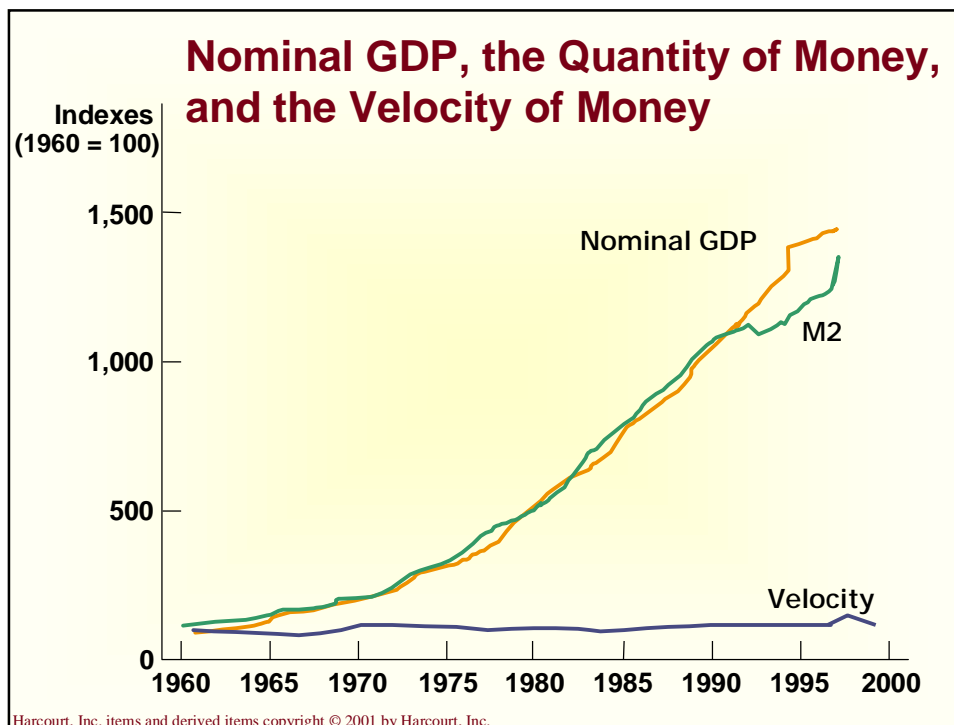
The **quantity equation** relates the quantity of money (**M**) to the nominal value of output (**P x Y**).

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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.

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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.

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The Equilibrium Price Level, Inflation Rate, and the Quantity Theory of Money

- ◆ **When the Fed alters the money supply and induces parallel changes in the nominal value of output, these changes are also reflected in changes in the price level.**
- ◆ **When the Fed increases the money supply rapidly, the result is a high rate of inflation.**

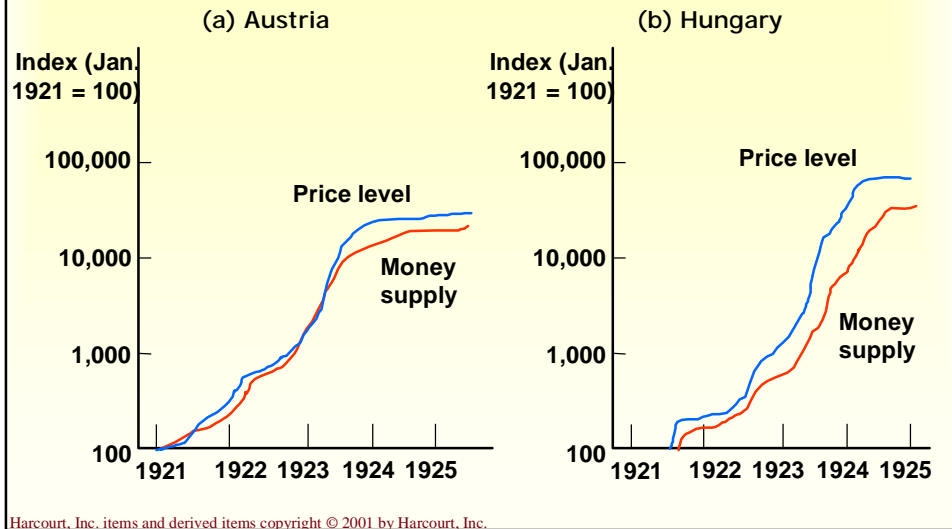
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Hyperinflation

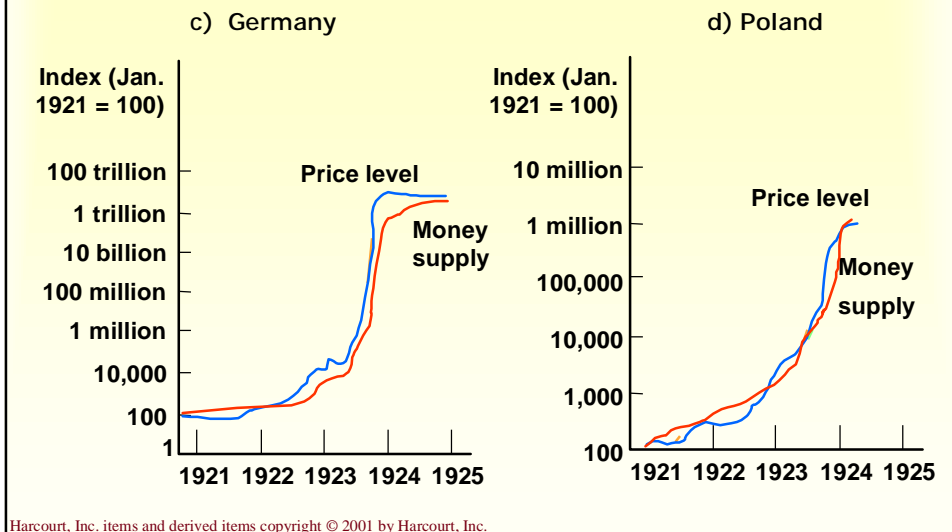
- ◆ **Hyperinflation is inflation that exceeds 50 percent per month.**
- ◆ **Hyperinflation occurs in some countries because the government prints too much money to pay for its spending.**

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Money and Prices During Four Hyperinflations



Money and Prices During Four Hyperinflations



Hyperinflation and 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.

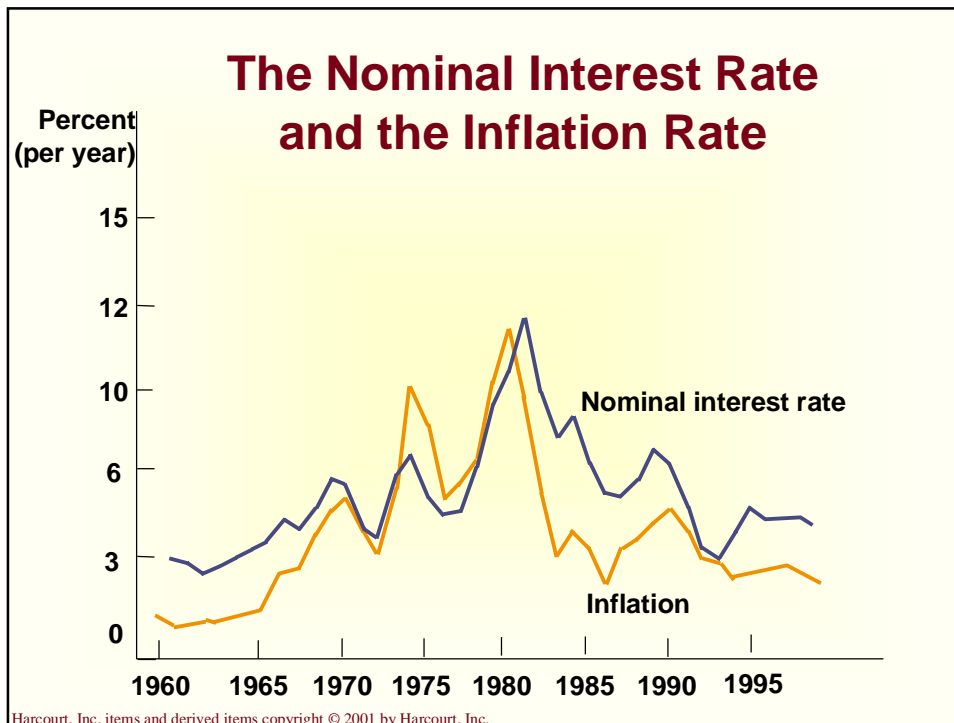
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The Fisher Effect

- ◆ 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.

$$\text{Nominal interest rate} = \text{Real interest rate} + \text{Inflation rate}$$

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The Costs of Inflation: A Fall in Purchasing Power?

***Inflation does not in itself
reduce people's real
purchasing power.***

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The Costs of Inflation

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

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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.

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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.**

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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.**

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Relative-Price Variability

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

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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.**

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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.

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How Inflation Raises the Tax Burden On Saving

	Economy 1 (price stability)	Economy 2 (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 x nominal interest rate)	1	3
After-tax nominal interest rate (.75 x nominal interest rate)	3	9
After-tax interest rate (after-tax nominal interest rate - inflation rate)	3	1

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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.**

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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.**

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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.**

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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.**

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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.

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Summary

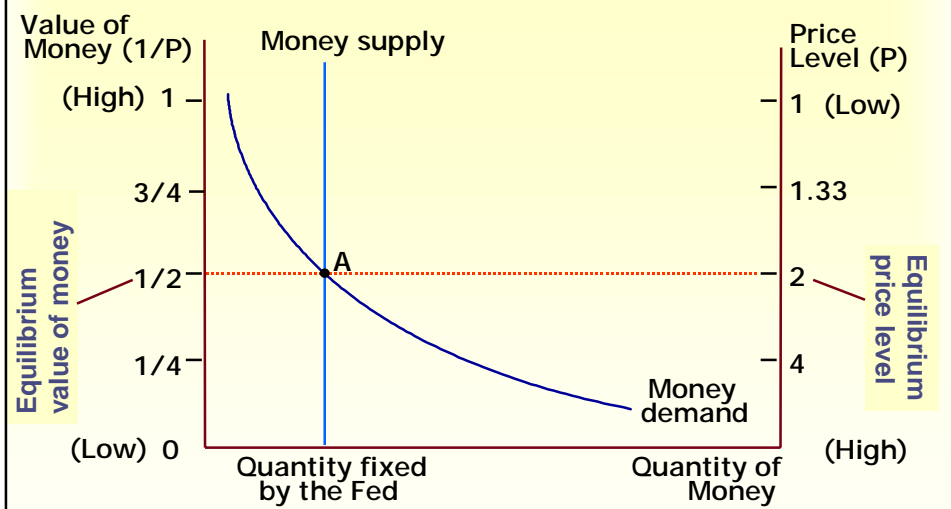
- ◆ Economists have identified six costs of inflation:
 - ◆ Shoeleather costs
 - ◆ Menu costs
 - ◆ Increased variability of relative prices
 - ◆ Unintended tax liability changes
 - ◆ Confusion and inconvenience
 - ◆ Arbitrary redistributions of wealth

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Graphical Review

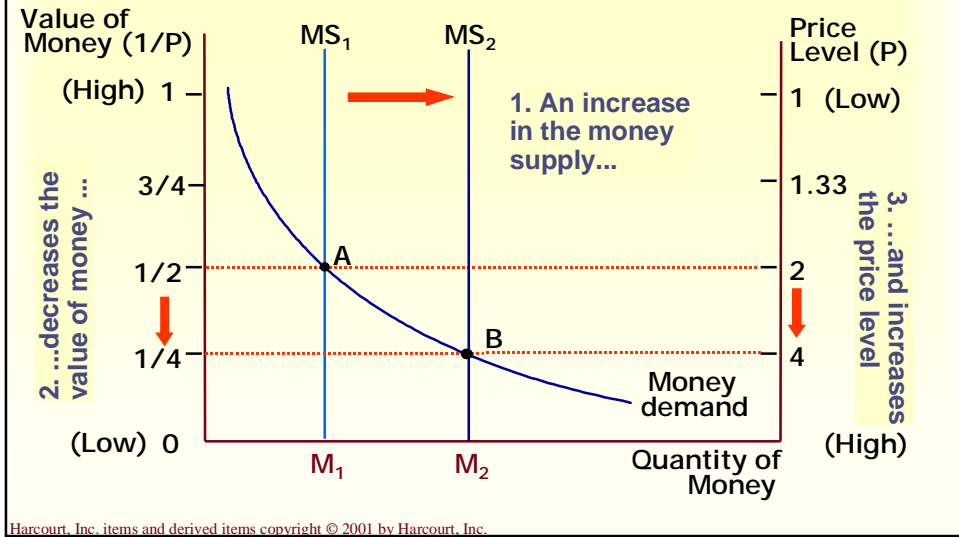
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Money Supply, Money Demand, and the Equilibrium Price Level

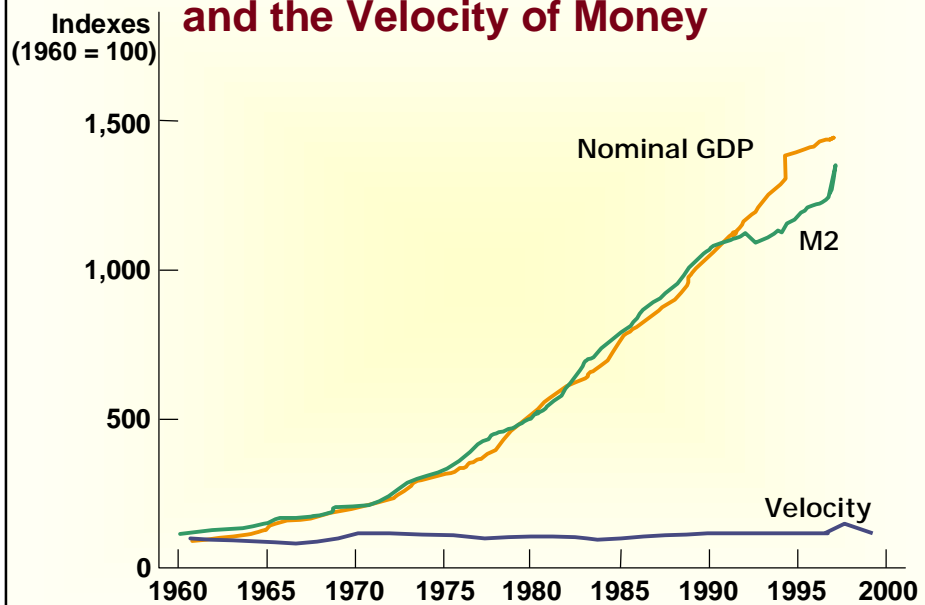


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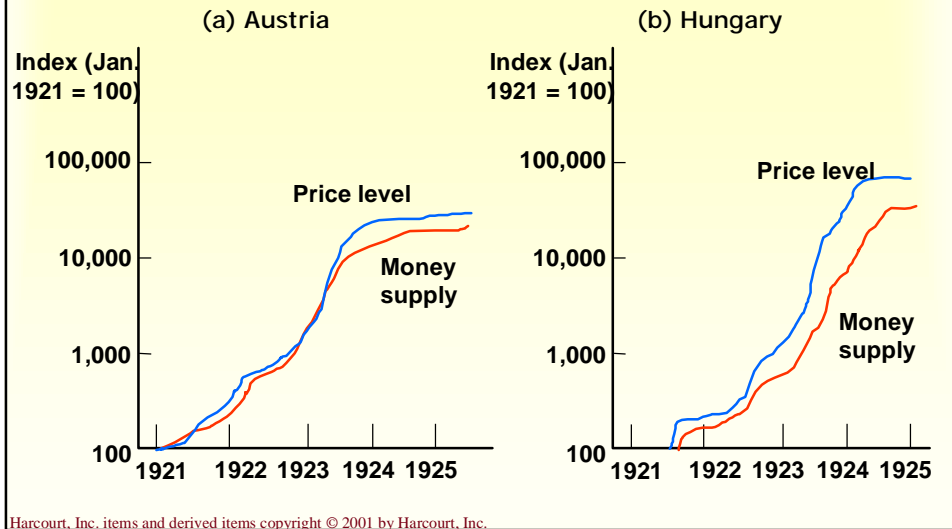
The Effects of Monetary Injection



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



Money and Prices During Four Hyperinflations



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