

Knowledge Enrichment Seminar for NSS Economics Curriculum

Series 1 Macroeconomics: Macroeconomic problems and policies

by

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Lecture Outline

1. How fiscal policy influences aggregate demand (Output and price level)
2. How monetary policy influences aggregate demand (Output and price level)
3. Do other government policies affect output and price level? (*The case of minimum wage law*)
4. Monetary policy
5. Inflation and deflation (quantity theory of money)
6. Unemployment

1. How fiscal policy influences aggregate demand (Output and price level) - Outline

- Marginal Propensity to Consume (MPC), Marginal Propensity to Save (MPS)
- Different types of budget
- Changes in government purchases
- The multiplier effect
- A formula for the spending multiplier
- The crowding out effect
- Changes in taxes

How Fiscal Policy Influences Aggregate Demand

- Fiscal policy** refers to the government's choices regarding the overall level of **government purchases (G) or taxes (T)**.

How Fiscal Policy Influences Aggregate Demand

□ Fiscal policy

- Definition of **budget surplus**: an excess of tax revenue over government spending ($T > G$).
- Definition of **budget deficit**: a shortfall of tax revenue from government spending ($G > T$).
- Definition of **Balanced budget**: tax revenue equals government spending ($G = T$).

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How Fiscal Policy Influences Aggregate Demand

Changes in Government Purchases (G)

- When the government changes the level of its purchases, it influences aggregate demand directly.
- An increase in government purchases shifts the aggregate-demand curve to the right, while a decrease in government purchases shifts the aggregate-demand curve to the left.
- There are two macroeconomic effects that cause the size of the shift in the aggregate-demand curve to be **different from** the change in the level of government purchases.
- They are called the **multiplier effect** and the **crowding-out effect**.

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How Fiscal Policy Influences Aggregate Demand

The Multiplier Effect

- When the government buys a product from a company, the immediate impact of the purchase is to raise profits and employment at that firm.
 - As a result, owners and workers at this firm will see an increase in income, and will therefore likely increase their own consumption.
 - Thus, total spending rises by more than the increase in government purchases.
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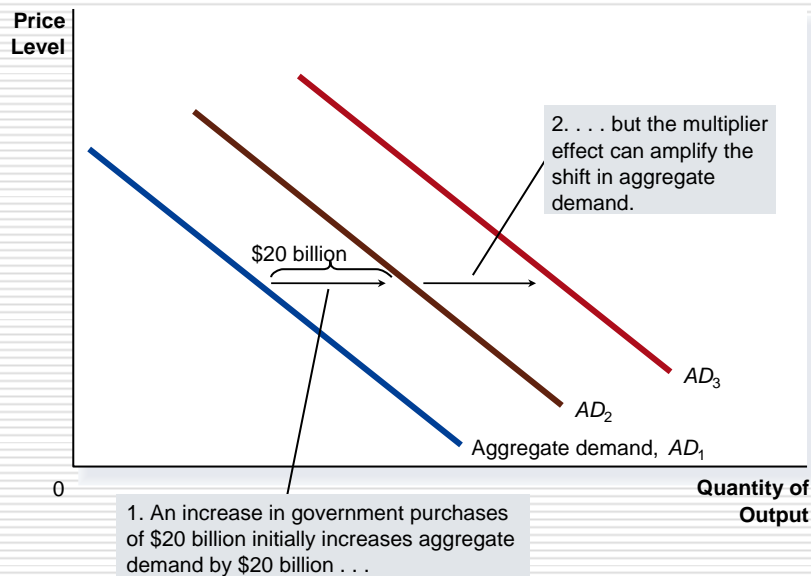
How Fiscal Policy Influences Aggregate Demand

The Multiplier Effect

- Definition of **multiplier effect**: **the additional shifts in aggregate demand that result when expansionary fiscal policy increases income and thereby increases consumer spending.**
 - The multiplier effect goes on and on.
 - When consumers spend part of their additional income, it provides additional income for other consumers.
 - These **consumers then spend some of this additional income, raising the incomes of yet another group of consumers.**
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Figure 1 The Multiplier Effect



How Fiscal Policy Influences Aggregate Demand

Consumption Function

Consumption (C)

= Autonomous Consumption (A) + MPC x Disposable Income (Y_d)

□ Thus,

$$C = A + MPC \times Y_d$$

□ Disposable Income (Y_d) = Income - Tax

How Fiscal Policy Influences Aggregate Demand

The Multiplier Effect

□ A Formula for the Spending Multiplier

- The *marginal propensity to consume (MPC)* is the fraction of extra income that a household consumes rather than saves.
- The *marginal propensity to save (MPS)* is the fraction of extra income that a household saves rather than consumes.

$$MPC + MPS = 1$$

- Example: The government spends \$20 billion on new planes. Assume that $MPC = 3/4$.
- Incomes will increase by \$20 billion, so consumption will rise by $MPC \times \$20$ billion.
- The second increase in consumption will be equal to $MPC \times (MPC \times \$20 \text{ billion})$ or $MPC^2 \times \$20 \text{ billion}$.

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How Fiscal Policy Influences Aggregate Demand

The Multiplier Effect

□ A Formula for the Spending Multiplier

- To find the total impact on the demand for goods and services, we add up all of these effects:

Change in government purchases = \$20 billion

First change in consumption = $MPC \times \$20$ billion

Second change in consumption = $MPC^2 \times \$20$ billion

Third change in consumption = $MPC^3 \times \$20$ billion

.....
 Total Change = $(1 + MPC + MPC^2 + MPC^3 + \dots) \times \20
 billion

Multiplier

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How Fiscal Policy Influences Aggregate Demand

The Multiplier Effect

□ A Formula for the Spending Multiplier

- This means that the multiplier can be written as:
- **Multiplier = $(1 + MPC + MPC^2 + MPC^3 + \dots)$.**
- Because this expression is an **infinite geometric series**, it also can be written as:

$$\text{multiplier} = 1 / (1 - MPC)$$

- Note that the **size of the multiplier depends on the size of the marginal propensity to consume.**
- $MPC \downarrow \rightarrow \text{Multiplier} \downarrow$; $MPC \uparrow \rightarrow \text{Multiplier} \uparrow$

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How Fiscal Policy Influences Aggregate Demand

The Multiplier Effect

□ Other Applications of the Multiplier Effect

- The multiplier effect **applies to any event that alters spending on any component of GDP** (consumption, investment, government purchases, or net exports).
- Examples include a reduction in net exports due to a recession in another country or a stock market boom that raises consumption.

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How Fiscal Policy Influences Aggregate Demand

The Balanced Budget Multiplier

- The Government Expenditure Multiplier
 - The **government expenditure multiplier** is the magnification effect of a change in government expenditure on goods and services on aggregate demand.
 - A multiplier exists because government expenditure is a component of aggregate expenditure.
 - An increase in government expenditure increases income, which induces additional consumption expenditure and which in turn increases aggregate demand.
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How Fiscal Policy Influences Aggregate Demand

The Balanced Budget Multiplier

- The Autonomous Tax Multiplier
 - The **autonomous tax multiplier** is the magnification effect a change in autonomous taxes on aggregate demand.
 - A *decrease* in autonomous taxes *increases* disposable income, which increases consumption expenditure and increases aggregate demand.
 - The magnitude of the autonomous tax multiplier is *smaller* than the government expenditure multiplier because the a \$1 tax cut induces less than a \$1 increase in consumption expenditure.
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How Fiscal Policy Influences Aggregate Demand

The Balanced Budget Multiplier

- The Balanced Budget Multiplier
 - The **balanced tax multiplier** is the magnification effect on aggregate demand of a *simultaneous* change in government expenditure and taxes that leaves the budget balance unchanged.
 - The balanced budget multiplier is positive because a \$1 increase in government expenditure increases aggregate demand by more than a \$1 increase in taxes decreases aggregate demand.
 - So when both government expenditure and taxes increase by \$1, aggregate demand increases.

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How Fiscal Policy Influences Aggregate Demand

The Crowding-Out Effect

- The crowding-out effect works in the opposite direction.
- Definition of **crowding-out effect: the offset in aggregate demand that results when expansionary fiscal policy raises the interest rate and thereby reduces investment spending.**

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How Fiscal Policy Influences Aggregate Demand

The **Crowding-Out Effect**

- ❑ As we discussed earlier, when the government buys a product from a company, the immediate impact of the purchase is to raise profits and employment at that firm.
- ❑ As a result, owners and workers at this firm will see an increase in income, and will therefore likely increase their own consumption.
- ❑ If consumers want to purchase more goods and services, they will need to increase their holdings of money.
- ❑ **This shifts the demand for money to the right, pushing up the interest rate.**

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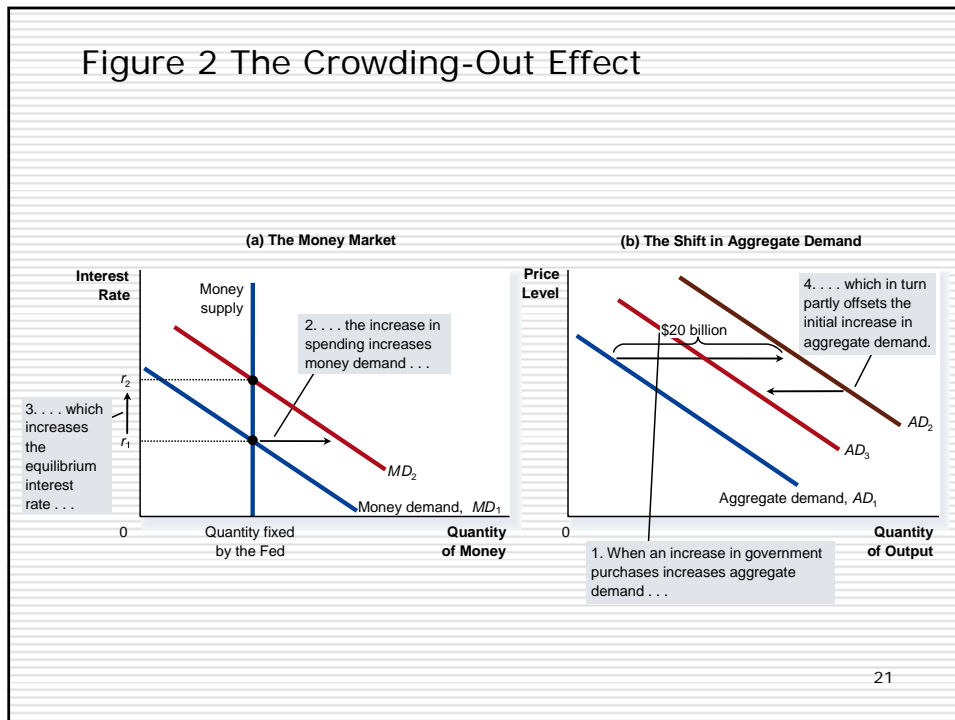
How Fiscal Policy Influences Aggregate Demand

The **Crowding-Out Effect**

- ❑ The higher interest rate raises the cost of borrowing and the return to saving.
- ❑ This **discourages** households from spending their incomes for new consumption or investing in new housing.
- ❑ Firms will also decrease investment, choosing **not** to build new factories or purchase new equipment.

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Figure 2 The Crowding-Out Effect



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How Fiscal Policy Influences Aggregate Demand

The Crowding-Out Effect

- Thus, even though the increase in government purchases shifts the aggregate demand curve to the **right**, this fall in consumption and investment will pull aggregate demand back toward the **left**.
- Thus, **aggregate demand increases by less than the increase in government purchases**.

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How Fiscal Policy Influences Aggregate Demand

The Crowding-Out Effect

- Therefore, **when the government increases its purchases by \$X, the aggregate demand for goods and services could rise by more or less than \$X, depending on whether the multiplier effect or the crowding-out effect is larger.**
- If the multiplier effect is greater than the crowding-out effect, aggregate demand will rise by more than \$X.
- If the multiplier effect is less than the crowding-out effect, aggregate demand will rise by less than \$X.

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How Fiscal Policy Influences Aggregate Demand

□ Changes in Taxes



Tax Allowance

Tax

<http://www.budget.gov.hk/>

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How Fiscal Policy Influences Aggregate Demand

Changes in Taxes

- ❑ Changes in taxes affect a household's take-home pay.
- ❑ If the government reduces taxes, households will likely spend some of this extra income, shifting the aggregate-demand curve to the right.
- ❑ If the government raises taxes, household spending will fall, shifting the aggregate-demand curve to the left.

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How Fiscal Policy Influences Aggregate Demand

Changes in Taxes

- ❑ The size of the shift in the aggregate-demand curve will also depend on the sizes of the multiplier and crowding-out effects.
- ❑ When the government lowers taxes and consumption increases, earnings and profits rise, which further stimulate consumer spending. This is the multiplier effect.
- ❑ Higher incomes lead to greater spending, which means a higher demand for money. Interest rates rise and investment spending falls. This is the crowding-out effect.

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How Fiscal Policy Influences Aggregate Demand

Changes in Taxes

- Another important determinant of the size of the shift in aggregate demand due to a change in taxes is whether people believe that the tax change is **permanent** or **temporary**.
- A **permanent tax** change will have a **larger effect** on aggregate demand **than a temporary one**.

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Lecture Outline

1. How fiscal policy influences aggregate demand (Output and price level)
2. **How monetary policy influences aggregate demand (Output and price level)**
3. Do other government policies affect output and price level? (The case of minimum wage law)
4. Monetary policy
5. Inflation and deflation (quantity theory of money)
6. Unemployment

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2. How monetary policy influences aggregate demand (Output and price level)

Teaching advice

- ❑ Students may be very interested in the way in which the central bank changes interest rates. Review what they learned about the central bank and its tools to change the money supply.
- ❑ The effects of monetary policy are easy to show graphically. Begin with money supply, money demand, and an equilibrium interest rate. Show how both an increase and a decrease in the money supply affect interest rates.

How Monetary Policy Influences Aggregate Demand

The aggregate demand curve is downward sloping for three reasons.

- ❑ The **wealth effect**. (Consumption)
- ❑ The **interest-rate effect**. (Investment)
- ❑ The **exchange-rate effect**. (Net Export)

How Monetary Policy Influences Aggregate Demand

All three effects occur simultaneously, but are not of equal importance.

- Because a household's money holdings are a small part of total wealth, the **wealth effect** is relatively small.
- Because imports and exports are a small fraction of U.S. GDP, the **exchange-rate effect** is also fairly small for the United States. (This effect can be significant for small open economies, such as Hong Kong.)
- Thus, the **most important reason** for the downward-sloping aggregate demand curve is the **interest-rate effect**.

How Monetary Policy Influences Aggregate Demand

- Definition of **theory of liquidity preference**: **Keynes's theory propounds that the interest rate adjusts to bring money supply and money demand into balance.**
- This theory is an explanation of the supply and demand for money and how they relate to the interest rate.

2. How monetary policy influences aggregate demand (Output and price level)

Teaching advice

- Point out that when we discuss the "interest rate" we are discussing both the nominal interest rate and the real interest rate because we are assuming that they will move together.

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How Monetary Policy Influences Aggregate Demand

The Theory of Liquidity Preference

- Money Supply
 - The money supply in the economy is controlled by the Federal Reserve (Central Bank).
 - The Fed can alter the supply of money using open market operations, changes in the discount rate, and changes in reserve requirements.
 - Because the Fed can control the size of the money supply directly, the quantity of money supplied does not depend on any other variables, including the interest rate. Thus, the supply of money is represented by a **vertical supply curve**.

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How Monetary Policy Influences Aggregate Demand

The Theory of Liquidity Preference

□ Money Demand

- Any asset's liquidity refers to the ease with which that asset can be converted into a medium of exchange. Thus, money is the most liquid asset in the economy.
- The liquidity of money explains why people choose to hold it instead of other assets that could earn them a higher return.
- However, the **return on other assets (the interest rate) is the opportunity cost of holding money.**
- All else equal, as the interest rate rises, the quantity of money demanded will fall. Therefore, the demand for money will be **downward sloping.**

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How Monetary Policy Influences Aggregate Demand

The Theory of Liquidity Preference

□ Equilibrium in the Money Market

- The **interest rate** adjusts to bring money demand and money supply into balance.

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Figure 3 Equilibrium in the Money Market

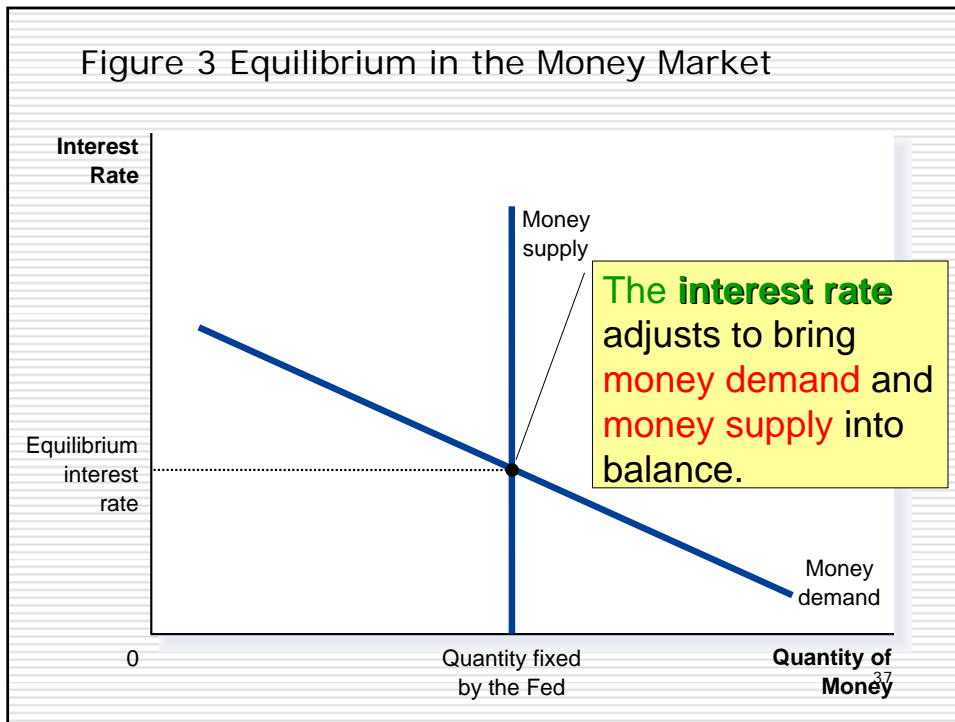


Figure 4 Equilibrium in the Money Market

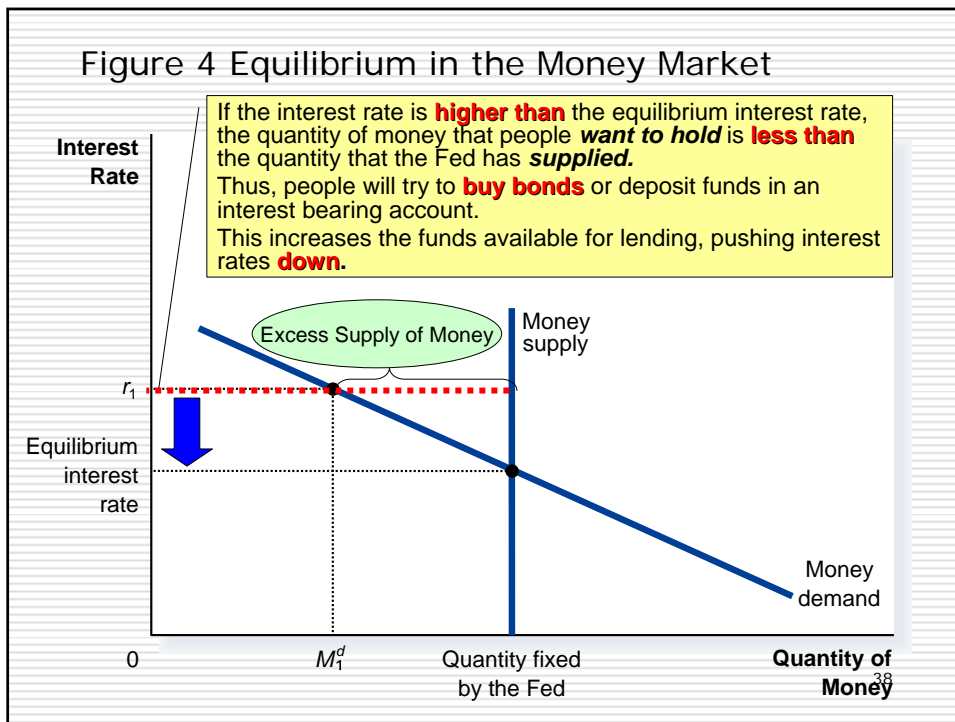
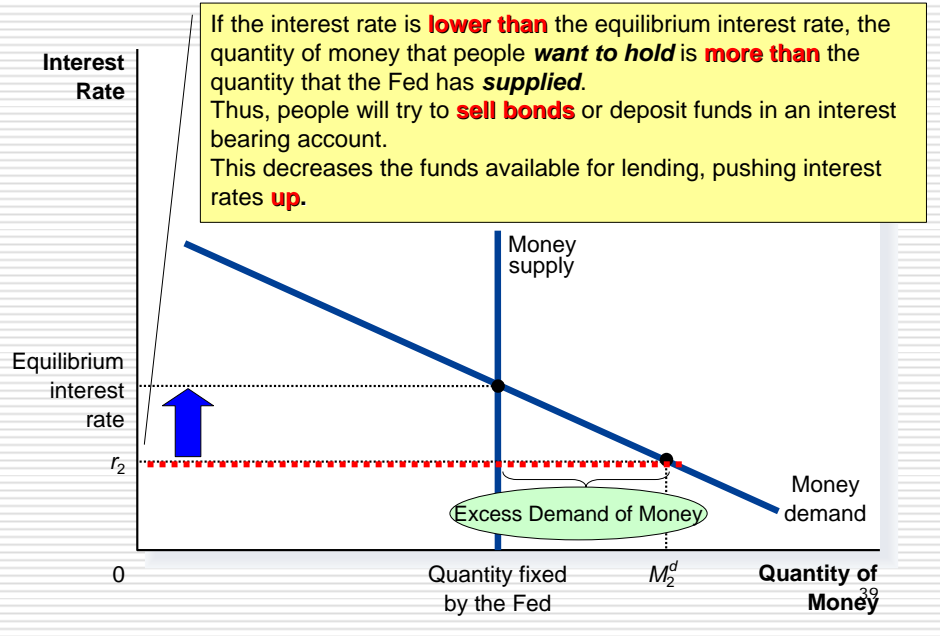


Figure 5 Equilibrium in the Money Market



How Monetary Policy Influences Aggregate Demand

The **Downward Slope of the Aggregate-Demand Curve**

- When the price level increases, the quantity of money that people need to hold becomes larger.
- Thus, an increase in the price level leads to an increase in the demand for money, shifting the money demand curve to the right.
- For a fixed money supply, the interest rate must rise to balance the supply and demand for money.

How Monetary Policy Influences Aggregate Demand

The **Downward Slope of the Aggregate-Demand Curve**

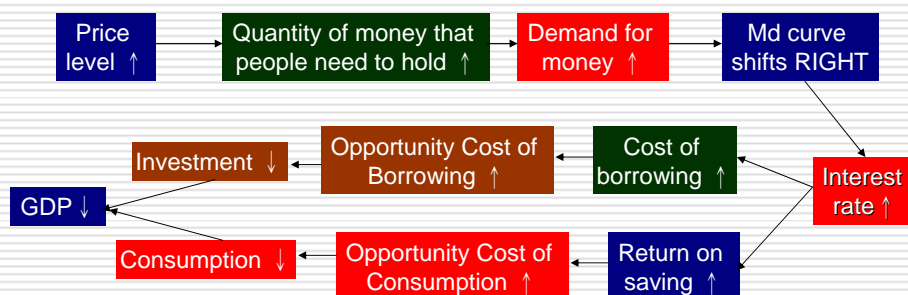
- ❑ At a higher interest rate, the cost of borrowing increases and the return on saving increases.
- ❑ Thus, consumers will choose to spend less and will be less likely to invest in new housing.
- ❑ Firms will be less likely to borrow funds for new equipment or structures.
- ❑ In short, the **quantity of goods and services purchased in the economy will fall.**
- ❑ This implies that as the price level increases, the quantity of goods and services demanded falls.
- ❑ This is **Keynes's interest-rate effect.**

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How Monetary Policy Influences Aggregate Demand

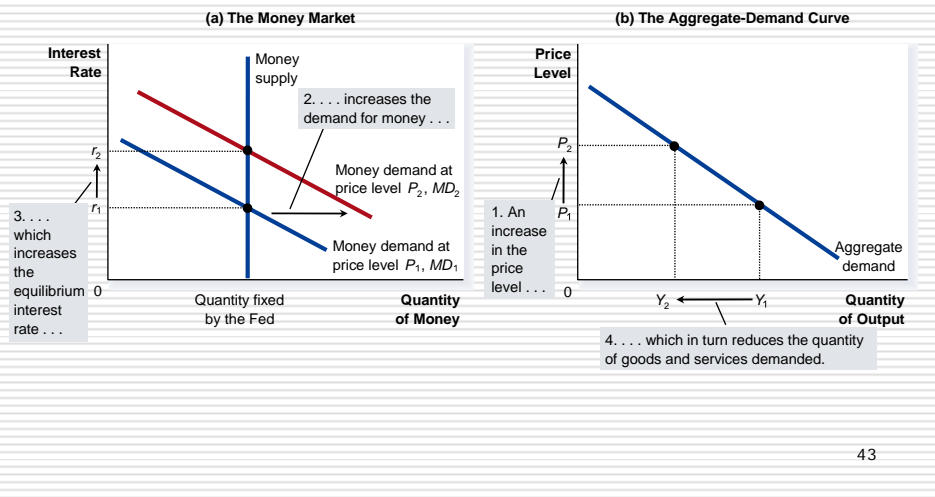
The **Downward Slope of the Aggregate-Demand Curve**

Keynes's interest-rate effect



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Figure 6 The Money Market and the Slope of the Aggregate-Demand Curve



How Monetary Policy Influences Aggregate Demand

Changes in the Money Supply

- ❑ Example: The Fed buys government bonds in open-market operations.
- ❑ This will increase the supply of money, shifting the money supply curve to the right.
- ❑ The equilibrium interest rate will fall.
- ❑ The lower interest rate **reduces the cost of borrowing and the return to saving.**

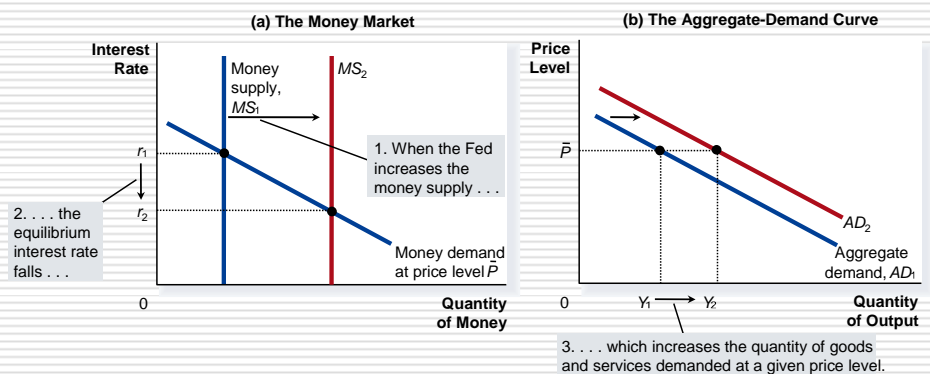
How Monetary Policy Influences Aggregate Demand

Changes in the Money Supply

- ❑ This encourages households to increase their consumption and desire to invest in new housing. Firms will also **increase investment**, building new factories and purchasing new equipment.
- ❑ The quantity of goods and services demanded will rise at every price level, shifting the aggregate-demand curve to the right.
- ❑ Thus, a **monetary injection** by the Fed **increases the money supply**, leading to a **lower interest rate**, and a larger quantity of goods and services demanded.

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Figure 7 A Monetary Injection



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How Monetary Policy Influences Aggregate Demand

Economy		
	Recession	Recovery
Policy Objective	Stimulate economy (MS)	Cool down economy (MS)
Policy Tools		
1) Open Market Operation	Buy Asset	Sell Asset
2) Required Reserve Ratio	RRR	RRR
3) Discount Rate	Discount Rate	Discount Rate

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3. Do other government policies affect output and price level? (The case of minimum wage law)
4. Monetary policy
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6. Unemployment

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3. Do other government policies affect output and price level? (The case of minimum wage law)

- ❑ Minimum wage laws will be effective from 1 May 2011 onwards. The minimum hourly rate is enacted at \$28 per hour.
- ❑ Workers earns more than \$28 per hour will not be much affected by the law.
- ❑ Workers who originally earned less than \$28 will benefit, but some of them may be laid off due to higher wages.
- ❑ Many economists have studied how minimum-wage laws affect the labour market. One common result is that the teenage and unskilled workers, in particular those earning below \$28, will have the greatest impact.

3. Do other government policies affect output and price level? (The case of minimum wage law)

- ❑ However, one controversial research by Card and Krueger (1995)* challenges this conventional view. Their research studies the minimum wages in California, New Jersey and shows that higher wage **increases** employment by making workers more conscientious and productive and less likely to quit, which lowers unproductive labour turnover. They also argue that managers seeks ways to enhance labour productivity, instead of laying off workers.
- ❑ If Card and Krueger's view is valid, AD will shift to the right. Output and price levels will rises.
- ❑ * Card, D. and Krueger, A. B. (1995) *Myth and Measurement: The New Economics of Minimum Wage*, Princeton NJ: Princeton University Press.

3. Do other government policies affect output and price level? (The case of minimum wage law)

- However, there are numbers of studies indicating that teenage and unskilled labour will be unemployed after the implementation of minimum wage laws, which will shift the AD curves leftward.
- The net result on output and price depends on the relative magnitudes of wage effect and employment effect.
- Whether output will increase or not is debatable, but it is certain that minimum wage laws cause a deadweight loss in the society.

Lecture Outline

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4. Monetary policy - Outline

- Meaning of monetary policy
 - Concept of monetary base/ high powered money
 - Effect of monetary policy on the level of output and price
 - The role of interest rate targets in central bank policy
 - Case Study: Why the central bank watches the stock market (and vice versa)
-

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Meaning of monetary policy

- **Monetary policy** is changes in interest rates and the quantity of money in the economy.
 - An increase in the quantity of money lowers interest rate.
 - A cut in interest rates increases expenditure and increases aggregate demand.
-

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4. Monetary policy - Outline

- Meaning of monetary policy
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-

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Concept of monetary base/ high powered money

Monetary base / High powered money

- The liabilities of the Central Bank that are usable as money
 - It is equal to currency in circulation plus bank reserve deposits
 - It is directly controlled by the Central bank
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Concept of monetary base/ high powered money

- Factors affecting the monetary base

Factor	Effect on Monetary Base	Effect on Money Supply
Open Market Purchase	Increase	Increase
Open Market Sale	Decrease	Decrease
Decrease in the discount rate	Increase	Increase
Increase in the discount rate	Decrease	Decrease
Decrease in required reserve ratio	Increase	Increase
Increase in required reserve ratio	Decrease	Decrease

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Effect of monetary policy on the level of output and price

Changes in the Money Supply

- ❑ Example: The Fed buys government bonds in open-market operations.
 - ❑ This will increase the supply of money, shifting the money supply curve to the right.
 - ❑ The equilibrium interest rate will fall.
 - ❑ The lower interest rate **reduces the cost of borrowing and the return to saving.**
-

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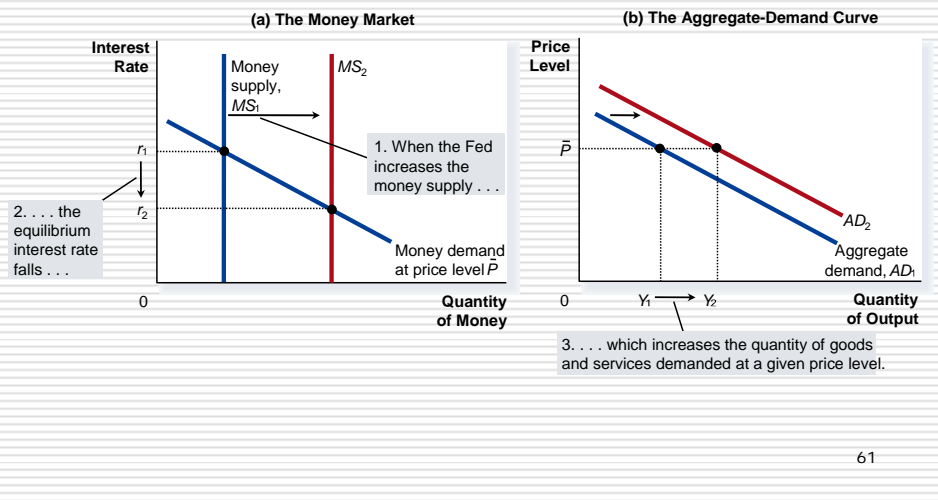
Effect of monetary policy on the level of output and price

Changes in the Money Supply

- ❑ This encourages households to increase their consumption and desire to invest in new housing. Firms will also **increase investment**, building new factories and purchasing new equipment.
 - ❑ The quantity of goods and services demanded will rise at every price level, shifting the aggregate-demand curve to the right.
 - ❑ Thus, a monetary injection by the Fed increases the money supply, leading to a lower interest rate, and a larger quantity of goods and services demanded.
-

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Figure 8 A Monetary Injection



4. Monetary policy - Outline

- Meaning of monetary policy
- Concept of monetary base/ high powered money
- Effect of monetary policy on the level of output and price
- The role of interest rate targets in central bank policy
- Case Study: Why the central bank watches the stock market (and vice versa)

Discussion about the role of interest rate targets in central bank policy

The Role of Interest-Rate Targets in Fed Policy

- In recent years, the Fed has conducted policy by setting a target for the **federal funds rate** (the interest rate that banks charge one another for short-term loans, i.e. **HIBOR** in Hong Kong).
- The target is reevaluated every six weeks when the Federal Open Market Committee meets. The Fed has chosen to use this interest rate as a target in part because the money supply is difficult to measure with sufficient precision.
- Because changes in the money supply lead to changes in interest rates, monetary policy can be described either in terms of the money supply or in terms of the interest rate. However, **the key is interest rate**, which stimulates consumption and spending. That's why the Fed is more inclined to interest-rate targeting. If increase in money supply does not lower interest rates, monetary policy is **ineffective**.

4. Monetary policy - Outline

- Meaning of monetary policy
- Concept of monetary base/ high powered money
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- Discussion about the role of interest rate targets in central bank policy
- **Case Study: Why the central bank watches the stock market (and vice versa)**

Why the central bank watches the stock market

Case Study: Why the Fed Watches the Stock Market (and Vice Versa)

- A booming stock market expands the aggregate demand for goods and services.
 - When the stock market booms, households become wealthier, and this increased wealth stimulates consumer spending (C).
 - Increases in stock prices make it attractive for firms to issue new shares of stock and this increases investment spending (I).

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Why the central bank watches the stock market

Case Study: Why the Fed Watches the Stock Market (and Vice Versa)

- Since one of the Fed's goals is to stabilize aggregate demand, the Fed may respond to a booming stock market by keeping the supply of money lower and raising interest rates. The opposite would hold true if the stock market would fall.
- Stock market participants also keep an eye on the Fed's policy plans.
- When the Fed lowers the money supply, it makes stocks less attractive because alternative assets (such as bonds) pay higher interest rates. Also, higher interest rates may lower the expected profitability of firms.

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5. Inflation and deflation (quantity theory of money) - Outline

- Definition of inflation and deflation
- Relationship between nominal and real interest rates
- Redistributive effects – Unexpected inflation and deflation
- Inflation and Quantity Theory of Money

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5. Inflation and deflation (quantity theory of money) - Outline

- ❑ Definition of inflation and deflation
- ❑ Relationship between nominal and real interest rates
- ❑ Redistributive effects – Unexpected inflation and deflation
- ❑ Inflation and Quantity Theory of Money

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Definition of inflation and deflation

Inflation

- ❑ Persistent **increases** in the general level of prices.

Deflation

- ❑ Persistent **decreases** in the general level of prices.

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5. Inflation and deflation (quantity theory of money) - Outline

- Definition of inflation and deflation
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Relationship between nominal and real interest rates

Real and Nominal Interest Rates

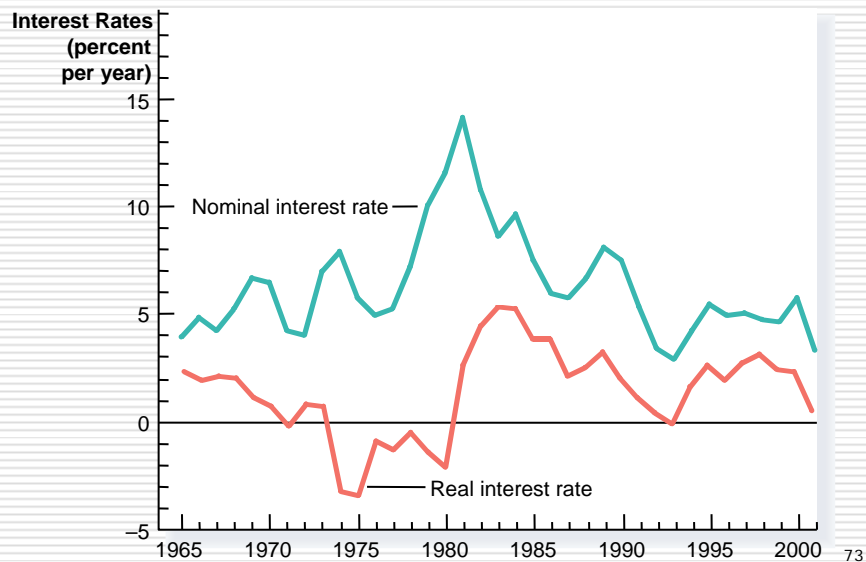
- Definition of **nominal interest rate**: the interest rate as usually reported without a correction for the effects of inflation.
- Definition of **real interest rate**: the interest rate corrected for the effects of inflation.

real interest rate = nominal interest rate - inflation rate

- Figure 3 shows real and nominal interest rates from 1965 to 2001. Note that in the late 1970s, the real interest rate was negative because the inflation rate exceeded the nominal interest rate.

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Figure 9 Real and Nominal Interest Rates



Relationship between nominal and real interest rates

Real and Nominal Interest Rates

- ❑ You borrowed \$1,000 for one year.
- ❑ Nominal interest rate was 15%.
- ❑ During the year inflation was 10%.

$$\begin{aligned} \text{Real interest rate} &= \text{Nominal interest rate} - \text{Inflation} \\ &= 15\% - 10\% = 5\% \end{aligned}$$

5. Inflation and deflation (quantity theory of money) - Outline

- Definition of inflation and deflation
- Relationship between nominal and real interest rates
- **Redistributive effects – Unexpected inflation and deflation**
- Inflation and Quantity Theory of Money

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Redistributive effects – Unexpected inflation and deflation

A Special Cost of Unexpected Inflation:

Arbitrary Redistributions of Wealth

- Example: Sam takes out a \$20,000 loan at 7 percent interest (nominal). In 10 years, the loan will come due. After his debt has compounded for 10 years at 7 percent, Sam will owe the bank \$40,000.

$$\$20,000 \times (1 + 0.07)^{10} = \$40,000$$

- The **real value of this debt will depend on inflation**.
 - If the economy has a **hyperinflation**, wages and prices will rise so much that Sam may be able to pay the \$40,000 out of pocket change.
 - If the economy has **deflation**, Sam will find the \$40,000 a greater burden than he imagined.

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Redistributive effects – Unexpected inflation and deflation

A Special Cost of Unexpected Inflation: Arbitrary Redistributions of Wealth

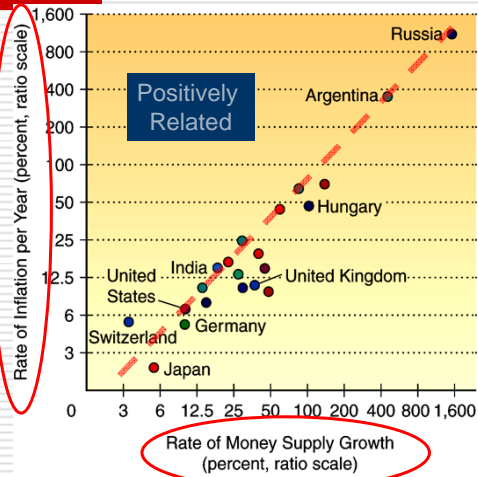
- Because inflation is often hard to predict, it imposes **risk** on both Sam and the bank that the real value of the debt will differ from that expected when the loan is made.
- Inflation is especially volatile and uncertain when the average rate of inflation is high.

5. Inflation and deflation (quantity theory of money) - Outline

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- Relationship between nominal and real interest rates
- Redistributive effects – Unexpected inflation and deflation
- Inflation and Quantity Theory of Money

Inflation and Quantity Theory of Money

- The Effects of a **Monetary Injection** ($MS \uparrow$)
 - Definition of **quantity theory of money**: a theory asserting that the quantity of money available determines the price level and that the growth rate in the quantity of money available determines the inflation rate.



Inflation and Quantity Theory of Money

Milton Friedman

"Inflation is always and everywhere a monetary phenomenon"

Inflation and Quantity Theory of Money

A Brief Look at the **Adjustment Process**

- The immediate effect of an increase in the money supply is to create an excess supply of money. (Once again, please be reminded that increase in money supply does not mean that it automatically increases the money holding by the people. It must go through the process that interest rates lower and money demand increases.)
- People try to **get rid of this excess supply** in a variety of ways.
 - They may buy goods and services with the funds.
 - They may use these excess funds to make loans to others. These loans are then likely used to buy goods and services.
 - In either case, the increase in the money supply leads to an increase in the demand for goods and services.
 - Because the supply of goods and services has not changed, the result of an increase in the demand for goods and services will be higher prices.

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Inflation and Quantity Theory of Money

Another perspective of Quantity Theory of Money

- How many times per year is the typical dollar bill used to pay for a newly produced good or service?
- **Velocity** and the **Quantity Equation**
 - Definition of **velocity of money (V): the rate at which money changes hands.**
 - To calculate velocity, we **divide nominal GDP by the quantity of money.**

$$\text{velocity} = \text{nominal GDP} / \text{money supply}$$

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Inflation and Quantity Theory of Money

Velocity and the Quantity Equation

- If P is the price level, Y is real GDP, and M is the quantity of money:

$$\text{velocity} = \frac{P \times Y}{M}$$

- Rearranging, we get the **quantity equation**.

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

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Inflation and Quantity Theory of Money

Velocity and the Quantity Equation

Suppose that:

- Real GDP = \$5,000
- Velocity = 5
- Money supply = \$2,000
- Price level = \$2
 - We can show that:
 - $M \times V = P \times Y$
 - $\$2,000 \times 5 = \$2 \times \$5,000$
 - $\$10,000 = \$10,000$

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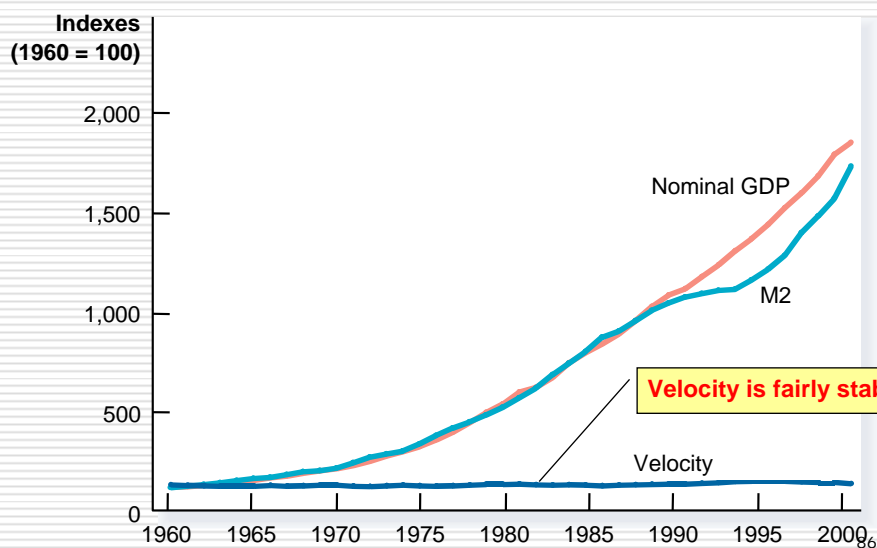
Inflation and Quantity Theory of Money

Velocity and the Quantity Equation

- Definition of **quantity equation**: the equation $M \times V = P \times Y$, which relates the quantity of money (M), the velocity of money (V), and the dollar value of the economy's output of goods and services (PY).
- The quantity equation shows that an increase in the quantity of money (M) must be reflected in one of the other three variables.
- Specifically, the price level (P) must rise, output (Y) must rise, or velocity (V) must fall.
- Figure 3 shows nominal GDP, the quantity of money (as measured by M2) and the velocity of money for the United States since 1960. It appears that **velocity is fairly stable**, while GDP and the money supply have grown dramatically.

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Figure 10 Nominal GDP, the Quantity of Money, and the Velocity of Money



Inflation and Quantity Theory of Money

Velocity and the Quantity Equation

- We can now explain how an increase in the quantity of money affects the price level using the quantity equation.
 - The velocity of money is relatively stable over time.
 - When the central bank changes the quantity of money (M), it will proportionately change the nominal value of output ($P \times Y$).
 - The economy's output of goods and services (Y) is determined primarily by available resources and technology. Because **money is neutral, changes in the money supply do not affect output**. This must mean that **P increases proportionately with the change in M** .
 - **Monetary neutrality is a long-run view. Money supply can affect the real sector (real output) through transmission mechanism (i.e. the impact of interest rates on consumption and investment).**

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Lecture Outline

1. How fiscal policy influences aggregate demand (Output and price level)
2. How monetary policy influences aggregate demand (Output and price level)
3. Do other government policies affect output and price level? (The case of minimum wage law)
4. Monetary policy
5. Inflation and deflation (quantity theory of money)
6. **Unemployment**

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6. Unemployment

Meaning of Unemployment

- ❑ **Structural unemployment:** Unemployment arising from a persistent **mismatch** between the skills and attributes of workers and the requirements of jobs.
 - For example, the employment of US steel workers dropped by almost half from the early 1980s to the early 2000s as a result of foreign competition and technological innovation which substitutes machine for workers.
 - The skills of these unemployed workers could not suit most of the other industries. The workers become structurally unemployed for a prolong period.

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6. Unemployment

- ❑ **Frictional Unemployment:** Short-term unemployment that arises from the process of matching of workers with jobs (also known as **search unemployment**).
- ❑ Some frictional unemployment is **unavoidable** as workers need some time to gather information and search jobs which suit them best.

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6. Unemployment

- ❑ **Cyclical Unemployment:** unemployment caused by a business cycle recession.
- ❑ During recession, firms cut back production and lay off workers.

6. Unemployment

- ❑ **Natural rate of unemployment:** The normal rate of unemployment, **consisting of frictional and structural unemployment.**
- ❑ There is no exact value for the natural rate of unemployment, it varies among countries. Most economists estimates the natural rate to be about 5 percent.
- ❑ When the unemployment rate is at the natural rate, the economy is said to be at **full employment.**

6. Unemployment

- **Underemployment:** A situation in which persons are working less than they would like to work, either daily, weekly or monthly.
- The definition of underemployment varies among different regions, but it focuses on one common point that workers are **involuntarily** working less hours than they desire.

6. Unemployment

- In Hong Kong, an employed person is classified as underemployed if he/she is involuntarily working less than 35 hours during the seven days before enumeration; and either (a) has been available for additional work during the seven days before enumeration; or (b) has sought additional work during the thirty days before enumeration.
- Working short hours is considered as involuntary if it is due to slack work, material shortage, mechanical breakdown and inability to find a full-time job.

6. Unemployment

□ Underemployment Rate in Hong Kong

Year	1986	1991	1996	1997	1998	1999	2000	2001	2002
%	1.7	1.6	1.6	1.1	2.5	2.9	2.8	2.5	3.0

Year	2003	2004	2005	2006	2007	2008
%	3.5	3.3	2.7	2.4	2.2	1.9

Source:

http://www.socialindicators.org.hk/en/indicators/employment_and_income_security/9.6

6. Unemployment

□ Cost of Unemployment

- Loss of income for the unemployed worker
- Loss of production for the economy
- Loss of human capital (in particular for prolonged unemployment)
- Discouraged worker-turned-welfare recipient (burden on social security net)

References

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- Parkin, P. (2010), *Economics*, 9th ed. Pearson, Chapter 22.