

# MACROECONOMICS

## INTRODUCTION

### DEFINITION OF ECONOMICS

1. Economics is the study of how limited resources are allocated.
2. Scarcity is an important part of this definition: There are not enough goods to satisfy everyone's desires; economics studies how people coordinate their wants and desires to do the best they can given this scarcity.
3. There are two main branches of economics: (1) **macroeconomics**, which looks at the economy as a whole, and focuses on issues such as growth, unemployment, inflation, and business cycles, and (2) **microeconomics**, which studies how individual economic actors (e.g., firms or households) make choices and are influenced by economic forces.

### ECONOMIC POLICY

1. Economic policies are the decisions of government that influence economic events.
2. Economic policy is guided both by objective policy analysis (**positive economics**) and by subjective beliefs of the policymakers (**normative economics**).

### ECONOMIC REASONING

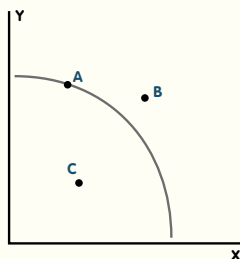
Making decisions on the basis of costs and benefits

1. **Marginal costs**: the additional costs above sunk costs you will pay for choosing an action
2. **Marginal benefits**: the benefits you receive from choosing an action
3. **Opportunity cost**: the cost of the activity you have chosen in terms of the benefits you miss by not having chosen the next-best alternative
4. **Economic decision rule**: you should take action only if the marginal benefits of the action exceed the marginal costs. Or, the opportunity cost must be less than the benefit you receive from the action you have chosen.

### PRODUCTION POSSIBILITY CURVE

1. The production process takes **inputs** and uses them to produce **outputs**. Inputs include land, labor, capital, entrepreneurship, and technology.
2. The production possibility curve measures the maximum combination of two outputs that can be achieved from a given number of inputs. It demonstrates the trade-off among choices, given existing institutions, resources, and technology.

#### THE PRODUCTION POSSIBILITIES CURVE



**FIGURE 1** The curve slopes downward from left to right. This represents the opportunity cost because you always have to give up some Y to get more X.

The curve is bowed out to represent the principle of increasing marginal opportunity cost: in order to get more of something, one must give up increasing quantities of something else.

Point A represents efficiency: achieving as much output as possible from a given number of inputs. Point B represents an

unattainable point. Point C represents inefficiency: either all inputs are not being used, or some inputs are not being used in the best possible way.

The curve can shift outward (or inward) as society's resources increase (or decrease).

## ECONOMIC ORGANIZATION OF SOCIETY

### ECONOMIC PROBLEMS A SOCIETY MUST SOLVE

1. What should be produced? How much?
2. How will society produce it?
3. For whom should society produce?

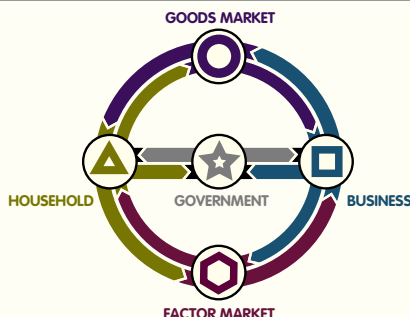
### TYPES OF ECONOMIC SYSTEMS

1. **Capitalism**: An economic system based on private property and market forces in which individuals answer the questions of what, how, and for whom to produce. Individuals follow their self-interest, and the market forces of supply and demand coordinate individual actions; government can play a role in defending property rights and ensuring a fair playing field among economic actors.
  - a. **Welfare Capitalism**: The economic system that has evolved in most developed countries, including the U.S. Under welfare capitalism, the market system still operates, but the government plays an increasing role in the regulation of markets in order to better provide for the basic welfare of all its citizens.
2. **Socialism**: An economic system based on government ownership of property and control of economic decisions. There are different degrees of socialism.
3. **Communism**: An economic system based on individuals' goodwill toward one another; property is collectively owned and society decides what, how, and for whom to produce, with the best interests of all its members in mind.

## THE U.S. ECONOMY

1. The US economy consists of businesses, households, and government.
2. There are two types of markets at work: (1) **factor markets**, where households supply labor and are paid wages and salaries, and (2) **goods markets**, where households purchase the productive output of businesses.
3. **Businesses** are the private producing units in the economy. They are organized as sole proprietorships, partnerships, or corporations.
4. **Households** supply labor to firms and guide what firms produce through their demands in the market.
5. **Governments** collect taxes in order to spend money in ways society deems fit. Government also develops the rules to guide the relationships between businesses and households.

#### THE CIRCULAR FLOW DIAGRAM



**Figure 2** The circular flow diagram expresses the linkages between businesses and households through the goods and factor markets, as well as through government.

## SUPPLY AND DEMAND

### DEMAND

1. **Law of demand**: The quantity demanded rises as price falls (for normal goods), other things being constant.
2. **Demand curve**: a graphical representation of the law of demand. It slopes downward.
3. **Movements along the demand curve**: A change in price is represented by movements along the demand curve; demand is still the same, but the quantity demanded changes as the price changes.
4. **Shifts in demand curve**: The demand curve will shift to the left or right when anything other than the price of the good has changed. Such factors include: changes in income, changes in the price of substitute or complement goods, changes in tastes and desires, and changes in expectations about your future income or future price levels.
5. The market demand curve is the horizontal sum of all individual demand curves.

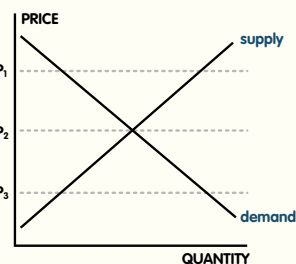
### SUPPLY

1. **Law of supply**: The quantity supplied rises as price rises, other things being constant.
2. **Supply curve**: a graphical representation of the law of supply. It slopes upward.
3. **Movements along the supply curve**: A change in price is represented by movements along the supply curve; supply is still the same, but the quantity supplied changes as the price changes.
4. **Shifts in supply curve**: The supply curve will shift to the left or right when anything other than the price of the good has changed. Such factors include: changes in prices of inputs used in production, changes in technology, changes in supplier expectations about future prices, and changes in taxes and subsidies.
5. The market supply curve is the horizontal sum of all individual supply curves.

### MARKET EQUILIBRIUM AND THE INVISIBLE HAND

1. The **invisible hand theory** states that prices will adjust to achieve equilibrium; this pricing mechanism coordinates individuals' decisions so that scarce resources can be put to their best possible use.
2. When quantity supplied exceeds quantity demanded (**surplus**), prices tend to fall.
3. When quantity demanded exceeds quantity supplied (**shortage**), prices tend to rise.
4. When the quantity demanded equals the quantity supplied, prices have no tendency to change and the market is in **equilibrium**.

#### SUPPLY AND DEMAND



**Figure 3** Equilibrium occurs at the price where quantity supplied is equal to quantity demanded.

# "PRACTICAL MEN, WHO BELIEVE THEMSELVES TO BE QUITE EXEMPT FROM ANY INTELLECTUAL INFLUENCES, ARE USUALLY THE SLAVES OF SOME DEFUNCT ECONOMIST."

JOHN MAYNARD KEYNES

- Shifting the supply curve to the right (left) causes the equilibrium price to fall (rise) and the equilibrium quantity to rise (fall).
- Shifting the demand curve to the right (left) causes the equilibrium price to rise (fall) and the equilibrium quantity to rise (fall).

## GOVERNMENT INVOLVEMENT IN MARKET EQUILIBRIA

- Price Floor:** a government imposed limit on how low a price can be (e.g., minimum wage)
- Price Ceiling:** a government-imposed limit on how high a price can be (e.g., rent control)
- Taxes, tariffs, and quotas
  - An **excise (sales) tax** is a tax levied on a specific good at the time it is purchased.
  - An **income tax** is a tax on income. It can be proportional, progressive, or regressive, depending on whether the tax rate stays the same, increases, or decreases as income increases.
  - Tariffs** are taxes on imports; taxes and tariffs raise prices and reduce quantity.
  - Quotas** are limits on how much of a good can be imported or sold in a particular country.

## OVERVIEW OF MACROECONOMICS

### ECONOMIC GROWTH

- Potential output** is the output an economy produces when operating at its full productive capacity, at the target rate of unemployment. Potential outputs are points on the production possibility curve.
- Long-run economic policy focuses on increasing the economy's potential output.
- Productivity** is the output produced per unit of input.
- Per capita output** is total output divided by total population. If there is per capita growth, then more output is being produced per person.
- Sources of growth include the accumulation of capital through investment, increases in available resources, and technological improvements.

### BUSINESS CYCLES

#### THE BUSINESS CYCLE

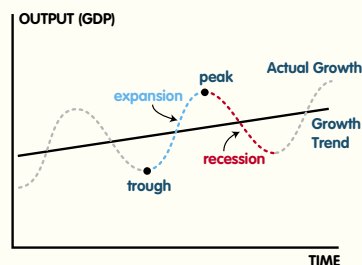


Figure 4 Business cycles are short-run fluctuations of the economy (real GDP and employment) around the growth trend.

- Peak:** the highest point before a recession
- Recession:** decline that lasts at least 6 months (2 quarters)
- Trough:** the lowest point at the end of a recession and before an expansion
- Expansion:** period between the end of a recession and the next peak
- Recovery:** very beginning of an economic expansion
- Boom:** extremely fast increase in output, usually near the end of an expansion
- Depression:** very long and low recession

### UNEMPLOYMENT

- The **unemployment rate** is the ratio of individuals without jobs to the number of people in the labor force.
- The **labor force** consists of those people in the economy who are over 16, not in the armed forces, and willing and able to work.
- The **target rate of unemployment** is the lowest sustainable rate of unemployment believed to be achievable under existing circumstances. Some unemployment (called **frictional unemployment**) will always exist as new people enter the labor force, retire, or quit one job to find another. The natural unemployment rate is the rate when the economy is in neither a recession nor an expansion. It changes over time and is generally thought to be around 5% in the U.S. today.
- Unemployment is related to economic output. Okun's rule of thumb states that a 1% decrease in the unemployment rate is generally associated with a 2% increase in output growth.

### INFLATION

- Inflation is the term for a rise in the overall price level over time. It is measured with price indexes.
- Price indexes** summarize what happens to the prices in a constant "market basket" of goods and services. Different price indexes may produce different results because they contain a different composition in their market baskets.
- Price indexes choose a **base year** in which the price level for the market basket of goods is set to 1 or 100. The price level in other years is then shows changes of the price level since the base year.
- The **Producer Price Index (PPI)** uses a basket of goods common to industrial production. It measures the change in the prices received by the producers for their goods as well as the prices of their raw materials and intermediate goods.

- The **GDP deflator** uses the aggregate output of the economy as the market basket.
- The **Consumer Price Index (CPI)** measures the prices of a fixed basket of consumer goods, which is designed to represent the average consumer's expenditures.
- Another way to find inflation is the spread between **real and nominal interest rates**: nominal interest rate = real interest rate + inflation rate.

## NATIONAL INCOME ACCOUNTING

### GROSS DOMESTIC PRODUCT (GDP)

- GDP is the international standard for measuring the economic output and growth of countries. It is the market value of all final goods and services produced within a country, usually measured in the span of a year, stated in terms of that year's prices.
- Related to GDP is **Gross National Product (GNP)**, which is a measure of the final output of the citizens and businesses of a country, regardless of where in the world the output is produced.
- GDP = GNP + net foreign factor income, where net foreign factor income is the income from foreign sources located domestically minus the income of domestic sources located internationally.
- GDP only measures final output and each final good is multiplied by its price; when one firm sells products to another firm for use in production of yet another good, the first firm's products are called intermediate products and do not count toward GDP; this prevents double-counting. Intermediate goods can be eliminated from the calculations either by only counting final goods or by counting the value added by each firm toward a final product.
- GDP measures market activity, not welfare or happiness. Also, it does not capture household work, illegal commerce, or improvements in the environment or quality of life.
- There are **3 ways to calculate GDP**: expenditure approach, income approach, and production approach.

### EXPENDITURE APPROACH: $GDP = C + I + G + (X - M)$

- GDP can be calculated as the sum of 4 categories: Consumption (C), Investment (I), Government expenditures (G), and Net Exports (exports - imports, or X-M).
- Households can spend their income on domestic goods, or they can save it, pay taxes, or buy foreign goods.
  - Consumption:** Households buy the goods produced by the businesses; this is the biggest category of GDP. It is about 70% of GDP in the US.
  - Investment:** Households can save a portion of their income, which goes into financial markets; businesses can borrow this money and invest it in equipment, factories, or inventories; this is gross investment.
  - Government expenditures:** This category consists of government payments for goods and services.
  - Net exports:** Goods exported to other nations (exports) are a part of the country's output, but the spending on foreign goods imported to the country (imports) does not add to domestic production. Net exports are equal to exports minus imports.
- Net Domestic Product (NDP)** = GDP - depreciation; where depreciation accounts for the gradual wearing out of factories and equipment

### INCOME APPROACH

- GDP can also be calculated through three different income approaches: aggregate, national, and personal.
- Aggregate Income** is the most common income approach and is the total income measured by adding all labor income (wages, salaries, and benefits), capital income (interest, profits, and rent), depreciation, indirect business taxes, and net income of foreigners.
- National Income** is the total income earned by citizens and businesses within a country during one year. It is the sum of labor income and capital income and excludes indirect business taxes, depreciation, and the net income of foreigners.
- Personal Income** is the total income paid directly to individuals. It includes capital income, labor income, and transfer payments.

### PRODUCTION APPROACH

The production approach is the total production of all firms or industries in the economy. In order to avoid double counting (mentioned above), only the value added by each manufacturer is counted. The total value added will be equal to the final price.

### REAL GDP AND NOMINAL GDP

- Nominal GDP** is GDP calculated at existing prices.
- Real GDP** is nominal GDP adjusted for inflation, and it measures what is really produced; real GDP = nominal GDP / GDP deflator.

## AGGREGATE DEMAND AND AGGREGATE SUPPLY

### THE AGGREGATE DEMAND CURVE

- The downward-sloping aggregate demand (AD) curve shows how changes in the price level lead to changes in the economy's aggregate expenditures.  
 $AD = \text{aggregate expenditures} = C + I + G + (X - M)$
- Reasons that a decrease in the price level leads to an increase in aggregate expenditures
  - Wealth effect:** As the price level falls, the real wealth people hold increases and they can consume more.
  - Interest rate effect:** A decrease in the price level leads to decreased interest rates, which increases investment expenditures (because it increases the real money supply).

CONTINUED ON OTHER SIDE

- c. **International effect:** A decrease in the price level leads domestic goods to be cheaper relative to foreign goods, which leads exports to rise and imports to fall, which increases net exports.
  - d. **Multiplier effect:** A multiplier effect amplifies the initial changes in expenditures caused by the above effects, which further flattens the AD curve.
- The AD curve can be shifted by anything that affects aggregate expenditures, except for changes in the price level.

### THE AGGREGATE SUPPLY CURVE

- The aggregate supply (AS) curve specifies how shifts in aggregate demand affect the price level and real output.
- It is **upward sloping**, as higher price levels prompt businesses to produce more goods.
- The AS curve shifts up (down) when firms begin adjusting their prices upward (downward) over a longer horizon; this can be due to changes in input prices (including wages) and changes in productivity.

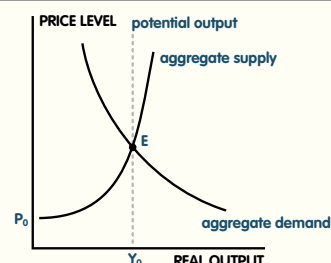
### THE POTENTIAL OUTPUT CURVE

- The potential output curve shows the amount of goods, which can be produced when both capital and labor are employed at their target levels.
- It is **vertical** because changes in the price level are not thought to cause changes to the available economic resources.

### LONG-RUN EQUILIBRIUM IN THE MACROECONOMY

- In the long run, output is fixed to the potential output level, and the price level is flexible to obtain the equilibrium at potential output.
- Increases (decreases) in AD lead to lower (higher) price levels.

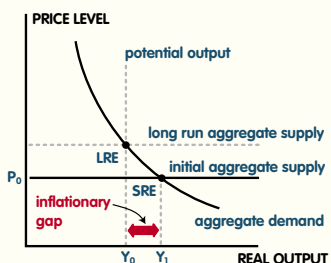
#### AGGREGATE SUPPLY AND AGGREGATE DEMAND



**FIGURE 5** The long-run equilibrium in the aggregate supply (AS) and aggregate demand (AD) model occurs where the AS and AD curves intersect with the potential output curve.

### SHORT-RUN EQUILIBRIUM IN THE MACROECONOMY

#### INFLATIONARY GAP IN THE AS/AD MODEL



**FIGURE 6** An inflationary gap occurs in the AS/AD model when AD intersects with AS to the right of the potential output curve. At this short-run equilibrium between AS and AD, there is upward pressure on the price level as the economy is producing above its potential and unemployment is low. If AD does not shift, then in the long-run the AS curve will shift upward to achieve the long-run equilibrium in which AD, AS, and potential output all intersect.

- The **short-run equilibrium** is where the AS and AD curves intersect.
- Increases (decreases) in AD leads to a higher (lower) output; if AS shifts upward, the increases (decreases) in AD leads to higher (lower) price levels, otherwise prices do not change in the short run.
- Inflationary (recessionary) **gaps** occur when this short-run equilibrium has output above (below) the potential output level. If AD does not change, then over the long-run the AS curve will shift upward (downward) to eliminate the gap.
  - a. Economies can operate at above-potential output for brief periods of time if resources are over-utilized (employees are forced to work extra over-time, for example).

### THE MULTIPLIER MODEL

The multiplier model assumes a constant price level. It provides a **graphical display** and **quantifies the effects of the multiplier** mentioned with the AS/AD model. When expenditures are increased or decreased, they ultimately increase or decrease by more than the initial change, due to the multiplier.

#### AGGREGATE PRODUCTION (AP)

AP is the total amount of goods and services produced in the economy. Production creates an equal amount of income, so that actual production and actual income are always equal (thus the line at 45° in the graph).

#### AGGREGATE EXPENDITURES (AE)

- AE is found the same way as the expenditure approach to GDP calculation.  
 $AE = C + I + G + (X - M)$
- Autonomous expenditures** are those that would exist at a zero level of income, because they are independent of income.
- The relationship between autonomous expenditures ( $AE_0$ ), aggregate expenditures (AE), and income (Y) can be expressed as:  $AE = AE_0 + mpc \times Y$  (assuming consumption is the only variable related to income).
- The expenditure function shifts up and down when there are changes in autonomous expenditures: C, I, G, or X-M.

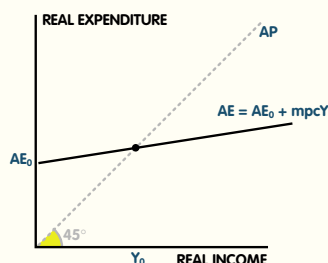
### MARGINAL PROPENSITY TO CONSUME (MPC)

MPC is the ratio of the change in consumption to the change in income:  $mpc = \text{change in } C / \text{change in } Y$ . It captures the idea that peoples' consumption tends to increase as their incomes increase, but not by as much as the increase in income.

### DETERMINING THE LEVEL OF AGGREGATE INCOME

- In equilibrium, expenditures are equal to income, which are at points of intersection between AP and AE. At such points, Aggregate Income = AE = AP.

#### THE MULTIPLIER MODEL



**FIGURE 7** The multiplier model assumes a constant price level. The short-run equilibrium in the economy occurs where aggregate production (also known as aggregate income) is equal to aggregate expenditure.

- Multiplier equation: In points of equilibrium, change in Y = change in AE = multiplier x change in  $AE_0$ , where multiplier =  $1/(1-mpc)$

### FISCAL POLICY

#### CLASSICAL ECONOMICS

- Classical economics originated in 1776 with **Adam Smith's Wealth of Nations** and was the dominant economic thinking until the mid-1850's.
- Uses a **laissez-faire approach**, meaning the government should not interfere in the market because the market can regulate itself.
- Economists should focus on how to encourage savings and investment in order to increase economic growth over the long-term.

#### KEYNESIAN ECONOMICS AND FISCAL POLICY

##### Aggregate Demand Management

- John Maynard Keynes** published *The General Theory of Employment, Interest, and Money* in 1936.
- Keynes's focus was on short-run economic issues. He agreed with the classical approach only for when the economy is at potential output. The general theory he spoke of was that when the economy is not producing at full output, laissez-faire approaches will not work, because the economy can get stuck in a rut, as was happening at the time with the Great Depression.
- The Paradox of Thrift:** Keynesians point out that savings will not always equal investment. If there is a recession, then there is great uncertainty about what will happen in the future, causing firms to reduce their investment plans. When savings do not translate into investment, the aggregate expenditures in the economy are reduced by new savings, which moves the economy further into a recession.
- The classical economists would let wages drop because they assume that all other things are equal, but Keynes points out that all other things are not equal since a decrease in wages leads to a decrease in income, which leads to decreased aggregate demand, which means decreased production from firms, which means less output and even more unemployment.
- Keynes argued that in order to get out of recessions and have any chance for long-term economic growth, **the government must take an active role in encouraging aggregate demand**, by increasing government spending or decreasing taxes.

#### CRITIQUES OF FISCAL POLICY

- Congress is too slow** to act. Government policies often come too late.
- Crowding out effects:** It is possible that a change in government expenditures could be offset by a change in private expenditures in the opposite direction.
- Real business cycle critique:** Increases in aggregate demand are only going to lead to inflationary gaps, since they are an artificial component of the economy, and so inflation will result, but nothing real will change (like the output or unemployment rate).
- Public choice critique:** Politicians are interested in being reelected. Expansionary fiscal policy is a popular political move, but the unpopularity of contractionary fiscal policy (raising taxes or cutting spending) makes it difficult to enact. Fiscal policy cannot be effective if it is only used in one direction.
- Supply side economics critique:** Taxes and government spending negatively affect peoples' incentives to work, save, and invest. The economy would grow quicker if the government were scaled back.

### GOVERNMENT BUDGETS

#### TERMINOLOGY AND DEFINITIONS

- A **nominal deficit** is a shortfall of revenues over payments in one year.
- A **nominal surplus** is an excess of revenues (receipts) over payments (expenditures) in one year.
- Debt** is accumulated deficits minus accumulated surpluses.
- A real deficit is the nominal deficit adjusted for inflation each year; inflation is wiping out some of the debt. **Real deficit** = Nominal deficit - (Inflation x Total debt)
- What is more important than the size of debt is the debt-to-assets ratio, or the debt burden. This is because the size of the debt means nothing if you do not have an amount of assets to compare it to.
- Economists frequently consider debts and deficits relative to the size of GDP, because this better demonstrates the government's abilities to handle its deficits and debt. **Debt service** = (interest rate paid on debt) x (total debt); it helps to give a better picture of the **debt burden** (debt relative to GDP).



## ADVANTAGES OF GOVERNMENT DEBT

If a government runs a deficit in order to spend on projects that increase the society's assets, and if these new assets are valued at more than their costs, then having the deficit makes the society better off.

## DISADVANTAGES OF GOVERNMENT DEBT

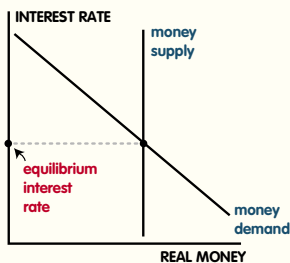
1. If there is excessive borrowing, which leads the debt burden to be too great, then the government will be strained in its ability to repay.
2. The government can be wasteful and inefficient, which can cause more harm than good when it attempts to influence economic events.

## MONEY AND BANKING

### THE FINANCIAL SECTOR OF THE ECONOMY

1. The financial sector of the economy mirrors the real sector. For each exchange of a good or service in the real economy, there is a financial transaction to mirror this.
2. The economist's definition of investment is the purchase of real assets (factories, machines, etc.).
3. Interest rates are what equilibrate supply and demand in the financial sector.
4. For financial assets that pay fixed interest rates, such as bonds, the market price of the financial asset is determined by the market interest rate. The price of the bond goes down (up) as market interest rates increase (decrease).
5. Interest rates are also what equilibrate the supply and demand of money. **Money supply is vertical**, because it will be chosen by the Federal Reserve Board ("the Fed") outside of the model. **Money demand is downward sloping** because people desire to hold less money as interest rates increase.

### EQUILIBRIUM IN THE MONEY MARKET



**FIGURE 8** Equilibrium in the money market occurs when the interest rate adjusts so that the quantity of money demanded equals the quantity of money supplied.

### MONEY: DEFINITIONS AND USES

1. Money is **highly liquid**, meaning that it can easily be exchanged for other assets or other goods.
2. Money is generally thought to have three functions: a medium of exchange, a unit of account, and a store of wealth.
3. Types of Money
  - a. **M1**: currency in the hands of the public, checking account balances, and travelers' checks
  - b. **M2**: everything in M1, as well as savings account deposits, small-denomination time deposits (i.e., CDs), and money-market mutual fund shares
  - c. **M3**: M2 plus foreign deposits

### BANKS AND THE CREATION OF MONEY

1. Banks take in deposits and use this money to make loans to consumers and businesses.
  - a. **Reserves** are the cash and deposits a bank keeps on hand to manage its normal cash inflows and outflows.
  - b. The **reserve ratio** is the ratio of cash a bank has on hand to the amount of checking account deposits it holds.
  - c. The **required reserve ratio** is the percentage of deposits a bank is required to hold in cash.
  - d. The simple **money multiplier** is equal to  $1/r$ , where  $r$  is the reserve ratio of the bank. For example, if the reserve ratio is 10% and \$100 is deposited in a bank, then the bank can loan \$90 which will eventually be deposited by someone else into the bank, so the bank can loan \$81 more dollars, and so on. The total amount of demand deposits created =  $(1/.1) \times \$100 = \$1,000$ .

## MONETARY POLICY

### DEFINITION OF MONETARY POLICY

1. Monetary policy consists of the central bank changing the money supply and thus also changing interest rates, exchange rates, inflation, unemployment, and real GDP.
2. The central bank in the United States is the Federal Reserve System (the Fed).

### TOOLS OF MONETARY POLICY

1. **Changing the reserve requirement ratio** of banks: By decreasing the reserve requirement ratio, the Fed increases the amount of excess reserves a bank has on hand to be lent out, and the money supply will be increased.
2. **Changing the discount rate**: The discount rate is the interest rate the Fed charges to banks for lending money to them; an increase in the discount rate makes borrowing more expensive for banks, and thus decreases the money supply.
3. **Executing Open Market Operations**: To expand the money supply, the Fed buys government bonds from banks, which increases the bank's reserves.

### MONETARY POLICY IN THE AS/AD FRAMEWORK

1. **Expansionary** monetary policy: decrease the required reserve ratio, decrease the discount rate, buy government bonds; these actions expand the money supply, which tends to decrease interest rates and raise income.

2. **Contractionary** monetary policy: increase the required reserve ratio, increase the discount rate, sell government bonds; these actions contract the money supply, which tends to raise interest rates and lower income.
3. Changes in the money supply enter into the AS/AD Framework through the effect on interest rates. When the Fed decreases the money supply, interest rates increase, which leads the quantity of investment to decrease, which decreases aggregate demand by a multiple of the decrease in investment, which shifts the AD curve to the left.

## RELATIONSHIP BETWEEN INFLATION AND UNEMPLOYMENT

### QUANTITY THEORY OF INFLATION

1. Inflation can be explained by the equation  $MV = PQ$ , where  $M$  is the money supply,  $V$  is the velocity of money (nominal GDP/money supply),  $P$  is the price level, and  $Q$  is the quantity of real goods sold.  $PQ$  is also equal to the nominal GDP.
2. The theory assumes  $V$  is constant in the long run. Therefore, nominal GDP growth ( $PQ$ ) is directly related to money supply growth in the long run.
3. The theory also assumes that the real output  $Q$  is independent of the money supply and is determined by factors outside of the equation.
4. The conclusion then is that in the long-term **changes in the money supply directly cause changes in the price level (inflation)**.

### INFLATION AND UNEMPLOYMENT

1. We can see the general relationship between inflation and unemployment in the AS/AD model. If the short-run equilibrium is at a point to the right of potential output, then the unemployment rate will be low and there will be inflationary pressures at work in the economy.
2. The **Phillips curve** expresses the relationship between inflation and unemployment.
  - a. The short-run Phillips shows the trade-off between inflation and unemployment given a fixed expectation about the future inflation rate.
  - b. The long-run Phillips curve is a vertical line at the target rate of unemployment, showing that full output occurs in the long run at the target unemployment rate regardless of the annual inflation rate.

## EXCHANGE RATES AND INTERNATIONAL MACROECONOMICS

### MARKETS, SPECIALIZATION, AND GROWTH

1. To hold a **comparative advantage** is to be better suited to the production of one good relative to another good compared with another person or country.
2. When individuals specialize in the activities in which they have a comparative advantage and then trade with one another to fulfill their wants and needs, the total output will be greater than if each individual had produced everything they desired by themselves. This is how **efficient production** is achieved.
2. As Adam Smith argued in *The Wealth of Nations*, markets and specialization have led to economic growth.

### BALANCE OF PAYMENTS

1. The balance of payments provides a statement of all transactions between a country's residents and residents of foreign countries. A balance of payments surplus (the quantity demanded of currency exceeds the quantity supplied) will put an upward pressure on the price of a nation's currency. The balance of payments has two components:
  - a. **Current account**: The part of the balance of payments listing all short-term payment flows, including net exports of goods and services, net investment income, and net transfers (foreign aid, gifts, or other payments not exchanged for goods and services).
  - b. **Capital account**: The part of the balance of payments listing all long-term payment flows, including the sale of assets and securities between countries.
2. **Official transactions account**: Official reserves are the government's holdings of foreign currencies.
  - a. Supporting a currency happens when a government buys its own currency to hold up the currency's price.
  - b. If a government sells its currency internationally, it is attempting to decrease the currency's value.
3. **Balance of trade**: the difference between the goods and services exported and imported in a country

### EXCHANGE RATES

1. The exchange rate between two currencies is the price of one currency in terms of the other currency.
2. When comparing the currencies of two countries, the exchange rate is the equilibrium price of one currency in terms of the other. It is determined by the intersection of supply and demand for that currency.
3. A number of forces are at work in determining exchange rates, including:
  - a. Changes in a country's price level,
  - b. Changes in a country's income,
  - c. Changes in a country's interest rates.
4. **Fixed exchange rate regimes**: A government can attempt to maintain a fixed exchange rate by maintaining predetermined values of its currency in terms of other currencies.
5. **Flexible exchange rate regimes**: Most governments today leave exchange rates to fluctuate according to the market effects of supply and demand for the currency.
6. Advantages and disadvantages of high exchange rates
  - a. Advantage: If foreign currency is cheaper, the price of imports is less, and lower import prices help keep domestic inflation low due to the competitive pressures of foreigners.
  - b. Disadvantage: High exchange rates encourage imports and discourage exports (causing a trade deficit).
  - c. Economists disagree on the best policy toward exchange rates.