MACROECONOMICS

OVERVIEW

- **Economics:** The study of how scarce resources are allocated among competing uses.
- **Key Economic Questions Include:**
  1. What is produced?
  2. How is it produced?
  3. Who gets what is produced?
- **PRODUCTION POSSIBILITY FRONTIER:**
  The alternative combinations of final goods and services that could be produced in a given time period with all available and limited resources and technology.
 1. Illustrates opportunity cost: Obtaining more production of one good requires a reduction in the production (lost opportunity) of one or more other goods.
  2. Law of increasing opportunity cost means that obtaining more of a good requires giving up ever larger amounts of the alternative good.
  3. **Inside frontier:** Unemployed resources (inefficiency).
  4. **Expanding frontier:** Increases in resources and technological advances.

  This economy produces only 2 goods (X,Y). Points on the curve (A,B,C,D) represent different combinations of the 2 goods when all resources are used (full employment of resources). If the allocation is inside the curve, some resources are not used or used inefficiently.

Good Y / Good X
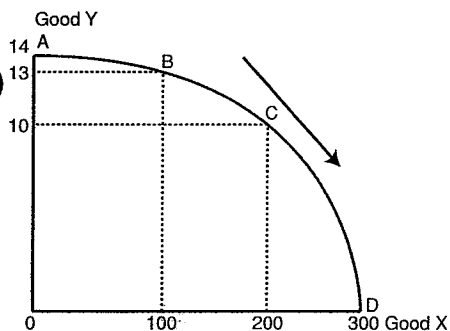
Explanation: This concave production possibilities frontier shows the law of increasing opportunity cost. Moving down the curve means this economy is producing more of X and less of Y. At point A, the economy produces 14 units of Y and zero X. At point B, 100 units of X are now produced. To do this, **1 unit of Y is given up.** To produce the next 100 however, Y production drops from 13 to 10 meaning **3 units of Y is given up (point C).** Finally to produce an additional 100 units of X, **10 units of Y has to be given up (point D).** It becomes more and more expensive to produce the same units of X.

- **HOW CHOICES ARE MADE:**
  1. **Market Mechanism:** Market determined prices signal surpluses and shortages, and owners allocate resources to take advantage of highest monetary rewards.
  2. **Command economy:** Central authority allocates resources to achieve goals.
     3. Mixed: Economy that uses both market and non-market signals to allocate goods and resources.
       - **Macroeconomics:** The study of economic aggregates such as national production and the price level.
- **Microeconomics:** The study of the behavior of individual consumers and producers operating in the individual markets of the economy.

SUPPLY AND DEMAND

DEMAND
- **Demand Curve (Schedule):** A curve (table) showing the quantities of a good a consumer is willing and able to buy at alternative prices given constant tastes, incomes, related prices, and number of buyers.
- **Law of Demand:** Increase in price (P) causes decrease in quantity (Q) demanded.
- **Change in demand:** Change in tastes, price of related goods, income, increase in number of buyers; alters planned consumption at all prices, shifting curve to right (increase) or left (decrease).
- **Change in quantity demanded:** Caused by own price change and results in movement along curve.
- **Related prices:** Include prices of complements or substitutes including future consumption.

SUPPLY
- **Supply Curve:** A curve (table) showing the quantities of a good a seller is willing and able to sell at alternative prices at a given cost of production determined by constant input prices, technology, and number of sellers.
- **Law of Supply:** Increase in price (P) causes increase in quantity (Q) supplied.
- **Change in supply:** Change in cost of production, technology, price of other produced goods; number of sellers alters planned sales at all prices, shifting curve to right (increase) or left (decrease).
- **Change in quantity supplied:** Caused by own price change and results in movement along curve.

MARKET EQUILIBRIUM
- **Equilibrium:** When price is established where quantity demanded (**Pe**) = quantity supplied (**Qe**).
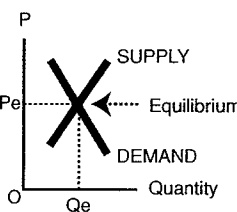- **Properties of Equilibrium:**
  1. $P > P_e$, surplus
  2. $P < P_e$, shortage
  3. $P = P_e$, stable
- **Price Controls:**
  1. Ceiling below equilibrium = shortage and black market
  2. Floor above equilibrium = surplus and cheating (secret sales)
- **Changes In Equilibrium:** Equilibrium price will change whenever the supply or demand curve shifts.

MEASURING ECONOMIC AGGREGATES

MEASURES OF OUTPUT/INCOME
- **Gross domestic product (GDP):** Value of production within a country's boundaries.
  1. **Value Added Concept** = value of production less value of material inputs summed across firms
  2. **Income Method** = wages and salaries + rent + profits + interest + adjustments
  3. **Expenditure Method** (Sum of expenditures on final goods and services) = Private Consumption (C) + Gross Private Domestic Investment (I) + Government Purchases (G) + Exports (X) - Imports (M) = (C+I+G+X-M)
- **Real GDP** = GDP / Price Index deflated by the price index
- **Net Domestic Product** (NDP) = GDP less capital consumption allowance
- **National Income** (NI) = NDP - Indirect Business Taxes + subsidies
- **Personal Income** (PI) = NI - (corporate taxes + retained earnings + social security taxes) + transfer payments
- **Disposable Income** (DI) = PI - Personal Taxes
- **GDP Shortcomings:**
  1. Factors or variables not measured:
     a. Underground economy
     b. Improved quality
     c. More leisure, although implying fewer hours of work, can lead to greater productivity.
  2. Certain goods and services contribute to personal or property destruction (e.g. alcohol, tobacco, guns, etc.).

MEASURING PRICE LEVEL
- **Price Index:** Average level of prices relative to the average level in a base time period. Cost of a fixed basket of goods reported as a percentage of base period cost.
- **GDP PRICE INDEX:** A measure of changes in the average price of all goods and services.
- **Consumer Price Index (CPI):** A measure of changes in the average price of urban consumer goods and services.
- **Producer Price Index (PPI):** A measure of changes in the average price of goods bought by producers (includes crude materials; intermediate goods; finished goods).
- **Cost Of Living Adjustment (COLA):** Automatic adjustments of income to the rate of inflation.

MEASURING INFLATION
- **Inflation:** Continuing increase in the average level of prices of goods and services over time.
- **Deflation:** Continuing decrease in the average level of prices of goods and services (negative inflation rate) over time.
- **Disinflation:** Falling inflation rate. Note that prices are still increasing.
- **Inflation rate:** between time period one and time period two is: $\frac{P_2 - P_1}{P_1} \times 100$
- **Types of Inflation**
  1. Supply side inflation
     a. **Wage-push** = wage increase leads to price increase
     b. **Cost-push** = increase in non-labor costs leads to price increase
  2. **Demand-pull inflation:** An increase in the price level initiated by excessive aggregate demand.
- Macro Consequences of (Unanticipated) Inflation:
  1. Uncertainty
  2. Speculation
  3. Non-productive investments

MEASURING UNEMPLOYMENT
- **Labor force:** Employed or Unemployed
- **Employed:** Working and not looking for work
- **Unemployed:** 3 requirements to be categorized as unemployed. 1. not working, 2. able to work, 3. looking for work
- **UNEMPLOYMENT rate** = $\frac{\text{unemployment total}}{\text{labor force}} \times 100$
- **Types of Unemployment:**
  1. **Seasonal:** Unemployed during periods between agricultural seasons, tourist seasons, school breaks, etc.
  2. **Frictional:** Unemployment as people move between jobs or into the labor market.
  3. **Structural:** Workers laid off by declining industries or in declining regions or by job obsolescence.
  4. **Cyclical:** Unemployment due to general economic recession.
- **Macro consequences of unemployment:** Lost Output; Okun's Law: 1% increase in unemployment rate reduces GDP by 2.5%
- SPECIAL CLASSES OF WORKERS:
  1. **Underemployed:** People seeking full-time paid employment work. Working only part-time or employed at jobs below their capability (phantom unemployed).
  2. **Laid-off individuals with promise to be rehired:** Not looking for work but part of unemployed population as an exception to the rule.
  3. **Discouraged workers:** Not considered in labor force because not looking for work. Likely to re-enter when labor market improves.

BUSINESS CYCLES

Definition: **Alternating periods of economic growth and contraction. A single business cycle would have these four parts:**
1. Trough
2. Recovery
3. Peak
4. Recession
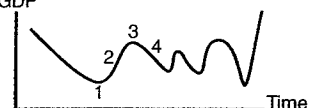
AGGREGATE SPENDING KEYNESIAN APPROACH

Circular Flow equilibrium: Spending = Output to meet Demand = Income

CONSUMPTION (C) & SAVINGS(S)

- **CONSUMPTION:**
  1. Equation: $C = a + MPC(Y)$; where a is consumption at 0 income, (also called autonomous consumption) and Y is personal disposable income
  2. Marginal Propensity to Consume $(MPC) = $ (change in C) / (change in Y) = fraction of an extra dollar of income that is spent.
  3. Average Propensity to Consume $(APC) = C / Y = $ fraction of an average dollar that is spent
- **SAVINGS:** Savings(S) = Income(Y) - Consumption(C)
  1. Equation: $S = -a + MPS(Y)$
  2. Marginal Propensity to Save $(MPS) = $ (change in S) / (change in Y) = fraction of an extra dollar of income that is saved.
  3. Average Propensity to Save $(APS) = S / Y = $ fraction of an average dollar that is saved.
- **MPC + MPS = 1**
- **APC + APS = 1**

GROSS PRIVATE DOMESTIC INVESTMENT (I)

Expenditures on or production of new plant and equipment (capital) in a given time period, plus changes in business inventories.
- Affected by Expectations & interest rates (e.g. Crash makes many fearful about the future).
- **Desired vs. Actual Investment**
  1. I = desired or planned investment
  2. Actual Investment = Savings
  3. Unintended Investment = Desired Investment < Actual Investment
  4. Unintended Disinvestment = Desired Investment > Actual Investment

GOVERNMENT EXPENDITURES (G)

Federal, state, and local government spending
- **Two types of G:**
  a. Direct purchases by government.
  b. Transfer payments which redistributes income from one group to another.

FOREIGN SECTOR

1. Exports (X): Expenditures by foreigners on domestically produced goods.
2. Imports (M): Expenditures by domestic residents on goods produced in foreign countries.

KEYNESIAN EQUILIBRIUM

Achieved when:
1. Output = Income (Y) = Aggregate expenditures (AE) From (1), we can get equilibrium Income or Output (Y*)
   $Y = AE$
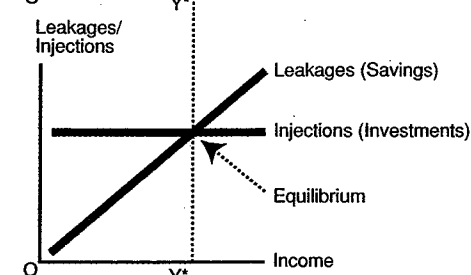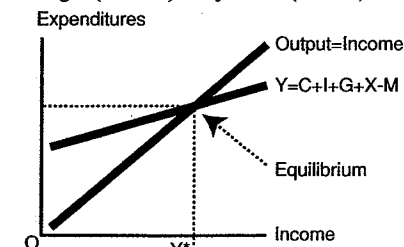 $Y = C + I + G + X - M$
   $Y = a + MPC(Y) + I + G + X - M$
   $Y - MPC(Y) = a + I + G + X - M$
   $Y(1-MPC) = a + I + G + X - M$
   $Y* = [1/(1-MPC)] [a + I + G + X - M]$
2. Injections / Leakages Approach
   Leakages $(S + T + M) = $ Injections $(I + G + X)$

Expenditures


Leakages/Injections

GDP GAP & THE MULTIPLIER

- **Gaps:** Difference between spending at equilibrium GDP vs. full-employment GDP.
  1. **Recessionary Gap:** Amount by which desired spending at full employment falls short of full employment output. This is represented by the difference between Y1 and Y*.
  2. **Inflationary Gap:** Amount by which desired spending at full employment exceeds full-employment output. This is represented by the difference between Y2 and Y*.
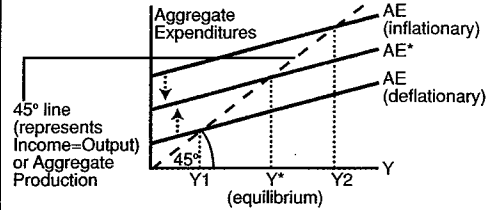
- **Expenditure Multiplier:** The multiple by which an initial change in aggregate spending will alter total expenditure after an infinite number of spending cycles = $(1 / (1-MPC))$ or $(1 / MPS)$.
  Simplified Example: Given MPC = 0.8; Deflationary Gap = $300 million; assume interest rates do not affect Investment (I)
  Question: How much of an increase in Investment (I) is required to solve the Deflationary Gap?
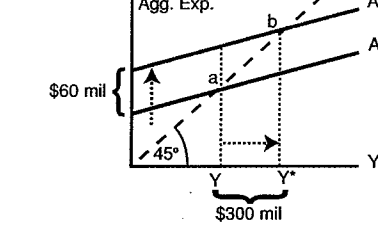 **Answer:** I x multiplier = $300 m
  $I* \times (1/MPS) = \$300$ m
  $I* = \$300$ m x MPS
  $I* = \$300$ m x (1-MPC)
  $I* = \$300$ m x (0.2)
  $I* = \$60$ m

- Adjustment to GAPS
  1. Keynesian View: Government intervention
  2. Classical View: No government intervention

FISCAL POLICY

- **Definition:** The use of government spending (G) or taxes (T) to change the level of total spending in the economy.

TYPES OF FISCAL POLICY

- **Expansionary Fiscal Policy:** Increases in government spending or reduction in taxes. Bigger budget deficit (G>T). New Deal was **expansionary fiscal policy.**
- **Contractionary Fiscal Policy:** Decreases in government spending or increases in taxes. Smaller deficit or surplus (G<T).
- **Keynesian Fiscal Policy:** Use of fiscal policy to eliminate GDP gaps, called discretionary fiscal policy.
- **Countercyclical Fiscal Policy:** Government policy that offsets shocks that would create a business cycle. The government usually engages in fine-tuning when it applies discretionary policy to bring the economy back to full-employment level.


- **Automatic Fiscal Stabilizers:** Built-in federal expenditure or fixed tax rates that automatically responds countercyclically to changes in national income.
- Ex. When income is high, spending increases, leading to inflationary periods; higher income means increase in tax payments (T increase) but this will cause a decrease in total expenditures. The expenditure curve will drop, thus lessening the inflationary gap. Also, with more people employed, unemployment compensation will decrease (G decrease) also causing a decrease in total expenditures as Government spends less on this item.
- **Passive Deficit:** Deficit portion due to the economy operating below potential income level.
- **Classical:** Belief that fiscal policy affects supply side of economy. Advocate tax cuts to stimulate labor supply, productivity and capital accumulation.
- **Laffer Curve Hypothesis:** Cutting tax rates will increase tax revenues through supply side effects.
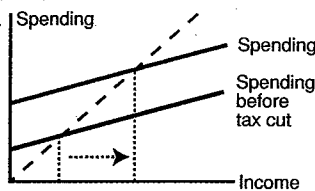
Most economists believe tax cuts caused large budget deficits in 1980's.
- **Structural Budget Deficit:** Deficit that would occur at full employment. Most economists believe tax cuts caused large budget deficits in the1980s.

EXPERIENCE WITH FISCAL POLICY

- Governments have continual expansionary fiscal policies (budget deficits) because they are politically popular.
- Results and Effectiveness of the amount of fiscal policy expansion are slow to achieve and often too late.

IMPORT MULTIPLIER

- Similar to consumption, imports can be modeled: $M = m + MPM(Y)$ where M = total imports, m = imports when Y=0
- MPM = marginal propensity to import
- **Import Multiplier:** $(1/(1-MPM))$

DETERMINING THE EQUILIBRIUM PRICE & OUTPUT LEVEL
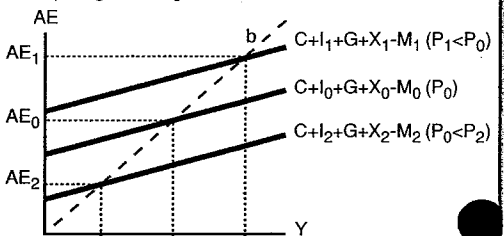
AGGREGATE DEMAND: Total quantity of output demanded at alternative price levels in a given time period.
- Reasons why it is downward sloping:
  1. **Real balances effect:** Price changes affect the real value of GDP.
  2. **Foreign trade effect:** Domestic price increase lowers exports (X) and increases imports (M). Goods are more expensive here and cheaper abroad. Lower exports and higher imports lower expenditures on local goods and services.
  3. **Interest-rate effect:** Increase in prices causes an increase in **Money Demand.** Increase in demand for money raises interest rates, which lower investments, lowering total expenditures.
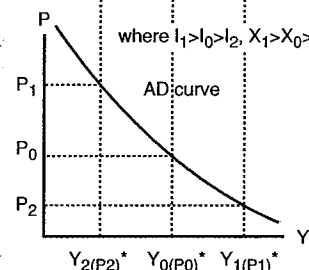
AGGREGATE SUPPLY: Total quantity of output produced at alternative price levels in a given time period
- Short Run Aggregate Supply (SRAS):
  1. As price level rises, quantity of output rises as firms seek higher profits. In short run, prices of inputs are fixed or sticky (e.g. wages).
  2. As firms expand output even with fixed input prices, price level rises because of diminishing returns (new labor less productive).
- Long Run Aggregate Supply (LRAS): As price level rises, no increase in output because input prices rise proportionally.

NO PAYOFF TO CHANGING AGGREGATE DEMAND IN THE LONG RUN

- Increase in aggregate demand AD0 to AD1 moves economy to short run equilibrium from a to b above full employment because wages are sticky.
- As wages adjust upward, short run aggregate supply gradually shifts upward from b to c.
- Short run equilibrium output gradually falls Pe to longrun equilibrium at full employment Y_1 to Y_f. In the long run output cannot be raised above Y_f and attempts to do so merely raise P.

- Rational Expectations Economists believe economy goes directly from original long run equilibrium to new long run equilibrium if government policy is anticipated.
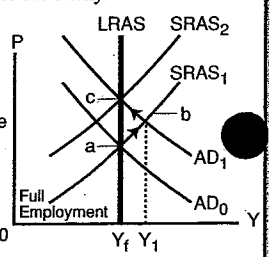
LAGS

The effectiveness of fiscal policy also depends on three types of lags:
1. **Recognition Lag:** Time it takes between the occurrence of the economic condition and policy maker recognition of the situation.
2. **Implementation Lag:** If an act of congress is required, it can take some time for congress to debate and approve the bill.
3. **Effectiveness Lag:** After the policy is implemented, it can take time for the policy to have an impact on the economy (ex. in the late '90s, Greenspan tried to anticipate inflationary tendencies by tightening the money supply [increasing interest rates] ahead of time).

BURDEN OF NATIONAL DEBT

Accumulated debt of the federal government.
- **Debt Service:** the interest required to be paid each year on outstanding debt (current deficit & debt)
- Transfer resources from bond holders to tax payers. No net change.
- Future generations transfer resources from tax payers to bond holders.
- **External Debt:** U.S. government debt (Treasury bonds) held by foreign households, businesses and governments. Imposes a burden on future generations.
- Crowding out investment leads to slower growth for future generations.

PROBLEMS WITH FISCAL POLICY

1. Accurate measure of variables: The government can only estimate the sizes of MPC, MPM and other exogenous variables.
2. Government is not able to change G or T quickly, as it is often subject to legislation as well as checks and balances between the Executive and Legislative bodies.
3. Financing deficits can have offsetting effects.
   - **Crowding out:** Classical economists believe that when government finances a deficit, the expansionary/contractionary effects are not fully realized. If government sells bonds to finance an expansionary fiscal policy, it is taking away funds from a possible private investment (I) undertaking. Therefore increase in G is offset by a decrease in I.
4. Fiscal policy can conflict with other goals. Ex. Deflationary gap and large public debt. Solving the deflationary gap may require an increase in G. Increasing G however, further raises the budget deficit (G<T) increasing public debt as funds are borrowed.

MACRO THEORIES

- **Classical Theory:** (Proponent: Adam Smith, etc.) Wages and prices are flexible. The economy self-adjusts to deviations from its long term growth trend. minimum government intervention required. Persistent unemployment requires supply side policies e.g. deregulation and tax cuts. Political conservatives.
- **Classical Equilibrium:**
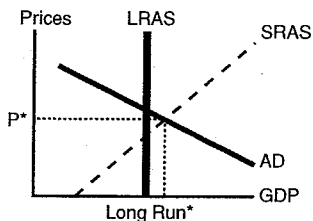
Explanation: Short run equilibrium occurs where the Short-Run Aggregate Supply curve (SRAS) intersects Aggregate Demand (AD). This is temporary. The economy will self-adjust so that both curves will intersect on the Long-Run Aggregate Supply (LRAS) thus achieving economic stability with full employment.

- **Keynesian Theory:** (Proponent: British economist John Maynard Keynes) Wages and prices are sticky (slow to change). Private demand is inherently unstable, thus requiring active government intervention. Persistent unemployment requires demand side policies, e.g. increases government spending and tax cuts. Political liberals.

EFFECT OF TAXES ON INCOME

Lump-sum Tax
The Consumption equation is transformed: $C = a + MPC(Y - T)$; $C = a + MPC(Y) - MPC(T)$
- **The tax multiplier:**
At equilibrium, $Y = AE$
Assuming C is the only expenditure consumption, $Y = C$
$Y = a + MPC(Y) - MPC(T)$
$Y - MPC(Y) = a - MPC(T)$
$Y(1-MPC) = a - MPC(T)$
$Y(MPS) = a - MPC(T)$
$Y = a(1/MPS) - (MPC/MPS)(T)$
This implies the Tax multiplier = MPC/MPS or MPC/(1-MPC).

DIFFERENTIAL EFFECT OF INCREASING T AND G

If T and G are increased by the same amount, the net effect on Y is the increase in G.
Explanation: The effect of each component on Y is based on their respective multipliers. Assuming all other components are unchanged:
$\Delta Y = (1/(1-MPC)) G - (MPC/(1-MPC)) T$
Assuming $\$40 = G = T$,
$\Delta Y = (1/(1-MPC)) \$40 - (MPC/(1-MPC)) \$40$
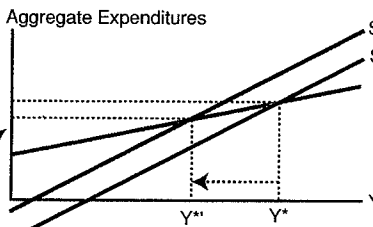$\Delta Y = \$40[(1/(1-MPC)) - (MPC/(1-MPC))]$
$\Delta Y = \$40[(1-MPC)/(1-MPC))]$
$\Delta Y = \$40[1]$
Where Δ = change

PARADOX OF THRIFT

- When investment depends on income, an attempt to increase saving can result in reduced savings.
- Individuals who save more can cause income to decrease, leading to a decrease in overall savings (S).

FINANCIAL SECTOR

Classical View: The financial market works smoothly. Investment and savings will always be equal. Interest rates change to ensure this equality.
Keynesian view: Savings and investments are often unequal with the monetary sector not working correctly. The real sector is affected. AD does not equal AS. The imbalance affects the real sector (due mostly to the multiplier effects). The savings curve is viewed as vertical and unaffected by interest rate changes. Discretionary fiscal policy needs to be implemented to increase/decrease savings:
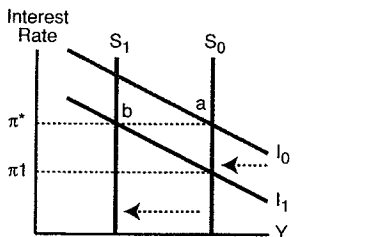
When investments decrease, the interest rate will not adjust quickly to $\pi 1$ to bring the economy to equilibrium. Instead the multiplier process will occur and will shift the S curve to S_1 and be back in equilibrium at π^* before interest rates even drop to $\pi 1$.

MONEY AND BANKING

MONEY: Anything generally accepted as a medium of exchange.
- **Characteristics of Good Money:** Relatively constant and limited supply, difficult to counterfeit, divisible, durable, small and portable.
Ex. Gold became the most important form of money in 17th and 18th century. **Problems:** relatively heavy, easy to counterfeit, subject to fluctuations (when new gold is discovered). Led to replacement of gold with paper money. Gold was deposited at the goldsmith, who issued receipts for the gold to the depositor. The depositor would then issue the receipts as payment for goods and services. The receipt had value because it was backed by the gold on deposit.
- **Uses of Money:**
  1. Medium of exchange
  2. Store of value
  3. Unit of account
- **Types of Money**
  1. **Commodity money:** Value as commodity = value as money
  2. **Fiat money:** Money declared by government as legal tender. Value as commodity < value as money
- **Money Supply**
  1. Basic Money Supply (M1)= currency held by the public outside banks (checking accounts) + balances in demand deposits including travelers checks
  2. M2 = M1 + savings accounts + small time deposits (< $100,000)
  3. M3 = M2 + large time deposits (> = $100,000)
  4. L = the broadest definition of money supply, consisting of all short-term (matures less than or equal to 1 year) financial assets. L refers to liquidity.
  5. **Credit Card is not money:** Money is a financial asset belonging to individuals and a **liability** to banks. Credit card is a savings item made available to be borrowed. Credit is not an asset.

BANKING

- **Financial Intermediary:** Banks function as an intermediary between lenders & borrowers by holding deposits and making loans.
- **Bank Reserves:** Vault cash and deposits at Federal Reserve, called federal funds. In general, reserves is the amount of cash a bank keeps on hand to manage inflows and outflows. Banks lend each other excess funds at the federal funds interest rate. Some reserves are required by central bank as a ratio (proportion) of deposits as a reserve against cash withdrawals. Expected rule: the more liquid the asset, the higher the reserve requirement.
- **Money Creation:**
  1. **How banks create money:** Banks create demand deposits, part of the money supply, when making bank loans.
  2. **Money multiplier:** the amount (dollars) of money that the banking system can create from $1 of excess reserves.
  3. **Maximum money creation:**
     a. Assumes public deposits all money received and does not add to cash leakage.
     b. Assumes banks lend or spend all excess reserves.
     c. Formula:
     $$\text{increse in money} = \frac{1}{\text{required reserve ratio}} \times \text{increase in excess reserves}$$
  4. **Complex Money Multiplier:** Measure of money created per dollar deposited in the banking system when people hold cash:
Formula: $[(1+c)/(r+c)]x$ increase in excess reserves where r = required reserve ratio; c = % of withdrawals not redeposited
Ex. r = 0.02; c = 0.4; increase in excess reserves of $1,000 money supply will increase by $3333.33.

MONEY CREATION PROCESS

Person borrows $2,000, r=0.1, c=0.4

Bank Gets	Bank keeps (Reserve Ratio: 10%)	Bank Loans (excess reserve 90%)	Demand Deposits (60% of loan is redeposited)	Person keeps 40%
		$1,200.00	$800.00	
$1,200.00	$120.00	$1,080.00	$648.00	$432.00
$648.00	$64.80	$583.20	$349.92	$233.28
$349.92	$34.99	$314.93	$188.96	$125.97
$188.96	$18.90	$170.06	$102.04	$68.02
$102.04	$10.20	$91.84	$55.10	$36.74
			up to $0.0001	

TOTAL money created will be: $6,840

S&L BAILOUT (late '80S - early '90S)

- Savings and Loans (S&Ls) held and invested savings back to the community.
- Up to 1980, they were regulated by the government; allowed to invest only in safe, private, residential mortgages.
- 1982 deregulation signaled the end for S&L stability. S&Ls started investing in risky high-yield but low-grade junk bonds and commercial real estate.
- S&Ls didn't have management capability to handle the growing bad loans.
- Because U.S. has guaranteed deposits of financial institutions including (S&Ls), it spent hundreds of billions of dollars. With the complexity of some of the deals, accurate government bailout cost was difficult to determine.

FEDERAL RESERVE SYSTEM (FED)

The FED is the United States' Central Bank. It supervises the financial system.
- **Structure:** Twelve regional Federal Reserve banks supervised by a Board of Governors in Washington nominated to fixed terms subject to senate approval.
- **Function:** Congress gave the FED 6 explicit functions.
  1. Conduct monetary policy (most important function).
  2. Supervise and regulate financial institutions.
  3. Serve as lender of last resort to financial institutions.
  4. Provide banking services to the U.S. Government.
  5. Issue coin and currency.
  6. Provide financial services to commercial banks, savings and loan associations, savings banks, and credit unions.
- **MONETARY POLICY:** Policy that affects the economy through changes in money supply and available credit.
- **Federal Open Market Committee (FOMC):** Composed of 7 members of the Board of Governors and 5 Federal Reserve Bank presidents. It is the chief policy-making body of the FED.
- Monetary Tools:
  1. **Reserve Requirement (ratio):** Proportion of deposits that must be held as reserves.
  2. **Discount Rate:** Rate of interest charged by the Federal Reserve banks for lending reserves to private banks.
  3. **Open Market Operations:** Federal Reserve purchases and sales of government bonds for the purpose of altering bank reserves. This is most often used by the Fed in controlling money supply.
- Tight money policy: (lowers MS)
  1. High reserve requirements
  2. High discount rate
  3. Open market sales
- Easy money policy: (increases MS)
  1. Low reserve requirements
  2. Low discount rate
  3. Open market purchases
- Demand for Money: The quantities of money people are willing and able to hold at alternative interest rate (S).
  1. **Transactions demand:** Money held for the purpose of making everyday market purchases.
  2. **Precautionary demand:** Money held for unexpected market transactions or emergencies.
  3. **Speculative demand:** Money held for speculative purposes, for later financial opportunities.

CONTROVERSIES / ISSUES
- Should central banks only set monetary policy to keep inflation low?
- Should monetary policy be used to stimulate a weak economy?
- Should central banks control the money supply or interest rates?
- How should money be measured?
- The FED's control on money supply, specifically on the effectiveness of expansionary policy, depends on the robustness of the estimated c parameter - % of the loan borrowers keep as cash and is not redeposited.

MONETARY POLICY

MONETARY BASE
- Vault cash plus bank reserves at the FED. The FED directly controls the Monetary Base and not Money Supply given the uncertainty of the c parameter and whether banks lend out exactly all, less, or more than its excess reserves.

CLASSICAL VIEW
- Classical theorists believe that monetary policy cannot be used to solve problems of income, output, and employment (real sector). Classical monetary policy is best exemplified through the EQUATION OF EXCHANGE:
  $MV = PQ$ where
  M = money supply
  V = velocity
  P = price level
  Q = output or GDP (full employment)
- In classical theory, velocity is fixed, and the economy operates in full employment in the long run. This means that V and Q are fixed and any change in money supply will only be inflationary in the long run. It has no effect on real economic variables:

M increase = $\overline{(Q/V)}$ P increase
This is called the QUANTITY THEORY OF MONEY.

INTEREST RATES:
1. Nominal
2. Real = Nominal interest - expected inflation rate

KEYNESIAN VIEW
- **Monetary Policy:** Used to fight recession and inflation, but may need to be supplemented by fiscal policy to fight recession and by incomes policy to fight inflation.
- Keynes monetary prescription on the economy:
  1. **Contractionary Monetary policy:** Money Supply decrease -> interest rate increase -> Investment decrease -> (Income=Output) decrease
  2. **Expansionary Monetary policy:** Money Supply increase -> interest rate decrease -> Investment increase -> (Income=Output) increase

Note: It is important that monetary policymakers are aware of the current condition of the real sector and the effectiveness lag of monetary policy.
- Keynesian stimulus
  1. Interest rates - price paid for the use of money
  2. Spending (Investments)
  3. Liquidity Trap: The portion of the money-demand curve that is horizontal; people are willing to hold unlimited amounts of money at some (low) interest rate. Monetary policy is ineffective.

MONETARIST PERSPECTIVE (MILTON FRIEDMAN'S VIEW)
- Monetary policy can control inflation.
- Increase money supply at a steady rate equal to growth of economy.
- Do not attempt to fine tune money growth.

PHILLIPS CURVE TRADE-OFF

Inflation and unemployment relationship: The theory--when unemployment is low, people have jobs, people have wages, purchases are made, demand increases, prices increase, leading to an increase in inflation rates. When unemployment is high, people are laid off, no income, demand is low, prices decrease, then inflation rates drop.
**Shortrun Phillips Curve (SRPC):** Graphical representation of the negative relationship between inflation and unemployment rate.
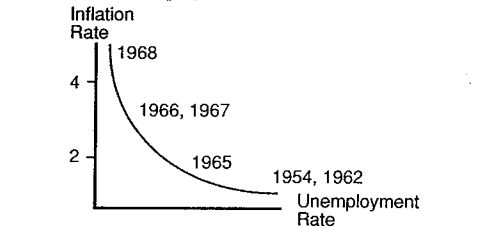
Note: Until 1968, the downward-sloping Phillips curve was apparent. In the early '70s it appeared to break down. When unemployment was high, inflation was also high.

LONGRUN PHILLIPS CURVE:
1. In the long run, when expectations of inflation are met, changes in expectation have no effect on the level of unemployment.
2. The Long Run Phillips Curve (LRPC) represents the situation when actual inflation equals expected inflation.
3. Economy is able to adjust correctly to the inflation rate.
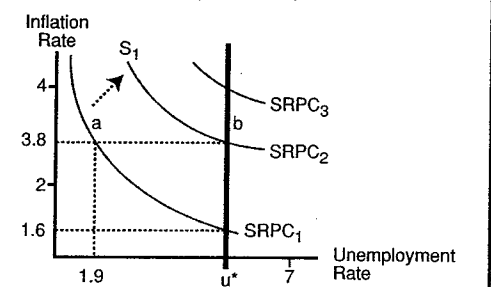
At SRPC$_1$, actual inflation is at 3.8, (actual unemployment rate is 1.9), however, expected inflation rate is only 1.6. Because of the discrepancy, prices further increase and unemployment increases also, representing a shift in SRPC to SRPC$_2$ which brings actual and expected inflation rate to equal at point b, resulting in unemployment rate in the long run. The shifting of the SRPC to the right represents a move toward stagflation.

STAGFLATION

Combination of high and accelerating inflation and high unemployment.
Classical explanation of stagflation: If the government wants to maintain or get close to the 1.9 unemployment rate, it will increase G or lessen T (movement up SRPC$_2$) to a higher inflation rate. However once again the economy will be pushed toward the natural rate of unemployment accomplished by an SRPC$_3$ that sits to the right of SRPC$_2$.
INFLATION: Can be subject to Adaptive Expectations (expectations of the future based on what has happened in the past).
Sustained high inflation: Accompanied by MS increase and expectations of inflation.
Distributional Effects of Inflation:
1. Individuals who can get higher wages and sell goods at higher prices, can still keep jobs and continue to gain revenue from sales, will benefit from sustained inflation. Indexing wages (such as current social security payments) to inflation prevents or reduces the bad effects of inflation. Their real income becomes independent or is less affected by inflation.
2. Bondholders: The real value of bonds drop with inflation if nominal interest rates are unchanged. Therefore bondholders' wealth status depends on how fast nominal interest rates adjust to expectations of inflation.

FIGHTING STAGFLATION:
1. **Classical:** Run a recession. This squeezes inflationary expectations out of the economy.
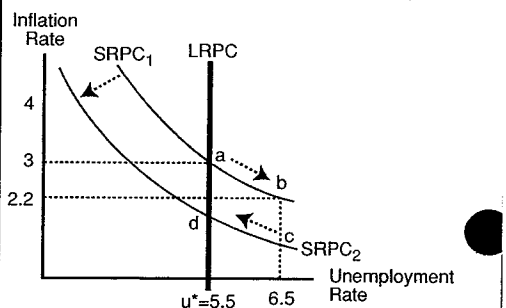
To lower the inflation rate from a, (3%), classicals prescribe a planned recession. Lowering money supply will raise interest rates, lowering investment and contribute to more unemployment, raising the unemployment rate to 6.5 but lowering inflation to 2.2. SRPC$_1$ shifts to SRPC$_2$ and settles at the natural rate of unemployment = 5.5 at d.
2. **Keynesian:** Inducing a recession is controversial and unpopular. MS decrease is inefficient.
Keynesian Solution: Supplementary policy called incomes policy.
  a. Direct pressure is put on individuals to hold down wages and prices of goods. (ex. wage and price controls). This helps lower expectations of inflation.
  b. With lower expectation of inflation SRPC shifts to the left without causing a recession. Lift controls when LRPC is reached.