PRINCIPLES OF MACROECONOMICS

Economics is the study of how society uses its scarce resources.

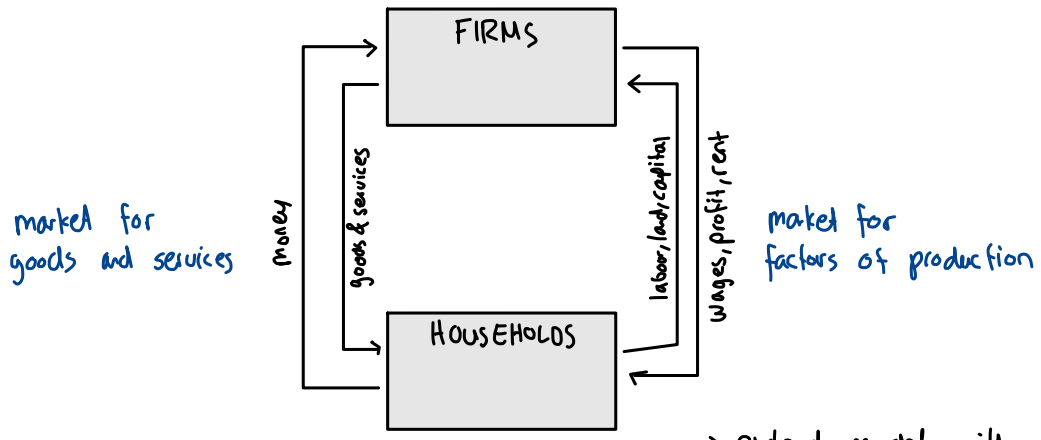
Decisions:
- face trade-offs
- opportunity costs
- think at the margin (marginal changes/benefits)
- respond to incentives

Interaction:
- trade makes everyone better off
- markets are a good way to organize economic activity (decentralized)
- governments can sometimes improve economic outcomes (property rights, market failure)

Economy:
- standard of living depends on its ability to produce goods and services
- price rise when government prints too much money (inflation)
- society faces short-run trade-off between unemployment and inflation

Economic models:
- assumptions to simplify reality to improve understanding
- endogenous variable: variable within the model → outcome variables
  exogenous variable: value determined outside model → assumptions

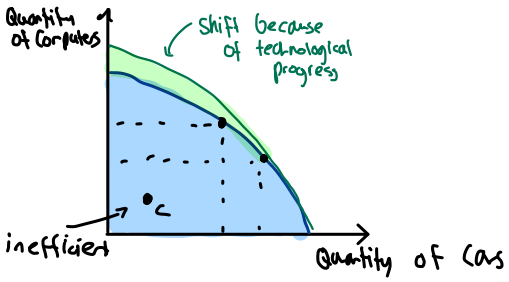
Circular-Flow Diagram



→ extend model with government, financial institutions and foreign exchange market

Production Possibilities Frontier

Combination of output that economy can possibly produce given the available factors of prod.



Normative Statements: how world should be (policy advisors)
Positive Statements: describe the world

National Accounting

total income of economy ≡ total expenditure of economy

Gross Domestic Product (GDP): total market value of all final goods and services produced within a country in a given period of time

tangible goods = materielle Güter, intagible services = immaterielle Güter

$$Y = C + I + G + NX \qquad NX = X - M$$

C: Consumption by households on goods and services except new housing (investment)
I: investment, spending on capital equipment, inventories and structures
G: government spending, transfer payments not included
NX: exports minus imports

GDP deflator: measure of price level, $\frac{\text{Nominal GDP}}{\text{Real GDP}} \cdot 100\%$ → part of GDP rise due to rising prices

GDP per person: best single measure of economic well-being → average income/expenditure of average person

inflation rate: percentage change in price level from previous period
consumer price index (CPI): overall cost of goods and services bought by typical consumer

↳ Problems:
- substitution bias → changes in relative prices → substitution not refl.
- introduction of new goods
- unmeasured quality changes

GDP Deflator vs. CPI

1. GDP Deflator reflects prices of goods produced domestically, whereas CPI reflects prices of goods consumed domestically.

2. CPI has a fixed basket of goods and services, GDP deflator compares prices of curr. prod. goods

Interest represents a payment in the future for a transfer of money in the past.

Real interest rate = Nominal interest rate − Inflation rate

When some money amount is automatically corrected for inflation → indexed for inflation

Production and Growth

small differences in growth rate have huge effects in long-run

productivity: amount of goods and services produced for each hour of a worker's time
↳ determines nation's standard of living

trend rate of growth: average sustainable rate of economic growth over period of time

Solow theory: explanation of growth using rate of human and physical capital and population growth

Factors that influence productivity and therefore growth:
- open to trade
- bureaucracy, corruption
- political instability
- geographical factors
- health
-

factors of production (physical, human capital, natural resources, technology) determine productivity

Production function: $Y = A \cdot F(L, K, H, N)$

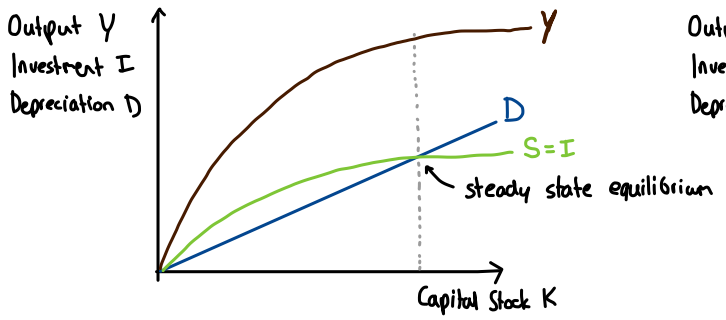
A: available technology; L: labour; K: physical capital; H: human capital; N: natural resources

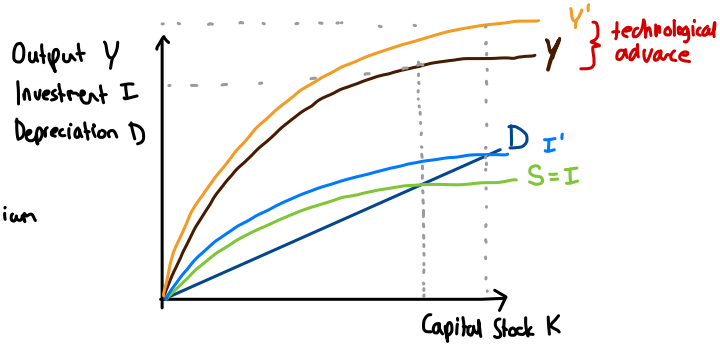
Output / worker: $\frac{Y}{L} = A \cdot F(1, \frac{K}{L}, \frac{H}{L}, \frac{N}{L})$ → constant returns to scale: $xY = AF(xL, xK...)$

Solow model: assumptions → closed economy / no government, diminishing marginal returns
↳ $Y = C + I$

Saving ≡ investment: $S = (Y - C) = I$
↳ constant share of income is saved: $S = s \cdot Y$

capital depreciation: $D = \delta \cdot K$ → $I - D$ = net investment





Economic Growth and Public Policy

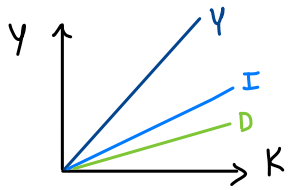
- encourage saving and investment
- encourage education
- political stability
- promote free trade
- promote research and development

As stock of capital rises, extra output from additional unit of capital falls → diminishing returns
↳ catch-up effect

Foreign Direct Investment: capital investment owned and operated by foreign entity
Foreign Portfolio Investment: investments financed with foreign money but operated by domestic residents

Basic endogenous growth model:

$Y = A \cdot K$, $I = sI$, $D = \delta K$



As long as $I > D$ ($sA > \delta$), K and therefor Y will continue to rise

Unemployment

1. Long-run problem: Natural Rate of Unemployment
2. Short-run problem: Cyclical Unemployment

Employed + Unemployed = Labour force

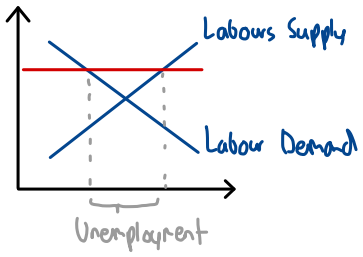
Unemployment rate = percentage of labour force that is unemployed
Labour-force participation rate = percentage of adult population that is in labour force

Measured in two ways: 1. claimant count (registered in unemployment offices)
2. monthly household surveys

Most of economy's unemployment problem is attributable to rel. few workers who are unemployed for long time
↳ Hysteresis: effect the longer unemployed the less likely to be hired by firm

Frictional Unemployment: time it takes to match workers with jobs → short spells of unemployment
Structural Unemployment: Number of jobs available insufficient

Minimum-Wage Laws



→ low-skilled workers with wages under minimum-wage are losers

Unions and Collective Bargaining

Union is a worker association
↳ bargains over wages, benefits, conditions
↳ insiders profit, outsiders lose

Strikes misused for power

Insider - Outsider - Problem

Theory of Efficiency Wages

voluntary above-equilibrium wages to increase productivity

- worker health
- worker turnover
- worker quality
- worker effort

Saving, Investment and the Financial System

financial institutions act as intermediaries that help to match one person's saving with investment

financial markets: savers can directly provide funds
↳ Stock and bond markets

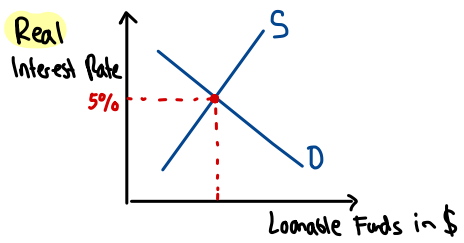
financial intermediaries: - banks, mutual funds

bond: certificate of indebtness, specifies obligations → principal, term, credit risk, tax treatment
Stock: claim to partial ownership in firm → claim to profits (equity financing)

Credit Default Swaps: a mean by which a bondholder can insure against risk of default
Collaterized Debt Obligations: pools of asset-backed securities,

National Saving $S = \underbrace{(Y - T - C)}_{\text{Private saving}} + \underbrace{(T - G)}_{\text{public saving}} = Y - C - G = I$ → income that remains after paying for consumption and government spending

Market for loanable funds: savers supply funds and borrowers demand funds in order to invest



1. Saving incentives (decrease taxes)
2. Investment tax credit (increases incentive to borrow)
3. Government budget deficit → crowding out, decreases supply

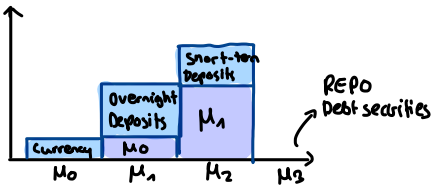
The Monetary System

Money is the set of assets in economy that people regularly use to buy goods

↳ Functions of money:
1. Medium of exchange
2. Unit of account
3. Store of value → transfer purchasing power present to future

Commodity money vs. fiat money

Liquidity of asset: ease with which an asset can be converted to money
Kapital, Anlagegut



Functions of central bank: oversee banking system, regulate quant of money
↳ banker's bank, lender of last resort
↳ monetary policy

Central Bank's Tools of Monetary Control

- Open market operations (repurchase agreements)
- Reserve requirements
- discount rate (Leitzins) → interest rate CB charges for loans

} can't control money in circulation because of multiplier effect

Fractional Reserve-Banking

deposits → liabilities, loans → assets, reserve ratio = fraction of deposits bank has to hold as reserves

$$\text{Money Multiplier} = 1/R$$

Quantitative Easing: central bank injects money into banks in order to encourage lending

Money, Growth and Inflation

Quantity theory of money → long run determinants of price level and inflation rate

nominal variables → measured in monetary units
real variables → measured in physical units

Monetary Neutrality: changes in money supply affect nominal but not real variables

assumed constant

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

← constant in long-run
↖ constant in short-run

Inflation Tax: government raises revenue by printing money → value of money decreases
Fisher Effect: one-to-one adjustment of nominal interest rate to inflation rate, real int. rate stays the same

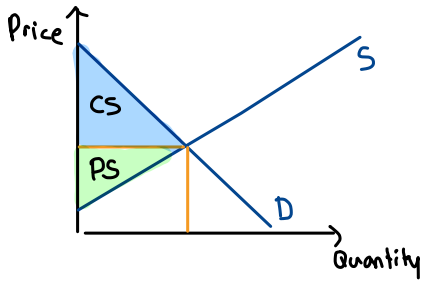
Inflation does not itself reduce purchasing power of the people (only in short-run because of contracts)

Costs of inflation

1. Shoeleather costs
2. Menu costs
3. Relative price variability (Misallocation of Resources)
4. Tax distortions
5. Confusion and Inconvenience
6. Arbitrary redistribution of wealth
   ↳ only if unexpected

International Trade

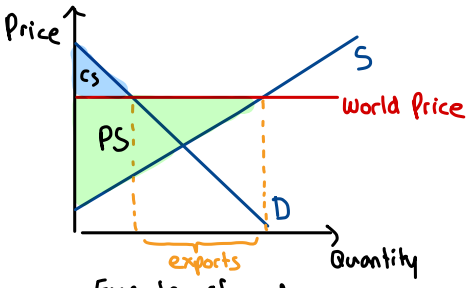
Welfare economics : study of how allocation of resources affects economic well-being
Consumer surplus = willingness to pay - actual price
Producer surplus = actual price - willingness to sell / seller's cost



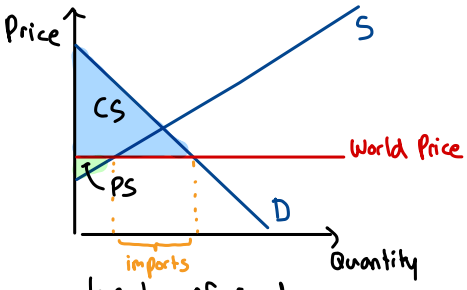
Total surplus = CS + PS = Value to buyers - Cost to sellers

Efficiency → maximizing total surplus
Pareto efficient : no individual can be made better off without harming others

Comparative Advantage: compares producers of good by opportunity cost
Absolute Advantage: comparison of a good according to productivity



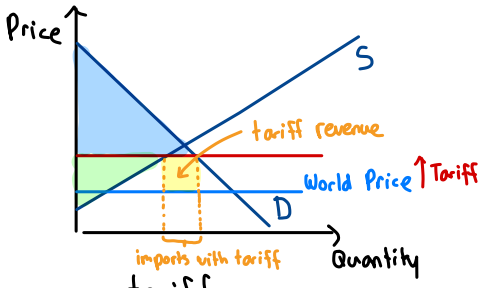
Exporter of good
(Comparative advantage)



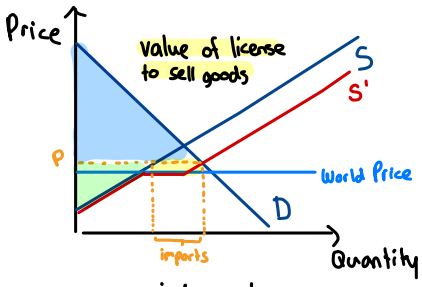
Importer of good
(Comparative disadvantage

- increased variety of goods
- lower costs through economies of scale
- increased competition
- enhanced flow of ideas/innovation

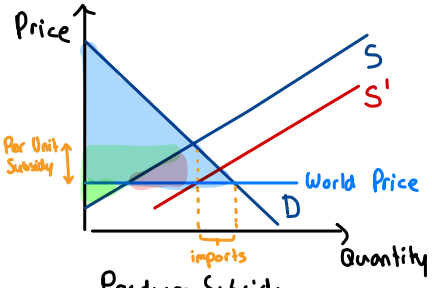
Restrictions on trade



tariff



import quota



Producer Subsidy

Arguments for restricting trade: protecting jobs, defending national security, helping infant indust, preventing unfair competition, responding to foreign trade restrictions

Open-Economy Macroeconomics

Open economy → buys and sells goods/services in world market
→ buys and sells capital assets in world financial markets

Net exports are also called trade balance (trade deficit/surplus, balanced trade)
↳ factors: prices, exchange rates, incomes, transport cost, government policies

Net Capital Outflow refers to the purchase of foreign assets by domestic residents minus the purchase of domestic assets by foreigners.
↳ factors: real interest rates, exchange rates, risks of holding assets abroad, government policies

NCO = NX → $Y - C - G = S = I + NX \Leftrightarrow S - I = NCO = NX$

Nominal exchange rate: rate at which one can trade the currency of one country with another
appreciation → increase in value, depreciation → decrease in value

Real exchange rate: rate at which a person can trade goods and services of one country for the goods and services of another

$$\text{real exchange rate} = \frac{\text{nominal exchange rate}\left(\frac{fc}{lc}\right) \times \text{domestic price}}{\text{Foreign price}}$$

Exchange Rate Determination

Purchasing Power Parity:
- currency must have the same purchasing power in all countries and exchange rates move to ensure that
- nominal exchange rates reflect different price levels

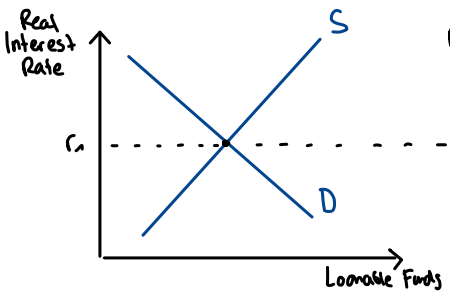
↳ limitations: many goods are not easily traded, not always perfect substitutes

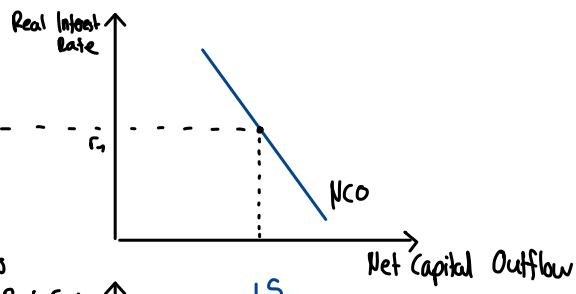
A Macroeconomics Theory of the Open Economy

basic assumptions: economy's GDP given (given from suply-side in long-run), price level given

market for loanable funds
coordinates savings, investment and net capital outflow
higher interest rate → reduces NCO → increases demand

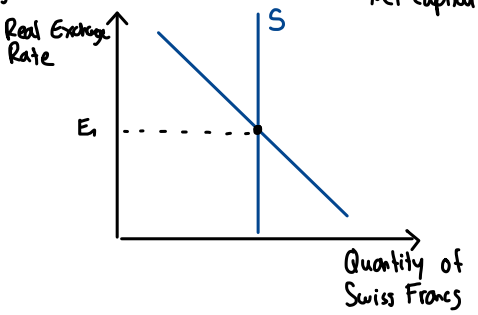
market for foreign currency
coordinates exchange of currencies
NCO represents imbalance of purchases/sales of capital assets
NX represent imbalance of purchase/sales of goods





Goverment budget deficit
↳ reduced supply of loanable funds → interest rate ↑
↳ net capital outflow falls → exchange rate ↑

Trade policies (e.g. import quotas)
↳ NX rises → shifts demand curve
↳ real exchange rate rises
↳ encourages imports > exports



Business Cycles

Okun's law: in order to keep unemployment rate steady, real GDP needs to grow at or close to its potential → unemployment is a lagged indicator

Recession: a period of declining incomes and rising unemployment (two quarters)
Business cycle: study of fluctuations of the economy around trend growth
↳ peak = high GDP ↳ trough = low GDP

Comovement: movement of pairs of variables
procyclical: variable that is above trend when GDP is above trend (e.g. real wages)
countercyclical: variable that is below trend when GDP is above trend (eg unemployment)

leading indicator ↔ coincident indicator ↔ lagging indicator

Causes of changes in the Business Cycle

1. Household spending decisions - supply of labour, decisions based on interest rates, taxation
2. Firm's decision making - increase output if strong demand, react to wage levels, interest rates, taxation
3. External sources - movements in exchange rates, unpredictable events (war, natural hazards)
4. Government policy - fiscal policy, government spending, central bank influences interest rate
5. Confidence and expectations - expectations of future strongly shape behaviour of economic agents

Business Cycle Models: classical models: information problem leads to business cycles
Keynesian models: price rigidity leads to business cycles

1. Supply Side - Classical model: - unanticipated price changes → real wages fall → increased output
   - supply shocks (temporary vs. permanent)

2. Supply Side - Keynesian model: - sticky prices, wages → unexpected fall in price level
   → firms can't lower prices → depresses sales / reduced output

3. Demand Side - Classical model: - any change in aggregate demand (C, I, G, NX)
   ↳ change in price level, inflation fallacy

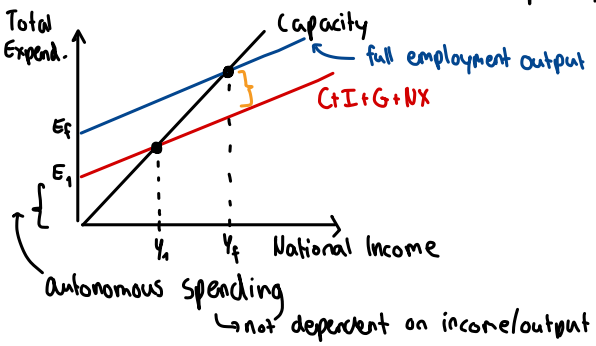
4. Demand Side - Keynesian model: - increase in aggregate demand → sticky prices
   → firms take steps to increase output
   → over time prices adapt → back to trend

5. Real Business Cycles (Supply Side): - positive and negative technology shocks affect productivity regardless of real wage rate
   ↳ employment, productivity and real wages procyclical

Keynesian Economics and IS-LM Analysis

Planned spending/saving vs Actual spending/saving
Full employment: people who want to work at going rate find a job

Keynesian cross diagram: 45° line actual spending = national income
↳ capacity of economy



deflationary gap: difference between full employment output and expenditure if $E_1 < E_f$

inflationary gap: difference between full employment output and actual expenditure if $E_1 > E_f$

multiplier effect: expansionary fiscal policy → additional shifts
↳ slope of expenditure function

accelerator principle: small demand increase ↔ no investment (higher prices)
big enough impuls → new investment

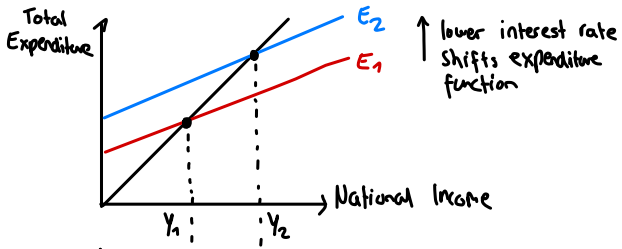
Spending Multiplier: $\frac{1}{1-MPC} = \frac{1}{MPS}$ → MPC = marginal propensity to consume
↳ open economy: $\frac{1}{MPS+MPT+MPM} = \frac{1}{MPW}$ → marginal propensity to withdrawal

IS and LM Curves

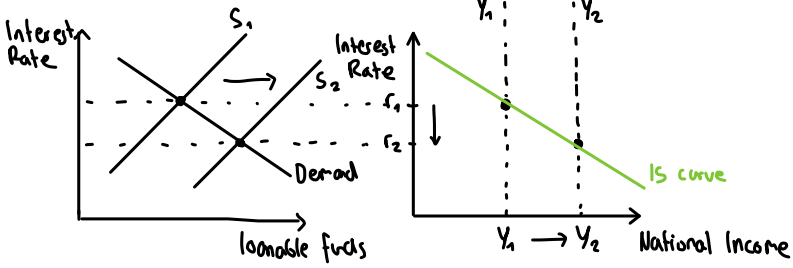
goods market ← interest rate → money market

IS: investment and saving , LM: liquidity and money

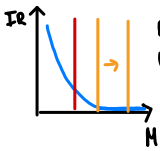
IS CURVE



↑ lower interest rate shifts expenditure function



Liquidity Trap

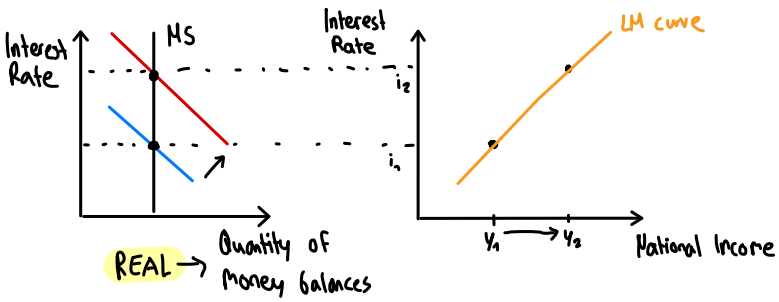


money demand becomes horizontal when nom. interest rate = 0%
↳ shifts of supply no effect

inverse relationship between interest rate and output

the more responsive C and I (steep expenditure function), the flatter IS-curve

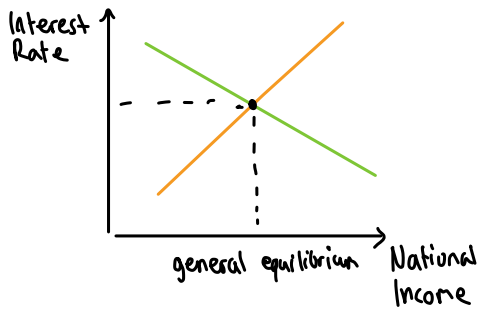
shifts in IS curve come from changes in autonomous spending



LM CURVE

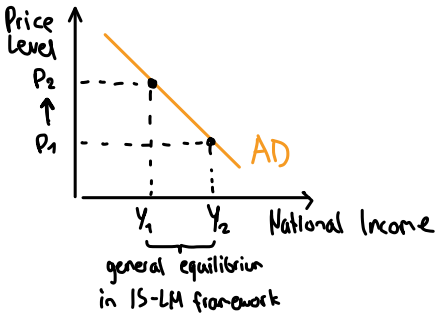
↑ demand for liquid money increase with increased national income
↳ cash needed for transactions

- IS curve represents a point of equilibrium in the goods markets
- LM curve represents equilibriums in money market



Aggregate Demand

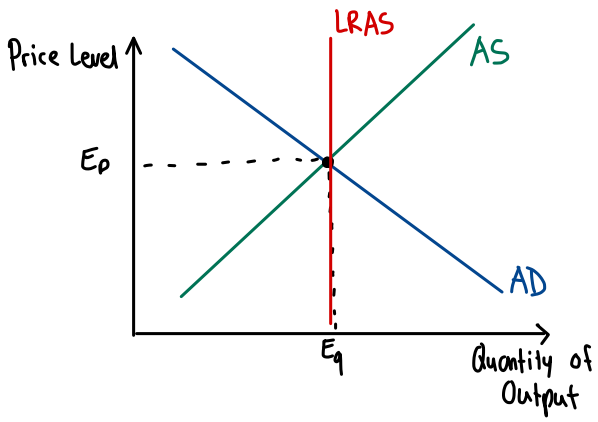
rise in price level reduces supply of real money balances → left shift of LM curve
↳ AD curve shows inverse relationship between price level and national income



→ in the short run, price level is constant
↳ changes in national income shift AD curve

model of aggregate demand and supply is used to explain short-run fluctuations around long-run trend

Aggregate Demand and Aggregate Supply



AD: $Y = C + I + G + NX$
downwards sloping:
- wealth effect (consumption)
- interest rate effect (investment)
- exchange rate effect (exports)

AS: long-run vertical → depends only on production factors
↳ natural rate of output
short-run upwards sloping:
- sticky wage theory
- sticky price theory
- misperceptions theory

Quantity of output supplied = Natural rate of output + $a \cdot$ (Actual price level − Expected price level)

Shifts in aggregate demand:
- short run → fluctuations in economy's output
- long run → only affects price level

Shifts in aggregate supply:
- long run → production factors
- short run → price level increases → left shift
  unemployment rises ↗

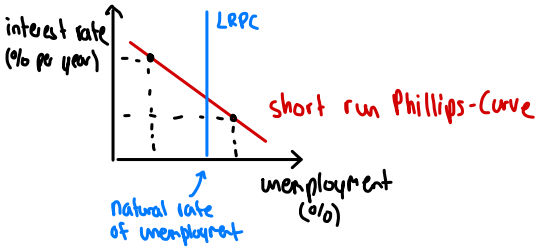
automatic stabilizers: stimulates AD during recession without deliberate action of policymakers

Stagflation: falling output and rising prices

Phillips Curve

natural rate of unemployment: unemployment that does not go away in long-run
↳ frictional (job search) and structural (wage rigidity) unemployment

Society faces short run trade-off between unemployment and inflation



Okun's law: one-percent decrease in unemployment
→ 2% points increase of GDP

unemployment rate = natural rate of unemployment + a · (actual inflation − expected inflation)

shifts of short-run Phillips curve: - changes in inflation expectations
- shocks to aggregate supply

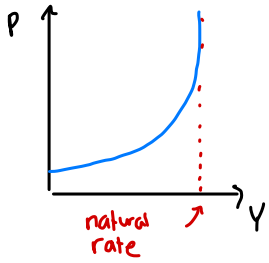
demand-pull inflation: positive shocks to aggregate demand → unemployment ↓ → inflation rate ↑
cost-push inflation: negative supply shocks → increase production costs → inflation ↑

To reduce inflation, an economy must endure a period of high unemployment and low output.
Sacrifice ratio: percentage points lost of GDP in the process of reducing inflation by 1% point. (≈ 5)

adaptive expectations (recent observation) ⟷ rational expectations (gather information)

New Keynesian Short-Run AS-Curve

↳ trade-off between increase in national income and price level depends on how large output gap is



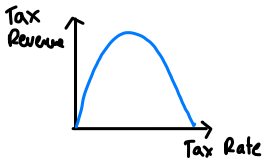
Sustained growth by shifting AS
↳ increases living standards
↳ reduces unemployment
↳ keeps prices stable

market-oriented supply-side policies: free up markets to improve resource allocation
interventionist supply-side policies: improve working of markets through infrastructure, education, R&D

market-oriented:
1. reduce distorting effects of tax and welfare policy
2. flexible labour markets
3. reduce government spending
4. Privatization / deregulation

} government spending less efficient

Laffer Curve



interventionist:
1. Infrastructure
2. Education & Training
3. Research and Development
4. Regional or Industrial Policies

The Great Financial Crisis

- financial market deregulation, low interest rates
  ↳ financial innovation: securization
    ↳ lack of transparency

→ overleveraging and excessive risk taking

- 2006-07 → interest rates started to rise again to prevent inflation
  ↳ many homeowners could not afford payments anymore → default

- house prices began to fall → negative equity

- lenders start to question solvency of financial institutions → stop transacting with bank
  ↳ no more short-term credits ↳ bank runs

- moral hazard: if banks know that they would be bailed out → less incentive to pursue prudential lending practices

- government took additional steps to prevent bank runs, quantitative easing

The Euro Crisis

- after introduction of Euro → Greece suddenly able to borrow at low interest rates
  ↳ living beyond its means (free rider problem) → large budget deficit

- financial crisis → couldn't borrow anymore money and could not pay back debts

- in case of default, many countries would have followed because of interdependence

→ emergency loans attached austerity measures
  ↳ cuts of public spending, tax rises, structural reforms