Economics Cheatsheet

A comprehensive cheat sheet covering fundamental concepts in economics, including microeconomics, macroeconomics, and econometrics. Ideal for students and professionals alike.

Microeconomic Principles

Supply and Demand

Demand	The quantity of a good or service that consumers are willing and able to purchase at various prices during a specified period.
Supply	The quantity of a good or service that producers are willing and able to offer for sale at various prices during a specified period.
Equilibrium Price	The price at which the quantity demanded equals the quantity supplied, resulting in a balanced market.
Price Elasticity of Demand (PED)	Measures the responsiveness of the quantity demanded to a change in its price. Calculated as: `% Change in Quantity Demanded / % Change in Price`
Price Elasticity of Supply (PES)	Measures the responsiveness of the quantity supplied to a change in its price. Calculated as: `% Change in Quantity Supplied / % Change in Price`
Factors Shifting Demand Curve	Changes in consumer income, tastes, expectations, prices of related goods (substitutes and complements).
Factors Shifting Supply Curve	Changes in input costs, technology, number of sellers, expectations about future prices.

Market Structures

Perfect Competition	Many buyers and sellers, homogeneous products, free entry and exit, price takers. Examples: Agricultural Markets.
Monopolistic Competition	Many buyers and sellers, differentiated products, relatively easy entry and exit. Examples: Restaurants, Clothing Stores.
Oligopoly	Few sellers, interdependent firms, barriers to entry. Examples: Automobile Industry, Airline Industry.
Monopoly	Single seller, unique product, high barriers to entry, price maker. Examples: Public Utilities (e.g., Water, Electricity).
Key Characteristics	Each market structure is defined by the number of firms, product differentiation, barriers to entry, and control over price.

Cost and Production

Total Cost (TC)	The sum of all costs incurred by a firm in producing a given level of output. Includes fixed and variable costs. Formula: `TC = FC + VC`
Fixed Cost (FC)	Costs that do not vary with the level of output. Examples: Rent, Insurance.
Variable Cost (VC)	Costs that vary with the level of output. Examples: Raw Materials, Labor.
Marginal Cost (MC)	The additional cost of producing one more unit of output. Calculated as: `Change in TC / Change in Quantity`
Average Total Cost (ATC)	Total cost divided by the quantity of output. Formula: `ATC = TC / Q`
Average Variable Cost (AVC)	Variable cost divided by the quantity of output. Formula: `AVC = VC / Q`
Production Function	Relationship between inputs (e.g., labor, capital) and the quantity of output. Often represented as `Q = f(L, K)` where Q is output, L is labor, and K is capital.

Macroeconomic Indicators and Models

Key Macroeconomic Indicators

Gross Domestic Product (GDP)	The total market value of all final goods and services produced within a country's borders in a specific time period. It's a primary indicator of economic activity.
Inflation Rate	The percentage change in the general price level over time. Measured using the Consumer Price Index (CPI) or the GDP deflator.
Unemployment Rate	The percentage of the labor force that is unemployed and actively seeking employment.
Interest Rates	The cost of borrowing money. Influenced by central banks and market forces. Affects investment and consumption.
Government Debt	The total amount of money owed by the government to its creditors.
Exchange Rates	The value of one currency in terms of another. Influences international trade and investment flows.

Basic Macroeconomic Models

Aggregate Supply and Demand (AS-AD)	A model that explains price level and output determination through the interaction of aggregate supply and aggregate demand curves.
IS-LM Model	A model that explains the interaction between the goods market (IS curve) and the money market (LM curve) to determine interest rates and output.
Mundell-Fleming Model	An extension of the IS-LM model to an open economy, considering the effects of exchange rates and capital flows.
Solow Growth Model	A model that explains long-run economic growth through capital accumulation, labor force growth, and technological progress. Key Equation: `dk = s*f(k) - δk` Where `k` is capital per worker, `s` is the savings rate, `f(k)` is output per worker, and `δ` is the depreciation rate.

Fiscal and Monetary Policy

Fiscal Policy	Government's use of spending and taxation to influence the economy. Expansionary fiscal policy (increased spending or tax cuts) can stimulate economic growth, while contractionary fiscal policy (decreased spending or tax increases) can curb inflation.
Monetary Policy	Central bank's actions to control the money supply and credit conditions to influence the economy. Tools include setting interest rates, reserve requirements, and conducting open market operations.
Inflation Targeting	A monetary policy strategy where the central bank announces an explicit inflation target and uses its policy tools to achieve that target.
Quantitative Easing (QE)	A monetary policy where the central bank purchases assets (e.g., government bonds) to increase the money supply and lower interest rates, typically used when conventional policy tools are ineffective.

Econometrics Essentials

Basic Regression Analysis

Ordinary Least Squares (OLS)	A method for estimating the parameters of a linear regression model by minimizing the sum of squared residuals.
Regression Equation	A statistical model that describes the relationship between a dependent variable and one or more independent variables. Generic Form: $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + ... + \varepsilon$ Where Y is the dependent variable, X are independent variables, β are coefficients, and ε is the error term.
R-squared	A statistical measure that represents the proportion of the variance in the dependent variable that is explained by the independent variables in the regression model. Ranges from 0 to 1, with higher values indicating a better fit.
Adjusted R-squared	A modified version of R-squared that adjusts for the number of independent variables in the model. It penalizes the inclusion of irrelevant variables.
Standard Error	A measure of the accuracy of the regression coefficients. Smaller standard errors indicate more precise estimates.
T-statistic	A measure of how many standard errors the estimated coefficient is away from zero. Used to test the significance of individual coefficients.
P-value	The probability of observing a test statistic as extreme as, or more extreme than, the one computed if the null hypothesis is true. A small p-value (typically < 0.05) indicates statistical significance.

Econometric Problems and Solutions

Multicollinearity	High correlation between independent variables in a regression model, which can lead to unstable coefficient estimates. Solutions include dropping one of the correlated variables or using regularization techniques.
Heteroskedasticity	Unequal variance of the error term across different levels of the independent variables. Solutions include using robust standard errors or transforming the data.
Autocorrelation	Correlation between error terms in a time series regression model. Solutions include using Newey-West standard errors or including lagged variables in the model.
Endogeneity	Correlation between the independent variables and the error term, which can lead to biased coefficient estimates. Solutions include using instrumental variables (IV) or two-stage least squares (2SLS).
Omitted Variable Bias	Bias that occurs when a relevant variable is excluded from the regression model. Solutions include adding the omitted variable to the model or using proxy variables.

Time Series Analysis

Stationarity	A property of a time series in which its statistical properties (e.g., mean, variance) do not change over time. Stationarity is a key assumption for many time series models. Common tests include the Augmented Dickey-Fuller (ADF) test.
ARIMA Models	Autoregressive Integrated Moving Average models. A class of models that capture the correlation in a time series by modeling the dependence of current values on past values and past errors. Key components include the autoregressive (AR), integrated (I), and moving average (MA) terms.
Autocorrelation Function (ACF)	A measure of the correlation between a time series and its lagged values. Used to identify the order of the MA component in an ARIMA model.
Partial Autocorrelation Function (PACF)	A measure of the correlation between a time series and its lagged values, after removing the effects of the intervening lags. Used to identify the order of the AR component in an ARIMA model.
Unit Root Tests	Statistical tests used to determine if a time series is stationary. The most common test is the Augmented Dickey-Fuller (ADF) test.

Financial Economics

Asset Pricing Models

Capital Asset Pricing Model (CAPM)	Describes the relationship between systematic risk and expected return for assets, particularly stocks. Formula: $E(Ri) = Rf + \beta i(E(Rm) - Rf)$ Where $E(Ri)$ is the expected return of the asset, Rf is the risk-free rate, βi is the asset's beta, and $E(Rm)$ is the expected return of the market.
Arbitrage Pricing Theory (APT)	A multifactor model that explains asset returns based on multiple systematic risk factors. Allows for more than one factor influencing asset prices.
Fama-French Three-Factor Model	An extension of the CAPM that includes size and value factors to explain asset returns. Factors: Market Risk, Size (SMB), and Value (HML).

Option Pricing

Black-Scholes Model	A model for pricing European-style options. It assumes that the price of the underlying asset follows a log-normal distribution.
Option Greeks	Measures of the sensitivity of an option's price to changes in various parameters. Include Delta, Gamma, Vega, Theta, and Rho.
Delta	Measures the change in an option's price for a one-unit change in the price of the underlying asset.
Gamma	Measures the rate of change of delta with respect to changes in the price of the underlying asset.
Vega	Measures the change in an option's price for a one-unit change in the volatility of the underlying asset.
Theta	Measures the change in an option's price for a one-unit change in time to expiration.
Rho	Measures the change in an option's price for a one-unit change in the risk-free interest rate.

Corporate Finance Metrics

Net Present Value (NPV)	The present value of future cash flows minus the initial investment. Used to evaluate the profitability of an investment or project. A positive NPV indicates a profitable investment.
Internal Rate of Return (IRR)	The discount rate that makes the NPV of all cash flows from a particular project equal to zero. Used to evaluate the profitability of an investment or project. If IRR is greater than the cost of capital, the project is considered acceptable.
Weighted Average Cost of Capital (WACC)	The average rate of return a company is expected to pay to its investors. Used as a discount rate for evaluating investment projects. `WACC = (E/V)*Ke + (D/V)*Kd*(1-Tax Rate)` Where: `E` = market value of equity, `D` = market value of debt, `V` = total market value of capital (E+D), `Ke` = cost of equity, `Kd` = cost of debt.
Free Cash Flow (FCF)	Cash flow available to the company after all operating expenses and investments have been paid. Used to determine the value of a company. Formula: `FCF = EBIT*(1-Tax Rate) + Depreciation - Capital Expenditures - Change in Net Working Capital`