Econometrics

🟦 1. Introduction

Econometrics combines economics, mathematics, and statistics to test hypotheses, estimate relationships, and forecast outcomes. It allows economists to quantitatively validate economic theories using real data.

🟦 2. Basic Concepts

Dependent variable (Y): outcome to explain
Independent variables (X): factors affecting Y
Regression equation: $Y = \beta_0 + \beta_1 X_1 + \ldots + \varepsilon$

🟦 3. Types of Econometric Models

Linear regression
Time series models
Panel data models
Simultaneous equations models

🟦 4. Estimation Methods

Ordinary Least Squares (OLS) – minimizes squared residuals
Maximum Likelihood Estimation (MLE) – finds parameters maximizing likelihood
Generalized Least Squares (GLS) – accounts for heteroskedasticity

🟦 5. Applications

Forecasting GDP, inflation, unemployment
Evaluating policy impact
Risk assessment in finance

🟦 6. Limitations

Data quality issues
Model misspecification
Multicollinearity and autocorrelation problems

🟦 7. Conclusion

Econometrics is essential for bridging theory and empirical evidence, allowing informed economic decision-making and policy evaluation.