Econometrics

Assignment Guidelines:

This task evaluates the fundamental principles and empirical methods of econometrics, focusing on Ordinary Least Squares (OLS) regression, hypothesis testing, diagnostic checking, and empirical model specification in business and economic decision-making. Students are expected to solve real-world economic problems, perform quantitative estimations using statistical software (e.g., Gretl, Stata, or R), and interpret computational results to guide data-driven business strategies and policy decisions.

Submission Format:

- Type: Practical Empirical Report (Econometric Analysis Project)
- Font/Spacing: Times New Roman, Size 12, Double Spaced
- Word Count: 1500 – 2500 words (excluding formulas, regression tables, and software output appendices)
- Submission Deadline: To be announced by the respective professors

Assessment Criteria:

- Application of econometric principles, theoretical frameworks, and model specification – 20%
- Accuracy of empirical estimation, statistical software execution, and diagnostic testing – 25%
- Critical interpretation of regression output, elasticity measures, and statistical significance – 20%
- Strategic economic insight, risk evaluation, and quality of managerial recommendations – 25%
- Structure, technical reporting clarity, presentation, and APA referencing – 10%

Mandatory Sections:

- Title Page
- Table of Contents
- Executive Summary
- Introduction
- Theoretical Framework & Model Specification
- Empirical Estimation & Diagnostic Testing
- Discussion & Managerial/Economic Implications
- Conclusion & Recommendations
- References
- Appendices (Software Output & Regression Tables)

Assignment Task – Choose ONE of the following practical projects:

Option 1: Consumer Demand Modelling and Price Elasticity Estimation

Analyse demand relationships and price elasticities for a consumer product or service using multiple linear regression models. Your paper should:

- Specify a log-log or linear empirical demand model that includes price, competitor prices, advertising expenditure and consumer income variables.
- Perform Ordinary Least Squares (OLS) estimation using statistical software, test goodness-of-fit (R^2) and test for statistical significance (t-tests, F-test).
- Identify major econometric violations, such as multicollinearity and heteroskedasticity, and use robust standard errors or remedial model transformations when necessary.
- Prepare a relevant empirical report for corporate management that includes elasticity estimates and actionable pricing strategies.

Option 2: Time Series Analysis and Business Sales Forecasting

Investigate dynamic economic relationships and time series modelling to forecast corporate revenue, demand fluctuations, or financial indicators. Your paper should:

- Develop and estimate time series econometric models (e.g., autoregressive AR models, trend projections, or distributed-lag specifications).
- Evaluate time series properties, including stationarity testing (Augmented Dickey-Fuller test), autocorrelation (Durbin-Watson test), and serial correlation remedies.
- Analyse real-world corporate financial or market datasets to evaluate forecast accuracy and out-of-sample prediction errors.
- Recommend a data-driven forecasting framework for executive decision-making and risk management in volatile market conditions.

Option 3: Corporate Performance, Capital Structure, and Cross-Sectional Determinants

Evaluate the key drivers of firm profitability (e.g., Return on Assets, operating margin) using cross-sectional or panel data across industry sectors. Your paper should:

- Formulate a multivariate empirical model linking firm financial performance to capital structure (debt ratio), firm size, R&D intensity, and macroeconomic variables.
- Estimate the model parameters using statistical software (e.g., Gretl, Stata, R) and interpret the economic and statistical significance of estimated coefficients.
- Conduct diagnostic checks for model specification errors, endogeneity risks, and omitted variable bias.
- Create an empirical business report providing strategic recommendations for capital structure optimisation and operational improvement