

# ECONOMIC STATISTICS

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Course Material Developed by Department of Economics,  
Faculty of Social Sciences, Eötvös Loránd University Budapest (ELTE)

Department of Economics, Eötvös Loránd University Budapest

Institute of Economics, Hungarian Academy of Sciences

Balassi Kiadó, Budapest

Author: Anikó Bíró

Supervised by Anikó Bíró

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# ECONOMIC STATISTICS

## Syllabus

This course gives an intuitive introduction to the analysis of economic data

### Schedule:

- 1. week:** Introduction – course requirements, connections to other subjects. About economic data – examples for economic questions, data sources on the internet. Basic computer knowledge (Excel, Power Point, Word) – Excel worksheets, computations in Excel.

Textbook chapter 2

- 2. week:** Data types: cross sectional, time series, panel. Descriptive statistics – graphical methods, histogram, point diagram. Indicators: mean, mode, percentiles, variation, skewness. Descriptive statistics with Excel, Analysis ToolPak.

Textbook chapter 2

- 3. week:** Correlation – definition, interpretation of square of correlation. Properties of correlation. Correlation and causality?

Correlation and regression – different approach. Introduction to simple regression – writing up the model, estimation.

Calculation of correlation, OLS estimation with Excel.

Textbook chapter 3

4. **week:** Simple regression – goodness of fit, definition and interpretation of R-squared. Nonlinearity, logarithmic form (elasticity). Influencing factors of estimation precision, confidence interval. Practicing.

Textbook chapter 4

5. **week:** Hypothesis testing: null and alternative hypothesis, procedure of hypothesis testing, t-test, p-value. Connection between hypothesis testing and confidence interval. F-test (intuitively). Examples. Summary. 1<sup>st</sup> exam.

Textbook chapter 5

6. **week:** Discussion of 1<sup>st</sup> exam. Multivariate regression – more explanatory variables. Estimation, interpretation of coefficients, confidence interval, hypothesis testing. Practicing examples: model of GDP growth, regression of production costs of electricity firms.

Simple simulation with Excel.

Textbook chapter 6

7. **week:** Bias due to omitted variables. Problems of “too many” and “too few” regressors. Multicollinearity: definition, symptoms, possible solutions. Binary variables, introduction: different intercept, different means of subgroups.

Textbook chapters 6, 7

8. **week:** Binary variables – interactions: different intercept and different slope across groups. Examples: housing price regression (properties of the real estate as binary regressors), wage regression (gender discrimination). Binary dependent variable: limitations of OLS. Summary. 2<sup>nd</sup> exam.

Textbook chapter 7

9. **week:** Discussion of 2<sup>nd</sup> exam. Basics of time series analysis – comparison with cross sectional analysis. Distributed lag model – model specification, interpretation of coefficients and their sum. Lag length selection. Introduction to EViews.

Textbook chapter 8

**10. week:** Univariate time series analysis – graphical analysis with examples. Trend. Autocorrelation, autocorrelation function, and its interpretation. AR(1) model. Stationarity based on the estimated coefficient in the AR(1) model. Practicing examples: time series of export and public debt.

Textbook chapter 9

**11. week:** AR(p) models – basic and modified forms. Unit root, based on the modified form. Seasonality: definition and methods of seasonal adjustment. Unit root test: Dickey-Fuller test. Lag length selection in AR(p) models.

Textbook chapter 9

**12. week:** Time series regression – basic and modified forms of ADL(p,q) models, interpretation of coefficients (temporary effect, long run multiplier). First differencing of unit root processes. Definition and testing of cointegration (Engle-Granger test). Error correction model: specification, interpretation of coefficients.

Textbook chapter 10

**13. week:** Summary, outlook. Further topics: Volatility analysis of asset prices – why important, examples. Granger-causality: definition and testing. VAR model – advantages and disadvantages. Macroeconomic example for VAR models (RMPY).

Textbook chapter 11

**Textbook:** Gary Koop: *Analysis of economic data*, 2nd Edition. (John Wiley & Sons Ltd, 2005)