University of Gdańsk

Subject card

Subject name and code	Econometrics I, PG_00198970						
Field of study	Economics						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2027/2028		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	4		ECTS credits		5.0		
Learning profile	academic		Assessment form		exam		
Conducting unit	Department of International Economics and Economic Development -> Faculty of Economics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Dorota Ciołek				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	0.0	0.0	30
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	30		4.0		91.0	125
Subject objectives	Presentation of the econometric model as a tool for hypothesis verification and forecasting in economics and management sciences. Acquiring knowledge and practical skills in building, estimating, interpreting and evaluating econometric models..						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[EKONL3_U03] is able to analyse the causes and course of specific economic and social processes and phenomena, and accurately analyse these phenomena using adequate methods and tools economic and social	is able to build and estimate an econometric model and verify and interpret it	[SU4] test/exam - oral or written
[EKONL3_U07] is able to participate in analyses and evaluations of alternative solutions to economic and social problems and to choose the methods and instruments to resolve them rationally	can propose an econometric model suitable for verifying specific hypotheses or research goals	[SU4] test/exam - oral or written
[EKONL3_K05] correctly identifies, diagnoses and resolves professional dilemmas and different options for solutions	is able to interpret the results of estimating an econometric model and use it appropriately in the process of making economic decisions	[SK4] test/exam - oral or written
[EKONL3_W06] has an advanced knowledge of selected methods and tools, including statistical and econometric techniques, for describing economic agents and structures as well as social institutions and the processes taking place in them	knows the basic types of single-equation econometric models, methods of their estimation, tools for their verification and ways of interpreting them in relation to specific relationships in economics and other social sciences	[SW4] test/exam - oral or written
[EKONL3_U02] is able to use the knowledge of theory and data to analyse concrete economic and social processes and phenomena and to analyse these phenomena using methods developed in economics, finance and management sciences	is able to obtain appropriate statistical data and use them to estimate, verify and interpret an econometric model	[SU4] test/exam - oral or written
[EKONL3_U04] can predict and forecast the course of economic and social processes and phenomena	is able to build and estimate a single-equation econometric model and verify its forecasting properties and use the model to build forecasts along with assessing their ex ante accuracy	[SU4] test/exam - oral or written

Subject contents

1. The nature of quantitative economic data: types of statistical data, economic variables as random variables, regression as an econometric model (dependent variable and explanatory variables, structural parameters, disturbances), essence of the error term, various analytical forms of the model, when logarithms and when levels of variables?, Interpretation of parameters in regression2. Model estimation using OLS: Gauss-Markov theorem, idea of the OrdinaryLeast Squares estimator, numerical conditions of applicability OLS, stochastic assumptions and their importance for OLS properties, OLS matrix formula, theoretical values and model residuals, standard errors of parameter estimation, confidence intervals for parameters3. Verification of the econometric model: tests of individual and joint significance of parameters, goodness-of-fit measures and their interpretation, tests regarding the error term, methods of dealing with failure to meet assumptions, robust standard errors, RESET test as verification of correctness analytical form4. Econometric model - additional issues: the impact of data scaling on the results of OLS estimation, the relationship between variables "inverted U" nature - quadratic function in the econometric model, models with interactions of variables, collinearity of variables explanatory factors, high correlation between explanatory variables, VIF (Variance Inflation Factor) measure, comparison of different models - criteria information: AIC, BIC, the problem of endogeneity of explanatory variables5. Regressions with artificial variables: qualitative variables as explanatory variables, dummy variables - change of the intercept, dummy variables - change in slope, exact multicollinearity, interactions between qualitative variables, identification atypical observations - measures: leverage, standardized residuals, Cook's distance, dummy variables for atypical observations, variables binary numbers for structural changes6. Econometric model for time series: specificity of data in the form of time series, stochastic process generating data,static model - interpretation of parameters, model with distributed lags - short- and long-term interpretation (multipliers), trend in variables observed over time, spurious regressions - common trend, introduction of the time variable t, R2 for the explained variables characterized by a trend, seasonality for higher frequency variables, trend models with seasonal fluctuations, stationarity and non-stationarity of time variables, unit root test, economic variables "with long memory"

The student discusses these issues during consultations with the course instructor

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Knowledge of:

- matrix algebra, basics of differential calculus, probability calculus,

- descriptive statistics and statistical inference

- theory of macroeconomics and microeconomics</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Written exam</td><td>51.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">Koop G. (2015), Wprowadzenie do ekonometrii, Wolters Kluwer, Warszawa

Kufel T.(2004), Rozwiązywanie problemów z wykorzystaniem programu Gretl, PWN, Warszawa

Kukuła K. (red.) (2009), Wprowadzenie do ekonometrii, PWN, Warszawa

Osińska M., (red), (2007), Ekonometria współczesna, TONiT. Toruń.

Strzała K., Przechlewski T., (2006), Ekonometria inaczej. Wydawnictwo Uniwersytetu Gdańskiego.</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">Wooldridge J. M. (2013), Introductory Econometrics: A Modern Approach, South-Western Cengage Learning

Greene W.H. (2002), Econometric Analysis, New York University. Upper Saddle.

Modelowanie ekonomicznej wartości denitryfikacji jako jednej z usług ekosystemowych Zatoki Gdańskiej z wykorzystaniem WTP Wrześniewska Ilona, Ciołek Dorota, Zarzycki Tomasz, Zarządzanie i Finanse, 2015, vol. 13, nr 4, cz. 2</td></tr>
<tr><td>eResources addresses</td><td colspan="2"></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3"></td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
</table>

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