GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Econometrics, PG_00050166						
Field of study	Economic Analytics						
Date of commencement of studies	October 2021		Academic year of realisation of subject		2022/2023		
Education level	first-cycle 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	general academic profile		Assessment form		exam		
Conducting unit	Faculty of Management and Economics						

Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Michał Pietrzak
	Teachers	dr Dagmara Nikulin
		dr hab. Jerzy Ossowski
		dr hab. Michał Pietrzak

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	0.0	60
	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	60	10.0	55.0	125

Subject objectives	Construction, estimation, statistical verification and interpretation of econometric models

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W07] Has the knowledge of sub-disciplines in economics and finance and understands their importance for economic development.	Student knows relationships between economic procceses	[SW1] Assessment of factual knowledge
	[K6_U01] Can correctly identify and describe, using quantitative methods, and interpret economic phenomena and processes and their conditions.	Student can identify the relationships between phenomena in economy and can describe them using econometric model.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
	[K6_W11] Knows quantitative methods to describe and analyse socio-economic processes; understands their conditions and consequences.	Student knows how to construct, estimate and interpret econometric models.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
	[K6_U07] Can use quantitative methods to analyse and solve economic problems using information technologies.	Student can construct the model and estimate it using econometric software.	[SU4] Assessment of ability to use methods and tools

Subject contents	Econometric model and its components. The method of least squares (LSM) of linear econometric model estimation - cases of simple and multiple regression. Numerical and stochastic properties of the OLS estimator. Verification of the estimated model - a measure of the degree of model fit and the significance of structural parameters. Multiplicative models - properties. Autocorrelation and heteroscedasticity of the random component of the model - measurement, testing and determining and removing causes. Removing the effects of autocorrelation and heteroscedasticity - GLS estimation procedures. Models of development tendency with seasonality. Econometric forecasting. Cause-effect dynamic model - assumptions, interpretation, estimation and verification. Cause-effect wage models. Cause-effect models of inflation, Cause-effect models of production and labor productivity. Cause-effect model of labor demand.
Prerequisites and co-requisites	matematics, microeconomics, macroeconomics, statistics

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
colloquium (lab)	55.0%	49.0%
written exam	55.0%	51.0%

Recommended reading		
	Basic literature	**Maddala G.S.: Introduction to Econometrics John Wiley&Sons,LTD, New York, 2002,**
	Supplementary literature	**Maddala G.S.: Introduction to Econometrics John Wiley&Sons,LTD, New York, 2002,**
	eResources addresses	Podstawowe https://enauczanie.pg.edu.pl/moodle/course/view.php?id=27746 - ecourse Adresy na platformie eNauczanie: Ekonometria AG - lato 2022/23 - Moodle ID: 27746 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=27746

Example issues/ example questions/ tasks being completed	**Problem 2**
	Based on **n=24** annual observations, the following model was estimated:
	$$y_t = B_0 p_t^{b1} pm_t^{b2} pe_t^{b3} \exp_t$$
	where:
	y_t - supply of pork in thous. tonnes in year t,
	p_t - purchase price of pork in PLN/kg in year t,
	pm_t - feed price (cereal mix) in PLN/kg in year t,
	pe_t - electricity price in PLN/KWh in year t
	The estimation results of the linearized form of the considered model are as follows:
	$$\ln \hat{y}_t = 0.05 + 0.25 \ln p_t - 0.3 \ln pm_t - 0.1 \ln pe_t$$
	The average parameters estimation errors are as follows:
	$$S(b1)=0.05 \quad S(b2)=0.1 \quad S(b3)=0.05$$
	The standard deviation of the residuals, the coefficient of determination, and the value of the ***DW statistic*** are:
	$$S_e=0.0125 \quad R^2 = 0.985 \quad DW=1.725$$
	The critical values of the relevant statistics at the significance level **a=0.05** are as follows:
	$$(t_a = 2.086) \text{ and } (d_l = 1.1010; d_u = 1.6565)$$
	Do the following and complete the sentences:
	2.1 Based on the estimated standard deviation, we will say that...
	2.2. Based on the estimated coefficient of determination, we will say that....
	2.3 Based on the estimated version of the model, we will say that if the buying-in price of meat in a given year
	will increase by .. then, with other conditions unchanged, the supply of pork meat......
	2.4 Based on the estimated version of the model, we say that if the price of feed in a given year
	will increase by .. then, other conditions unchanged, the supply of pork
	2.5 Based on the estimated version of the model, we say that if the price of electricity in a given year

	other things being equal, the supply of pork will increase by that...
	In order to examine the significance of the impact of the purchase price of meat and the price of feed on the supply of meat, I verify
	the following null hypothesis: H0: b1, b2, b3 = 0 ... against the alternative hypothesis: H1: b1, b2, b3 0. .
	2.6. In the case of the purchase price of meat, the null hypothesis (I reject/do not reject) in favor of the hypothesis
	alternative because . . . .
	2.7, therefore the parameter b1 statistically significantly (differs/does not differ) from zero.
	2.8 in the light of the above, the variable pt statistically significantly (affects/does not affect) the supply of meat.
	1.9. In the case of feed price, the null hypothesis (I reject/do not reject) in favor of an alternative hypothesis
	Because ....
	2.10, therefore the parameter b2 statistically significantly (differs/does not differ) from zero.
	2.11 in the light of the above, the pmt variable has a statistically significant (affects/does not affect) meat supply.
	2.12. In the case of the price of electricity, the null hypothesis (I reject/do not reject) in favor of the hypothesis
	alternative because ....
	2.13, therefore the parameter b3 statistically significantly (differs/does not differ) from zero.
	2.14 in the light of the above, the pet variable has a statistically significant (affects/does not affect) meat supply.
	2.15. In order to assess autocorrelation, I verify:
	the following null hypothesis: H0: $ro1 = 0$ against the alternative hypothesis: H1: $ro1 > 0$ .. .
	Due to the fact that . in the case of the model in question:
	- I lean towards the hypothesis ... ..., ...,
	- I am not in favor of any of the hypotheses put forward.
	which means, that.......
	2.16. Based on the DW, I find that the approximate value of the autocorrelation of the first-order residuals is:......
Work placement	Not applicable