

# Models with Qualitative Dependent Variables

**Sheluntsova Mariya**

Class Times and Locations: Pokrovsky Boulevard 11

Email: [msheluntsova@hse.ru](mailto:msheluntsova@hse.ru)

Phone: +7-495-7729590 ext.27504

Office Location: Pokrovsky Boulevard 11, room S-528

Office Hours: Wednesday 16.00 – 18.00, Friday 16.00 – 18.00

## **Section 1. General information about the course**

- This course is devoted to binary choice models that are central in applied econometrics. We deal with the situation when the potential outcomes are discrete, i.e. the presence or absence of some quality of the object in question. It might also be the decision of an individual to perform or not to perform any action. The scope of application of these models is very wide. Classical examples are the problems of forecasting companies' defaults, employment equations, modeling the level of education, and many other problems of identifying the determinants of a certain choice and predicting its probability. In addition, we consider models with truncated dependent variable. The course includes Tobin and Heckman models that enables us to deal with truncated samples and selection bias. The course is applied in nature. Analysis of course's topics is based on numerical examples. At the seminars, students use statistical software, i.e. STATA.

## **Section 2. Course goals, learning objectives, expected learning outcomes**

- The main goal of the course is to explore methods of analyzing microeconomic data. This includes estimating binary choice models and truncated regression models on the basis of statistical software

package. Students will know the areas of application of the studied models, as well as the methods of checking the adequacy of these models with real data.

- Prerequisites are probability theory, statistics and econometrics.

### **Section 3. Course Outline**

<b>№</b>	<b>Topic</b>	<b>Week</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Self-study</b>	<b>Total</b>
1	Introduction	1	2	0	6	8
2	Binary choice models	2-4	4	6	18	28
3	The system with binary choice equations with correlated errors	5-7	4	4	18	26
4	Multiple choice models	8-9	4	4	18	26
5	Truncated regression models	10-11	4	4	18	26

The course includes lectures and practice in computer lab as well as self-study and preparing own research based on course materials.

### **Section 4. Texts, readings and other informational resources**

1. Required readings:

Green (2008), *Econometric Analysis*, Pearson Prentice Hall, 6rd ed

Cameron, Trivedi (2010), *Microeconometrics Using Stata*, -- Stata Press.

2. Additional readings:

Wooldrige, J. M. (2010) *Econometric Analysis of Cross Section and Panel Data*. The MIT Press, 2nd edition.

Cameron, C.A. and Trivedi, P.K. (2005) *Microeconometrics: methods and applications*. Cambridge U.P.

3. Websites and other informational resources (databases, software, etc.):

statistical software STATA from the university's internal network (contract), articles from HSE Library e-resources <https://library.hse.ru/en/e-resources/> from the university's internal network (contract)

## **Section 5. Examination/Evaluation**

Grading system is the following:

$$O = 0,7*O_{\text{individual home task}} + 0,3*O_{\text{final exam}}$$

$$O_{\text{individual home task}} = 0,6*O_{\text{written paper}} + 0,4*O_{\text{presentation}}$$

Individual home task and the final exam are estimated out of 10 points.

Individual home task includes preparing own research using microeconomic data and estimation tools studied during the course. Student must put their own research question and coordinate it with the lecturer. Students independently collect data to answer the research question and apply the models studied in the course. Students may choose not to present the results of their individual home task. In that case  $O_{\text{presentation}} = 0$ . In a case of failure of the deadline for preparing the individual home task, the written part ( $O_{\text{written paper}}$ ) will be estimated a maximum of 5 points out of 10.

The final exam will be held in the written form for 60 minutes. Examples of questions for the final exam:

1. Describe the procedure for choosing between Heckman, Tobin, and OLS regression models.
2. What is tetrachoric correlation?
3. When are instrumental variables estimators inconsistent?
4. Explain what exclusion restrictions mean.
5. Table shows estimation results of a binary choice model. You need to estimate average marginal effect and forecast the value of the dependent variable Y at X = 30.

Dependent Variable: INLF				
Method: ML - <b>Binary Logit</b>				
Sample: 1 450				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	15.96794	2.902652	5.501155	0.0000
X	0.205714	0.034275	6.001929	0.0000
Log likelihood	-364.2002	Hannan-Quinn criter.		1.052702
Restr. log likelihood	-514.8732	Avg. log likelihood		-0.483666
LR statistic (1 df)	301.3460	McFadden R-squared		0.292641
Probability(LR stat)	0.000000			
Obs with Dep=0	250	Total obs		450
Obs with Dep=1	200			

## **Section 6. Academic Integrity**

The Higher School of Economics strictly adheres to the principle of academic integrity and honesty. Accordingly, in this course there will be a zero-tolerance policy toward academic dishonesty. This

includes, but is not limited to, cheating, plagiarism (including failure to properly cite sources), fabricating citations or information, tampering with other students' work, and presenting a part of or the entirety of another person's work as your own. HSE uses an automated plagiarism-detection system to ensure the originality of students' work. Students who violate university rules on academic honesty will face disciplinary consequences, which, depending on the severity of the offense, may include having points deducted on a specific assignment, receiving a failing grade for the course, being expelled from the university, or other measures specified in HSE's [Internal Regulations](#).