The Government of the Russian Federation
the Federal State Autonomous Educational Institution of Higher Education «National Research University «Higher School of Economics»

Sociological department

Course syllabus

Panel data Analysis and Applications for the Social Sciences

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Overview:

The purpose of this course is to present the background necessary to understand the applications of panel data and to provide students with the practical skills which could be applied to analyse a variety of research questions in social sciences. The wide range of topics will be covered: continuous and discrete panel models, survival analysis. The seminars are designed to give the students some hands-on experience with data manipulation through a statistical software package Stata. The course is designed with a focus on students as the persons doing research and involves reading, writing and in class practice. Previous experience in basic statistics and econometrics is expected.

Aims of the course:

This course will give students a practical grounding in the panel data analysis. It has the following key aims

1. Introduce advantages and limitations of panel data and consider what sort of questions may be answered by using this data.
2. Review some panel data models commonly used in social sciences and demonstrate how longitudinal analysis contributes to the social processes.
3. Show how to handle panel data and provide students with the skills to manipulate panel datasets and choose the right technique for research question.

Learning Goals:

Having completed the essential practical assignments students are expected to leave the course with:

1. An understanding of basic concepts of panel data analysis
2. Developing practical skills in selecting and conducting different types of panel data analysis
3. Confidence to manipulate panel datasets with different panel methods, choose the rights data technique and interpret the results

Course Structure:

The course will cover one major topic each week (see course content below). The time spent on each topic may be adjusted. The course consists of lectures and practical seminars with Stata implementations. Each lecture is followed by a practical session where students will use Stata to implement the methods covered in the lectures. Main data will be from Russian Longitudinal Monitoring Survey - HSE (RLMS-HSE). Also, there will be Problems sets to be discussed in class. The practical seminars and lectures will have been illustrated the value of panel surveys, using findings from the RLMS-HSE as the primary example.

Course Content:

Week 1. The main concepts and definitions of the panel analysis. We will discuss many types of longitudinal data first and then we will discuss why panel data are so useful (benefits and drawbacks of using panel data), what kind of data are required for panel analysis and how to get to know panel data. Applications of panel data to wide areas of empirical studies will be reviewed. Basic data manipulation and descriptive techniques, simple summary statistics (within and between variation, transition tables) will be covered this week. We will also look at some empirical applications of using panel data to mobility analysis and labor market studies.

Week 2. Introduction to linear panel data models. This week will begin by giving a brief overview of the basic panel data models and discussing various reasons for endogeneity and ways of solving the endogeneity with panel data. We will discuss how to eliminate unobserved heterogeneity with standard fixed- and random effects models and when to use these models. Some empirical applications of these models will be discussed.

Week 3. Extensions to panel data models: dynamic models. We will keep exploring different forms of endogeneity with fixed and random effect models. Basic fixed and random effects regressions with continuous dependent variables will be estimated and main assumptions will be tested. We will discuss unobserved heterogeneity and state dependence issues in panel data and will know when it is necessary to use dynamic models. We will look at the applications of these models to empirical studies focusing on the correct specification and interpretation.

Week 4. Introduction to nonlinear panel data models. We will discuss discrete outcomes in panel data, types of discrete variables and will know how nonlinear models are estimated. We

will compare linear probability model and probit/logit models (random effect probit/logit model, conditional fixed effect logit model) and will estimate predicted probabilities and marginal effects. Applications of these models to health and well-being studies will be covered.

Week 5. Extensions to nonlinear panel data models: selection models. We will also discuss non-response, sample selection and attrition in panel data and their consequences. We will explore qualitative response models and limited dependent variables and will look at how tobit and Heckman selection models can be estimated with panel data. Applications of these methods to labor supply model will be made.

Week 6. Policy evaluation. We will discuss how to evaluate the impact of various policies with panel data using difference-in-difference and matching estimators

Week 7. Introduction to survival analysis.

Course Plan:

Week №	Topics	Total number of hours	Credit hours		Self-study hours
			Lectures	Seminars	
1	The main concepts and definitions of the panel analysis	10	2	2	6
2	Introduction to linear panel data models	10	2	2	6
3	Extensions to panel data models: dynamic models	10	2	2	6
4	Introduction to nonlinear panel data models	10	2	2	6
5	Extensions to nonlinear panel data models: selection models	10	2	2	6
6	Policy evaluation	10	2	2	6
7	Introduction to survival analysis	10	2	2	6
	Project			4	28
	Overall	102	14	18	70

Reading list:

- Wooldridge, J. M. (2001), Econometric Analysis of Cross Section and Panel Data, MIT Press
- Cameron A. C and Trivendi P. K. (2010), Microeconometrics Using Stata. STATA Press
- Halaby, C. N. (2004). Panel data models in sociological research: Theory into practice, American Review of Sociology 30, 507-544

Course project

As a part of this course students are expected to prepare the proposal of research project using panel data and estimation methods that have been studying during the course. Project is prepared in a group up to three students and presented at the end of the course.

Course Grading:

Seminars participation: 20%

Research project presentation: 40%

Final exam: 40%