



Vesna Bucevska

ECONOMETRICS WITH APPLICATION IN EVIEWS

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ECONOMETRICS WITH APPLICATION IN EIEWS

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**To my loving mother Lence,
my father Spiro and my sister Jasmina**

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PREFACE

There are already a large number of textbooks in econometrics. However most of them teach econometric theory in the theory and proof mode, giving students only limited exposure to applied econometric work. With the rapid use of computer technology in the teaching of econometrics, writing of textbooks which combine econometric theory and practice become a bare necessity. The book *Econometrics with Application in EViews* is such a textbook.

It is designed to provide both undergraduate and postgraduate students of economics, but also students other sciences using econometrics, with introduction to econometric theory and techniques by demonstrating its use with the econometric software package *EViews 6*, which is the number one Windows-based econometric software package in the world. The emphasis of the book is on practice rather than on theory. Therefore in elaborating the various topics, I have used very little matrix algebra or calculus and no proofs. The reader of this book is assumed to have a good knowledge of elementary statistics, matrix algebra and some previous exposure to regression analysis.

This book is based on my *Lecture Notes in Econometric Theory* written for students attending the international postgraduate programme “Statistical Methods for Business and Economics” held at the Faculty of Economics of University “Ss. Cyril and Methodius” in Skopje. In my experience in teaching econometrics both at undergraduate and postgraduate level, students learn econometrics more efficiently when they see techniques being applied to real data by running a statistical package on a computer. Therefore, the book *Econometrics with Application in EViews* contains numerous illustrative examples that are solved using the statistical software package *EViews 6*. The computer printouts from this statistical package are also included in the book. All the data sets can be found on the following web site: http://www.eccf.ukim.edu.mk/smebe/Material_en.htm as well as on the CD accompanying this textbook.

The book *Econometrics with Application in EViews* is organized in eight chapters and two appendices.

Chapter 1 is an introduction to econometrics and econometric methodology. In this chapter we discuss the steps involved in the econometric methodology and how to choose the right econometric model.

In Chapter 2 we elaborate the basic ideas of linear regression which is the core of every econometric analysis. First we discuss the classical simple linear regression model i.e. the two-variable model. We examine the assumptions underlying this model and how relevant they are. Our objective is to estimate the population regression function (PRF) on the basis of the sample regression function (SRF) as accurately as possible. In this chapter we will show how to estimate the population regression model on the basis of the sample data using the *method of ordinary least squares* (OLS). The least-squares estimates obtained with *method of ordinary least squares* (OLS) take on certain properties summarized in the Gauss-Markov theorem, which states that in the class of linear unbiased estimators, the least-squares estimates have minimum variance. In this chapter we also measure the overall goodness of fit of the regression model with the coefficient of determination R^2 .

In Chapter 3 we discuss models that have more than one explanatory variable called multiple regression models. Multiple regression is closer to *ceteris paribus*, since it enables to control other factor affecting the dependent variable more explicitly. This is important for testing of economic theories as well as for evaluating of the effects of some policy when we have to rely on no experimental data.

Chapter 4 is concerned with the problem of inference related to multiple regression. Other issues included in this chapter are normality assumptions, hypothesis testing, and testing for significance in multiple regression.

In Chapter 5 we discuss the properties of the least square estimators in a large or infinite sample, the so called asymptotic properties.

In Chapter 6 we try to find out what happens if the assumption of the classical linear regression model that errors have a constant variance (homoskedasticity) is violated. If the error variance is not constant, we speak of heteroscedasticity. In this chapter we elaborate the causes and consequences as well as the remedial measures for heteroscedasticity.

Chapter 7 considers another violation of the assumptions of the CLRM i.e., violation of the assumption that the error term in the linear regression model is not correlated with its past value(s). This phenomenon is called autocorrelation. In this chapter we examine in depth the consequences of autocorrelation, the test of autocorrelation and the remedies for autocorrelation.

In Chapter 8 we discuss the question of building a "good" model and then the various types of model misspecification errors. In this chapter we examine a variety of nonlinear models and show how and where such models can be used.

Each chapter concludes with an illustrative example using typical datasets which is solved step by step using the latest version of the statistical software package EViews. Screen shots have been included to illustrate the use of EViews 6. At the end of each chapter there are a number of questions for review. They can be used to check whether the reader understood the material of the chapter before he/she proceeds to the next chapter.

In Appendix A we familiarize students as well as other readers of this book with the modern powerful econometrics software package EViews which we use for solving the illustrative examples throughout this book.

Appendix B contains several commonly used tables of statistical distributions.

I would like to thank the reviewers, professor Slave Risteski and prof. Drage Janev for their very constructive remarks. I also owe much to my colleague in econometrics, professor Luciano Pieraccini from the Department of Economics of the Third University of Rome for his very helpful suggestions on very early outlines and preliminary content of this book.

In closing, I would like to thank the European Commission for their financial support for printing of this book within the framework of the TEMPUS CD_JEP “Statistical Methods for Business and Economic (SMEBE).

Finally, I want to thank my father Spiro and my sister Jasmina for their huge support, assistance and understanding in the preparation of this book.

Vesna Bucevska