Regression Analysis With R and Easystats

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Preface

Acknowledgement

I would like to express my heartfelt gratitude to the individuals who have played a significant role in the creation of this book on Regression Analysis with R. Their guidance, knowledge, and support have been invaluable throughout this journey.

First and foremost, I extend my deepest appreciation to my esteemed professors, [Professor's Name], [Professor's Name], and [Professor's Name]. Their expertise in statistics and econometrics has shaped my understanding of quantitative analysis and provided a solid foundation for this book. Their dedication to teaching and their unwavering commitment to fostering academic excellence have been instrumental in my growth as a student of econometrics.

I would like to extend special thanks to my colleague and dear friend, [Colleague's Name]. Their introduction to the world of R programming language opened up a world of possibilities for me. Their patience, willingness to share their knowledge, and countless hours spent assisting me with R-related challenges have been indispensable. I am grateful for their unwavering support and the collaborative environment we fostered, which significantly enriched my learning experience.

A heartfelt appreciation goes to the developers of R, an open-source programming language that has revolutionized the field of data analysis and statistical computing. Their tireless efforts in creating and continuously improving R have made it an indispensable tool for researchers and analysts worldwide. Without their dedication, this book would not have been possible.

I would also like to express my gratitude to the developers of the R packages that have been instrumental in the analysis and visualization techniques presented in this book. Their commitment to excellence, innovation, and user-friendly implementations has immensely contributed to the field of regression analysis. Their packages have not only expanded the capabilities of R but have also facilitated the seamless integration of econometric methodologies into practical applications.

Finally, I extend my heartfelt thanks to my family and friends who have supported me throughout this writing process. Their encouragement, understanding, and belief in my abilities have been a constant source of motivation.

To all those mentioned above, and to anyone else who has contributed to this book in any way, I offer my deepest appreciation. Your guidance, knowledge, and support have been invaluable in shaping this work and have helped me fulfill my goal of sharing the beauty and importance of regression analysis with R.

Thank you.

[Your Name]

Part I.

BASICS OF ECONOMETRICS AND R

1. Introduction

```
:::: status
::: callout-important
You are reading the work-in-progress first edition of Regression Analysis with R and Easystats
::::
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Learning Objectives:
In this chapter, you will learn to

- *Importance of regression analysis in econometrics*
- *Overview of the book's structure and goals*
- *Introduction to R programming language and its relevance to econometric analysis*

This chapter introduces the basics of Econometrics and R to a novice user. Econometrics is a combination of two words: Econo + Metric. Econo refers to concepts of economics, while metric refers to measurement. Let's take an example of the law of demand from microeconomic theory. We know the demand of a commodity will decrease if the price of the commodity increases. But we don't know how much the demand will decrease, given the increase in the price is one unit (i.e., one Dollar, or one Euro, etc.). In Econometrics, we measure such increase or decrease using various experiments.

2. Introduction to Econometrics and Regression Analysis

Learning Objectives:
In this chapter, you will learn to

- *Understanding the basics of econometrics*
- *Role of regression analysis in econometric modeling*
- *Overview of the regression analysis process*
- *Introduction to R for econometric analysis*

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3. Getting Started with R for Econometrics

Learning Objectives:
In this chapter, you will learn to

- *Introduction to R programming language and its ecosystem*
- *Setting up the R environment and installing necessary packages*
- *Loading and manipulating data in R for econometric analysis*
- *Exploring data visualization techniques using R*

Part II.

ISSUES IN REGRESSION ANALYSIS

4. Simple Linear Regression

Learning Objectives:
In this chapter, you will learn to

- *Understanding the principles of simple linear regression*
- *Performing simple linear regression in R for econometric analysis*
- *Interpreting regression results in the context of economic variables*
- *Assessing model assumptions and addressing violations*
- *Practical examples and exercises using R*

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5. Multiple Linear Regression

Learning Objectives:
In this chapter, you will learn to

- *Extending regression analysis to multiple independent variables*
- *Building and interpreting multiple linear regression models in R*
- *Handling multicollinearity and selecting significant predictors in an economic context*
- *Model evaluation and diagnostics in econometric regression*
- *Application of multiple linear regression in economic analysis using R*

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- Application of multiple linear regression in economic analysis using R

6. Regression Analysis with Dummy Variables

Learning Objectives:
In this chapter, you will learn to

- *Incorporating categorical variables in regression analysis*
- *Creating and interpreting dummy variables in R*
- *Dummy variable pitfalls and remedies in econometric modeling*
- *Examples and case studies of dummy variable regression in economics using R*

- Incorporating categorical variables in regression analysis
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7. Heteroscedasticity and Robust Regression

Learning Objectives:
In this chapter, you will learn to

- *Understanding heteroscedasticity and its implications*
- *Addressing heteroscedasticity using robust regression techniques in R*
- *Interpreting robust regression results in an economic context*
- *Practical examples and exercises showcasing robust regression in econometrics*

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- Addressing heteroscedasticity using robust regression techniques in R
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- Practical examples and exercises showcasing robust regression in econometrics

8. Time Series Regression

Learning Objectives:
In this chapter, you will learn to

- *Introduction to time series data in econometrics*
- *Time series regression models in R for economic analysis*
- *Dealing with autocorrelation and lagged variables*
- *Forecasting with time series regression models in R*
- *Applications of time series regression in economic forecasting*

- Introduction to time series data in econometrics
- Time series regression models in R for economic analysis
- Dealing with autocorrelation and lagged variables
- Forecasting with time series regression models in R
- Applications of time series regression in economic forecasting

9. Introduction to Logistic Regression

Learning Objectives:
In this chapter, you will learn to

- *Basics of logistic regression in econometrics*
- *Estimating logistic regression models in R*
- *Interpreting logistic regression coefficients and odds ratios*
- *Applications of logistic regression in economic research using R*

- Basics of logistic regression in econometrics
- Estimating logistic regression models in R
- Interpreting logistic regression coefficients and odds ratios
- Applications of logistic regression in economic research using R

10. Model Evaluation and Selection

Learning Objectives:
In this chapter, you will learn to

- *Evaluating model performance and goodness-of-fit measures in econometrics*
- *Validation techniques for econometric regression models*
- *Comparing and selecting models using information criteria*
- *Cross-validation and bootstrapping for robust model assessment in econometrics*

- Evaluating model performance and goodness-of-fit measures in econometrics
- Validation techniques for econometric regression models
- Comparing and selecting models using information criteria
- Cross-validation and bootstrapping for robust model assessment in econometrics

11. Practical Tips and Resources for Econometric Regression

Learning Objectives:
In this chapter, you will learn to

- *Data preparation and preprocessing tips for econometric analysis*
- *Handling missing data and outliers in regression analysis*
- *Dealing with endogeneity and instrumental variables*
- *Additional resources for further learning and practice in econometrics with R*

- Data preparation and preprocessing tips for econometric analysis
- Handling missing data and outliers in regression analysis
- Dealing with endogeneity and instrumental variables
- Additional resources for further learning and practice in econometrics with R

12. Conclusion

Learning Objectives:
In this chapter, you will learn to

- *Summary of the key concepts covered in the book*
- *Importance of regression analysis in econometrics and economic research*
- *Encouragement for further exploration and application of econometric regression using R*

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Part III.

APPENDICES

Appendix A: R packages for econometric regression analysis and additional resources

Appendix B: Data sets used in the book's examples

Appendix C: R code snippets and tutorials for reference

The whole book is published on bookdown.org website. You can read the book online on this website. You can also download the source code of this book in multiple ways. The easiest way is to visit the website github, and Alternatively, you can download the entire source code of the book from github. Please run the following code to download the book:

```
#install.packages("devtools")
#devtools::install_github("bhattmaulik/RegressionAnalysis)
```