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AGRICULTURE IN AN INTERCONNECTED WORLD

Using **R** for Agricultural Economics Research

Pre-Conference Workshop

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The participants of this pre-conference workshop will learn to conduct various econometric analyses with R. In order to achieve this, the workshop will mostly consist of practical exercises. The workshop will be divided into two parts. The first part will give an introduction to R with special emphasis on applications in agricultural economics and applied microeconometrics. This part of the workshop will be designed for participants who have no or only little experience with R. The second part of the workshop will be designed for participants who have at least a little experience in R, e.g. obtained in the first part of the workshop. The participants will learn to prepare and aggregate data; estimate production functions using OLS and panel data methods and calculate elasticities based on the estimation results; conduct efficiency analysis using Stochastic Frontier Analysis (SFA) and Data Envelopment Analysis (DEA); and use nonparametric kernel regression.

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1. Introduction

R has become the 'lingua franca' in many areas of statistics and data analysis. In recent years, R also gained high popularity among applied econometricians and a huge number of methodologies that are relevant for applied econometrics have been implemented in R.

2. Description of the Workshop

The participants of this pre-conference workshop will learn to conduct various econometric analyses with R. As the workshop will mostly consist of practical exercises, at least every second participant should bring a laptop computer with R[1] and RStudio IDE[2] installed.

The workshop will be divided into two parts. Conference participants can choose to participate only in the first part (in the morning), only in the second part (in the afternoon), or in both parts of the workshop (entire day).

2.1. First Part: General Introduction to Econometrics with R

The first part of the workshop will give an introduction to R with special emphasis on applications in agricultural economics and applied microeconometrics. This part of the workshop will be designed for participants who have no or only little experience with R.

After attending the tutorial, the participants:

- know the essentials of R and RStudio IDE, e.g. basic usage, obtaining help, simple calculations;
- can work with data sets, e.g. create and manipulate variables, obtain descriptive statistics, visualize data;
- can conduct basic econometric estimations and statistical tests;
- can apply selected more advanced methodologies that are frequently used in agricultural economics and applied microeconometrics; and
- have an overview over add-on packages that are particularly relevant for agricultural economists and applied microeconometricians.

Literature:

- Zuur, Ieno & Meester (2009): A Beginner's Guide to R, Springer.
- Kleiber & Zeileis (2008): Applied Econometrics with R, Springer.

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[1]Free and open-source software, available at `http://www.r-project.org/`.
[2]Free and open-source software, available at `http://www.rstudio.com/ide/`.

2.2. Second Part: Introduction to Econometric Production Analysis with R

The second part of the workshop will be designed for participants who have at least a little experience in R, e.g. obtained in the first part of the workshop.

After attending the tutorial, the participants:

- can prepare and aggregate data (e.g. price and quantity indices), e.g. using the add-on package "micEcon";
- can estimate production functions using OLS and panel data methods, calculate elasticities, etc., e.g. using the add-on package "micEcon";
- can conduct Stochastic Frontier Analysis (SFA) using the add-on package "frontier";
- can apply Data Envelopment Analysis (DEA) using the add-on package "R"; and
- can use nonparametric kernel regression, e.g. for estimating production technologies, using the add-on package "np".

Literature:

- Henningsen (2013): Introduction to Econometric Production Analysis with R, available at http://www.arne-henningsen.name.

3. About the Workshop Teacher

Arne Henningsen is Associate Professor at the Department of Food and Resource Economics at the University of Copenhagen. His research and teaching is at the intersection of microeconomic production theory and applied microeconometrics, particularly in the agricultural sector. He is using R for more than 13 years and he is co-author of several R packages, e.g. for stochastic frontier analysis ("frontier"), estimation of equation systems ("systemfit"), sample selection models ("sampleSelection"), censored regression ("censReg"), maximum likelihood estimation ("maxLik"), and microeconomic modelling ("micEcon", "micEconCES", "micEconAids", "micEconSNQP").