

# CompNet

The Competitiveness Research Network

## CompNet-based analysis: An e-learning course to research on competitiveness

### *Introduction*

This e-learning course gives an overview of some of the most useful research tools offered by the CompNet database.

Micro-based data provide crucial information to understand the drivers of competitiveness, whereas aggregate indicators alone, if interpreted as the representative's firm outcomes, may often be misleading. This issue arises because a high degree of heterogeneity persists even in narrowly defined industries and size classes. Thus, cross-country information on the underlying distribution of firms is essential to assess the drivers of a variety of economic indicators, such as aggregate productivity, export performance and competitiveness.

The richness of the CompNet database allows to go beyond the standard representation of average quantities, taking into consideration the full heterogeneity of firms' economic performances. In fact, data include variables' percentiles, outcomes of firm level-based parametric indicators, joint distributions of several economic variables, production function's estimations at different levels of aggregation and other useful information. This is meant to help data users to investigate the economic dynamics with a sophisticated research toolbox.

### *Structure*

This course is made for autonomous online learning. It is structured in three modules: *Beginners*, *Intermediate* and *Advanced*. Each of them requires a different level of background knowledge with regards to economic theory and Stata software. Participants self-identify in each level of preparation by completing a simple survey, which is made available together with the course material.

The e-learning material of each module includes:

- A set of scripts in Stata format (.do files), one for each step of analysis;
- A detailed (.ppt) presentation explaining how to execute and how to interpret all the tasks included in the do-files.

Despite the course is meant for autonomous learning, the CompNet staff will be available to answer technical questions and to receive feedback or suggestions, in order to help the data users to exploit this learning opportunity at their best.

## *Contents*

The aim of the course is to learn how to use CompNet data to analyse competitiveness, by looking at different economic dynamics including productivity, financial conditions, international trade, labour, misallocation and market power. The three modules touch upon the same topics going at a deeper level of analysis, by growing in analytical complexity from *Beginners* to *Advanced*.

Before the three modules start, an introductory presentation explains the structure of the CompNet database:

- Data collection process, data release and confidentiality
- Coverage: countries, years and sectors
- Samples: full, 20e, trade data
- Data files: unconditional statistics, productivity decomposition, misallocation data, joint distributions, transition matrices and production function estimations
- Indicators: parametric and non-parametric
- Statistics: percentiles, statistical moments (mean, variance, kurtosis), weights

The *Beginners* module is thought for CompNet's first users, Bachelor's students and professionals with a limited knowledge of Stata, micro-data analysis and/or economic theory. The goal is to show how to download and open data using Stata, to make the user able to understand the basic structure of the database and to carry out some initial analysis. The final output includes tables and line charts, which are made using standard non-parametric variables at country, sectoral and regional level. Do-files are prepared using the simplest commands of Stata, therefore a basic knowledge of Stata would be useful but is not required in this first session.

Tasks for *Beginners*:

- Data preparation: how to download the data from the website, open and merge data files, tailor the sample of interest (*Task 1*)
- Data mining: how to summarize data and represent them in simple tables (*Task 2*)
- Data visualisation: standard line charts, bar charts and scatter plots at different levels of aggregation (*Task 3 & 4*)

The *Intermediate* module is minded for professionals and graduate students who are familiar with the basic structure of CompNet and the micro-based economic analysis with Stata. It aims at showing all the most common analyses which are typically implemented using CompNet for economic reports and working papers. Participants deal with parametric and non-parametric variables coming from different data files. They will have the opportunity to take advantage of the database's richness understanding the different trends across the firms' distribution, using the joint distributions with a theory-based approach, performing some standard regressions and making more complex charts for a richer visual representation. Rigorous definitions of the different variables' parametric estimations are explained in the material provided, in order to make the users aware of the economic reasoning behind their usage.

Tasks for *Intermediate*:

- Normalization of parametric estimates for cross-country/sector comparison, considering the necessary theoretical structure for their measurement (*Task 1*)
- Combination of more dimensions in a single chart and representation over additional levels of aggregation, by using firms' clusters (country, sector, year) and firms' characteristics (deciles of the productivity distribution, size classes, exporting status, financial constraint status, zombie status, etc) (*Task 2*)
- Analysis of dispersion: how to study trends over time combining mean/median values with the evolution of indicators of dispersion, interquartile ranges, percentile ratios and indicators of misallocation (*Task 3*)
- Understanding firm composition: dividing the population of firms over shares of different types of firms, e.g. zombie, exporters, etc, and analysing changes over time (*Task 4*)
- Regression analysis and results representation: scatter plots with fitted line and significance, comparison of punctual estimates and confidence intervals over sub-samples, coefficient normalization and contribution charts of the regressors' predictive power (*Task 5*)

The *Advanced* module is minded for academic scholars, PhD students and professionals with a solid knowledge of applied economics. It does not solely relate to the standard use of CompNet, while it shows some more original ideas requiring a certain degree of economic and econometric understanding.

Tasks for *Advanced* (work in progress):

- Kernel approximation of firm-level distributions using CompNet percentiles
- Simulation of a small firm-level dataset and use of the CompNet production functions' coefficients to get a better estimation of parametric variables
- Beyond OLS: probit models, quantile regressions, DiD, IV
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