

Research in Applied Econometrics

Chapter 0. Introduction

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M1 APE Analyse des Politiques Économiques
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Plan

- ▶ Motivation
- ▶ Organisation

Course Objectives & Motivations

- ▶ Class in Econometrics
 - ▶ In a unit of English language
- ▶ Goal: Expose students to applied econometrics in **English**
 - ▶ Applied examples with environmental economics data
 - ▶ Students should improve both their applied econometrics skills and their English level
 - ▶ Attendance and interactions in class
- ▶ Focus on applied techniques: **Introduction to R**
 - ▶ More on that later
- ▶ Context : **ex ante** valuation of **public (environmental) policies**
 - ▶ Contingent valuation / stated preferences
 - ▶ In econometrics details
 - ▶ With R commands
 - ▶ With data & examples

The relevance of valuation studies

- ▶ Cost-benefit analysis
 - ▶ Newly in France: public project with a “déclaration d'utilité publique” have to justify that Benefit > Cost
 - ▶ For market and nonmarket goods & services
 - ▶ Including e.g. value of human life, ecosystem services, patrimonial & heritage values
 - ▶ In principle
 - ▶ How do we compute that ?
 - ▶ That includes environmental “services”, e.g. ecosystem functions
 - ▶ But also all kinds of benefits & costs, e.g. a prison removes criminal from society and helps their rehabilitation
 - ▶ “valeurs tutélaires” (guidelines) & consensual discount rate
- ▶ Damage assessment for non-market goods
 - ▶ France introduced a few years ago the principles of environmental damage and compensation in kind
 - ▶ well-embodied in US legislation
 - ▶ not so much in EU legislation
- ▶ Greening the National Accounts

Course Plan

1. Introduction to R
2. Nonmarket valuation basic theory
 - ▶ French tend to say “évaluation”
 - ▶ English stresses the idea of valuing
 - ▶ “assigning a value”
3. Contingent valuation
 - ▶ Best-known technique
4. (Choice experiment)
 - ▶ Harder econometrics

Course Organization

- ▶ 6 lectures of 3.5 hours each
 - ▶ Every week
 - ▶ “Dispense d’assiduité” not possible for language courses
 - ▶ Bring your laptop as much as possible
- ▶ Do not forget it is a language course
 - ▶ Please interrupt me when you don’t understand

Evaluation: “Contrôle continu” in class for 100%

- ▶ About 20’ at some point of **each** lecture
 - ▶ Beginning, end or middle
 - ▶ On what we have seen during that lecture & the previous one (not several)
- ▶ If you miss one, you get zero at that one
 - ▶ The 1st one is just practice
- ▶ No final exam in “first session” in Decembre
 - ▶ “Rattrapage” in June
- ▶ It is **super important** that you read / study the class notes **before** coming to class
 - ▶ That is why we do CC
- ▶ I will try to correct the tests as much as possible

References

- ▶ Aizaki et.al. *Stated Preference Methods Using R*. Chapman and Hall/CRC, 20140815. VitalBook file.
 - ▶ Use DCchoice-package {DCchoice} in R
 - ▶ Base documentation in R
- ▶ Kleiber & Zeilis, *Applied Econometrics with R*, Springer, 2008
- ▶ Wooldridge, J. *Introductory Econometrics : A Modern Approach*, Michigan State University, 2012
 - ▶ [Click this link](#)
 - ▶ BU Chevreul[330.015.2 WOO] (1)
 - ▶ Not [330.015.2 WOO] (2) Econometric analysis of cross section and panel data

Install R

- ▶ Come to class w/ a laptop
 - ▶ R & R-studio installed & up-to-date
- ▶ R @ www.r-project.org/
 - ▶ R-Studio <https://www.rstudio.com/>
 - ▶ IDE (integrated development environment)
 - ▶ Not a Graphical User Interface, but more useful
 - ▶ Packages “add functionalities”
 - ▶ Most often from within R-studio
 - ▶ Start R-Studio
 - ▶ R-Studio calls R

Presenting R-studio: 4 windows

The screenshot displays the RStudio interface with four main windows:

- Source Editor:** Contains R code for a logistic regression model. The code includes comments explaining the use of `summary()` for coefficient extraction, the `glm()` function with `alpha/beta` and `sex` variables, and the calculation of `WTP2.probit` based on the model coefficients.
- Environment:** Shows a table of objects in the Global Environment. The table has columns for Name, Type, Length, Size, and Value. Objects include `SB.NP.DC.logit`, `SB.NP.DC.probit`, `SB.NP.glm`, `SB.NP.glm.llogit`, `SB.NP.glm.lnorm`, `SB.NP.glm.logit`, `SB.NP.glm.probit`, `tab`, `WTP.probit`, and `WTP2.probit`.
- Console:** Displays the output of the R script, showing the number of Fisher Scoring iterations (4) and the estimated median WTP for the SB.NP.DC.probit model, which is 33.71668.
- Help:** Shows the documentation for `is.numeric`, explaining that it returns `TRUE` if the base type is `double` or `integer`, and `FALSE` otherwise.

R-Studio Upper Left Window: *editor*

- ▶ Invoked with any of 2 leftmost buttons of the toolbar (New or Load)
 - ▶ Color-coded, with online help & command recognition
- ▶ Programming is written in the editor
 - ▶ Programming = sequence of commands in a text file “script”
 - ▶ with an .R extension
 - ▶ This file is saved for further use, between “sessions”
 - ▶ **Commands** are passed by e.g. `plot(x)`
 - ▶ The editor recognizes command and colors them in **blue**
 - ▶ Commands are executed in the editor by `CMD↵` row by row
 - ▶ Command results may be stored in **objects** with `<-`
 - ▶ `y_lm <- lm(y~x1+x2)`
 - ▶ Several command files may be simultaneously open
 - ▶ tabs

R-studio Windows

- ▶ Lower Left : *console*
 - ▶ Print out command results from editor
 - ▶ Usual way to write code : write one or a few lines, test it
 - ▶ Write commands for immediate execution (with ↵)
 - ▶ Does not stay in memory
- ▶ Upper Right
 - ▶ Environment: List in memory
 - ▶ Can be data or results or functions
 - ▶ Within a project (later) or not
 - ▶ Command history
 - ▶ Can be reused

R-studio Lower Right Window : 5 tabs

- ▶ Files within the project
- ▶ Visualisations of Plots
- ▶ Packages that are present
 - ▶ Loaded if checked square
 - ▶ Install button
 - ▶ Click it (you must be connected)
 - ▶ Type swirl & follow instructions
- ▶ Help
- ▶ Viewer
 - ▶ to view local web content (if you edit webpages)
- ▶ These 5 tabs have in common the Search window

First commands: Project

- ▶ A project is a file that refers to a collection of files
 - ▶ R command files .R, data files, results
- ▶ There's an icon in the upper-right corner of R-Studio
 - ▶ Click it & create a project "RAE"
 - ▶ Where you create it, that is your work directory
 - ▶ Do not use the desktop, the root, or any hard-to-find location
 - ▶ Download the RAE2017.R on my courses' site
 - ▶ Into the same directory as your project
 - ▶ Open it from R-studio Editor : Icon upper left
- ▶ R-Studio recalls the projects
 - ▶ You can go from one to another
 - ▶ All the files written on disk remain available

First commands

- ▶ Some manipulation in Console
 - ▶ write `Sys.setenv(LANG = "fr")`
 - ▶ Sets R Console in French, only for “core”, not for most packages
 - ▶ R-Studio is only in English
 - ▶ write `install.views("Econometrics")`
 - ▶ For about all the packages we will ever need
 - ▶ This is long : don't do that in class !
 - ▶ In the future `update.views("Econometrics")`
- ▶ Editor
 - ▶ Write here things that you intend to reuse
 - ▶ **Avoid** French symbols é, è, ê, ë, à, ù, ç, ...
 - ▶ **Avoid** symbols like #, \$, &, -... if you are unsure of their use
 - ▶ **Try to stick** to unaccented latin characters (i.e. US alphabet)
 - ▶ CAPITALISATION is important
- ▶ Starting a row w/ # indicates to R that it is a **commentary**
 - ▶ Green-colored, will not be executed

SWIRL: set of basic training modules

- ▶ Install swirl as any package from R-studio (should be installed by now)
 - ▶ Then type
 - ▶ `install_course("R Programming")`
 - ▶ `install_course("Regression_Models")`
 - ▶ Other courses https://github.com/swirldev/swirl_courses
 - ▶ About SWIRL: <http://swirlstats.com/students.html>
 - ▶ Slides <https://github.com/DataScienceSpecialization/courses>
- ▶ Self-training : Type `swirl()` in concole
 - ▶ do course 1: R programming, Lessons 1-9 + 14
 - ▶ By yourself, from home, when you have time
 - ▶ We will (re)do Lesson 1 in class

Some ressources about R on the web

- ▶ Use Google !
 - ▶ Ask question based on English keywords
 - ▶ e.g. “R read Stata data”
- ▶ From R home page www.r-project.org
 - ▶ Getting help, Manuals, FAQs...
- ▶ A few interesting links
 - ▶ Quick-R www.statmethods.net/index.html
 - ▶ <http://stats.idre.ucla.edu/r/>
 - ▶ <http://varianceexplained.org/RData/>
 - ▶ www.r-bloggers.com
 - ▶ R for economists
 - ▶ www.mayin.org/ajayshah/KB/R/R_for_economists.html
- ▶ En français: forget about French for R

To sum up

- ▶ For the 1st course you have to have
 - ▶ installed R & R-Studio on your machines
 - ▶ From R-Studio
 - ▶ `install.views("Econometrics")`
 - ▶ install swirl
 - ▶ In swirl :
 - ▶ install the 2 modules (programming & regressions)
 - ▶ do course 1: R programming, Lessons 1-9 + 14
- ▶ Install packages : DCchoice, Ecdat, stats
- ▶ Created your project & opened RAE2017.R
- ▶ Classes are mandatory
 - ▶ There is CC in each one, no final exam