Research Seminar

Theme C

Quantitative Data Sources and Software Packages.

Ethical issues in the use of data use in research

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Goal

Discuss the access and the use of quantitative data, the potentialities of software packages, and ethical issues on quantitative data use when carrying on empirical research.

... based on our own experience

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Topics

- Empirical research
- Access/preparation of data
- Data sources
- Software packages
- Ethical issues

Empirical research

- **Definition of a *topic* – based on a theoretical model/ the literature....**
- **Definition of the hypotheses to test – the *thesis***
- ***Access and preparation of data***
  - **Collection of data and data set construction**
  - **Measurement methods and instruments**
- ***Test of hypotheses* – data analysis and model building**
  - **Univariate, bivariate or multivariate analysis**
- **Presentation of results**

Empirical research

- **Empirical research is subsidiary to an *idea*, is carried out to answer a question, which is the centre of the thesis**
  - **We don't carry on empirical research just to do empirical research…**
- **Empirical research enables to test whether an idea is true… to answer a concrete question…**
  - **The increase of minimum pensions helps to reduce poverty?**
  - **A marketing campaign raises the number of consumers of a given product?**
  - **The action of the central bank reduces de cost of funding for companies?**

Access/Data preparation

- **Without data empirical work doesn't exist…**
- **… the nature and type of data condition methods and models that can be used…**
- **… to test a theoretical hypothesis… refutation or confirmation.**

Access/Data preparation

- **Secondary information – produced by entities of the statistical system/ other entities**

- **Primary information – direct collection**
  - **Enquiries / surveys**
  - **Case studies**

Data access: Most common sources of secondary statistical information

- **Statistical entities**
  - **National:**
    - **INE, Bank of Portugal, DGO, etc...**
  - **Internacional**
    - **Eurostat, ECB, European Commission, OECD, United Nations, World Bank, IMF, WTO, ILO, etc...**
- **Other**
  - **Datastream, Bloomberg, Reuters, Dun & Bradstreet**

Data access

Secondary data from statistical sources

- **Some checks:**
  - **Metadata**
    - Information about the construction and specificities
    - Description of concrete issues
  - **Statistical classifications**
    - Conventions and rules
  - **Problems/ examples:**
    - different sources for the same variable
    - original *vs* normalised values
    - international comparisons
    - breaks in series

Data access

Direct collection/ Enquiries

- **Some checks:**
  - **Population and sample selection**
  - **Enquiry methodology**
  - **Pilot enquiry and simulation of analysis**
  - **Some problems**
    - **type of questions: open vs closed**
    - **answers coding**
    - **closed questions: measurement scales**
    - **monetary and time costs to apply an enquiry**

Types of Data

- **How statistical units are observed**
  - **sectional (cross section) – several statistical units (individuals, companies, countries) "pictured" in a given moment or period**
  - **temporal (time series) – the same unit "filmed" across several periods or moments (years, quarters, months or seconds (financial data))**
  - **longitudinal or in panel (panel) – combines the 2 previous:**
    - **Large panels – several units and few temporal observations**
    - **Deep panels – not many units but many temporal observations**

Types of Data

- **Level of aggregation**
  - **Aggregated data – combines information from several statistical units (e.g macro data)**
  - **Micro data – information for individual statistical units**

Data analysis and model building
Types of analysis

- **Static analysis:** **In a given period, compares several statistical units (uses cross sectional data)**

- **Comparative statics:** **compares the situation of statistical units in 2 or 3 moments (cross sectional data or non deep panels**

- **Dynamic analysis (over time)**
  - **Aggregated data: time series**
  - **Micro data: deep panels**

Statistics Sources

- **Free access**
  - **Portal INE**
  - **Portal Bank of Portugal (BPSTAT, etc)**
  - **Portal Eurostat**
  - **European Commission: DG ECFIN (AMECO, KLEMS, BACH, …)**
  - **Portal OECD**
  - **WTO (World Trade)**
  - **IMF, World Bank, etc**
  - **CMVM/Euronext**

Statistics Sources

- **Available in ISEG terminals or using ISEG *proxy***
  - **Amadeus**
  - **Datastream**
  - **BANKSCOPE – information on over 23,000 banks**
  - **CHELEM – world trade, macroeconomic data and balance of payments**
  - **OSIRIS – Information on listed companies**

Statistics Sources

- **Available for research (protocol)**
  - **Protocol ex-MCTES/INE – access to microdata**

  NOTE:

  To access data it takes time: contracts / protocols / waiting time…=>

  Need to consider this at an early stage of the research.

Software

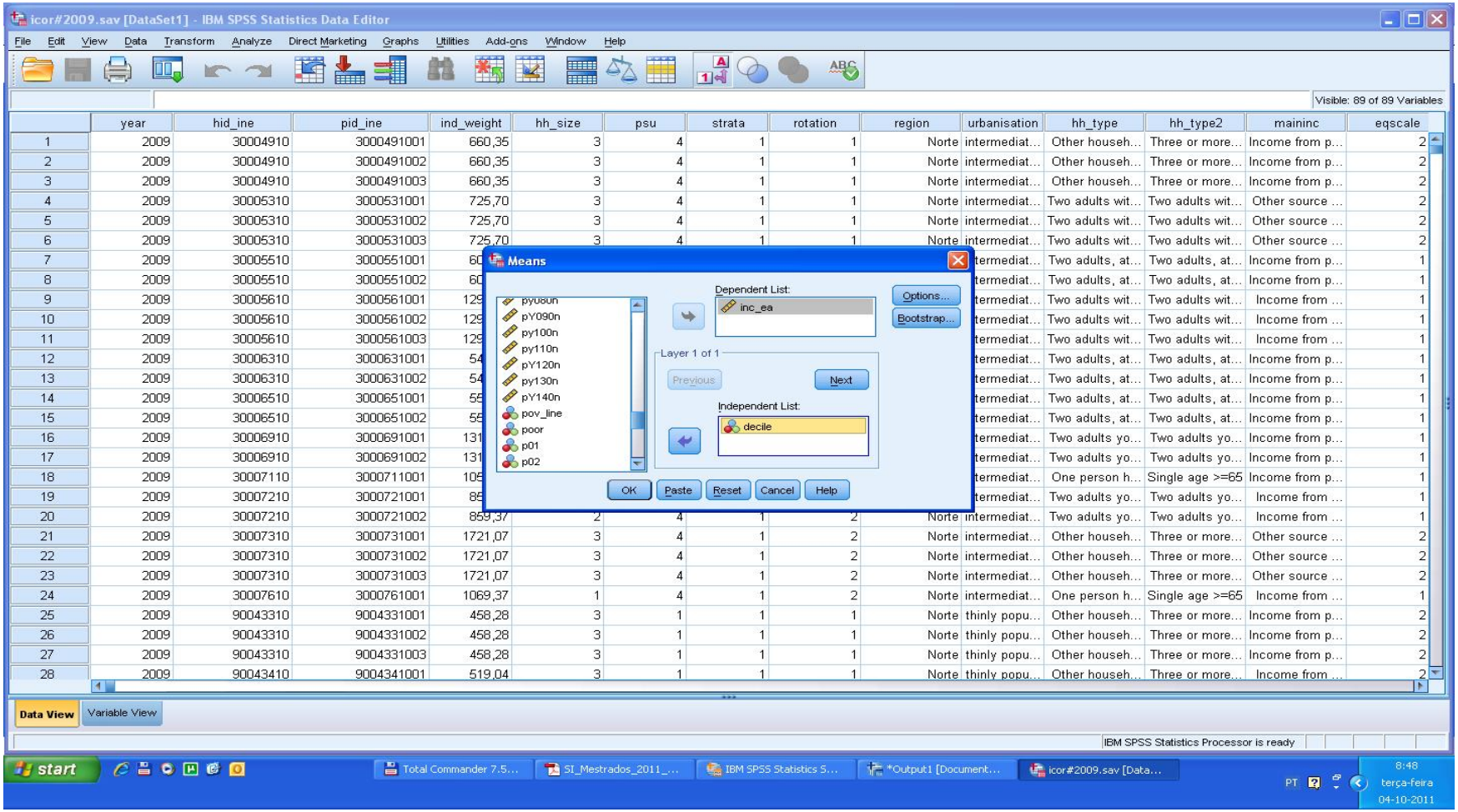
- **The choice of the package**
  - **Depends on the work to carry on and on the structure of the data**
  - **Three levels:**
    - **Excel**
    - **SPSS, Stata, SAS, TSP, Eviews, R...**
    - **Gauss, MATLAB**

For a discussion on the levels of popularity of the different statistical packages check: The Popularity of Data Analysis Software by Robert A. Muenchen (http://r4stats.com/popularity)

Statistical packages

- **Work with SPSS/STATA/SAS**
  - **All have an user interface based in a system of menus, a data sheet and an output window**
  - **Most have another interface that enable the user to write and run procedures using commands**
    - **Many of the most powerful commands are only available this way**
    - **Usually there is some possibility of interaction between the menu system and the programming interface – allows to use the menus to create command lines**

Statistical packages



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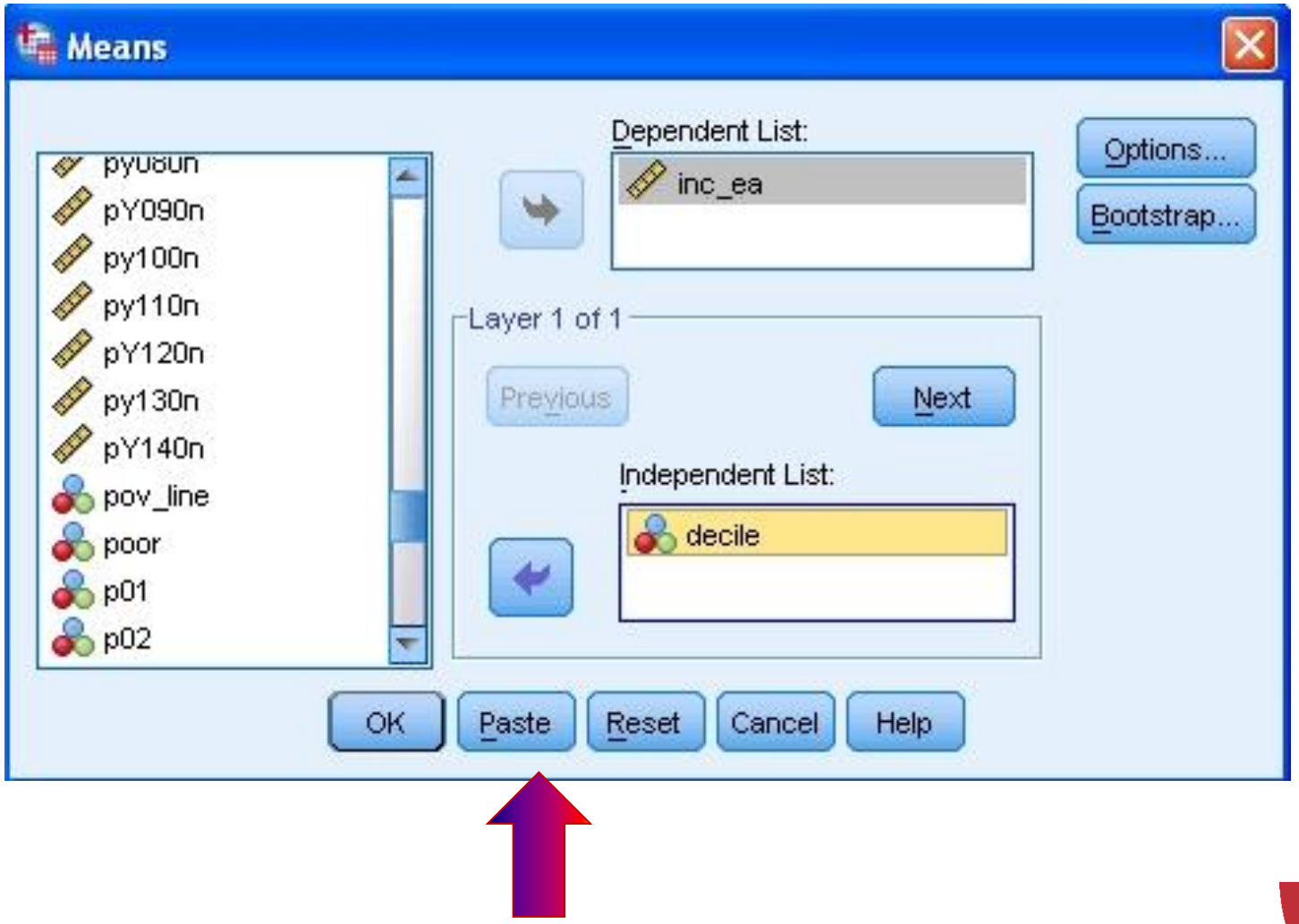
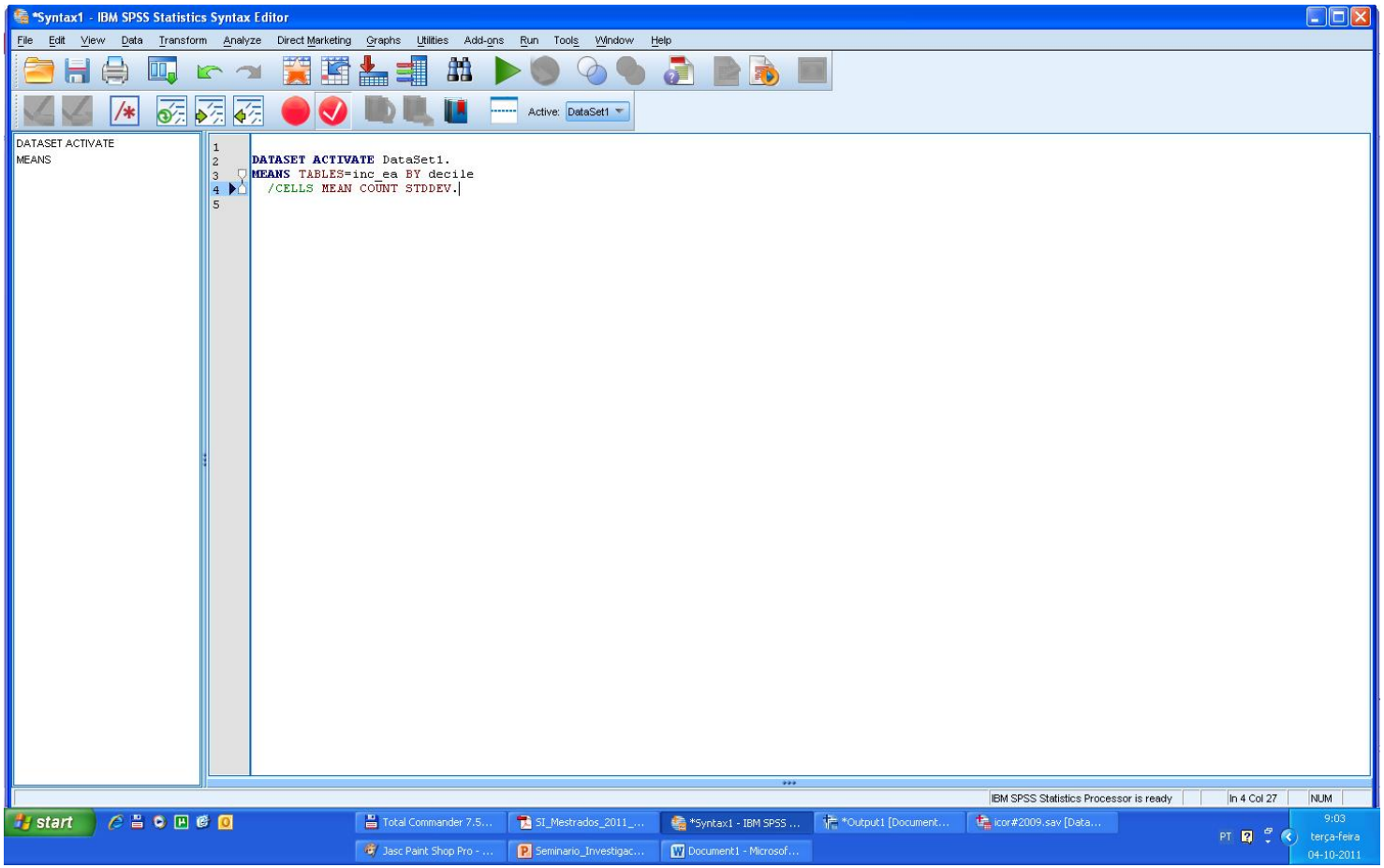
Statistical packages



Statistical packages



Statistical packages

```
SET  printback=listing messages=listing.
Title     '****              rsi_model_09#001              ****'.
* ********************************************************************************************************.
* rsi_model_09#001:
*.
*    Simulation of RSI based on SILC 2009
*.
*    Builds the individual datafile from silc files
*.
* ********************************************************************************************************.
* @cfr2011 - version 24-09-2011
** *******************************************************************************************************.
DATASET CLOSE ALL.
GET FILE='c:\temp\icor2009r.sav'/KEEP hid_ine pid_ine rb010 rb030 rb050 rb080 rb090 rb220 rb230 rb240.
DATASET NAME DataSet1 WINDOW=FRONT.

IF (rb080 ne rb010)age=(rb010-1)-rb080.
IF (rb080 eq rb010)age=0.
FORMATS age (f3.0).
VARIABLE LABELS age 'Age at the end of the income reference period'.
EXECUTE.

Rename vars (rb010 rb030 rb050 rb090 rb220 rb230 rb240 = year pid ind_weight sex pid_father pid_mother
pid_partner).
execute.
compute hid = trunc(pid/100).
variable label hid 'Household ID'.
execute.
```

Statistical packages

- **Advantages of using syntax files**
  - **Once the language is known it saves a lot of time – it is easier to change some bits of the program and run it again than to repeat all the steps**
  - **The programme allows to understand the research strategy and options made when dealing with data or model problems**
  - **The same programme may be used in different projects**

NOTE: It is possible to find many procedures available on line

Simulation and symbolic manipulation packages

- **Symbolic manipulation: helps in calculus without the need of having numerical specification (different to statistical or simulation).**
  - **Maple**
  - **Mathematica**
- **Simulation: enable to simulate models without explicit analytical solution**
  - **Matlab**
  - **Gauss**

Ethical issues

Some rules on research and master thesis

- **Intellectual property**
  - **Plagiarism**
  - **Software piracy**
  - **No reference to data sources or software used**
- **Verifiability or replicability of results: Results have to be verifiable by our peers:**
  - **In principle data sources and code must be freely accessible (careful with intellectual property issues)**
  - **When it is not possible to have free access the have to be made available to members of jury or referees**
  - **Methodological notes and intermediary computations available (e.g. Reinhart & Rogoff)**

Ethical issues

- **Behavioural rules on data use**
  - **Do not use data for commercial or other non agreed uses**
  - **Always refer who has made the data available (and the version that is being used)**
  - **Respect the rules of confidentiality and anonimization**
  - **Destroy data in the end of the period agreed**