Introduction to Stata

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Organization

- Please do interrupt and ask questions if questions are relevant to the currrent topic or if you are lost
- For further questions there will be a Q & A after the class
- Collaboration with your neighbours is encouraged
- Slides/Exercises assume you use lab computer; If you have laptop adjust (e.g. paths) accordingly
- If you are ahead of time:
  - help others
  - experiment with commands
  - read help files

Organization cont'd

- Make comments in the code file (we will download it), not on your handouts – you are going to use code/commands, not the handouts
- Save commented code file on flash drive or email to yourself

Outline

Assumptions and Disclaimers

- This is **Introduction** to Stata
- Assumes no/very little knowledge of Stata
- Not appropriate for people already well familiar with Stata
- Computer paths pertain to default lab setup; If you have laptop adjust paths accordingly
- Your level of knowledge will differ from the mean – If you are ahead of time experiment with command features described in help files

Outline

Class Website

- `http://stathelp.iq.harvard.edu/stata_intro`
- More detailed information
- Good for self-study
- More advanced topics
- Links to resources

Preliminaries

- Feel free to interrupt, especially if lost
- Learn how things work and how to get help
- Share code and use others code
  (Learn by example !)
- My replication code is available on class website
- The goal is *not* to memorize commands

Statistics is the Future !

"I keep saying that the sexy job in the next 10 years will be statisticians."

NYT: Hal Varian, chief economist at Google

`http://www.nytimes.com/2009/08/06/technology/06stats.html`

- More and more data, e.g. surveys, blogs, twitter
- Academia more quantitative, e.g. pol sci
- Industry more quantitative, e.g. google
- In fact, even qualitative data (pictures, text, etc.) is rich quantitative data and we can analyze it as quantitative data. In fact, everything can be quantified. Any examples of non-quantifiable things ?

Why Stata

- Powerful. No need to learn any other software; Sufficient for vast majority of projects: data analysis, data management and graphics.
- User friendly (Good GUI, Built-In Documentation)
- Great user community: Listserv, websites, etc.
- Reasonable cost

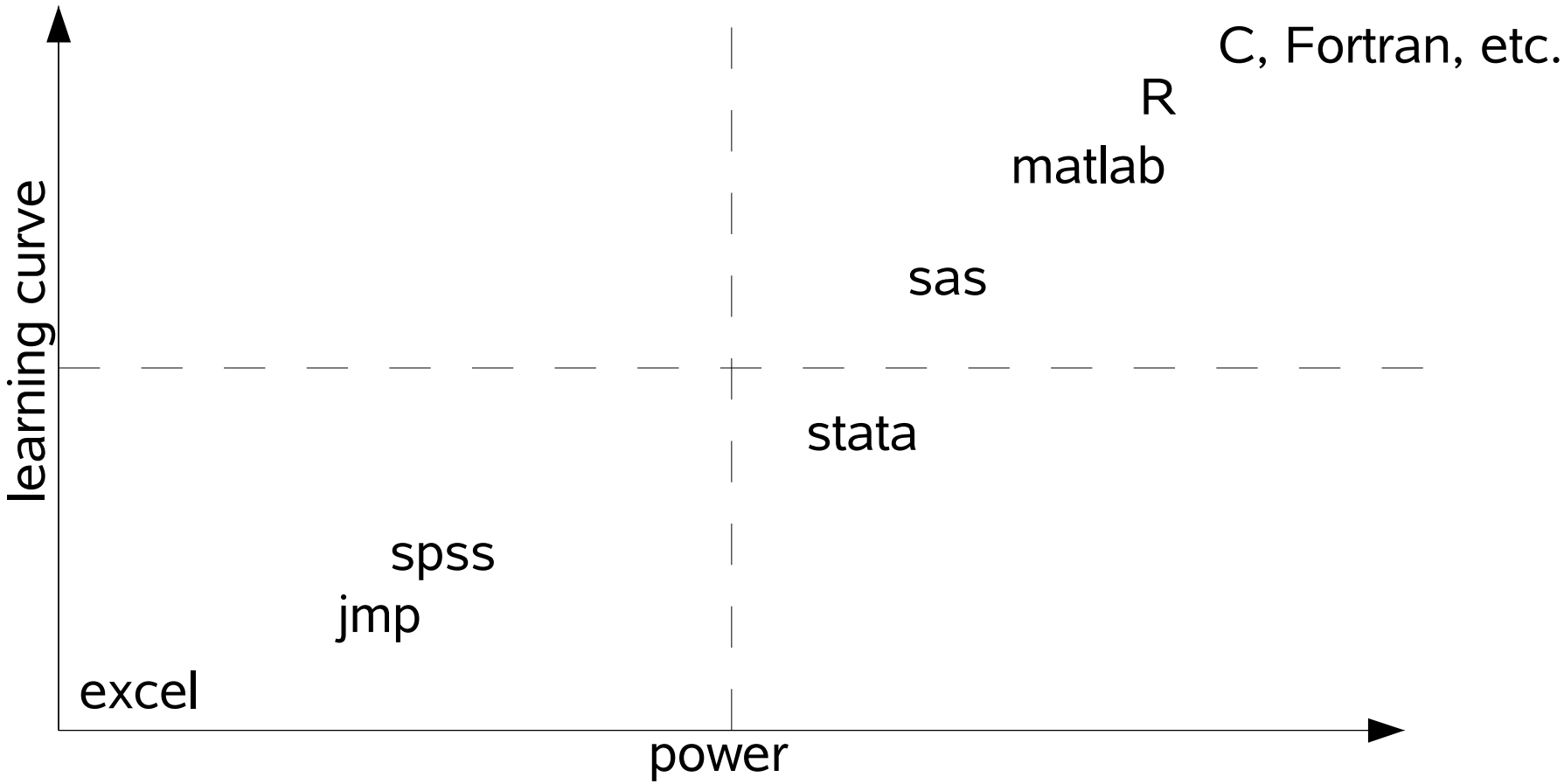
Why Stata (subjective)

sas

spss

R

Why Stata (subjective)



Which Stata

Stata Editions	# observations	# variables
Small(Student version)	1,000	99
Intercooled (Standard version)	Based on RAM in your computer	2,047
SE (For large datasets)		32,767
MP (Multi-processor)		32,767

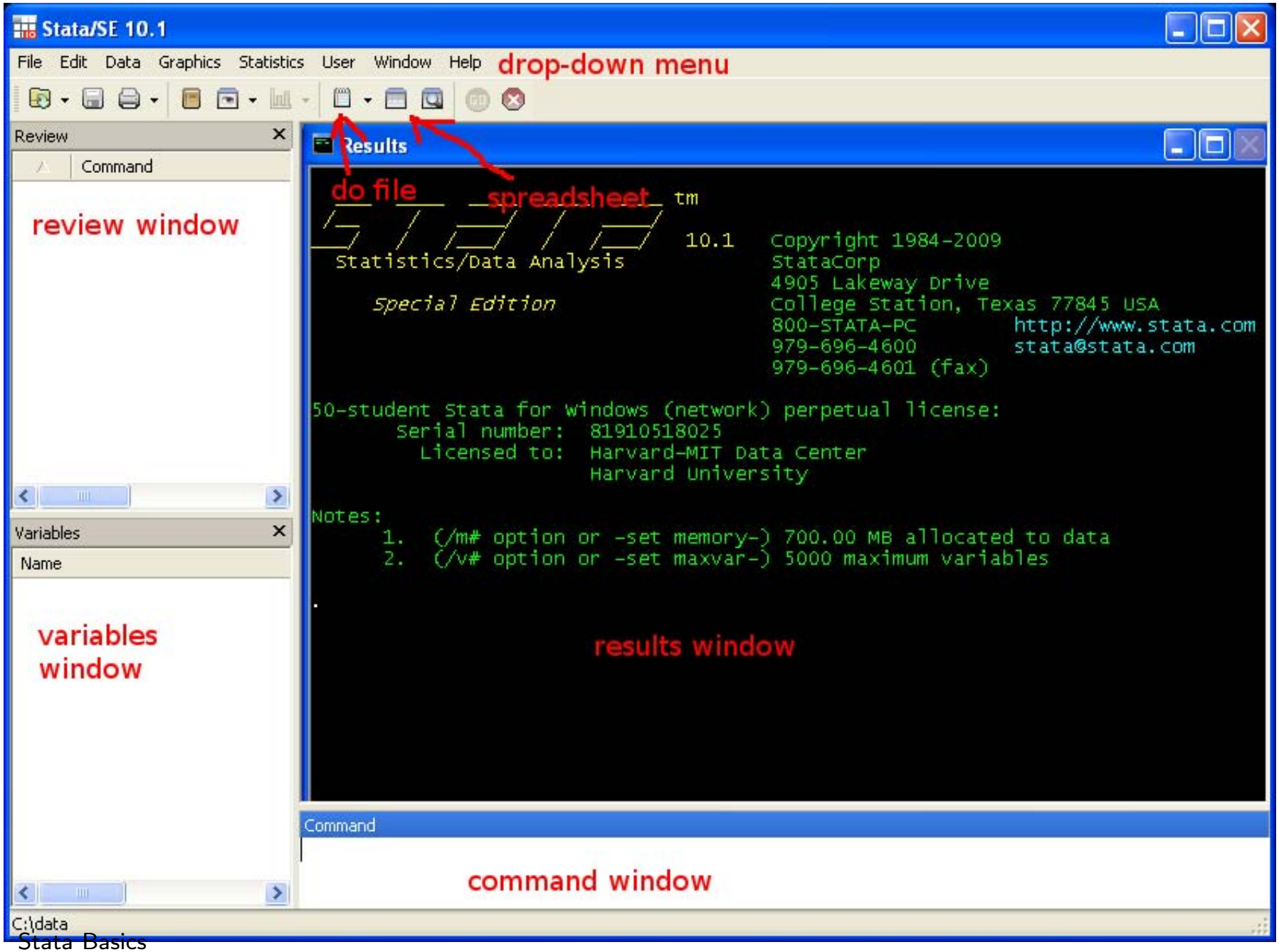
- Most people need Stata-IC (Intercooled)
- Small Stata is useless !

How Do I Get Stata ?

- Your Department IT
- HMDC Labs
- RCE (Research Computing Environment)
- Buy it: educational or grad plan. Again, IC is usually what you want

Outline

Stata Interface



Exercise 0: Data for Today

- Find class materials `http://stathelp.iq.harvard.edu/stata_intro`
- Right-click, Save Link As, and put on C:\ drive,
  go to C:\ and right-click, select **Win-Zip** and **Extract to here**
- There are several formats of the same data, presentation slides, handouts, and exercises

Getting Help

- Stata Help Files
  - `help` if you know command name, e.g. `help regress` [useful]
  - `search` if you do not know , e.g. `search regression` [not useful]
- Built-in pdf documentation
- Do web search e.g. "stata, dummy variables" [very useful]
- GUI [useful]

Stata Command Syntax

- <command> <variables> , <options>

  `describe var1 var2, detail`

- <variables> and <options> are optional
- Command specific syntax is in help files,

  e.g. `help describe`

Tips

- Make sure you have enough memory when you start stata

  `set mem 500m, perm`
- Use drop-down menus instead of command line to run Stata if you are a beginner. It will still produce code.
- Learn abbreviations, e.g. `d` for `describe`, they are underlined in help files
- Press Page-UP to get previous command in Command Window

Data for Today

- Data we use is a subset of General Social Survey:
  `http://www.norc.org/GSS+Website/`
- Probably the most comprehensive social science data for the U.S.
- It is very exciting data set
- We will look today at income, education and gender across U.S. regions

Outline

Paths

- To import data you need path
- Path is shown in “address” window or right-click file and select “Properties” (Windows), Ctrl-click and select “Get Info” (Mac)

Importing Stata Data files .dta

- Safe to put path in quotes. Use "clear" in case there is already data in memory

```
use "C:\files\gss.dta", clear
```

- Note "Review" and "Variables" Windows

Importing Stata Data files .dta cont'd

- A better way to import/export data :
- Change dir first

```
cd "C:\files"
```

- See where you are

```
cd
```

- See what you have

```
dir
```

- No need for quotes if no spaces

```
use gss.dta, clear
```

Exporting Stata Data files .dta

- Use "replace" in case there is old version of this file on hard drive; replace will not prompt if the file exists

```
save mydata.dta, replace
```

- To maintain compatibility with <Stata10

```
saveold mydata.dta, replace
```

Text File Types

- Data often comes as text file. E.g. **.tab .csv .dat .raw .txt**
- **.tab** is TAB delimited file
- **.csv** is Comma Separated Values file
- But do not trust suffixes
- Check yourself by opening file with text editor, such as **Stata do-file editor**
  – if it opens in text editor it is... a text file

Delimited, ASCII (text file)

- Stata will usually figure delimiter out
- Assuming it is in current directory:

```
insheet using gss.csv, clear
insheet using gss.tab, clear
outsheet using mydata.csv, replace comma
```

Fixed Format, ASCII (text file) [extra]

- **.raw, .dat, ...** They will either tell you or open it in text editor and figure yourself
- You need a dictionary that specifies variables columns
- There are several ways to do it...
- infix rate 1-4 speed 6-7 str country 9-11 using highway.raw /*note str*/

Import/Export Tips

- Use the following commands often:
- `d`
- `sum`
- `edit`
- `list` (Stata will list variables; Press "–more–" to get more or green arrow in menu. Press red cross in menu to break)

Import/Export Tips Cont'd

- Use GUI: File-Open/Import/Export
- Copy-Paste between Excel and Stata Data Editor
- Use Stat-Transfer
- Let's do Exercise 1

Outline

Variable Names

- Are we in the right directory?

```
pwd
```

-
```
insheet using gss.csv, clear
```

- Ugly

```
d
```

-
```
rename v1 hh_inc
```

- Nice

```
d
```

Variable Labels

- `label var hh_inc "household income"`
- `d`
- You can search labels; useful
  `lookfor income`
- There are also **value labels** – labels of values that a variable takes on – we will talk about them in data management class

Tips

- Give variables short names
- Labels prevent confusion later and for other people
- Labels automatically appear on graphs, regressions, etc.
- Use `lookfor` if you have many variables
- Let's do Exercise 2

10 Minutes Break

Outline

Research Philosophy

- Replication is **necessary** for Science

  Scientific results need to be documented

  1. People make mistakes
  2. People forget
  3. People lie

- Other scientist should be able to replicate your results. You too

Implications of Research Philosophy

- GUI and Command Window OK for playing around
- Copy-paste from review window or from results window to do-file
- By saving commands in do-file you document results
- Do-file should contain *all* (correct) commands you executed
- Do-file should produce final results (e.g. regression results) from raw data (e.g. data you downloaded)

Do-File Basics

- Do-File is just a text file (**.do**) containing commands
- Let's close Stata and open it again
- Click "New do-file editor" icon
- New window pops up. File-Open... and open stata_intro.do
- It has all the code we used and will use today
- Note the preamble and comments
- Highlight code you want to run and press Ctrl-D

Do-File Basics Cont'd

- You can have several do-files opened at the same time: In do-file editor: File-New
- You can copy-paste between do-file editor and command window, review window and results window
- To save do-file, go to File-Save As...
- You can open do-file with Stata do-file editor as well as with any other text editor (e.g. Notepad)

Do-File Tips

- Always have preamble in do-file as in our example
- Use comments !

```
*comment
```

```
/*comment
block*/
```

Outline

Operators

- == equal to (status quo)
- = used for assigning values
- != not equal to
- > greater than
- >= greater than or equal to
- & and
- | or
- `replace hi_ses=1 if (educ==7 | y==10) & inc>=10`
- Let's have a look at the do-file

Tips

- Beware of missing values: Come to our Data Management Class
- Understand your data: level of measurement, coding
- Use often: `d`; `sum`; `edit`; `tab` and `tab, nola`
- Use `lookfor`, especially if you have many variables
- Let's do Exercise 3

Outline

Fun

- This is where fun begins
- We may use data to answer interesting questions, e.g.:
- Do women make less than men ?
- Is the income gap bigger in North-East than in South ?
- Does education really help with income ?
- At home go to `http://www.norc.org/GSS+Website/` and use full GSS dataset

Descriptive Statistics

- Do you understand what a variable is describing ? For instance, variable 'education' may measure years of schooling or highest degree obtained on scale from 1 to 4
- Measurement ? Is income in $ or thousands of $?
- Does it make sense ? Can a person be -9 years old?
- What are the implications for your statistical analysis? (Number of observations, missing values, etc.)
- Let's see do-file

Tips

- `tab` is Stata workhorse; See `help tab` for useful options
- Also see GUI: Statistics–Summaries, Tables and Tests

Tips Cont'd

- Again, use often: `d`; `sum`; `edit`; `tab` and `tab, nola`
- Do not do inferential statistics (e.g. regressions) before doing descriptive statistics (e.g. histograms, scatterplots, frequency tables and cross-tabs)
- Let's do exercise 4

More Information

For further information see: our class website

`http://stathelp.iq.harvard.edu/stata_intro`

and especially this section:

`http://stathelp.iq.harvard.edu/stata_intro#Extras`

- Paper replication code
- Stata useful commands
- Software comparison
- And much more...

Outline

Missing Values

- Most data sets have missing values
- Missing value is blank or empty value
- We have no information for a particular observation
- For instance, a person declined to report his income
- Missing value is NOT 0; e.g. if income is 0 it is not missing: we have information that a person does not have income
- If it is missing we do not know
- Stata labels missing as ".", or ".a", ".b", etc.

Missing Values

- Let's load data with missing values

  ```
  use gss_missing.dta
  ```

- Tabulate income

  ```
  tab inc
  ```

- Use "mi" option to see the missing values

  ```
  tab inc, mi
  ```

- **Always** use "mi" option with tabulate

- You will also see missings in the spreadsheet

  ```
  edit
  ```

Missing Values

- Stata treats missings as a very big number
- For instance, if income is coded from 1 to 26 and we generate high income, this is **wrong:**
- `gen hi_inc=0`
- `replace hi_inc=1 if inc>15` it would be 1 for >15 and for missing
- It should be:
- `gen hi_inc=.`
- `replace hi_inc=1 if inc>15 & hi_inc<26`
- `replace hi_inc=0 if inc>0 & hi_inc<16`

Thank You !

- Please fill evaluations AND give us some comments/feedback – we do care for these classes and want to make them better
- Come to other classes we offer and tell your friends about our classes `http://www.iq.harvard.edu/statistical_software_2009_2010`

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