Seminar Corporate Governance:
Topics on Data Analysis with STATA

Yuhao Zhu
y.zhu@ese.eur.nl

22 November 2017

Contents

Part I
Introductory

1 Why we are here and how we get there?

Slide 2 **Who am I?**

- Yuhao (Hanan) Zhu.
- Final-year PhD Students at Erasmus School of Economics.
- Corporate Governance, Asset pricing, and Behavioral Finance.

Slide 3 **Why this topic?**

- Not knowing where to collect desired data.
- Lacking sufficient knowledge about STATA.
- Improperly resenting the results.

Slide 4 **How to approach?**

- Popular databases and what you can find from them.
- Basic knowledge of STATA commands, essential issues, and ability to read help documents.
- Design of the tables of results.

Slide 5 **What to expect?**

- Better data quality for your thesis.
- Correct results for your analysis.
- Clear way of showing your results.

Slide 6 **Above all**

You can improve your thesis grade by at least 1.0 if you do can reach these three criterion.

2 What to learn today?

Slide 7 **Databases**

- Popular databases.
- EDSC.
- WRDS.

Slide 8 **STATA**

- Layout.
- Idea behind STATA commands (functions). Link them to other computer languages.
- Basic commands for panel regressions.
- Essential issues and common mistakes.
- How to read STATA help document?

Slide 9 **Tables**

- How to get beautiful tables from STATA.
- How to get them into Excel?
- What items to show in your thesis?
- Title and captions.

Slide 10 **Note**

- Important sections and points are preceeded by an asterisk $*$.
- There are two kinds of questions: questions and good questions. So feel free to ask.
- I will also ask questions during the lecture.

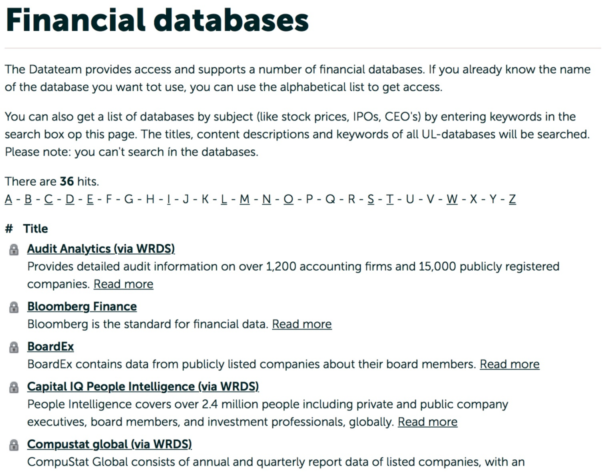
Part II
Databases

3 Fantastic databases and how to find them

Slide 11 $*$ **Erasmus Data Service Center**

- When you do not know which databases meet your need, go to the website of EDSC.
- `https://www.eur.nl/ub/en/edsc/databases/financial_databases/`

Slide 12 **EDSC - Financial databases**



Financial databases

The Datateam provides access and supports a number of financial databases. If you already know the name of the database you want tot use, you can use the alphabetical list to get access.

You can also get a list of databases by subject (like stock prices, IPOs, CEO's) by entering keywords in the search box op this page. The titles, content descriptions and keywords of all UL-databases will be searched. Please note: you can't search in the databases.

There are **36** hits.

A - B - C - D - E - F - G - H - I - J - K - L - M - N - O - P - Q - R - S - T - U - V - W - X - Y - Z

# Title

Audit Analytics (via WRDS)
Provides detailed audit information on over 1,200 accounting firms and 15,000 publicly registered companies. Read more

Bloomberg Finance
Bloomberg is the standard for financial data. Read more

BoardEx
BoardEx contains data from publicly listed companies about their board members. Read more

Capital IQ People Intelligence (via WRDS)
People Intelligence covers over 2.4 million people including private and public company executives, board members, and investment professionals, globally. Read more

Compustat global (via WRDS)
CompuStat Global consists of annual and quarterly report data of listed companies, with an

Slide 13 **Hand-collected data sets**

- Sometimes, hand collected data sets are also important.
- Not all data you need for your thesis is available through data sets.
- You can collect them by hand or by spiders.

4 ∗ WRDS

Slide 14 **WRDS**

- Wharton Research Data Services.
- `https://wrds-web.wharton.upenn.edu/wrds/`
- You can get permission to WRDS through EDSC.

Slide 15 **Databases**

- Compustat: Fundamentals of the firm.
- Execucomp: Executive compensation.
- CRSP; Stock prices.
- Event Study: A nice tool to do event study.

Part III
STATA

5 Why STATA?

Slide 16 **Too many choices**

- Excel (VBA): We know them when we are very young.
- SPSS: The first statistical software you met in your bachelor.
- EViews
- R
- Matlab
- Python

Slide 17 **Advantages of STATA**

- Ready-to-use packages and commands that are written and revised by previous researchers.
- Reusable codes and programs.
- Professional in handling panel data sets.
- In-design statistics.

Slide 18 **Alternatives**

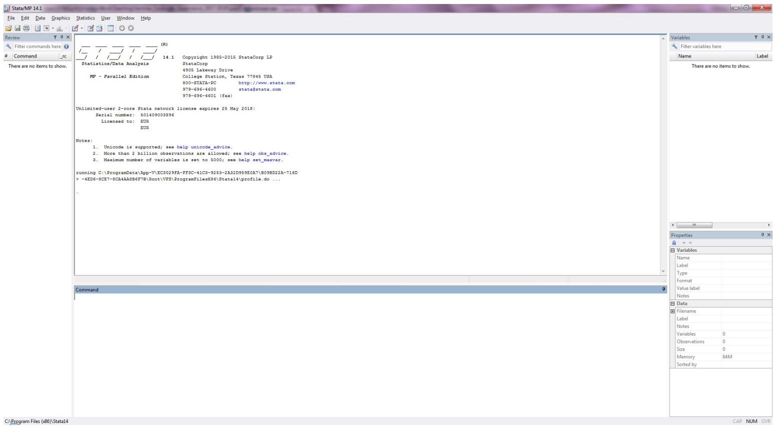
- Excel (VBA and Python add-ins): Pre-process of the raw data sets. Some data sets are not clean enough for STATA.
- EViews: Professional in handling time-series analysis.
- R: Data visualization.
- Matlab: Simulations.
- Python: Spiders.

Slide 19 **Job synergy**

- Catch online data with Python.
- Pre-process and clean the data sets using Excel.
- Data visualization using R.
- Panel analysis using STATA.

6 STATA basics, commands, and do-files

Slide 20 Layout



```
  ___  ____  ____  ____  ____ (R)
 /__    /   ____/   /   ____/
___/   /   /___/   /   /___/   14.1   Copyright 1985-2015 StataCorp LP
  Statistics/Data Analysis            StataCorp
                                      4905 Lakeway Drive
     MP - Parallel Edition            College Station, Texas 77845 USA
                                      800-STATA-PC        http://www.stata.com
                                      979-696-4600        stata@stata.com
                                      979-696-4601 (fax)

Unlimited-user 2-core Stata network license expires 25 May 2018:
       Serial number:  501409003896
         Licensed to:  EUR
                       EUR

Notes:
      1.  Unicode is supported; see help unicode_advice.
      2.  More than 2 billion observations are allowed; see help obs_advice.
      3.  Maximum number of variables is set to 5000; see help set_maxvar.

running C:\ProgramData\App-V\EC3029FA-FF3C-41C3-9253-2A32D959E0A7\B09BD22A-716D
> -4ED6-8CE7-8CA4AA8B6F7B\Root\VFS\ProgramFilesX86\Stata14\profile.do ...

.
```

Slide 21 Windows

- ∗ Input window: you give command to STATA.
- ∗ Output window: STATA gives you results.
- Review window: commands you typed before. You can reuse them by clicking.
- Variables window: List of variables within the data set.
- Property window: Property of a certain variable, e.g., name, label, and data type.

Slide 22 Give commands

- There are always two ways to give command:
- Click buttons in the menu bars or ribbons (like what you do in SPSS).
- Type your command and press ”Enter” (like what you do in CMD or Terminal).

Slide 23 Preferred way

- Typing command is preferred to clicking. Why?
- Clicking is annoying.
- Commands can be re-used later.
- We have ”do-file”.

Slide 24 Commands

- Commands are the most essential advantage of STATA.
- Clicking menu bars is first translated to commands, and then executed by STATA.
- Commands are well-defined functions!
- When you give commands, think that you are programming!

Slide 25

Idea behind commands

- Typed-in commands are conceptually equivalent to functions used in other computer languages.
- $Y = \mathit{Function}\,(X_1, X_2, X_3, \cdots \mid \theta)$.
- X_1, X_2, X_3 and so on are the input arguments (independent variables).
- θ is the parameters (optional variables).
- Y is the output (dependent variable).
- *Function* is well-defined sequential calculations and actions. Define once, and can be re-used many times.

Slide 26

Structure of the STATA commands

- `command [arg1 arg2 ...]  [if expression] [, options]`
- Command name.
- main argument.
- optional arguments.
- sample constraints.
- options.
- ”Commands” are ”Functions” without parenthesis.

Slide 27

An example: OLS estimate

- What if we calculate the OLS estimate by hand?
- Independent variable(s): Matrix X.
- Dependent variable: Y.
- OLS estimate $b = (X'X)^{-1} X'Y$.
- This formular can be defined as a function: `regress`

Slide 28

An example: STATA

- We type the command: `regress Y X`
- STATA analyzes your command:
- The function is `regress`. The OLS estimate should be used.
- The first argument is `Y`. It is the dependent variable.
- The second argument is `X`. It is the independent variable.
- STATA conducts calculation in the background: $b = (X'X)^{-1} X'Y$.
- b is printed in the output region.

Slide 29 An extended example: STATA

- We type the command: `regress Y X if year == 2000, vce(robust)`
- The function is `regress`. The OLS estimate should be used.
- The first argument is `Y`. It is the dependent variable.
- The second argument is `X`. It is the independent variable.
- STATA sees `if`. So the sample is constrained to observations with year equal to 2000.
- STATA sees `,`. So `vce(robust)` is option: using robust standard error.

Slide 30 * The most important things to learn about STATA commands

- The purpose of the command (function).
- The main arguments (variable) of the function.
- Which observations (sub-sample) are used?
- The options.

Slide 31 Example

- `summarize age income if gender == 1, detail`
- The purpose of the function is to summarize the variables.
- The variables we want to summarize are `age` and `income`.
- Which observations are used: males.
- We want to show more detailed summary: `, detail`

Slide 32 What is do-file?

- A sequence of commands just like a program.
- Automatically run from the beginning to the end. Or run the selected parts.
- Easy to re-use the codes.
- Ready to show to others with comments.
- Loops.

Slide 33 Always use do-files

- Always use do-files when you use STATA.
- `Ctrl + D` on PC, or `Shift + Cmd + D` on Mac to run selected commands.

7 ∗ Basic commands with Demo

Slide 34 **Basic functions**

- We will go through basic commands (functions) for panel analysis by:
- The idea behind commands.
- The structure of a command.
- A real example.

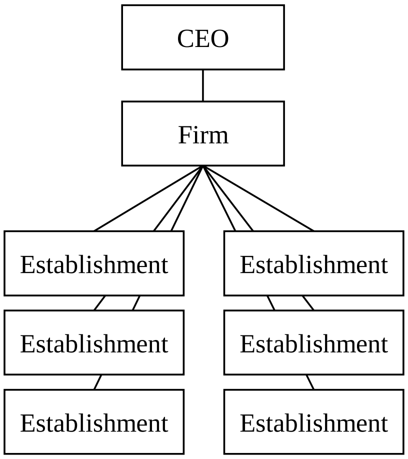
Slide 35 **Learning by doing**

- Now we introduce the most basic commands in STATA. They are frequently utilized when doing corporate finance studies. Get familiar with them for your thesis.
- Example: a German panel data set.
- Working paper: *The real costs of CEO compensation: the effect of behindness aversion of employees.*
- Purpose: Relationship between CEO compensation and workers' pay.

Slide 36 **Real example**

- Data set 1: Firm-level information on 100 largest German firms (CEO compensation and performance)
- Data set 2: Branch-level (establishment-level) information (workers' pay and labor structure)
- Data set 3: Match book of the firm ID and the branch (establishment) ID.

Slide 37 **Data structure**



CEO compensation and personal information.

Firm-level characteristics, e.g., performance, size, capital structure and etc.

Workers' wages and establishment-level characteristics, e.g., number of workers, proportion of different kinds of workers and etc.

Slide 38 Organize your folder

- Organize your folder for better readability.
- A parent folder, and several sub-folders.
- /orig: Contains original data sets. Do not change data sets in this folder.
- /data: Contains modified or intermediate data sets saved for further analysis.
- /prog: Do files.
- Other sub-folders if needed.

Slide 39 Create a do-file

- We need to create a do-file.
- Save it under ”analysis/prog/”
- Save the file in time.

Slide 40 Locate the path of the parent folder

- Locate your parent folder.
- For example, it is named ”analysis”.

-
  ```
  cd "C:\Data\...\guest_lecture\analysis"
  ```

Slide 41 Open a data set

- We begin with open a data set.

-
  ```
  use "orig/firm_level_data.dta", clear
  ```

Slide 42 Generate variables

-
  ```
  generate ln_market_capital = ln(market_cap)
  gen return_on_asset = ebitda / total_asset
  ```

Slide 43 Summarize

- Summarize the variables.
- Missing values are not summarized.
- With option `detail`, you can obtain more detailed descriptions including quantiles.

-
  ```
  summarize ceo_total market_cap total_sales
  sum ceo_total, detail // Show more details.
  ```

Slide 44 Correlation matrix

- You can create correlation matrix of many variables.

-
  ```
  correlate ceo_total ceo_cash board_total
  corr market_cap total_sales employees
  ```

Slide 45 Sort

- Sort by variable name(s).

-
  ```
  sort market_cap
  sort market_cap total_sales
  sort id_iab // Sort firm id.
  ```

Slide 46 Merge data sets

- Step 1: Find the common key(s)
- Step 2: Identify the matching mode: 1-to-1, m-to-1, or m-to-m.
- Step 3: Decide the master and the using data sets.

Slide 47 Command `joinby`

- Syntex: `joinby [varlist] using filename [, options]`

-
  ```
  sort id_iab // sort before joinby
  joinby id_iab using "orig/match_book.dta"
  ```

Slide 48 Command `merge`

- Syntex: `merge m:m varlist using filename [, options]`

-
  ```
  * Many-to-many matching
  merge m:m betnr year using "data.dta"
  * Keep only mathced observations
  keep if _merge==3
  * Drop the auto-created variable
  drop _merge
  ```

Slide 49 Rename variables

- You maybe want to rename variables to make them easily recognized.

-
  ```
  rename id_iab firm_id
  rename betnr branch_id
  ```

Slide 50 Handle duplicates

- Sometimes there are duplicates within sample.
- For example, for each branch and each year, there should be only one variable.
- But there are some times multiple values (mistakes during data collection, or just change of id).
- `duplicates drop branch_id year, force`

Slide 51

Generate dummy variables

- We need dummy variables for descriptive information.
- For example, we want to create a dummy indicating whether the union within the firm is ”igmetall”.
-
  ```
  * Generate a dummy with value 0.
  gen is_igmetall = 0
  * Change it to 1 under certain conditions.
  replace is_igmetall = 1 if union == "igmetall"
  ```

Slide 52

Generate fixed effects dummies

- If you want to do regressions with fixed effects, you need to create dummies.
- STATA create N new dummy variables for N groups.
-
  ```
  tabulate year, generate(year_fe_)
  tabulate id_iab, generate(firm_fe_)
  tabulate state_branch, generate(state_fe_)
  ```
- For example, year dummies: *year_fe_1*, *year_fe_2*, and so on.

Slide 53

Save modified data sets

- After modifications, we can save our data sets that are ready to be used for analysis.
- The option `replace` is important!
-
  ```
  save "data/panel_data_zhu.dta", replace
  ```

Slide 54

Begin regressions

- Now we can use the modified data sets to do regressions.
-
  ```
  clear all
  use data/panel_data_zhu.dta, clear
  ```

Slide 55

Declare data structure

- Before panel analysis, you need to declare the data structure.
- Time series, cross-sectional, or panel data set.
- For panel data set: `xtset [group] [time]`.
- For time series data set: `tsset [time]`.
- This enables time operators `l.year`, `f.year`, or `l2.year`.
-
  ```
  xtset branch_id year
  ```

Slide 56 **OLS**

- Example 1: Normal OLS with 1 explanatory variable.

-
  ```
  regress ln_worker_wage ln_ceo_total
  ```

Slide 57 **OLS**

- Example 2: Normal OLS with multiple explanatory variables.

-
  ```
  reg ln_worker_wage ln_ceo_total ///
  return_on_asset leverage_ratio
  ```

Slide 58 **OLS**

- Example 3: OLS when year is after 2006.

-
  ```
  reg ln_worker_wage ln_ceo_total ///
  return_on_asset leverage_ratio ///
  if year >= 2006
  ```

Slide 59 **OLS**

- Example 4: OLS when year is after 2006, using robust standard errors.

-
  ```
  reg ln_worker_wage ln_ceo_total ///
  return_on_asset leverage_ratio ///
  if year >= 2006, vce(robust)
  ```

Slide 60 **OLS**

- Example 5: OLS when year is after 2006, using robust standard erros, with firm fixed effects.

-
  ```
  reg ln_worker_wage ln_ceo_total ///
  return_on_asset leverage_ratio ///
  firm_fe_⋆ ///
  if year >= 2006, vce(robust)
  ```

Slide 61 **OLS**

- Example 6: OLS when year is after 2006, using robust standard erros, with multiple fixed effects.

-
  ```
  reg ln_worker_wage ln_ceo_total ///
  return_on_asset leverage_ratio ///
  firm_fe_⋆ year_fe_⋆ state_fe_⋆ ///
  if year >= 2006, vce(robust)
  ```

Slide 62 **OLS**

- Example 7: One-year lagged OLS when year is after 2006, using robust standard erros, with multiple fixed effects.

-
  ```
  reg ln_worker_wage l.ln_ceo_total ///
  return_on_asset leverage_ratio ///
  firm_fe_* year_fe_* state_fe_* ///
  if year >= 2006, vce(robust)
  ```

8 ∗ Essential issues and common mistakes

Slide 63 **Essential issues**

- Some issues are very essential when doing analysis or writing do-files with STATA.
- If you neglect these issues (or even ignore them), you may get error reports.
- Of course, your results are probably wrong! If your supervisor or co-reader detect this, then...
- Sometimes, remember these issues will save your a lot of time and energy. Time is money.

Slide 64 **Write comments**

- Comments start with *, //, or be blocked by /* and */.
- Sometimes you forget what you wrote yesterday. So use comments to remind yourself.
- If you want to show your do-file to others, comments may help.

Slide 65 **Example: comments**

```
* This is a single-line comment.
[commands]
// This is also a single-line comment.
[commands]
/*
This is a block of comments.
*/
```

Slide 66 **Line break**

- Sometimes it is hard to write everything in a single line.
- Use `[ ///]` (one space and three slashes) to break lines for your commands.

Slide 67 **`merge` or `joinby`**

- Sometimes you need to think which merging command to choose.
- `merge` and `joinby` should generate the same results.
- However, under certain circumstances, one is superior to the other.
- `joinby` creates all pair-wise matching. Suppose that you think you are doing 1-to-1, m-to-1, or 1-to-m matching. However, there is duplicate observations in your sample. `joinby` will not report his error, but `merge` does.
- `merge` is not encouraged to do m-to-m matching! The matching is unstable! You get different results every time you re-run this command.

Slide 68 **Decision: `merge` or `joinby`**

- `merge` for 1-to-1, m-to-1, or 1-to-m matching.
- `joinby` for m-to-m matching.
- Remember: I warned you...

Slide 69 **Missing values**

- Missing values should be treated carefully!
- Otherwise, you make mistakes.

Slide 70 **Missing values: problem 1**

- If most of the observations for `prop_female` are missing.
- You dropped missing values during data preparation. Compare the following codes:
-
```
use data/panel_data_zhu.dta, clear
regress ln_worker_wage ln_ceo_total
```
-
```
use data/panel_data_zhu.dta, clear
keep if prop_female == .
regress ln_worker_wage ln_ceo_total
```
- Your sample size will shrink! You are measuring only local treatment effect.
- So, do not drop missing variable if the variable is a trivial one!. STATA automatically drop them during regressions.

Slide 71 ∗ **Missing values: problem 2**

- I want to regress for branches where more than half of the workers are female. Compare the following codes:
-
```
use data/panel_data_zhu.dta, clear
keep if prop_female != .
keep if prop_female > 0.5
regress ln_worker_wage ln_ceo_total
```

-
  ```
  use data/panel_data_zhu.dta, clear
  regress ln_worker_wage ln_ceo_total ///
  if prop_female > 0.5
  ```

-
  ```
  use data/panel_data_zhu.dta, clear
  regress ln_worker_wage ln_ceo_total ///
  if prop_female > 0.5 & prop_female != .
  ```

- Wrong sample during regression! Why?

Slide 72 ∗ Missing values are treated as very large numbers

- Missing values `.` are treated as very large values in STATA. Compare the following codes:

-
  ```
  use data/panel_data_zhu.dta, clear
  keep if prop_female > 1
  count prop_female if prop_female == .
  ```

-
  ```
  use data/panel_data_zhu.dta, clear
  keep if prop_female < 1
  count prop_female if prop_female == .
  ```

- Do always treat missing values carefully!

Slide 73 Fixed effects

- What is fixed effects?

- How we add them into the regression?

- Fixed effects. i. or fe_*

Slide 74 Do not use command `xtreg`

- Many students love to use the command `xtreg`.

- Do not use it!

-
  ```
  use "orig/firm_level_data.dta", clear
  xtset id_iab year
  xtreg ceo_total employees, fe
  reg ceo_total employees i.id_iab
  ```

- Drawback 1: `xtreg` does not report overal R-square and adjusted R-square. Not comparable to OLS.

- Drawback 2: `xtreg` does not report coefficients for FE dummies.

- Drawback 3: It is hard to incorporate multiple fixed effects with `xtreg`.

- Drawback 4: *t-statistics* are more robust using FE dummies than using `xtreg`.

Slide 75 Fixed effect regressions: alternative methods

- Choice 1: create dummies and include them in the regression.
- firm_fe_* means all variables starting with firm_fe_.

-
  ```
  reg ln_worker_wage ln_ceo_total ///
  firm_fe_* year_fe_* state_fe_*
  ```

Slide 76 Fixed effect regressions: alternative methods

- Choice 2: use operator i.
- It only applies to numerical catagorical variables.

-
  ```
  reg ln_worker_wage ln_ceo_total ///
  i.firm_id i.year i.state_branch
  ```
- Following codes give error report:

-
  ```
  reg ln_worker_wage ln_ceo_total i.union
  ```

Slide 77 Operations within groups

- Sometimes we need to do operations only within groups.
- For example: generate increase rate for each firm.
- Common mistake: inter-group increase rate.
- Always be careful when you are handling lagged data.

Slide 78 Row identifier

- Cells can be located by variable name and row identifier [_n].
- Handling lags with row identifier.
- Remember to sort before handling data.

-
  ```
  sort id_iab year
  gen roa_increase = ///
  (roa[_n] - roa[_n-1]) / roa[_n-1]
  ```
- What is the problem left? Inter-group increase rate!
- Drop them!

Slide 79 Alternative ways

- Method 1: Use `by` command to identify groups.

-
  ```
  by id_iab: gen roa_increase = ///
  (roa[_n] - roa[_n-1]) / roa[_n-1]
  ```
- Method 2: Use `xtset` command to specify the panel data set.
- Then use lagging operators.

-
  ```
  xtset id_iab year
  gen roa_increase = (roa - l.roa) / l.roa
  ```

Slide 80 by command

- `by` is equal to looping the command for each group.

-
  ```
  by id_iab: sum roa
  ```
- We can do this also by looping.

-
  ```
  levelsof id_iab, local(id)
  foreach i of local id {
  display "id_iab == ‘i’"
  sum roa if id_iab == ‘i’
  }
  ```

Slide 81 Third-party packages

- Some functions are programmed by third-parties.
- For example: IV regression, table output, winsorizing, and etc.
- Can be installed by commands: `ssc install [package]`.
- Be careful in selecting third-party packages, especially about historical versions.

Slide 82 Winsorizing

- Sometimes we need to winsorize the outliers.
- What is winsorizing?
- For the first time you use the package:

-
  ```
  ssc install winsor
  ```
- Now we conduct single-sided winsorizing to the observations whose value exceed 99% percentile.

-
  ```
  winsor prop_female ///
  , generate(prop_female_winsor) p(0.01) highonly
  sum prop_female, detail
  sum prop_female_winsor, de
  ```

Slide 83 **Help with commands**

- When you are not familiar with a new command, read the help documents.
- Type `help [command]`.
- Read syntax in the pop-out window.
- Click "[R] command – purpose of the command" in the pop-out window.
- Read more detailed descriptions in "STATA BASE REFERENCE MANUAL"

Slide 84 **Learn to read documentations**

- A typical STATA syntax goes as follows.
- `regress depvar [indepvars] [if] [in] [weight] [, options]`
- Also important: Description, Options, Stored results, and of course, Examples.
- Demo.

Part IV
Tables

9 Why tables are important?

Slide 85 **Tables**

- An organized way of showing your results.
- A good table (figure) is better than 1000 words.

Slide 86 **Above all**

We do not read your sentences that carefully. We read your tables!

10 * A good table

Slide 87 **Structure**

- A good title.
- Well-written descriptive words (caption).
- A nice table with necessary statistics.

Slide 88 **Title**

- Numbering: Table 1, Table 2, and so on.
- The purpose of your table.
- Not too long.
- Example: "Summary statistics".
- Example: "CEO compensation and workers' pay: Baseline regressions".

Slide 89 **Caption**

- The caption should include all information about what you are testing, so that readers do not need to refer to the main context.
- You need to specify:
- The purpose of your regressions (what relationship you want to test).
- The methods you are using (OLS, IV regression, Difference-in-difference, Probit model).
- The dependent variable and independent variables.
- Special settings.
- How standard errors are treated or clusterd?
- How *t-statistics* and significant levels are expressed.

Slide 90 **Caption: an example**

This table presents results for regressions with the annual wage of employees as the dependent variable. All independent variables are lagged by one year. See Table 1 for a detailed overview of variable definitions. In specification (3), we consider the observations after 2006 only. We use the White (1980) robust standard errors clustered at firm level. The *t*-statistics are reported below the estimates. ***, ** and * indicate that the value is significantly different from zero at the 1%, 5% and 10% levels.

Slide 91 **Table**

- What information is necessary:
- Dependent variable and independent variables.
- Coefficients.
- *t-statistics*
- Significance level.
- R-square or adjusted R-square.
- Number of observations.

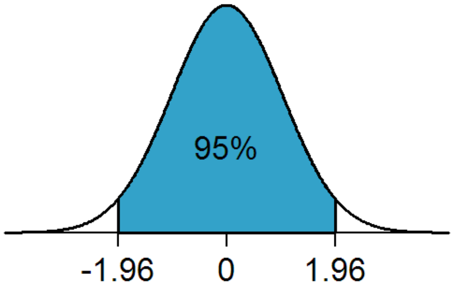
Slide 92

STATA table output

- The build-in table is not desirable.
- Only one regression per table. Hard to compare between models.
- Too long if fixed effects are included. We do not need them!
- Standard error, *t-statistics*, and *p-value*: Redundant.
- Confidence interval, *F-statistics*, Root MSE: we do not need them.
- Too long notes of collinearity.

Slide 93

t-statistics and *p-value*



- Reject the null hypothesis at the 95% level if t-statistics is located in the white region.
- To know about significant level, simply count stars.

Slide 94

We design our own table

- Use thrid-party package `estout` to generate concise and beautiful tables.
- Ready to be included in your thesis.
- No redundant output printed on your screen.

Slide 95

Command `estout`

- Install it for the first time.
- Use command `quietly` before `regress`
- Save statistics using `estout store [name]`
- Show the table with following commands.
-
  ```
  estout m_*, ///
  cells(b(star fmt(%9.3f)) t(fmt(%9.2f))) ///
  style(fixed) title(Regression Results) ///
  stats(r2_a N, fmt(%9.3f %9.0f)) ///
  starlevels(* 0.10 ** 0.05 *** 0.01) ///
  drop(*industry_fe* *year_fe* *state_fe*)
  ```

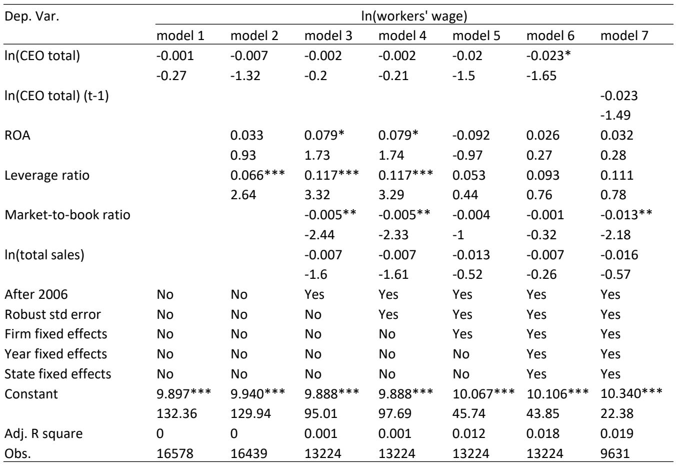
Slide 96

Export STATA table, a demo

- Copy as table.
- Modifications in Excel.
- Copy into Word / Powerpoint as pdf.

Slide 97

Outcome



Dep. Var.	ln(workers' wage)						
	model 1	model 2	model 3	model 4	model 5	model 6	model 7
ln(CEO total)	-0.001	-0.007	-0.002	-0.002	-0.02	-0.023*	
	-0.27	-1.32	-0.2	-0.21	-1.5	-1.65	
ln(CEO total) (t-1)							-0.023
							-1.49
ROA		0.033	0.079*	0.079*	-0.092	0.026	0.032
		0.93	1.73	1.74	-0.97	0.27	0.28
Leverage ratio		0.066***	0.117***	0.117***	0.053	0.093	0.111
		2.64	3.32	3.29	0.44	0.76	0.78
Market-to-book ratio			-0.005**	-0.005**	-0.004	-0.001	-0.013**
			-2.44	-2.33	-1	-0.32	-2.18
ln(total sales)			-0.007	-0.007	-0.013	-0.007	-0.016
			-1.6	-1.61	-0.52	-0.26	-0.57
After 2006	No	No	Yes	Yes	Yes	Yes	Yes
Robust std error	No	No	No	Yes	Yes	Yes	Yes
Firm fixed effects	No	No	No	No	Yes	Yes	Yes
Year fixed effects	No	No	No	No	No	Yes	Yes
State fixed effects	No	No	No	No	No	Yes	Yes
Constant	9.897***	9.940***	9.888***	9.888***	10.067***	10.106***	10.340***
	132.36	129.94	95.01	97.69	45.74	43.85	22.38
Adj. R square	0	0	0.001	0.001	0.012	0.018	0.019
Obs.	16578	16439	13224	13224	13224	13224	9631

Slide 98

Advantage of `estout`

- All necessary information is included.
- Comparable between different models.
- Ready to be used in your thesis.

Part V
Conclusion

11 Concluding remarks

Slide 99

What we learnt

- Databases.
- STATA.
- Design your tables.

Slide 100 **Questions**

- Thank you for your attention.
- Please feel free to ask questions.