

Exporting Stata Tables and Figures to \LaTeX

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Why create figures and tables using Stata and L^AT_EX?

- Robustness — By automating everything you reduce the likelihood of making an error such as mislabeling figures or inputting elements of a table incorrectly.
- Repeatability and editability — You will have code for the entire process of creating your figure/table so it is simple to recreate your figures/tables, make minor edits to them, or create additional versions with subtle differences.
- Appearance — The combination of Stata and L^AT_EX can produce tables and figures that are far more visually appealing than anything you will create in Word or Excel.
- Ease of updating — Suppose you want to add additional years of data to your regression or realize that you made a mistake in creating your data set. Updating your tables is as simple as re-running your Stata code and re-compiling your L^AT_EX document.

Which looks better?

Table: Ugly Excel Table

Car type	No.	%
Domestic	52	70.3
Foreign	22	29.7
Total	74	100

Table: Pretty L^AT_EX Table

Car type	No.	%
Domestic	52.0	70.3
Foreign	22.0	29.7
Total	74.0	100.0

What I will cover today

- 1 **tabout** — Outputting tabulations of variables
- 2 **esttab/estout** — Outputting regression output and other statistical tables
- 3 **graph export** — Export Stata figures

What is **tabout**?

tabout allows the user to produce oneway or twoway tables of frequencies and/or percentages, as well as tables of summary statistics. These tables can be exported in a number of different formats, including .scv, but the most useful is .tex, which is used by \LaTeX . A much more thorough treatment of **tabout** can be found at http://www.ianwatson.com.au/stata/tabout_tutorial.pdf.

A simple tabulation

The below command will produce a simple oneway tabulation of the variable *foreign* and save it as a .tex file for use in a L^AT_EX document:

tabout foreign using 'filepath'tabout_foreign.tex, replace style(tex)

A simple tabulation

The below command will produce a simple oneway tabulation of the variable *foreign* and save it as a .tex file for use in a L^AT_EX document:

tabout foreign using 'filepath'tabout_foreign.tex, replace style(tex)

Code produced by **tabout**

```
Car type&No. \\
\hline
Domestic&52.0 \\
Foreign&22.0 \\
Total&74.0 \\
```

Which, when compiled, looks like

Car type	No.
Domestic	52.0
Foreign	22.0
Total	74.0

Now let's make the table prettier by using the "booktabs" option and add a column for the column percentage

```
tabout foreign using 'filepath'tabout_foreign2.tex, replace style(tex) ///  
cells(freq col) booktabs
```


Now let's make the table prettier by using the "booktabs" option and add a column for the column percentage

**tabout foreign using 'filepath'tabout_foreign2.tex, replace style(tex) ///
cells(freq col) booktabs**

```
Car type&No.& \% \\
\midrule
Domestic&52.0&70.3 \\
Foreign&22.0&29.7 \\
Total&74.0&100.0 \\
```

Car type	No.	%
Domestic	52.0	70.3
Foreign	22.0	29.7
Total	74.0	100.0

We could also do a twoway cross-tab

```
tabout foreign over40mpg using 'filepath'tabout_foreign_over40mpg.tex,  
/// replace style(tex) cells(freq col)
```

We could also do a twoway cross-tab

**tabout foreign over40mpg using 'filepath'tabout_foreign_over40mpg.tex,
/// replace style(tex) cells(freq col)**

Car type	over40mpg					
	0		1		Total	
	No.	%	No.	%	No.	%
Domestic	52.0	71.2	0.0	0.0	52.0	70.3
Foreign	21.0	28.8	1.0	100.0	22.0	29.7
Total	73.0	100.0	1.0	100.0	74.0	100.0

Summary statistics for MPG and weight, broken down by foreign or domestic car

**tabout foreign using 'filepath'tabout_sumstats.tex, replace sum ///
cells(mean mpg median mpg mean weight median weight) style(tex)**

Summary statistics for MPG and weight, broken down by foreign or domestic car

**tabout foreign using 'filepath'tabout_sumstats.tex, replace sum ///
cells(mean mpg median mpg mean weight median weight) style(tex)**

Car type	Mean mpg	Median mpg	Mean weight	Median weight
Domestic	19.8	19.0	3,317.1	3,360.0
Foreign	24.8	24.5	2,315.9	2,180.0
Total	21.3	20.0	3,019.5	3,190.0

So how do I actually create the table in L^AT_EX?

The “tabular” environment!

- The **tabular** environment is opened by `\begin{tabular}{specs}` and ends with `\end{tabular}`, where *specs* defines how many columns the table will have and how they should be aligned.
- L^AT_EX’s **tabular** environment has a number of commands that control the look of your table, but the two most important are `&` and `\\`. The `&` command delimits cells within a table and `\\` ends a line.

The below table, therefore, has one left-aligned column followed by two right-aligned columns:

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The below table, therefore, has one left-aligned column followed by two right-aligned columns:

```
\begin{tabular}{lrr}
  Car type&No.& \% \\
  \midrule
  Domestic&52.0&70.3 \\
  Foreign&22.0&29.7 \\
  Total&74.0&100.0 \\
\end{tabular}
```

Car type	No.	%
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Getting a little bit fancier

Although the above examples all successfully produce a table in \LaTeX , you will usually enclose your **tabular** within a **table**. This allows you to include a caption and/or a label. This is especially useful if you would like to include a table of contents and hyperlinks.

```
\begin{table}
  \caption{Origin of Cars}
  \label{mytablelabel}
  \begin{tabular}{lrr}
    Car type&No.&\% \\
    \midrule
    Domestic&52.0&70.3 \\
    Foreign&22.0&29.7 \\
    Total&74.0&100.0 \\
  \end{tabular}
  \footnotesize My footnote...
\end{table}
```

Table: Origin of Cars

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Domestic	52.0	70.3
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Total	74.0	100.0
My footnote...		

But didn't **tabout** create the table for me?

tabout generates code for your table but does not create the opening and closing text for it (although with the right options I believe it is possible to automatically generate that code as well). To include another .tex file in your document you use L^AT_EX's `\input{}` command. In the above example **tabout** saved the table as “`tabout_foreign2.tex`.” Therefore, the simplest way to create your table in a L^AT_EX document is as follows:

```
\begin{table}
  \caption{Origin of Cars}
  \label{mytablelabel}
  \begin{tabular}{lrr}
    \input{\results/tabout_foreign2.tex}
  \end{tabular}
  \footnotesize My footnote...
\end{table}
```

Table: Origin of Cars

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The **estout** package is a user-written package which provides tools for producing publication-quality tables in Stata. It contains the following programs:

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- **eststo**: Utility to store estimation results for later tabulation. **eststo** is an alternative to official Stata's estimates store. Main advantages of **eststo** over estimates store are that the user does not have to provide a name for the stored estimation set and that **eststo** may be used as a prefix command.

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For further details see <http://repec.org/bocode/e/estout/index.html>

esttab

For the most part you will want to use **esttab** rather than **estout** because it produces nicely-formatted tables suitable for export as \LaTeX , CSV, RTF, or HTML formats. All of **estout**'s options are also available in **esttab**, however the reverse is not true. Additionally, **esttab** produces all of the code for opening the table and tabular environment that we had to provide ourselves when using `tabout`.

Let's produce a simple regression table using the auto data set.

```
sysuse auto, clear
eststo clear
eststo: reg price mpg weight
eststo: reg price mpg foreign
eststo: reg price mpg weight foreign
esttab using 'filepath'table1.tex, ///
        replace booktabs compress      ///
        addnote("Your footnote here")
```

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eststo: reg price mpg weight
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esttab using 'filepath'table1.tex, ///
    replace booktabs compress    ///
    addnote("Your footnote here")
```

	(1) price	(2) price	(3) price
mpg	-49.51 (-0.57)	-294.2*** (-5.28)	21.85 (0.29)
weight	1.747** (2.72)		3.465*** (5.49)
foreign		1767.3* (2.52)	3673.1*** (5.37)
_cons	1946.1 (0.54)	11905.4*** (10.28)	-5853.7 (-1.73)
<i>N</i>	74	74	74

t statistics in parentheses

Your footnote here

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Alternatively, we could explicitly name each set of regression estimates and **esttab** any combination of the stored estimation sets.

```
sysuse auto, clear
eststo clear
eststo e1: reg price mpg
eststo e2: reg price mpg weight
eststo e3: reg price mpg foreign
eststo e4: reg price mpg weight foreign
esttab e2 e3 e4          ///
    using 'filepath'table1.tex,  ///
    replace booktabs compress  ///
    addnote("Your footnote here")
```

	(1) price	(2) price	(3) price
mpg	-49.51 (-0.57)	-294.2*** (-5.28)	21.85 (0.29)
weight	1.747** (2.72)		3.465*** (5.49)
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N	74	74	74

t statistics in parentheses

Your footnote here

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Including your table in L^AT_EX

Unlike **tabout**, **esttab** generates the commands to open and close the table for you. Therefore, including a table created by **esttab** in your L^AT_EX document is as simple as including the line `\input{filename.tex}`. The `\input{}` command simply inserts the contents of another .tex file directly into your file. To create a document containing only the table on the previous slide all we need is the below code:

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To create a document containing only the table on the previous slide all we need is the below code:

```
\documentclass[11pt]{article}

\usepackage{booktabs}
\usepackage{caption}
\usepackage{verbatim}

\begin{document}
  \input{S:/trainings/exporting_stata_tables_figures/results/table1.tex}
\end{document}
```

esttab flexibility

esttab allows the user a great deal of flexibility in formatting tables. For example, we can add model titles, a caption, and replace the t-statistics with standard errors.

```
esttab using 'filepath'table2.tex, replace booktabs compress ///
      mtitles("Model 1" "Model 2" "Model 3") ///
      title("My Regression Table") se
```

Table: My Regression Table

	(1) Model 1	(2) Model 2	(3) Model 3
mpg	-49.51 (86.16)	-294.2*** (55.69)	21.85 (74.22)
weight	1.747** (0.641)		3.465*** (0.631)
foreign		1767.3* (700.2)	3673.1*** (684.0)
_cons	1946.1 (3597.0)	11905.4*** (1158.6)	-5853.7 (3377.0)
N	74	74	74

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

graph export

Stata's **graph export** command allows the user to export the graph currently in memory. Therefore **graph export** usually appears immediately after a Stata graph command, such as `twoway tsline varlist`. **graph export** allows you to export graphs as a number of different file types, however I usually export figures as .eps files because they are supported by both Linux and Windows Stata and because they interact well with L^AT_EX.

Syntax

Unlike **tabout** and **esttab**, the syntax for **graph export** is very simple. Below I create a simple plot using the auto data set and export it as an eps file.

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```
twoway (scatter price mpg) (lfit price mpg), title(Price v. MPG) ///  
      caption(Source: Stata auto data set)  
graph export 'filepath'price_mpg_figure.eps, replace as(eps)
```

Syntax

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```
twoway (scatter price mpg) (lfit price mpg), title(Price v. MPG) ///  
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To include the figure in a \LaTeX document you use the **figure** environment, which is in a lot of ways analogous to **table**

Syntax

Unlike **tabout** and **esttab**, the syntax for **graph export** is very simple. Below I create a simple plot using the auto data set and export it as an eps file.

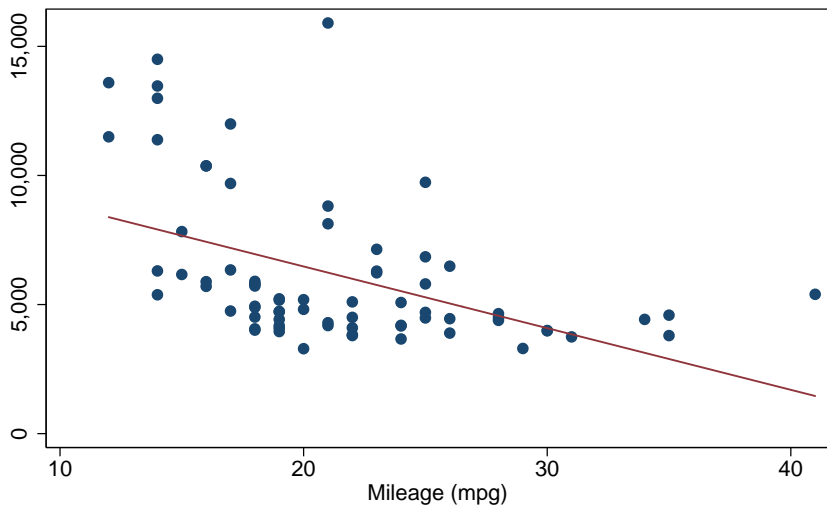
```
twoway (scatter price mpg) (lfit price mpg), title(Price v. MPG) ///
      caption(Source: Stata auto data set)
graph export 'filepath'price_mpg_figure.eps, replace as(eps)
```

To include the figure in a \LaTeX document you use the **figure** environment, which is in a lot of ways analogous to **table**

```
\begin{figure}
  \caption{Price v. MPG}
  \includegraphics[width=.95\textwidth]{\results/price_mpg_figure.eps}
\end{figure}
```

Figure

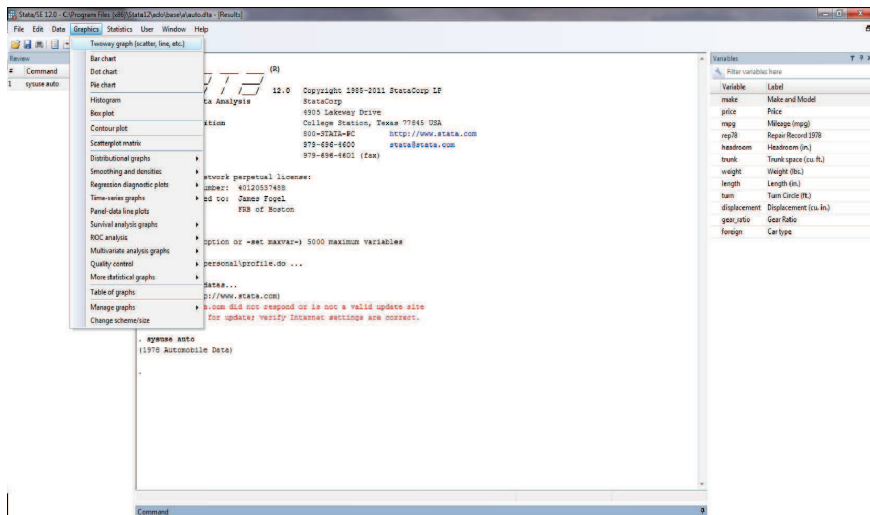
Figure: Price v. MPG



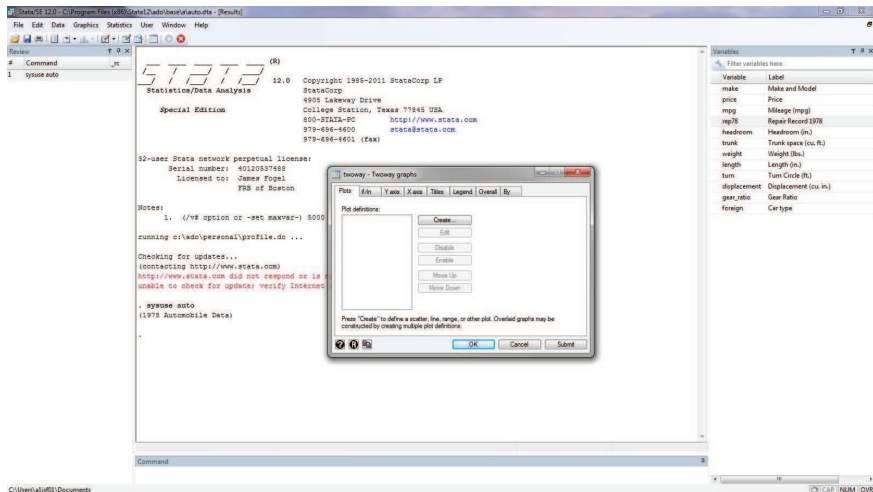
Creating figures in Stata

Stata's graphics capabilities are quite powerful, although the learning curve can be somewhat steep, as there are many different types of graphs and each type comes with a vast assortment of options. In general I recommend using do-files rather than the Stata GUI, however you may want to create a graph but not know the specific options you need to specify in order to add titles and axis labels, format the legend, or change colors. In this case simply use the Stata graphics editor to create the graph. It will then give you the code necessary to re-create the graph in both

Graphics editor



Graphics editor



Graphics editor

The screenshot displays the Stata 12.1 software interface. The main window is the Do-file Editor, showing a script for exporting a regression table and a scatter plot. The Results window displays the output of the regression, including coefficients and standard errors. The twoway - Twoway graphs dialog box is open, showing the plot definition for 'Price v. MPG'. The Graph window shows the resulting scatter plot with a fitted regression line.

StataMP 12.1 - /usr/local/statal2/ado/base/a/auto.dta (on a1pcmp02.bos.frh.org)

Review

#	Command	Results
15	tab gear_ratio foreign	
16	r	199
17	br	
18	about foreign using ...	
19	do "/tmp/57415.1.sta..."	
20	do "/tmp/57415.1.sta..."	
21	do "/tmp/57415.1.sta..."	
22	do "/tmp/57415.1.sta..."	
23	do "/tmp/57415.1.sta..."	199
24	do "/tmp/57415.1.sta..."	
25	do "/tmp/57415.1.sta..."	
26	do "/tmp/57415.1.sta..."	
27	do "/tmp/57415.1.sta..."	4
28	do "/tmp/57415.1.sta..."	
29	do "/tmp/57415.1.sta..."	
30	do "/tmp/57415.1.sta..."	
31	help estout	
32	do "/tmp/57415.1.sta..."	199
33	do "/tmp/57415.1.sta..."	
34	do "/tmp/57415.1.sta..."	
35	do "/tmp/57415.1.sta..."	
36	help twoway	
37	twoway scatter price ...	
38	twoway (scatter price ...	
39	do "/tmp/57415.1.sta..."	
40	do "/tmp/57415.1.sta..."	
41	twoway (scatter price ...	
42	twoway (scatter price ...	
43	twoway (scatter price ...	

Results

	mpg	weight	foreign	_cons
	21.8536	74.22114	8.29	0.769
	3.464766	.630749	5.49	0.009
	3673.06	683.9783	5.37	0.009
	-5953.696	3376.987	-1.73	0.087
				-126.1758
				2.266717
				2386.989
				-12588.88
				881.4

twoway - Twoway graphs

Plot definitions:

Plot 1: Create... Edit Disable Enable Move Up Move Down

Plot 2: Create... Edit Disable Enable Move Up Move Down

(scatter price mpg)

Graph (Graph)

Price v. MPG

Source: Stata auto data set

Legend: Price (blue dots), Fitted values (red line)

Conclusion

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- Once you have created a figure, it is easy to export using **graph export**
- \LaTeX provides a convenient place to organize your tables and figures because making changes to tables and figures is as simple as editing your do-file, re-running your Stata code, and then re-compiling your \LaTeX document. There is NO copying and pasting and there are fewer places to make mistakes.

Conclusion

- Never copy tables from Stata's result's window! Use **esttab** or **tabout** instead!
- Once you have created a figure, it is easy to export using **graph export**
- \LaTeX provides a convenient place to organize your tables and figures because making changes to tables and figures is as simple as editing your do-file, re-running your Stata code, and then re-compiling your \LaTeX document. There is NO copying and pasting and there are fewer places to make mistakes.
- Once you have created a few tables in **tabout** or **esttab** and written a few \LaTeX documents you have a template for future tables and documents.