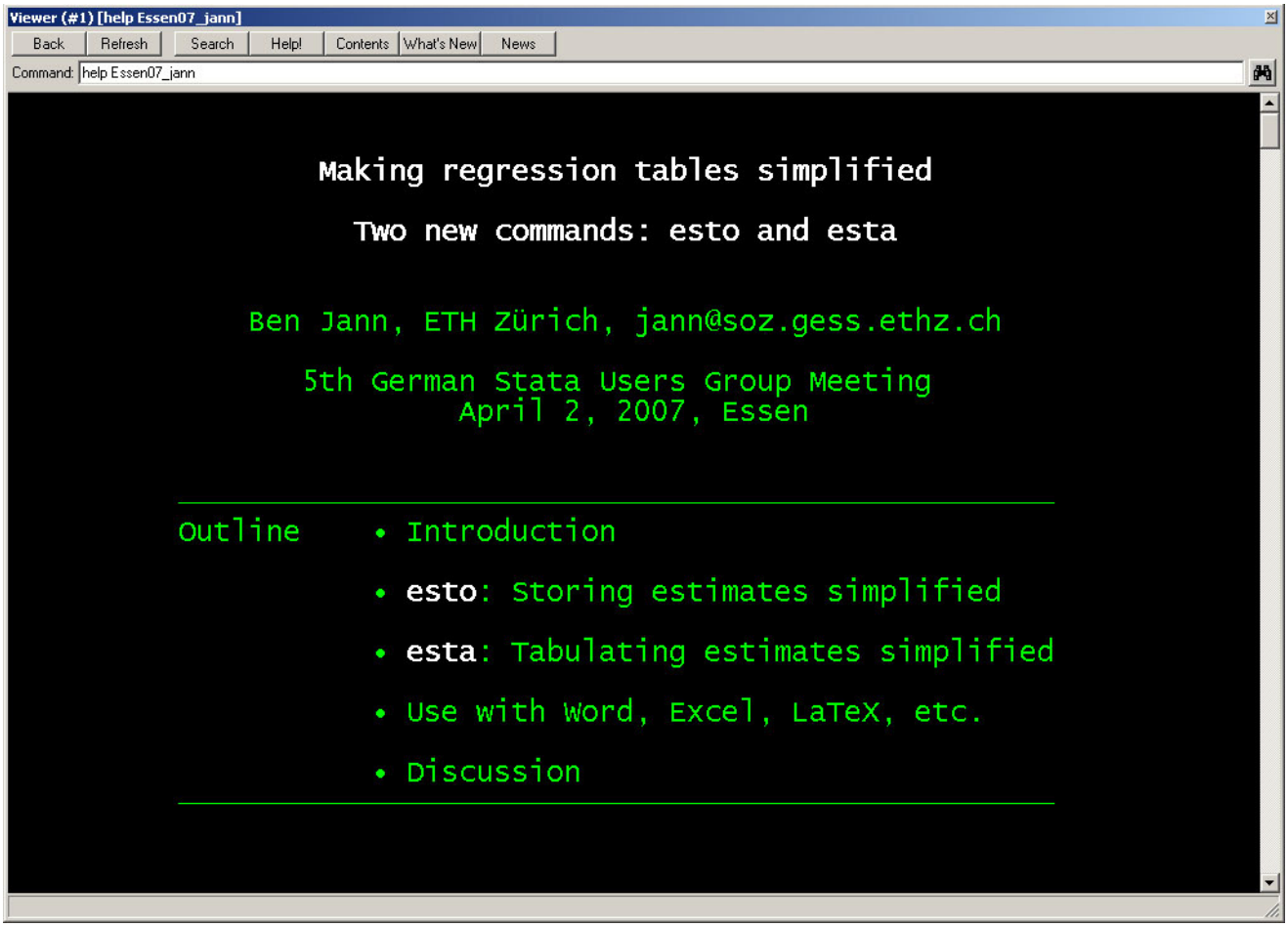
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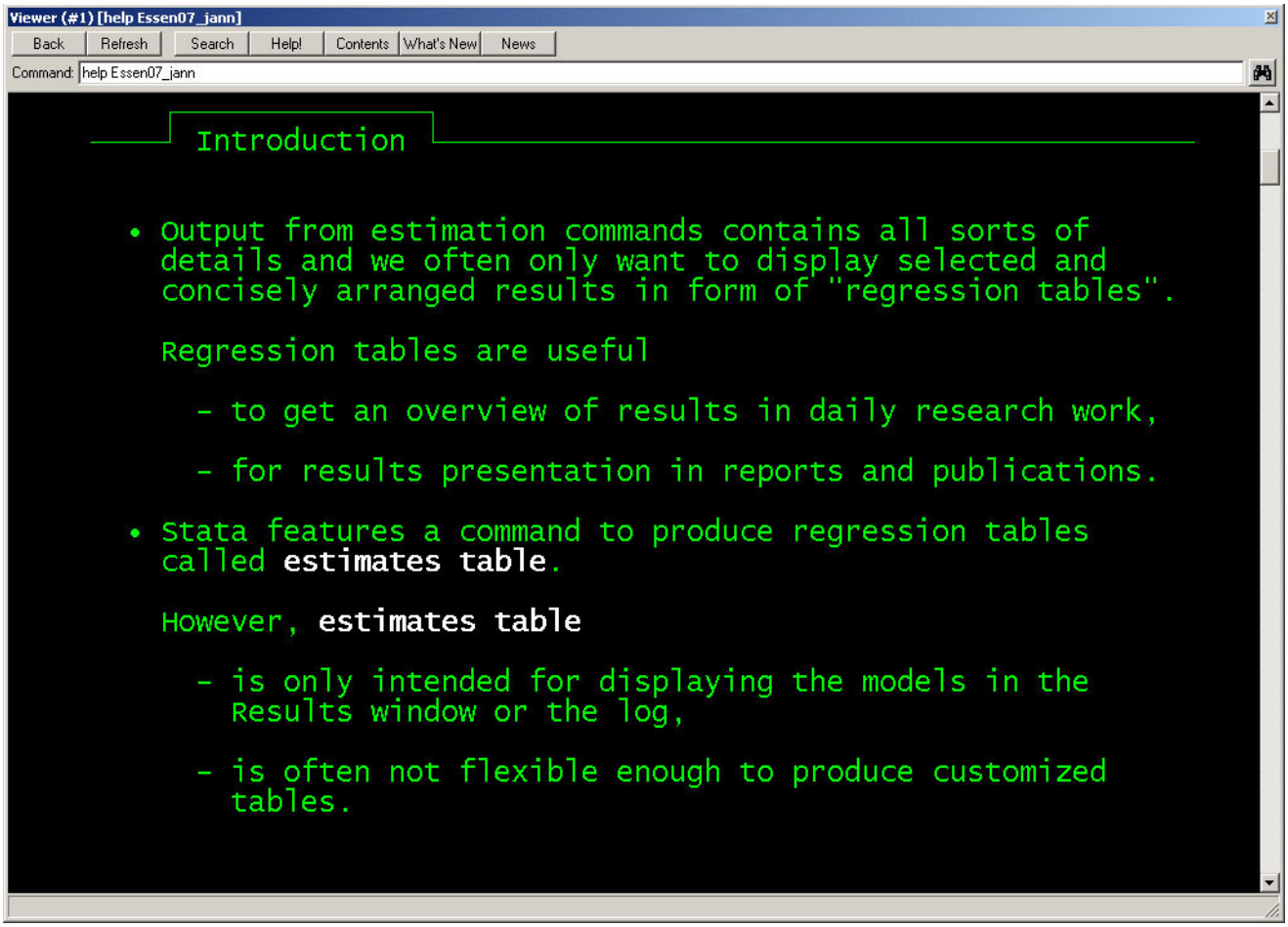
Making regression tables simplified
Two new commands: esto and esta
Ben Jann, ETH Zürich, jann@soz.gess.ethz.ch
5th German Stata Users Group Meeting
April 2, 2007, Essen
Outline
• Introduction
• esto: Storing estimates simplified
• esta: Tabulating estimates simplified
• Use with Word, Excel, LaTeX, etc.
• Discussion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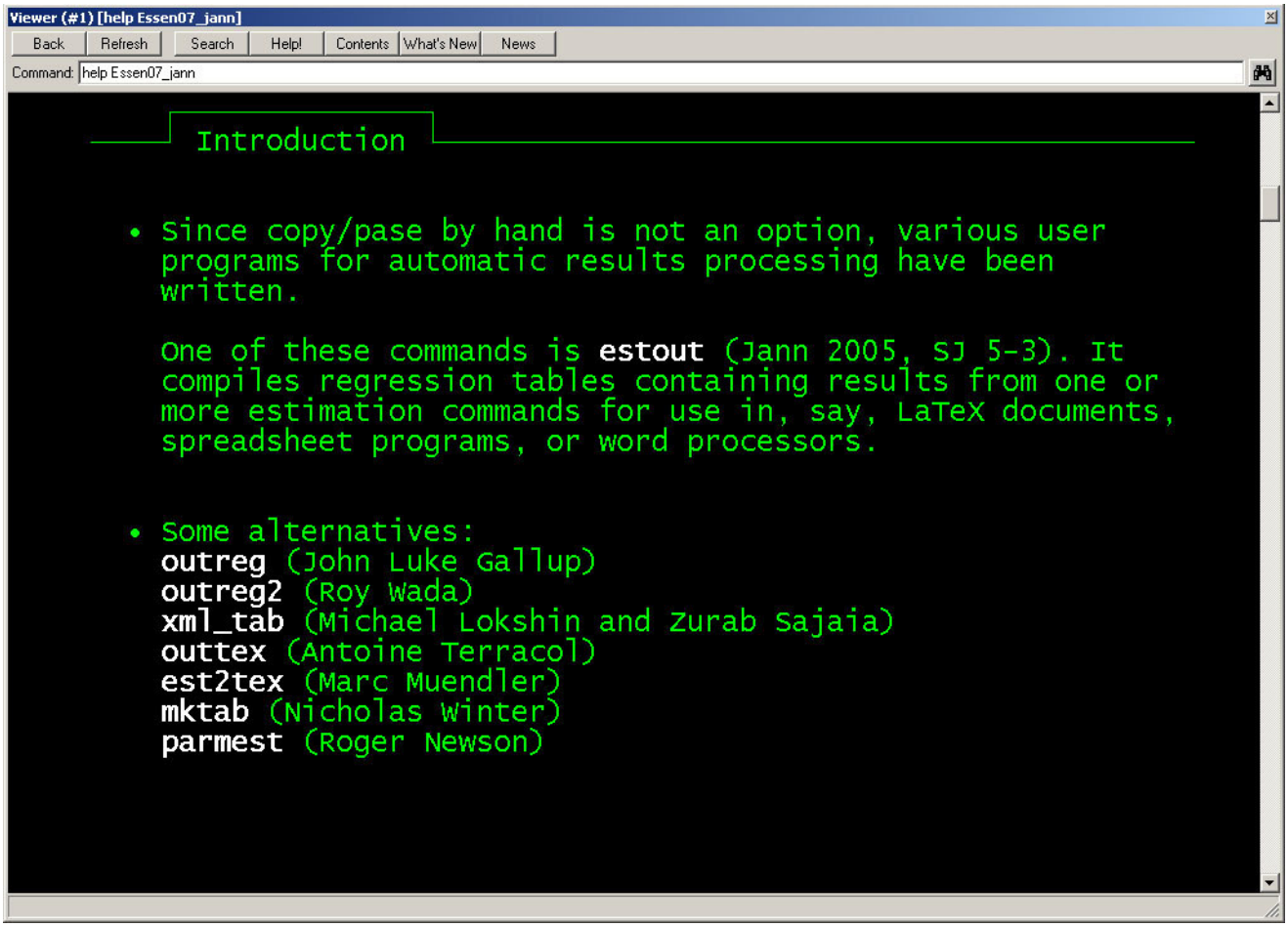
• Output from estimation commands contains all sorts of details and we often only want to display selected and concisely arranged results in form of "regression tables".
Regression tables are useful
- to get an overview of results in daily research work,
- for results presentation in reports and publications.
• Stata features a command to produce regression tables called estimates table.
However, estimates table
- is only intended for displaying the models in the Results window or the log,
- is often not flexible enough to produce customized tables.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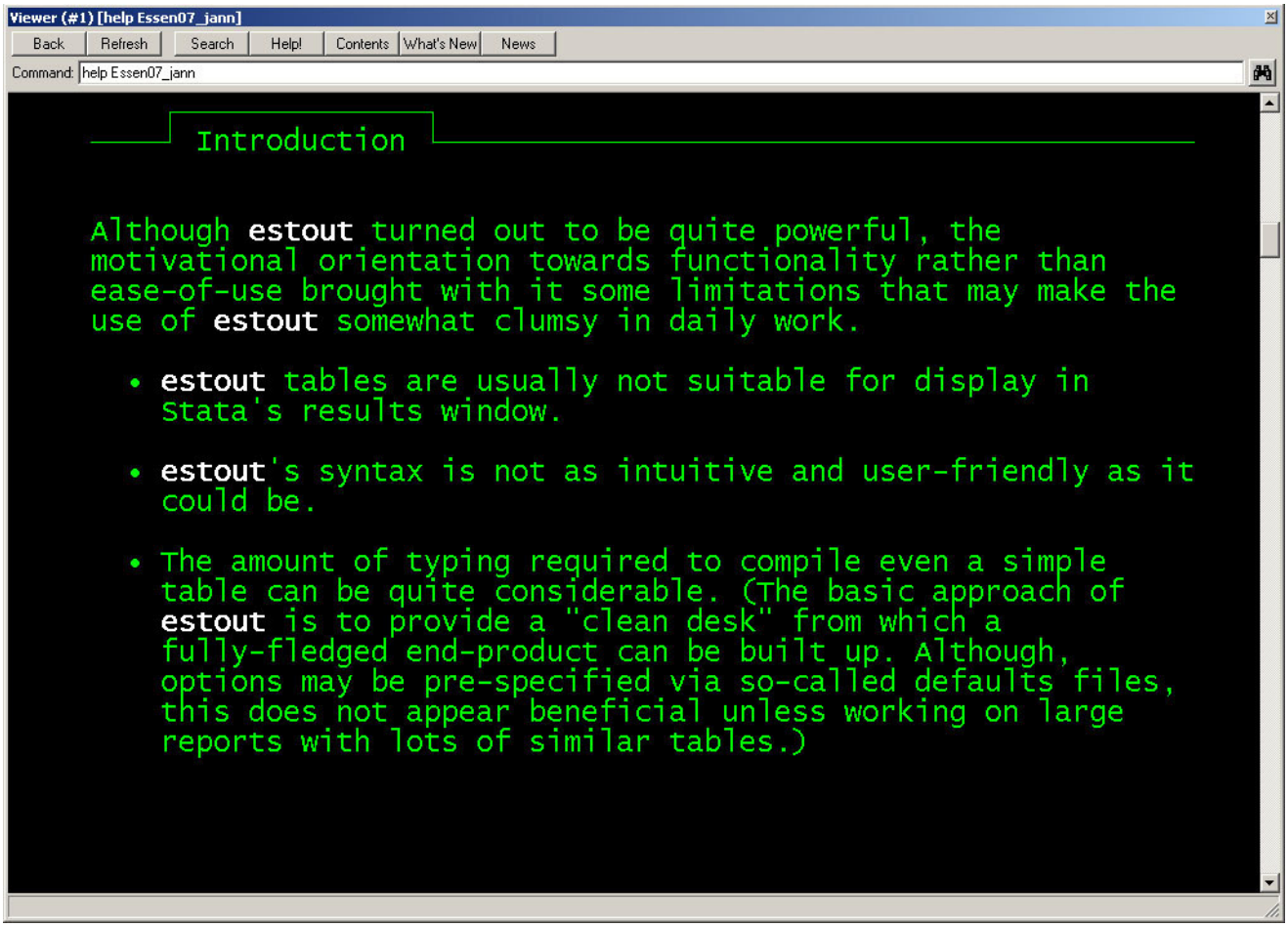
• Since copy/pase by hand is not an option, various user programs for automatic results processing have been written.
One of these commands is estout (Jann 2005, SJ 5-3). It compiles regression tables containing results from one or more estimation commands for use in, say, LaTeX documents, spreadsheet programs, or word processors.
• Some alternatives:
outreg (John Luke Gallup)
outreg2 (Roy Wada)
xml_tab (Michael Lokshin and Zurab Sajaia)
outtex (Antoine Terracol)
est2tex (Marc Muendler)
mktab (Nicholas Winter)
parmest (Roger Newson)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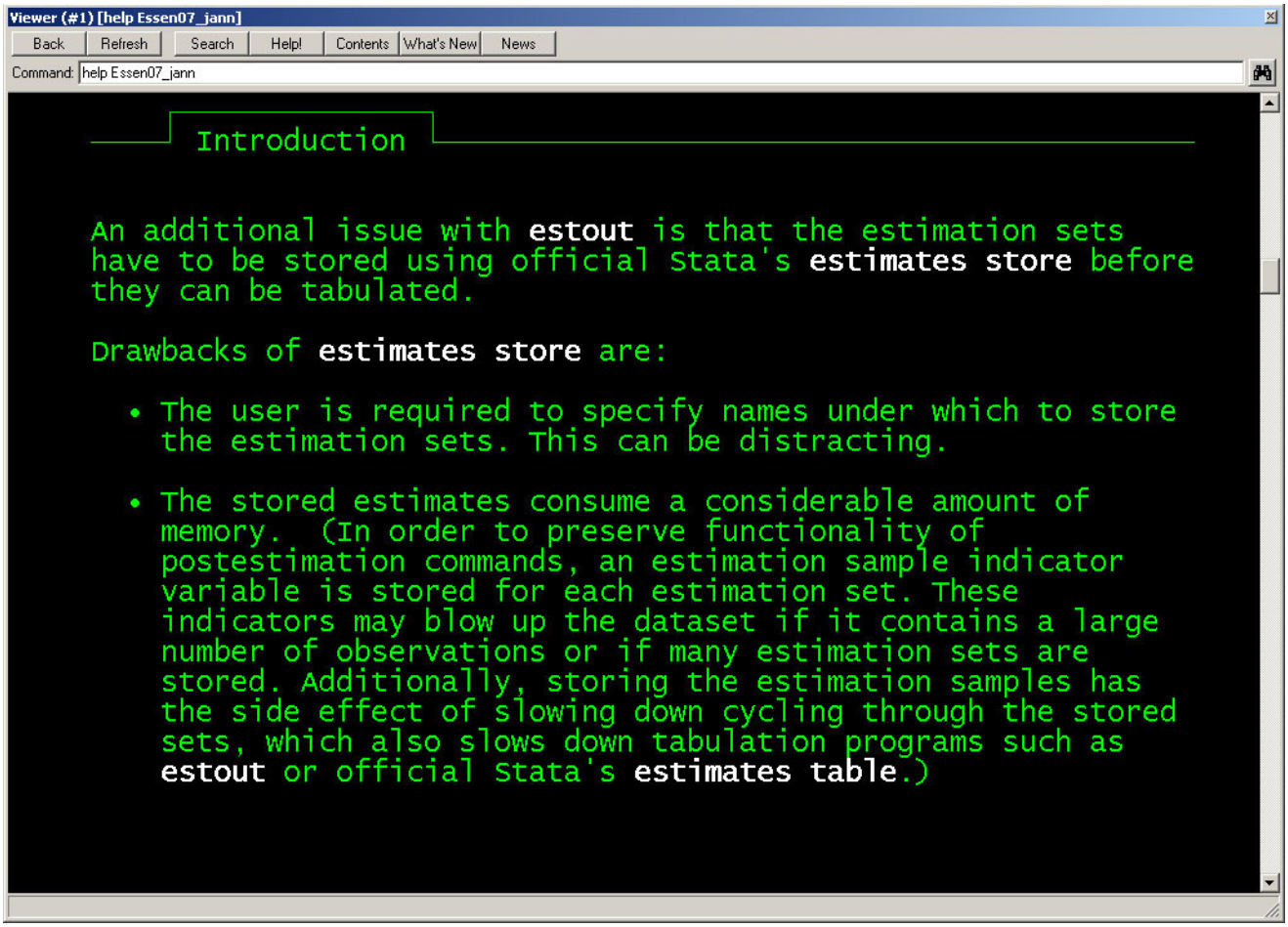
Although estout turned out to be quite powerful, the motivational orientation towards functionality rather than ease-of-use brought with it some limitations that may make the use of estout somewhat clumsy in daily work.
• estout tables are usually not suitable for display in Stata's results window.
• estout's syntax is not as intuitive and user-friendly as it could be.
• The amount of typing required to compile even a simple table can be quite considerable. (The basic approach of estout is to provide a "clean desk" from which a fully-fledged end-product can be built up. Although, options may be pre-specified via so-called defaults files, this does not appear beneficial unless working on large reports with lots of similar tables.)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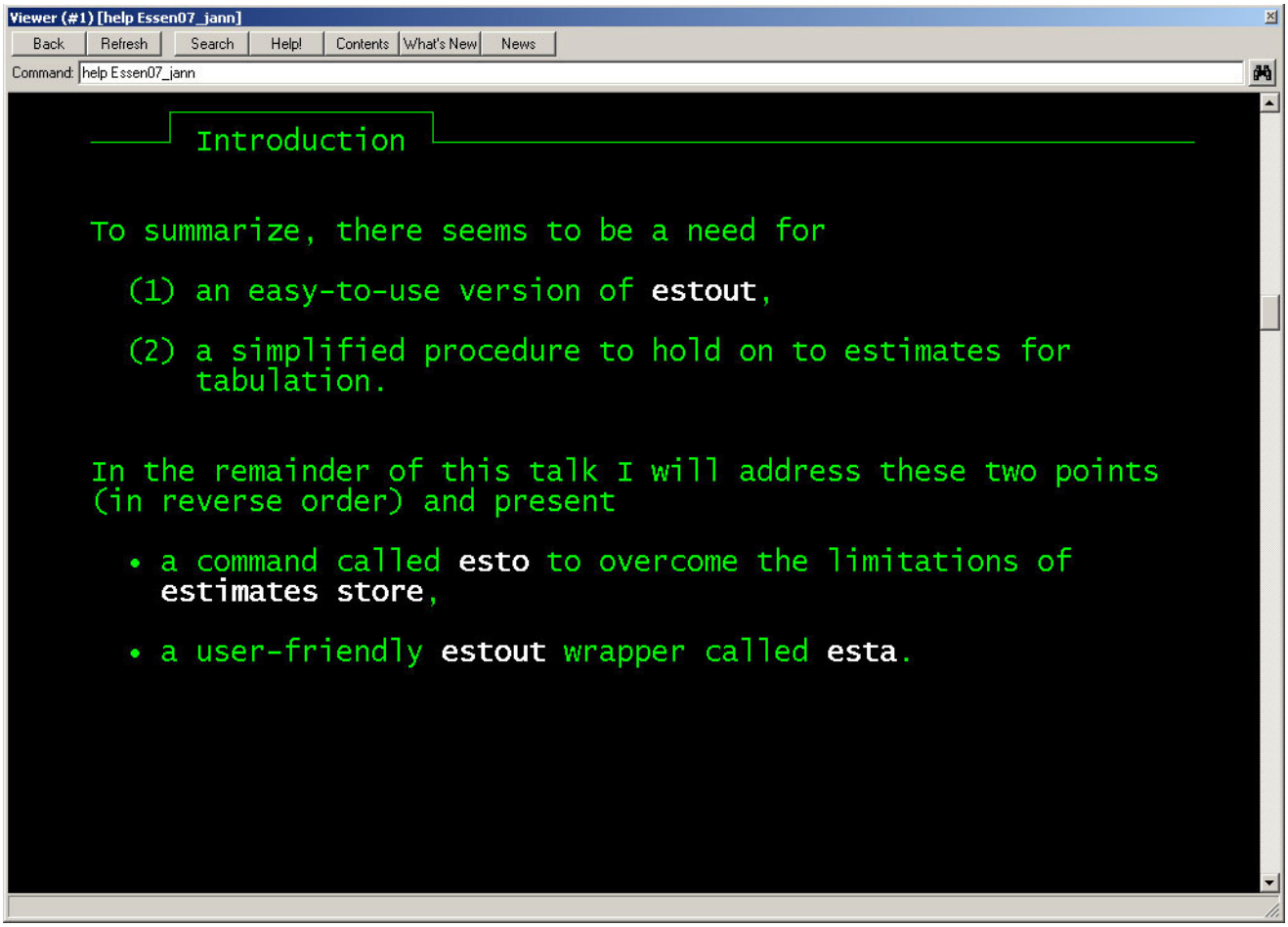
Introduction
An additional issue with estout is that the estimation sets have to be stored using official Stata's estimates store before they can be tabulated.
Drawbacks of estimates store are:
• The user is required to specify names under which to store the estimation sets. This can be distracting.
• The stored estimates consume a considerable amount of memory. (In order to preserve functionality of postestimation commands, an estimation sample indicator variable is stored for each estimation set. These indicators may blow up the dataset if it contains a large number of observations or if many estimation sets are stored. Additionally, storing the estimation samples has the side effect of slowing down cycling through the stored sets, which also slows down tabulation programs such as estout or official Stata's estimates table.)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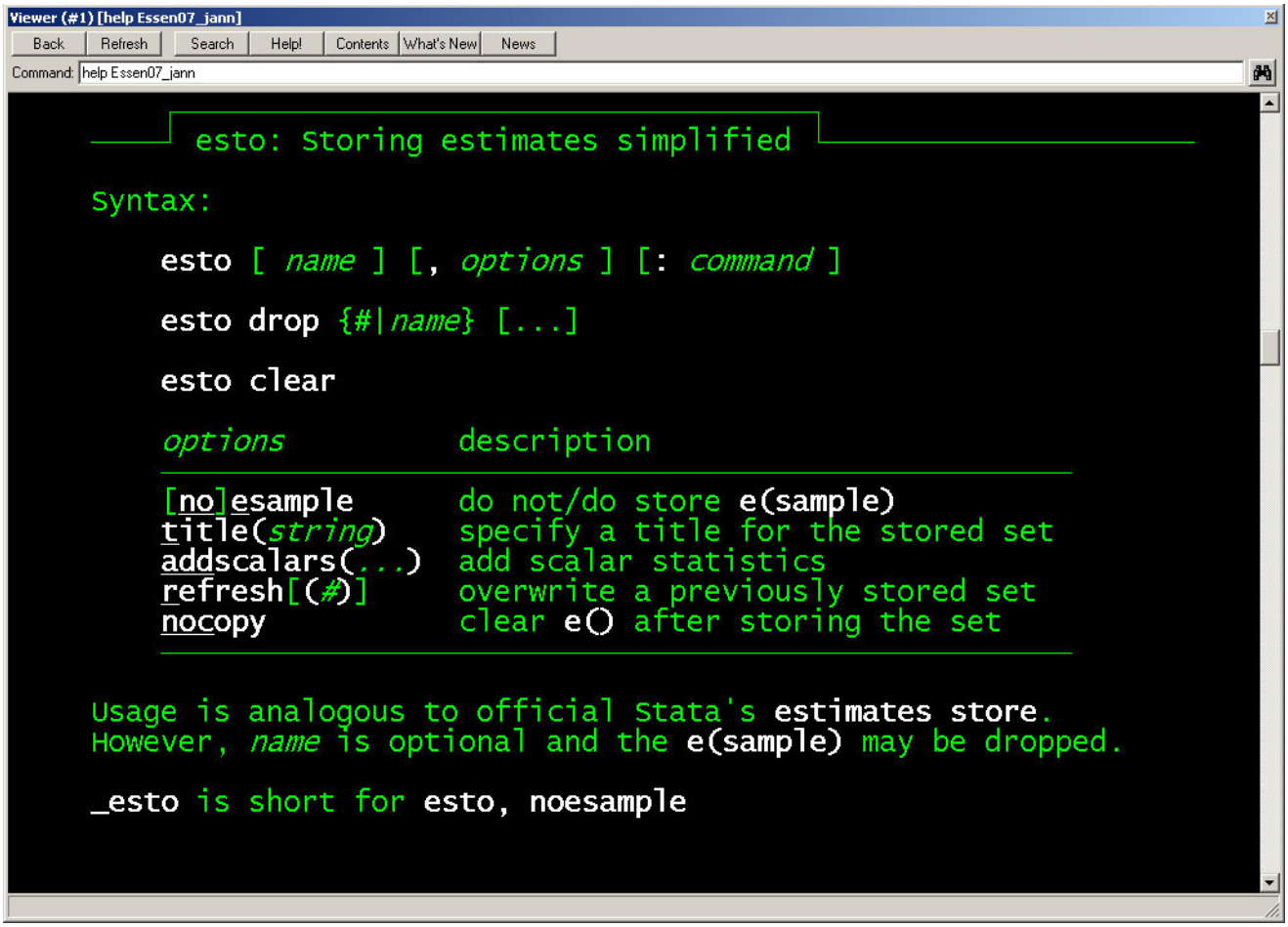
To summarize, there seems to be a need for
(1) an easy-to-use version of estout,
(2) a simplified procedure to hold on to estimates for tabulation.
In the remainder of this talk I will address these two points (in reverse order) and present
• a command called esto to overcome the limitations of estimates store,
• a user-friendly estout wrapper called esta.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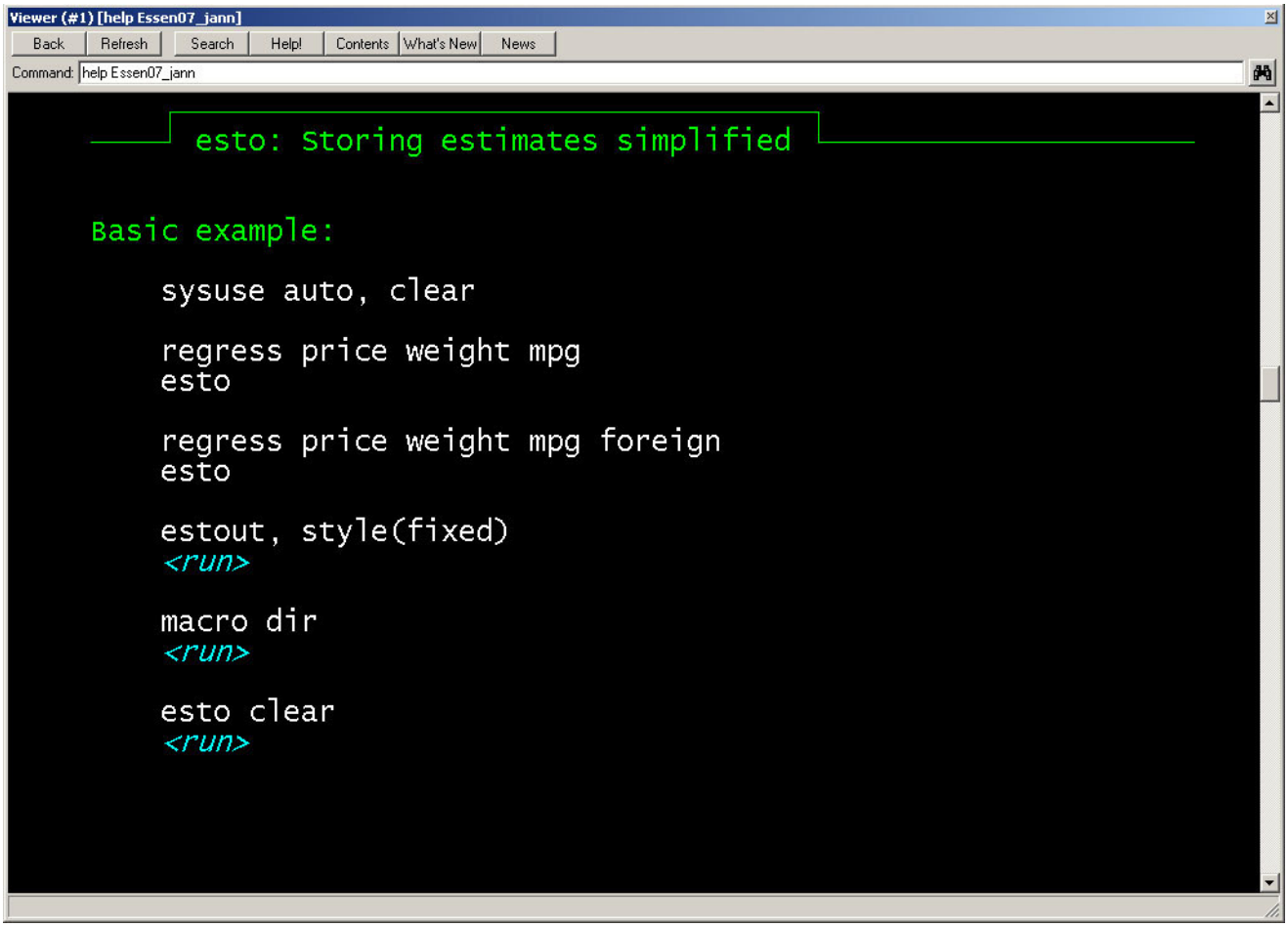
esto: Storing estimates simplified
Syntax:
esto [name] [, options] [: command]
esto drop {#|name} [...]
esto clear
options description
[no]esample do not/do store e(sample)
title(string) specify a title for the stored set
addscalars(...) add scalar statistics
refresh[(#)] overwrite a previously stored set
nocopy clear e() after storing the set
Usage is analogous to official Stata's estimates store.
However, name is optional and the e(sample) may be dropped.
_esto is short for esto, noesample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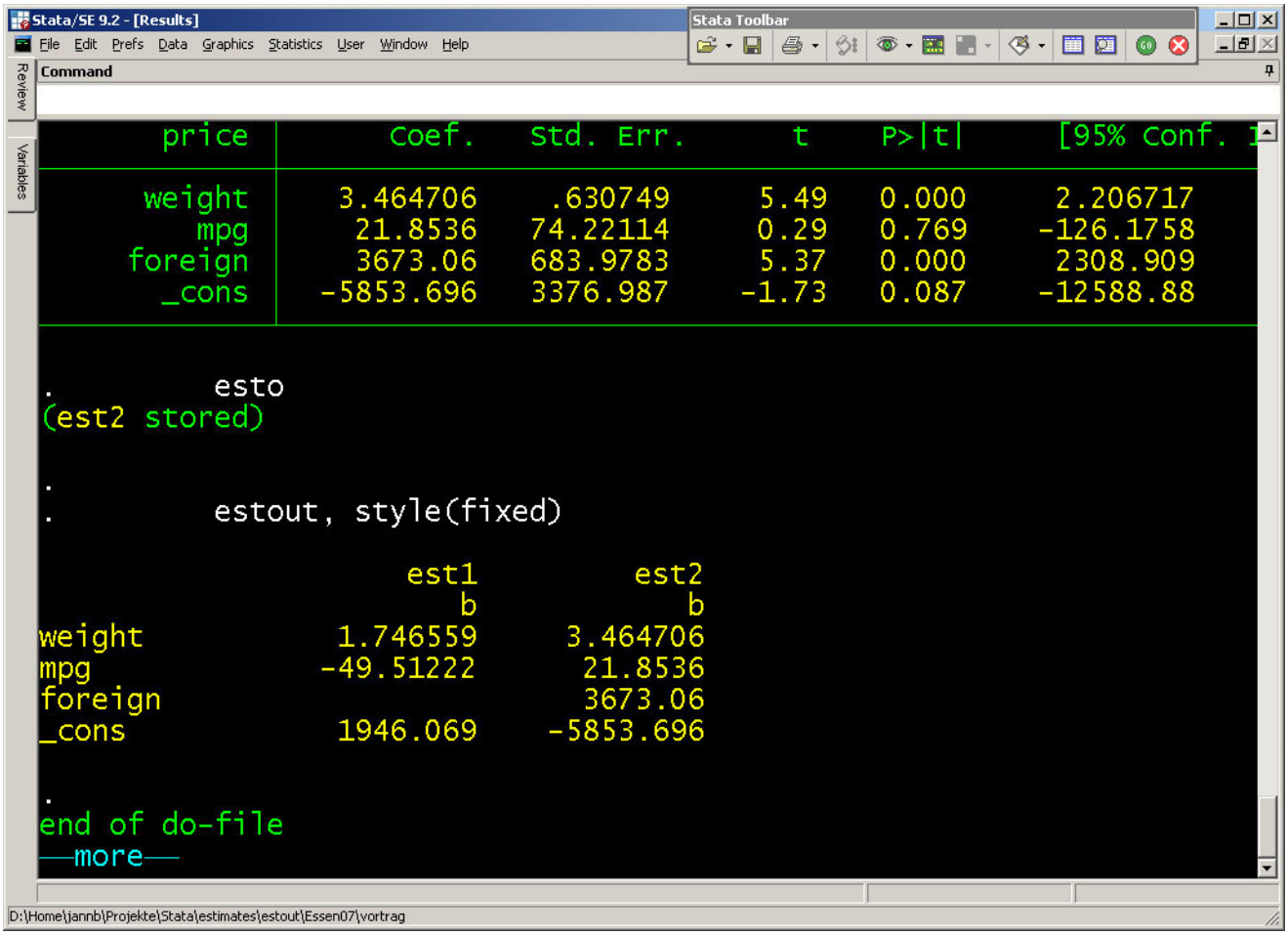
esto: Storing estimates simplified
Basic example:
sysuse auto, clear
regress price weight mpg
esto
regress price weight mpg foreign
esto
estout, style(fixed)
<run>
macro dir
<run>
esto clear
<run>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Variables
price | Coef. Std. Err. t P>|t| [95% Conf. I
weight 3.464706 .630749 5.49 0.000 2.206717
mpg 21.8536 74.22114 0.29 0.769 -126.1758
foreign 3673.06 683.9783 5.37 0.000 2308.909
_cons -5853.696 3376.987 -1.73 0.087 -12588.88
. esto
(est2 stored)
. estout, style(fixed)
est1 est2
b b
weight 1.746559 3.464706
mpg -49.51222 21.8536
foreign 3673.06
_cons 1946.069 -5853.696
end of do-file
--more--
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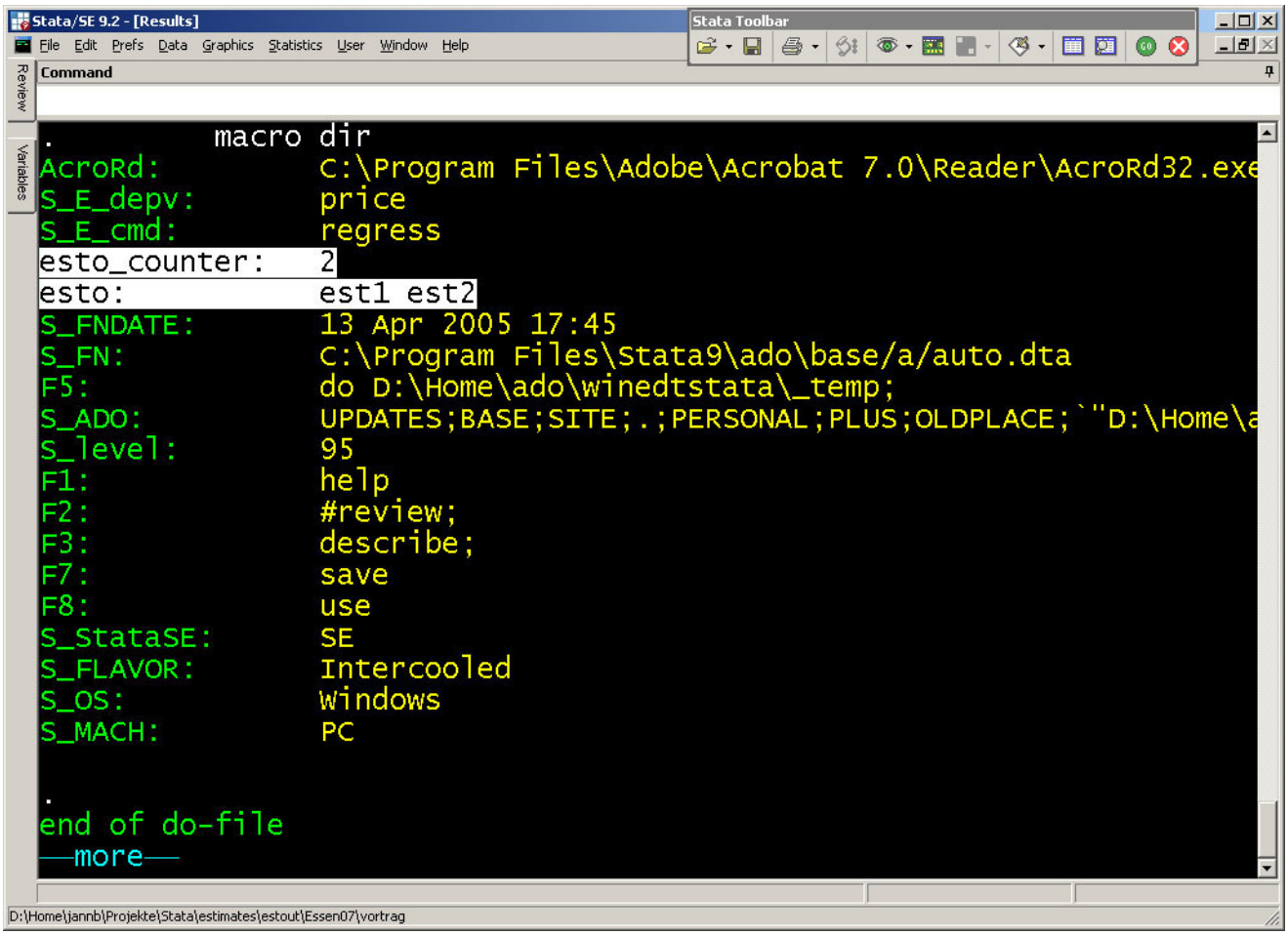
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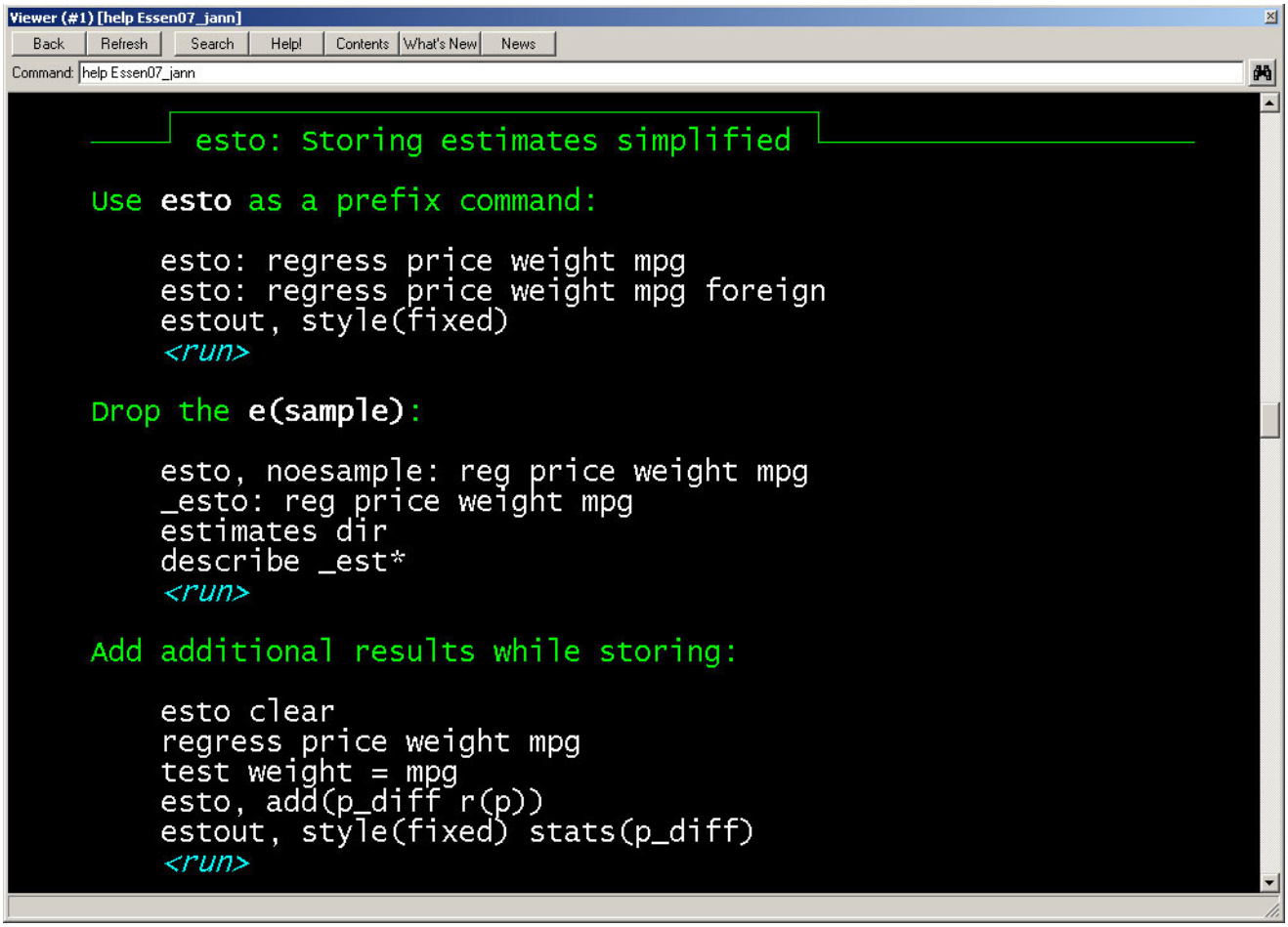
. macro dir
AcroRd: C:\Program Files\Adobe\Acrobat 7.0\Reader\AcroRd32.exe
S_E_depv: price
S_E_cmd: regress
esto_counter: 2
esto: est1 est2
S_FNDATE: 13 Apr 2005 17:45
S_FN: C:\Program Files\Stata9\ado\base/a/auto.dta
F5: do D:\Home\ado\winedtstata_temp;
S_ADO: UPDATES;BASE;SITE;.;PERSONAL;PLUS;OLDPLACE;`"D:\Home\a
S_level: 95
F1: help
F2: #review;
F3: describe;
F7: save
F8: use
S_StataSE: SE
S_FLAVOR: Intercooled
S_OS: Windows
S_MACH: PC
end of do-file
--more--
D:\Home\jannb\Projekte\Stata\estimates\estout\Essen07\vortrag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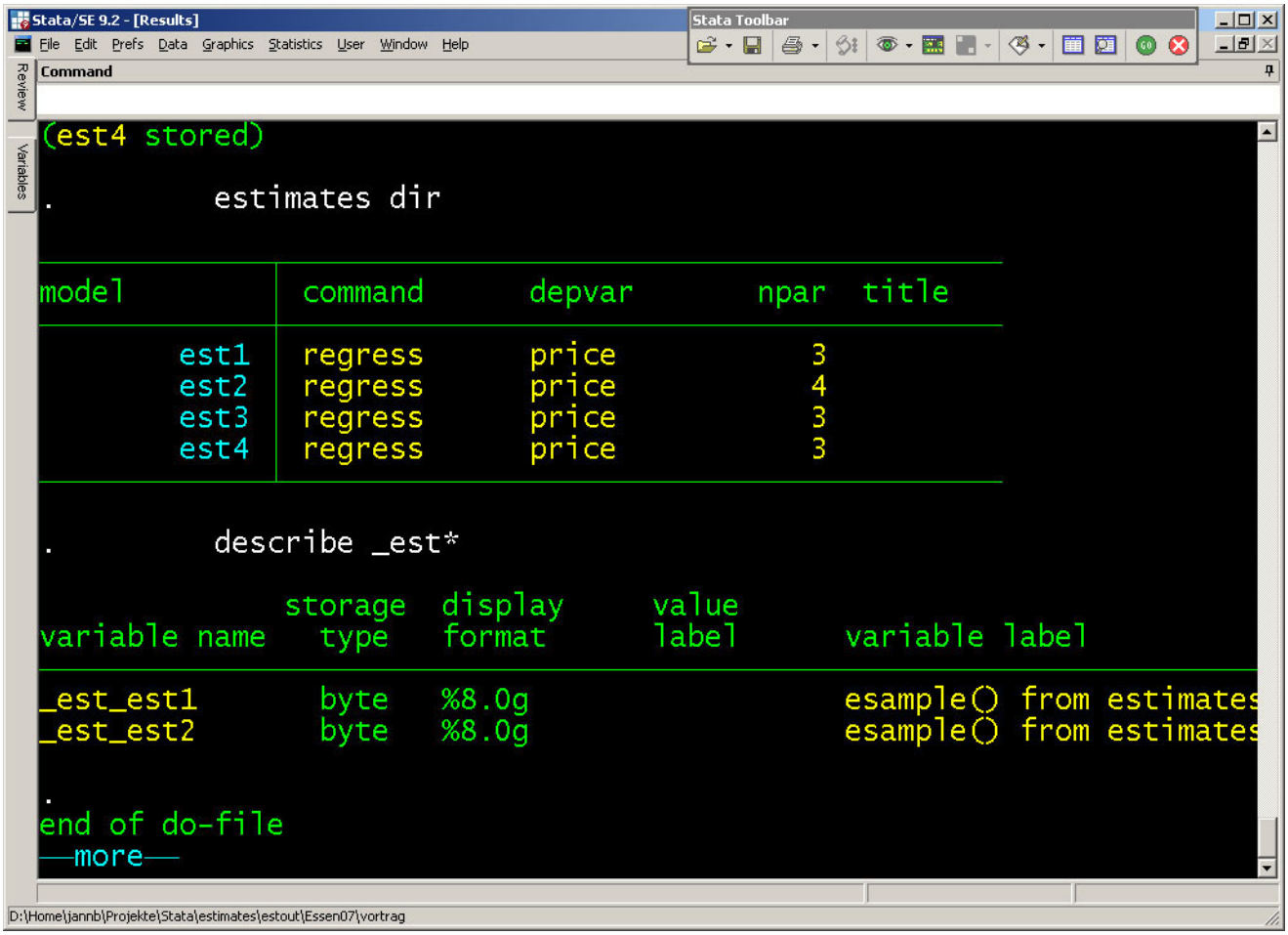
esto: Storing estimates simplified
Use esto as a prefix command:
esto: regress price weight mpg
esto: regress price weight mpg foreign
estout, style(fixed)
<run>
Drop the e(sample):
esto, noesample: reg price weight mpg
_esto: reg price weight mpg
estimates dir
describe _est*
<run>
Add additional results while storing:
esto clear
regress price weight mpg
test weight = mpg
esto, add(p_diff r(p))
estout, style(fixed) stats(p_diff)
<run>


Stata/SE 9.2 - [Results]
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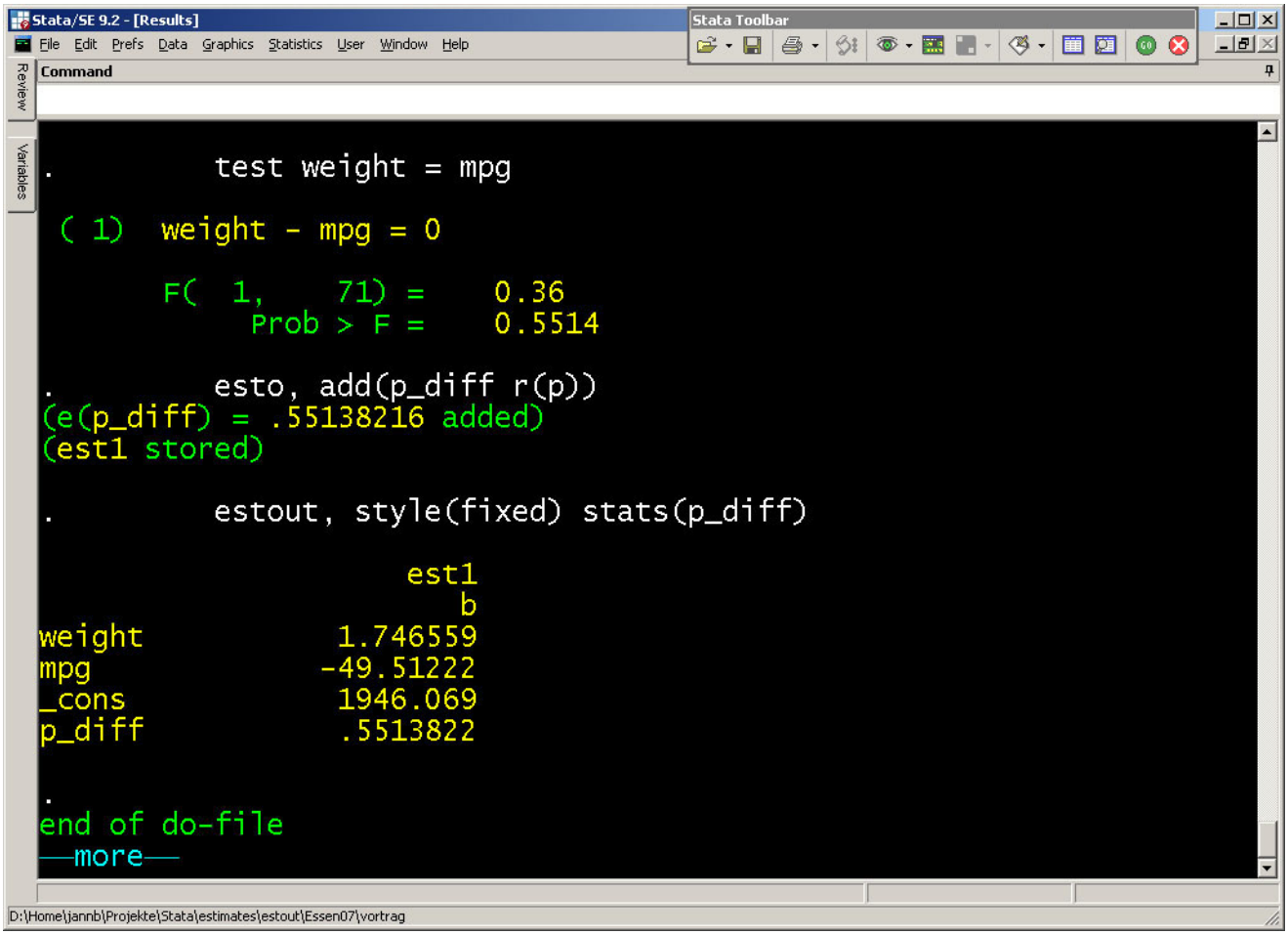
(est4 stored)
. estimates dir
model | command depvar npar title
est1 | regress price 3
est2 | regress price 4
est3 | regress price 3
est4 | regress price 3
. describe _est*
variable name | storage type | display format | value label | variable label
_est_est1 byte %8.0g esample() from estimates
_est_est2 byte %8.0g esample() from estimates
.
end of do-file
--more--
D:\Home\jannb\Projekte\Stata\estimates\estout\Essen07\vortrag


Stata/SE 9.2 - [Results]
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. test weight = mpg
(1) weight - mpg = 0
F(1, 71) = 0.36
Prob > F = 0.5514
. esto, add(p_diff r(p))
(e(p_diff) = .55138216 added)
(est1 stored)
. estout, style(fixed) stats(p_diff)
est1
b
weight 1.746559
mpg -49.51222
_cons 1946.069
p_diff .5513822
.
end of do-file
--more--
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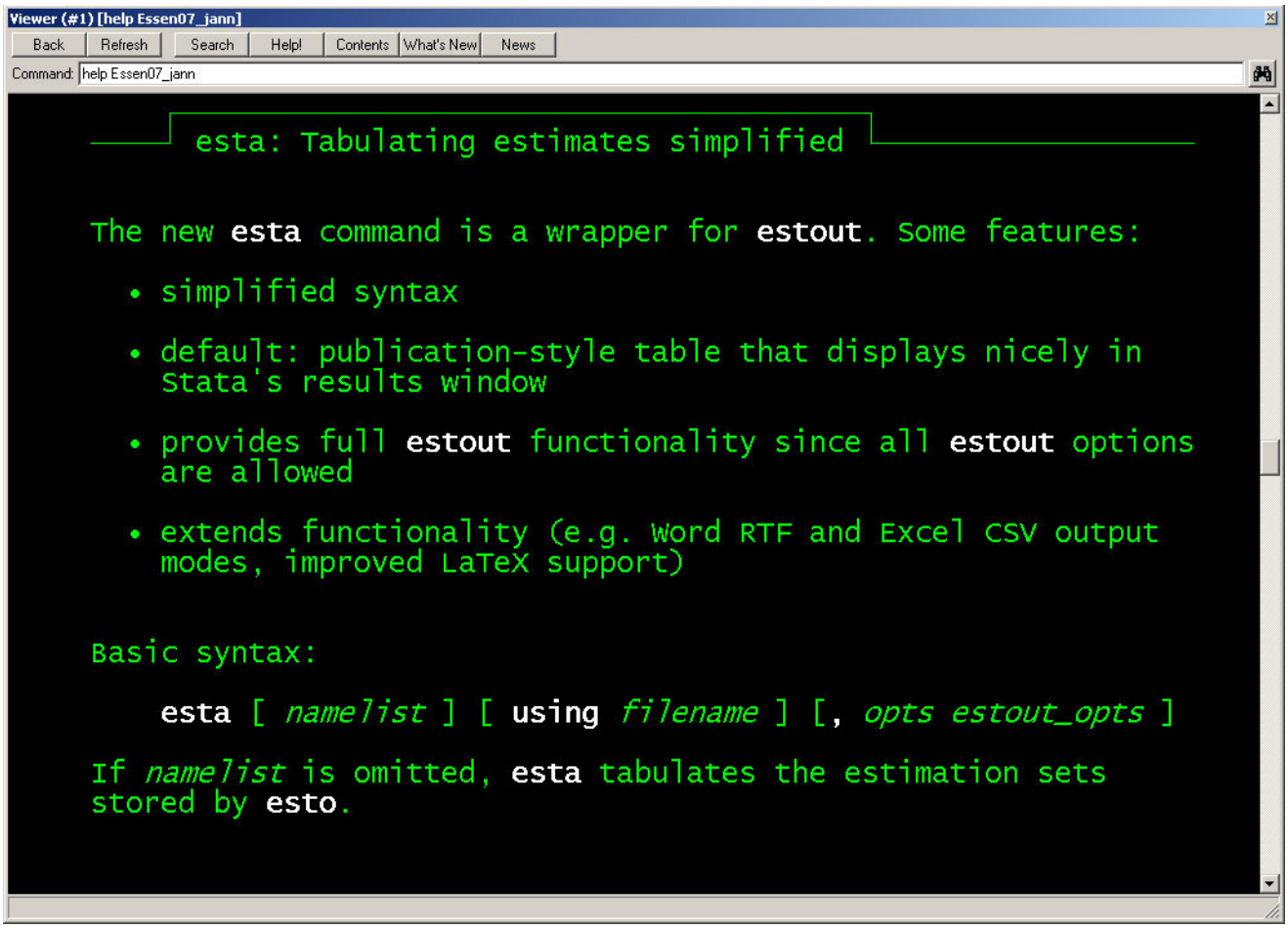
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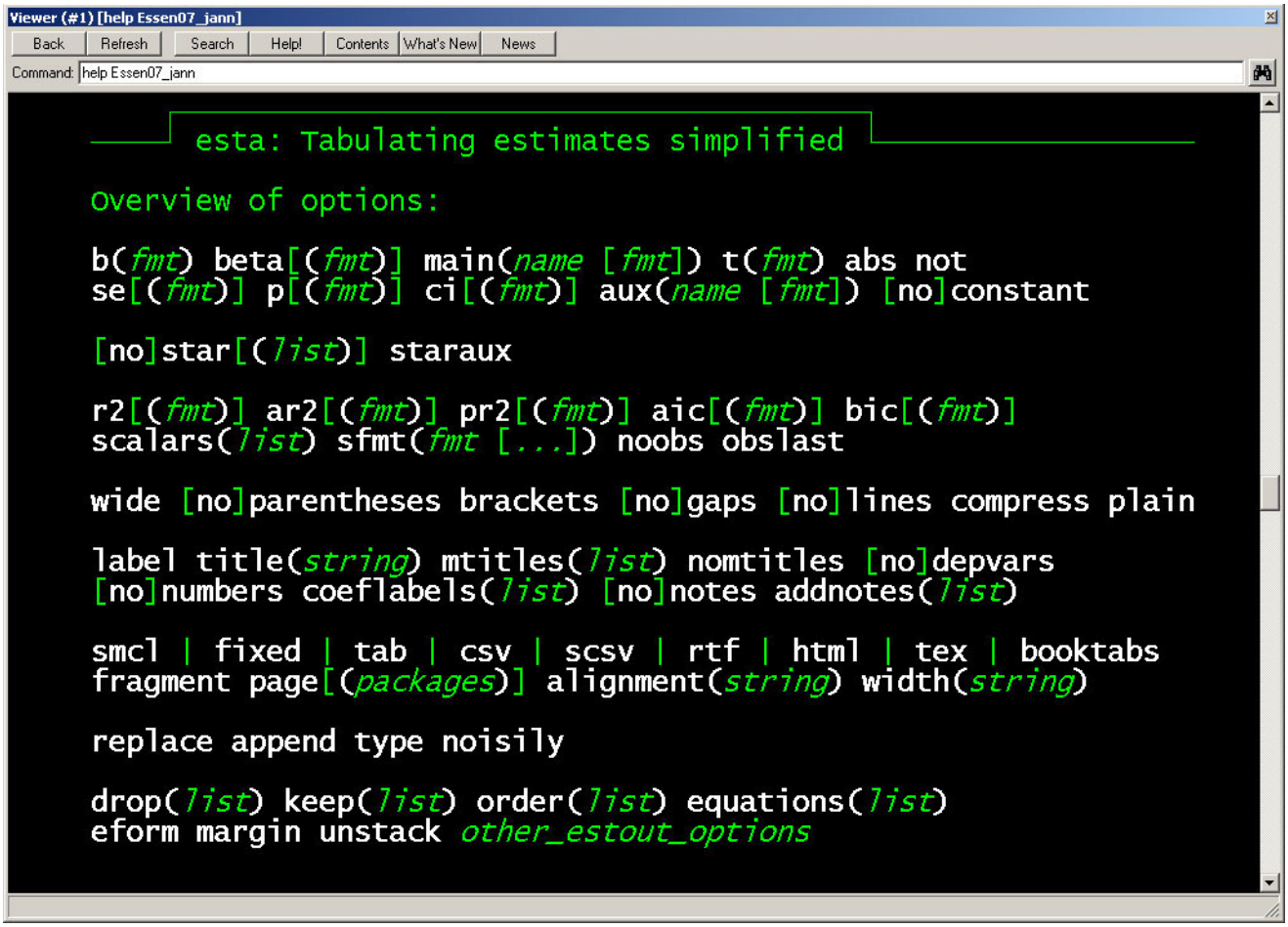
esta: Tabulating estimates simplified
The new esta command is a wrapper for estout. Some features:
• simplified syntax
• default: publication-style table that displays nicely in Stata's results window
• provides full estout functionality since all estout options are allowed
• extends functionality (e.g. Word RTF and Excel CSV output modes, improved LaTeX support)
Basic syntax:
esta [namelist] [using filename] [, opts estout_opts]
If namelist is omitted, esta tabulates the estimation sets stored by esto.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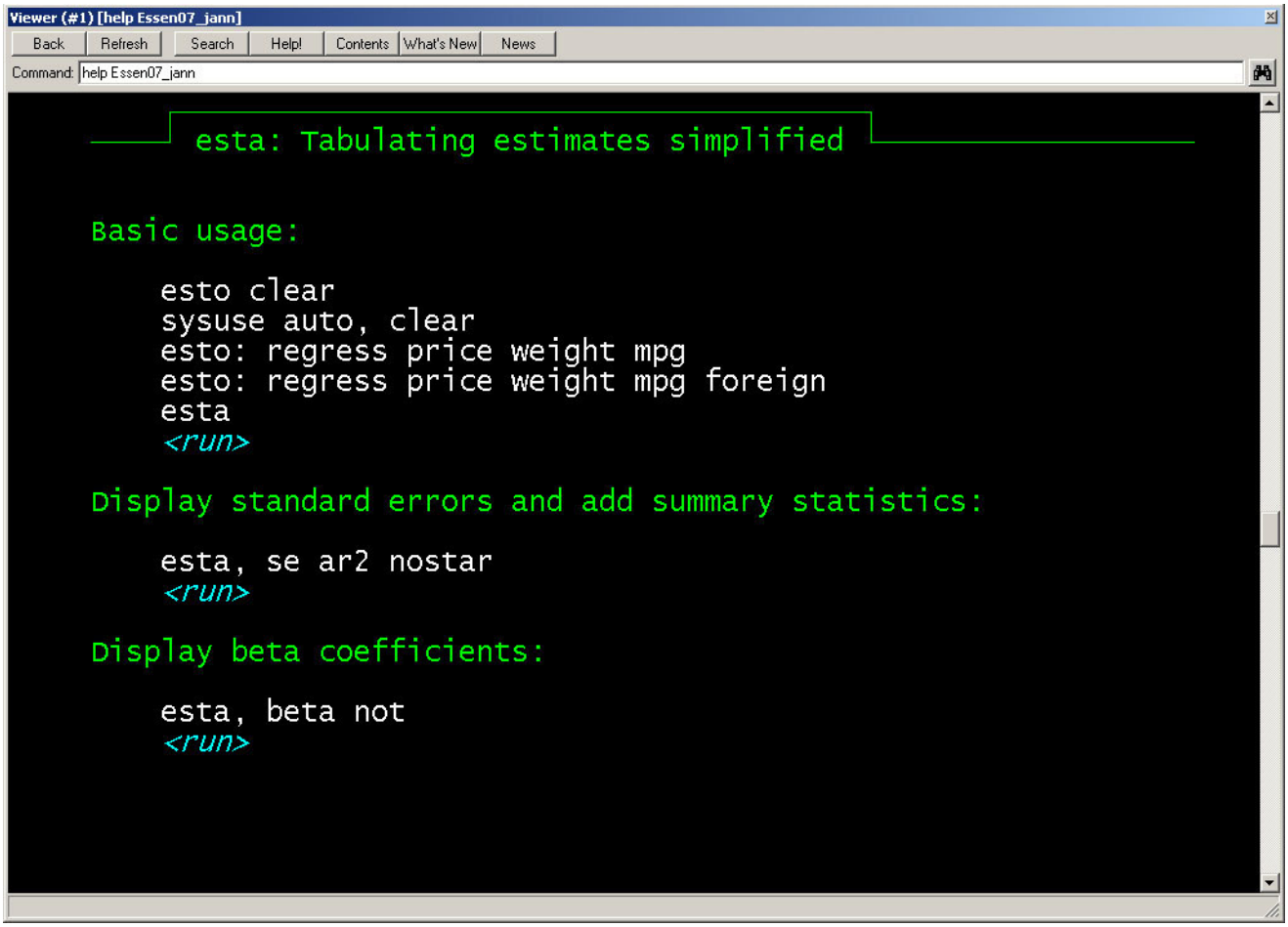
esta: Tabulating estimates simplified
Overview of options:
b(fmt) beta[(fmt)] main(name [fmt]) t(fmt) abs not
se[(fmt)] p[(fmt)] ci[(fmt)] aux(name [fmt]) [no]constant
[no]star[(list)] staraux
r2[(fmt)] ar2[(fmt)] pr2[(fmt)] aic[(fmt)] bic[(fmt)]
scalars(list) sfmt(fmt [...]) noobs obslast
wide [no]parentheses brackets [no]gaps [no]lines compress plain
label title(string) mtitles(list) nomtitles [no]depvars
[no]numbers coeflabels(list) [no]notes addnotes(list)
smcl | fixed | tab | csv | scsv | rtf | html | tex | booktabs
fragment page[(packages)] alignment(string) width(string)
replace append type noisily
drop(list) keep(list) order(list) equations(list)
eform margin unstack other_estout_options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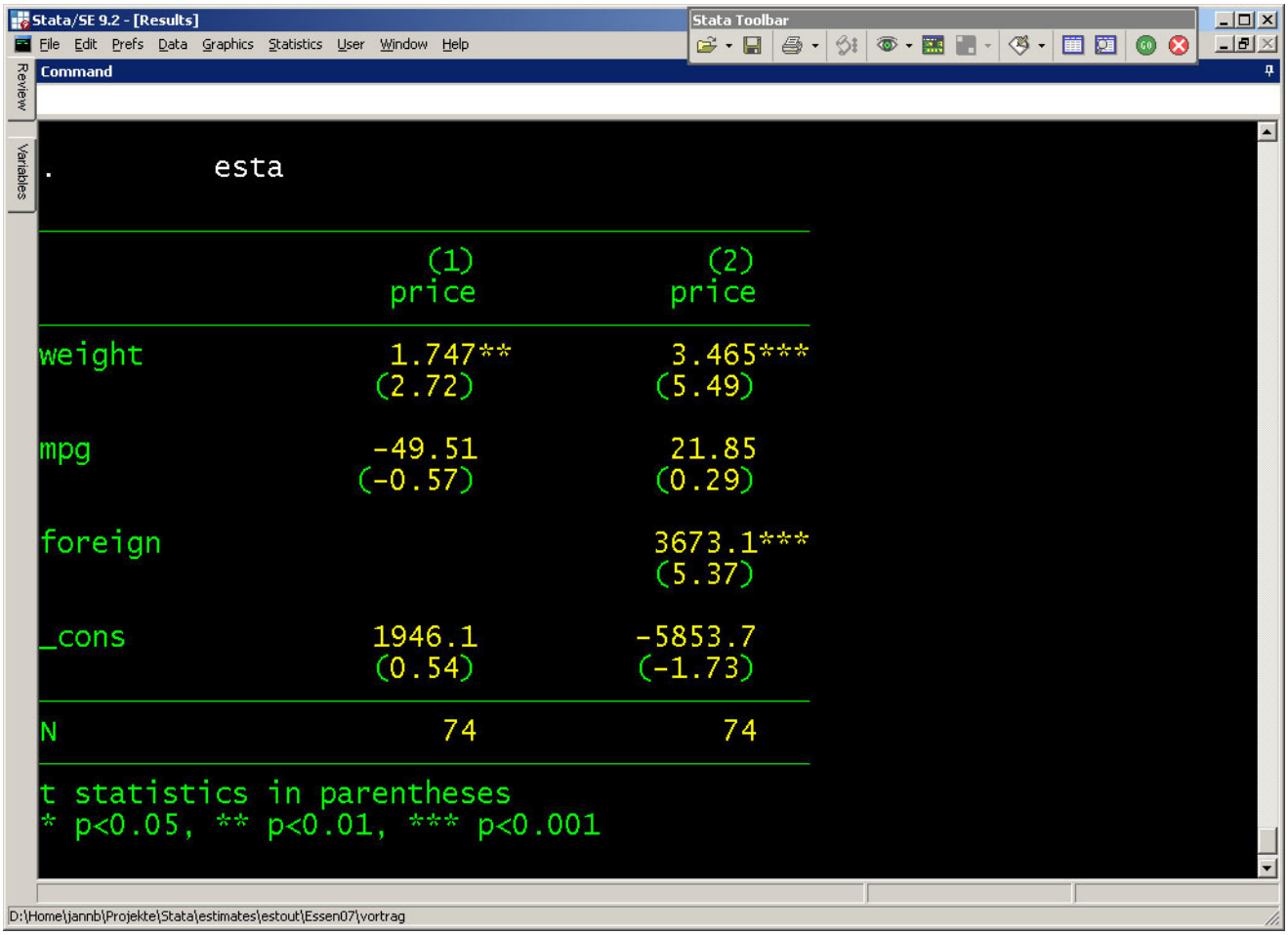
esta: Tabulating estimates simplified
Basic usage:
esto clear
sysuse auto, clear
esto: regress price weight mpg
esto: regress price weight mpg foreign
esta
<run>
Display standard errors and add summary statistics:
esta, se ar2 nostar
<run>
Display beta coefficients:
esta, beta not
<run>


Stata/SE 9.2 - [Results]
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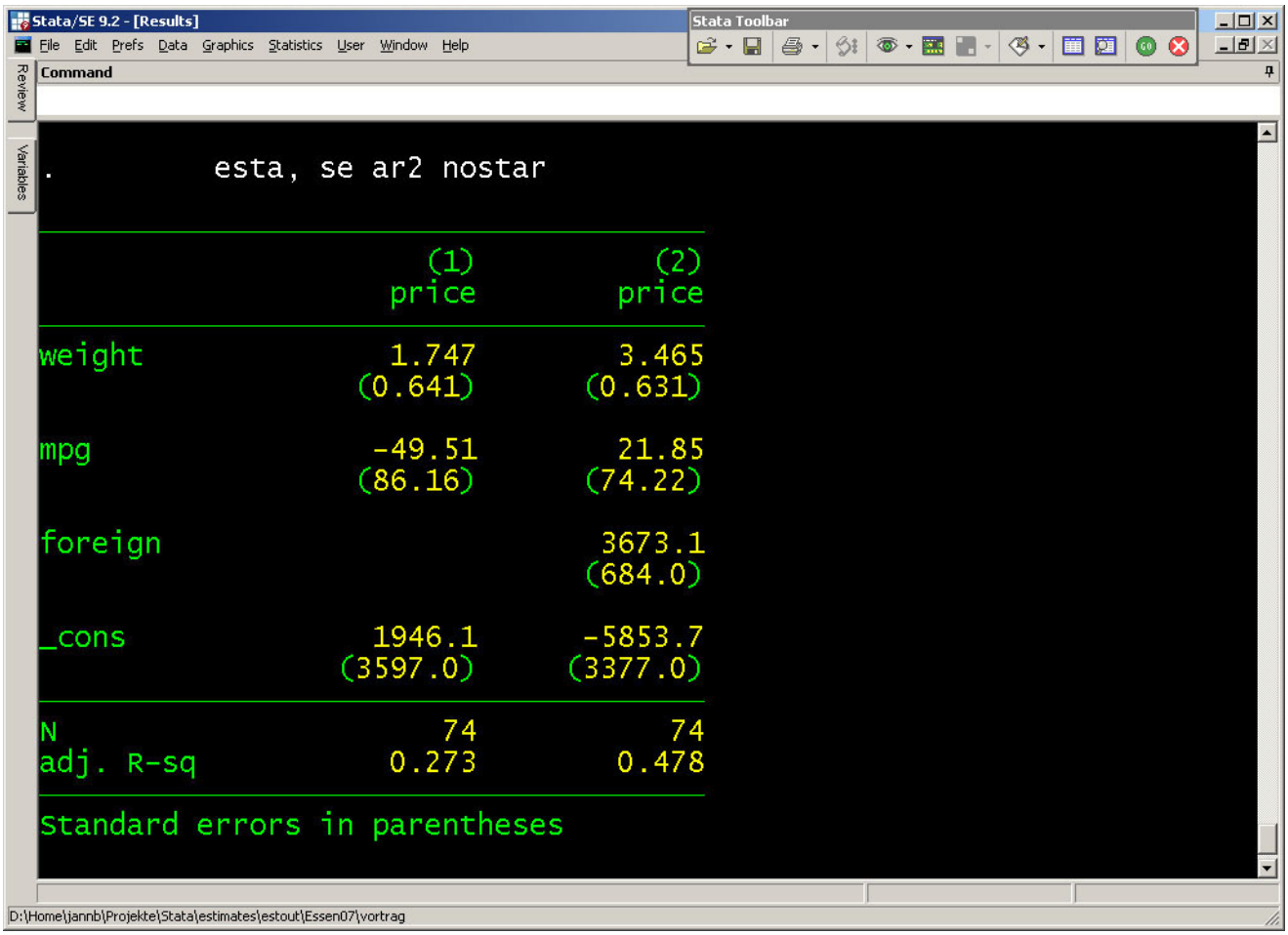
Command
. esta
(1) price
(2) price
weight 1.747** 3.465***
(2.72) (5.49)
mpg -49.51 21.85
(-0.57) (0.29)
foreign 3673.1***
(5.37)
_cons 1946.1 -5853.7
(0.54) (-1.73)
N 74 74
t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001
D:\Home\jannb\Projekte\Stata\estimates\estout\Essen07\vortrag


Stata/SE 9.2 - [Results]
File Edit Prefs Data Graphics Statistics User Window Help
Stata Toolbar
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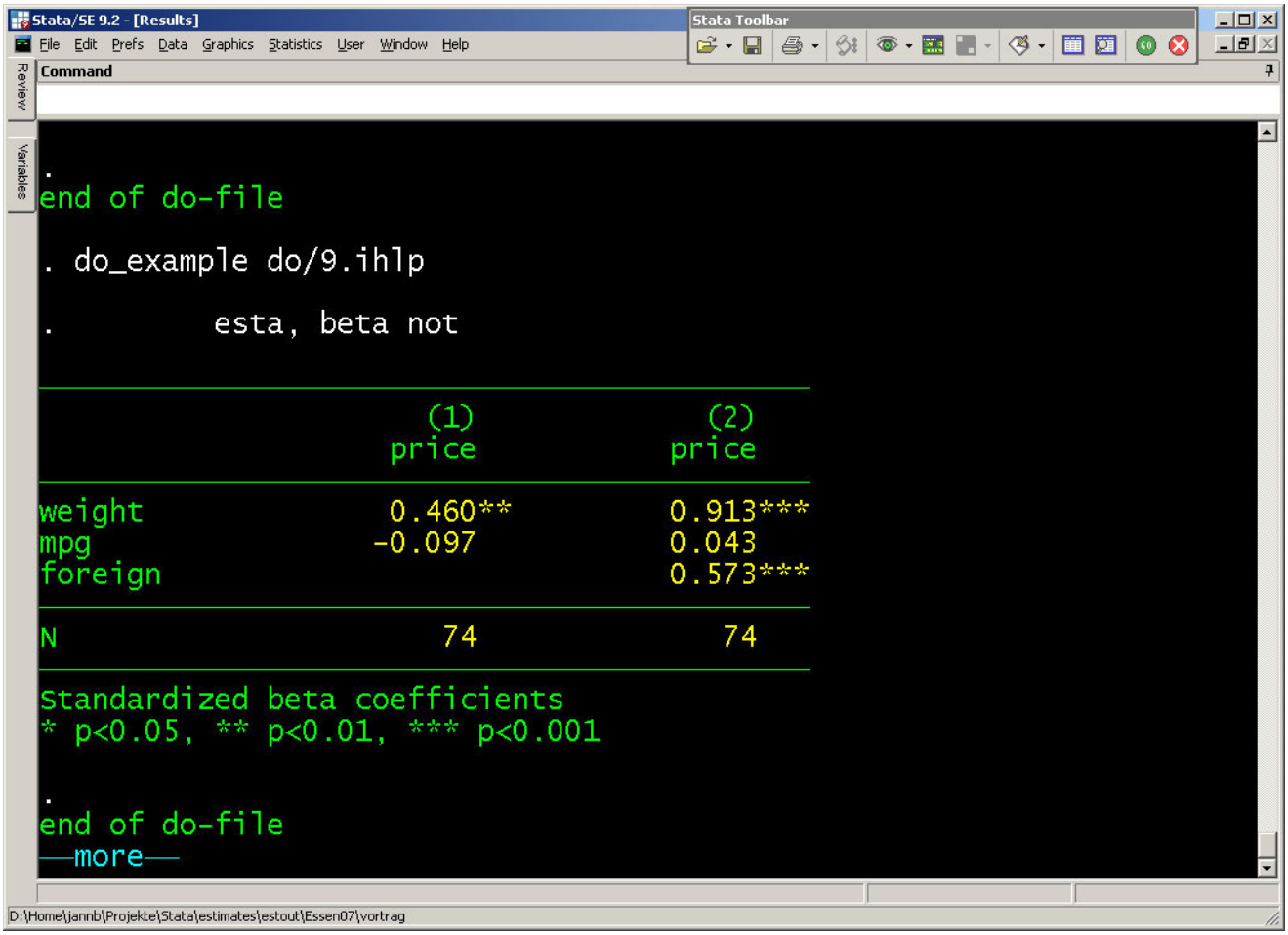
Variables
Command
. esta, se ar2 nostar
(1) price
(2) price
weight 1.747 3.465
(0.641) (0.631)
mpg -49.51 21.85
(86.16) (74.22)
foreign 3673.1
(684.0)
_cons 1946.1 -5853.7
(3597.0) (3377.0)
N 74 74
adj. R-sq 0.273 0.478
Standard errors in parentheses
D:\Home\jannb\Projekte\Stata\estimates\estout\Essen07\vortrag


Stata/SE 9.2 - [Results]
File Edit Prefs Data Graphics Statistics User Window Help
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.
end of do-file
. do_example do/9.ihlp
. esta, beta not
(1) (2)
price price
weight 0.460** 0.913***
mpg -0.097 0.043
foreign 0.573***
N 74 74
Standardized beta coefficients
* p<0.05, ** p<0.01, *** p<0.001
.
end of do-file
--more--
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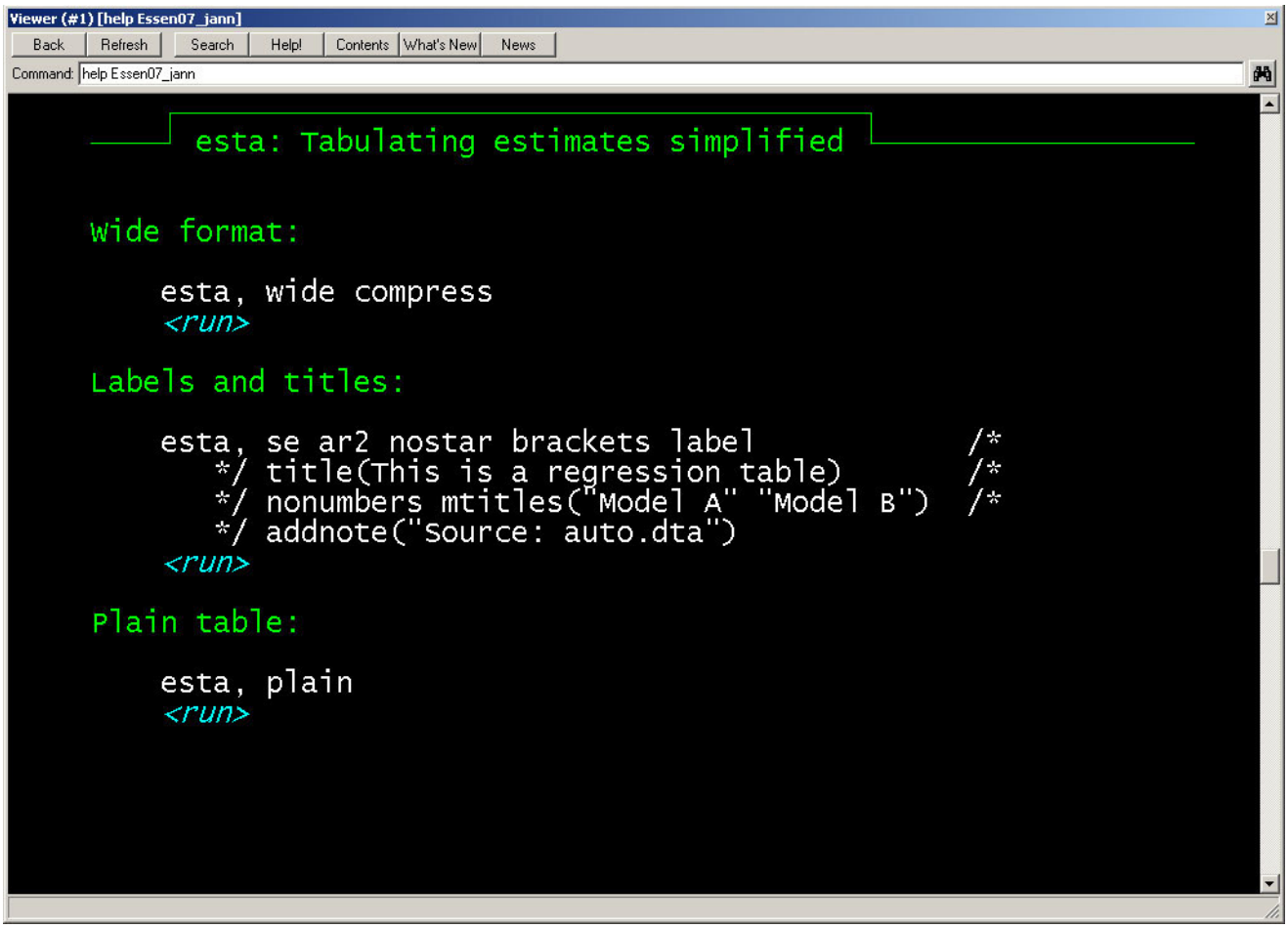
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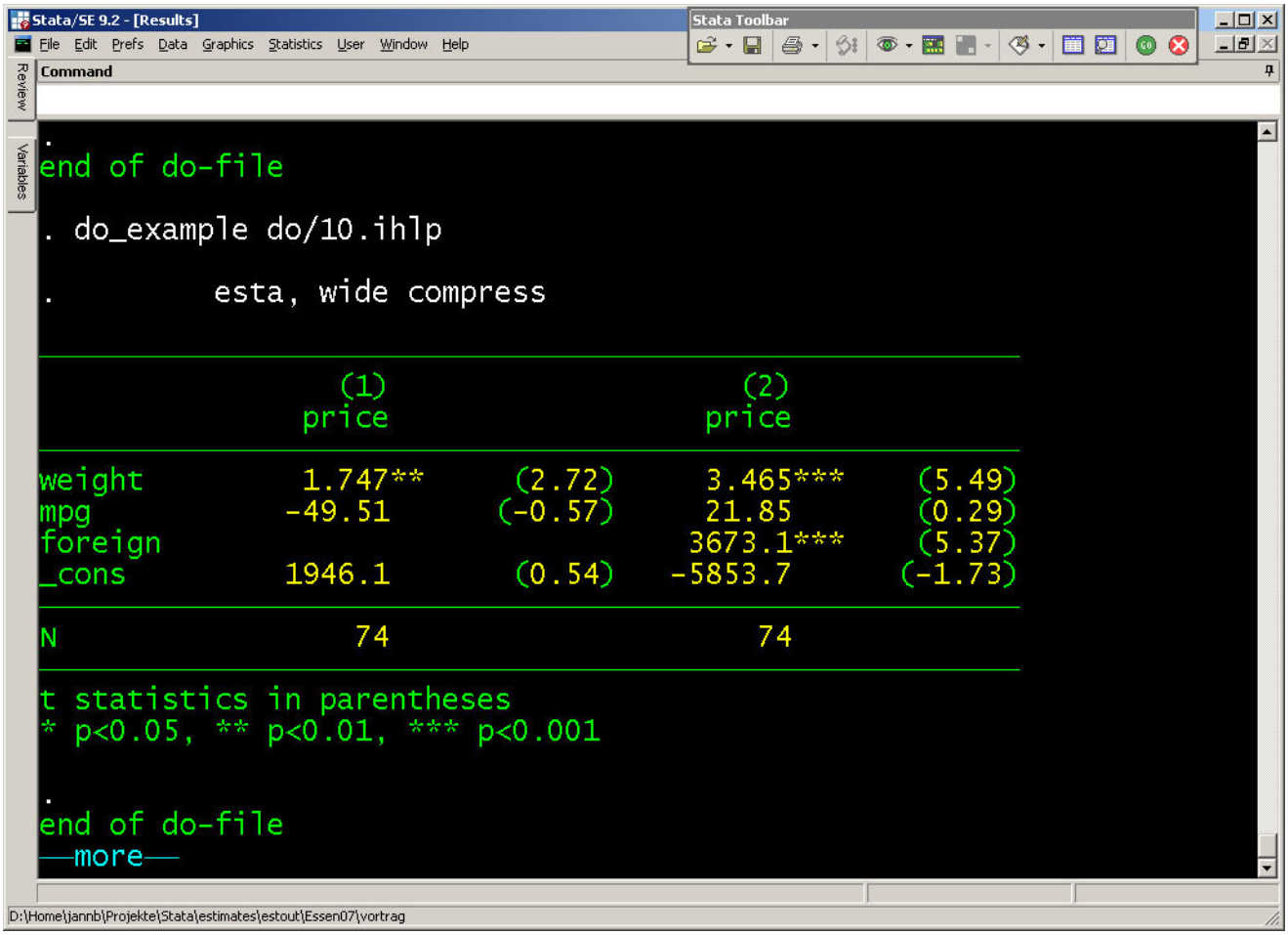
Command: help Essen07_jann
esta: Tabulating estimates simplified
Wide format:
esta, wide compress
<run>
Labels and titles:
esta, se ar2 nostar brackets label /*
/ title(This is a regression table) /
/ nonumbers mtitles("Model A" "Model B") /
*/ addnote("Source: auto.dta")
<run>
Plain table:
esta, plain
<run>


Stata/SE 9.2 - [Results]
File Edit Prefs Data Graphics Statistics User Window Help
Stata Toolbar
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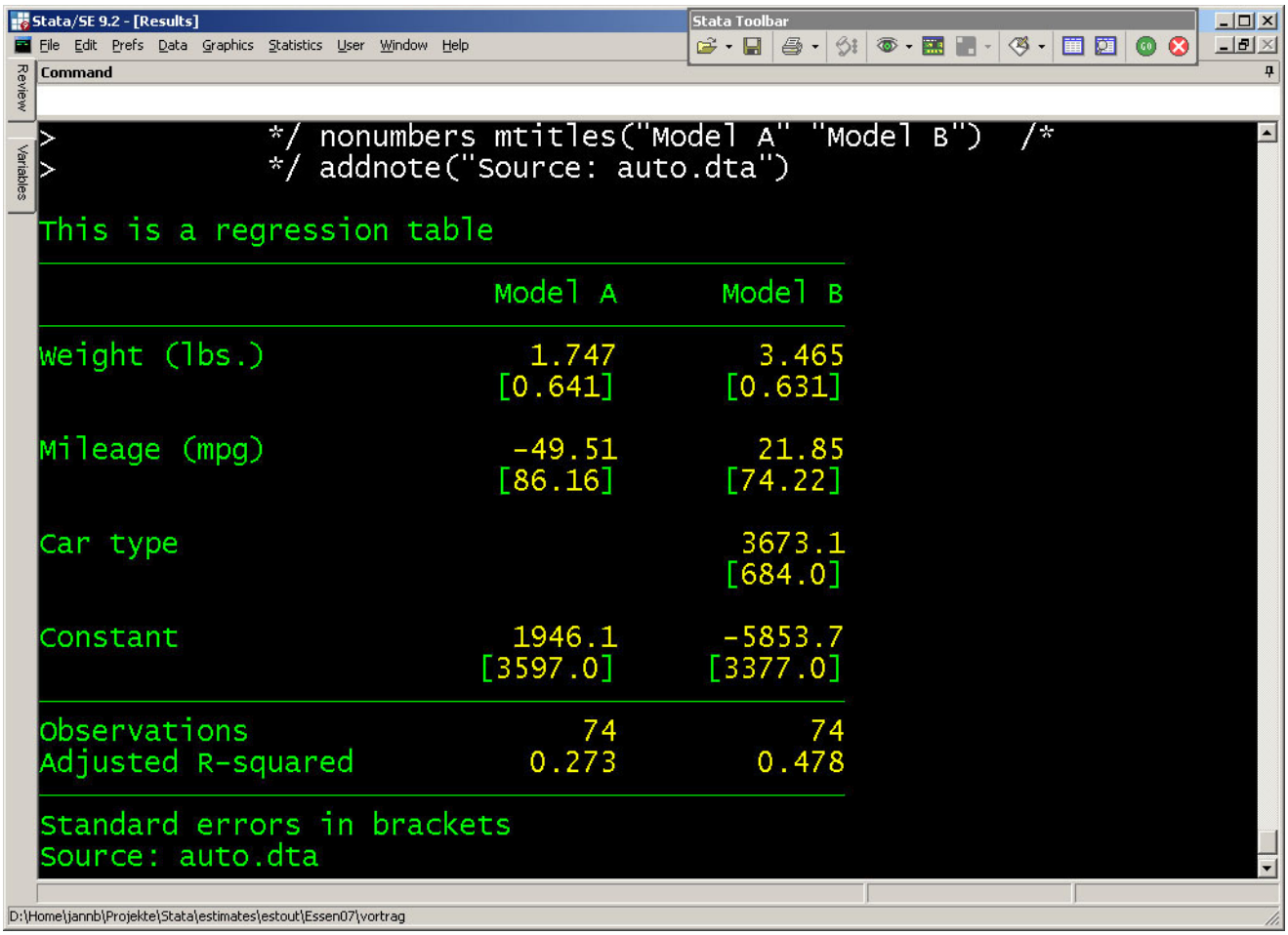
Variables
Command
.
end of do-file
. do_example do/10.ihlp
. esta, wide compress
(1) price
(2) price
weight 1.747** (2.72) 3.465*** (5.49)
mpg -49.51 (-0.57) 21.85 (0.29)
foreign 3673.1*** (5.37)
_cons 1946.1 (0.54) -5853.7 (-1.73)
N 74 74
t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001
.
end of do-file
--more--
D:\Home\jannb\Projekte\Stata\estimates\estout\Essen07\vortrag


Stata/SE 9.2 - [Results]
File Edit Prefs Data Graphics Statistics User Window Help
Stata Toolbar
Review
Variables
Command
> */ nonumbers mtitles("Model A" "Model B") /*
> */ addnote("Source: auto.dta")
This is a regression table
Model A Model B
weight (lbs.) 1.747 3.465
[0.641] [0.631]
Mileage (mpg) -49.51 21.85
[86.16] [74.22]
Car type 3673.1
[684.0]
Constant 1946.1 -5853.7
[3597.0] [3377.0]
Observations 74 74
Adjusted R-squared 0.273 0.478
Standard errors in brackets
Source: auto.dta
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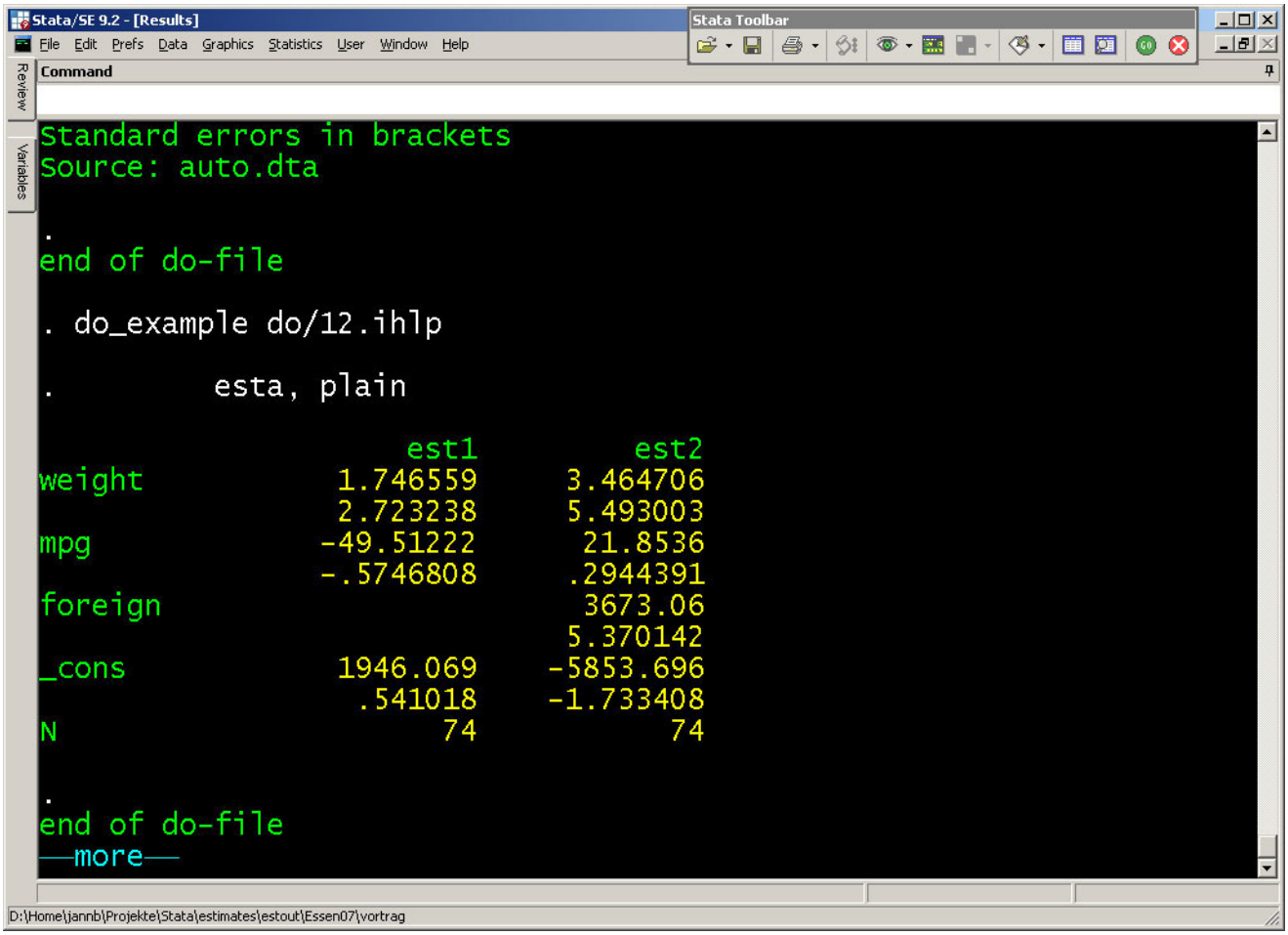
Stata/SE 9.2 - [Results]
File Edit Prefs Data Graphics Statistics User Window Help
Stata Toolbar
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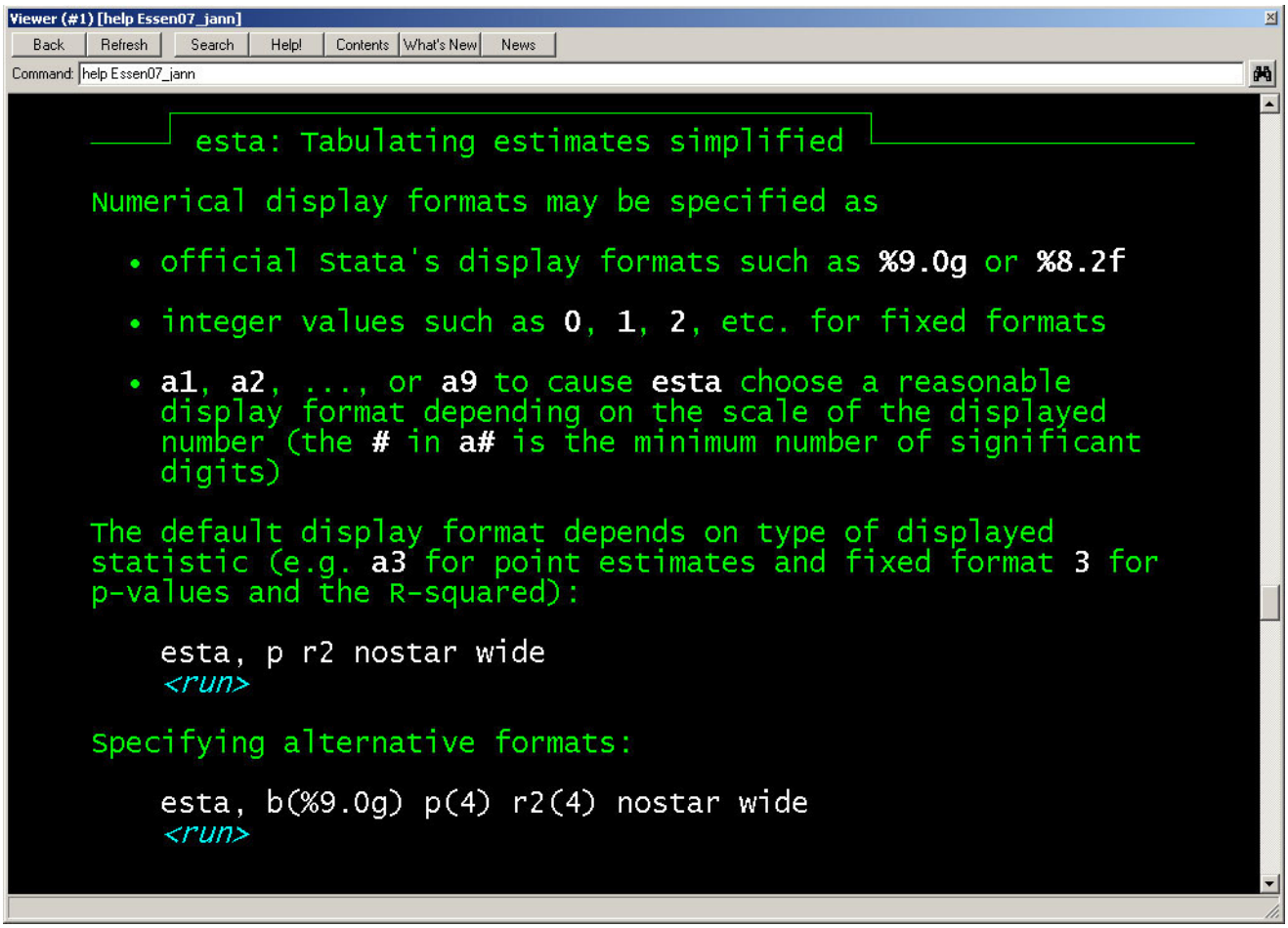
Variables
Command
Standard errors in brackets
Source: auto.dta
.
end of do-file
. do_example do/12.ihlp
. esta, plain
est1 est2
weight 1.746559 3.464706
2.723238 5.493003
mpg -49.51222 21.8536
-.5746808 .2944391
foreign 3673.06
5.370142
_cons 1946.069 -5853.696
.541018 -1.733408
N 74 74
.
end of do-file
--more--
D:\Home\jannb\Projekte\Stata\estimates\estout\Essen07\vortrag


Viewer (#1) [help Essen07_jann]
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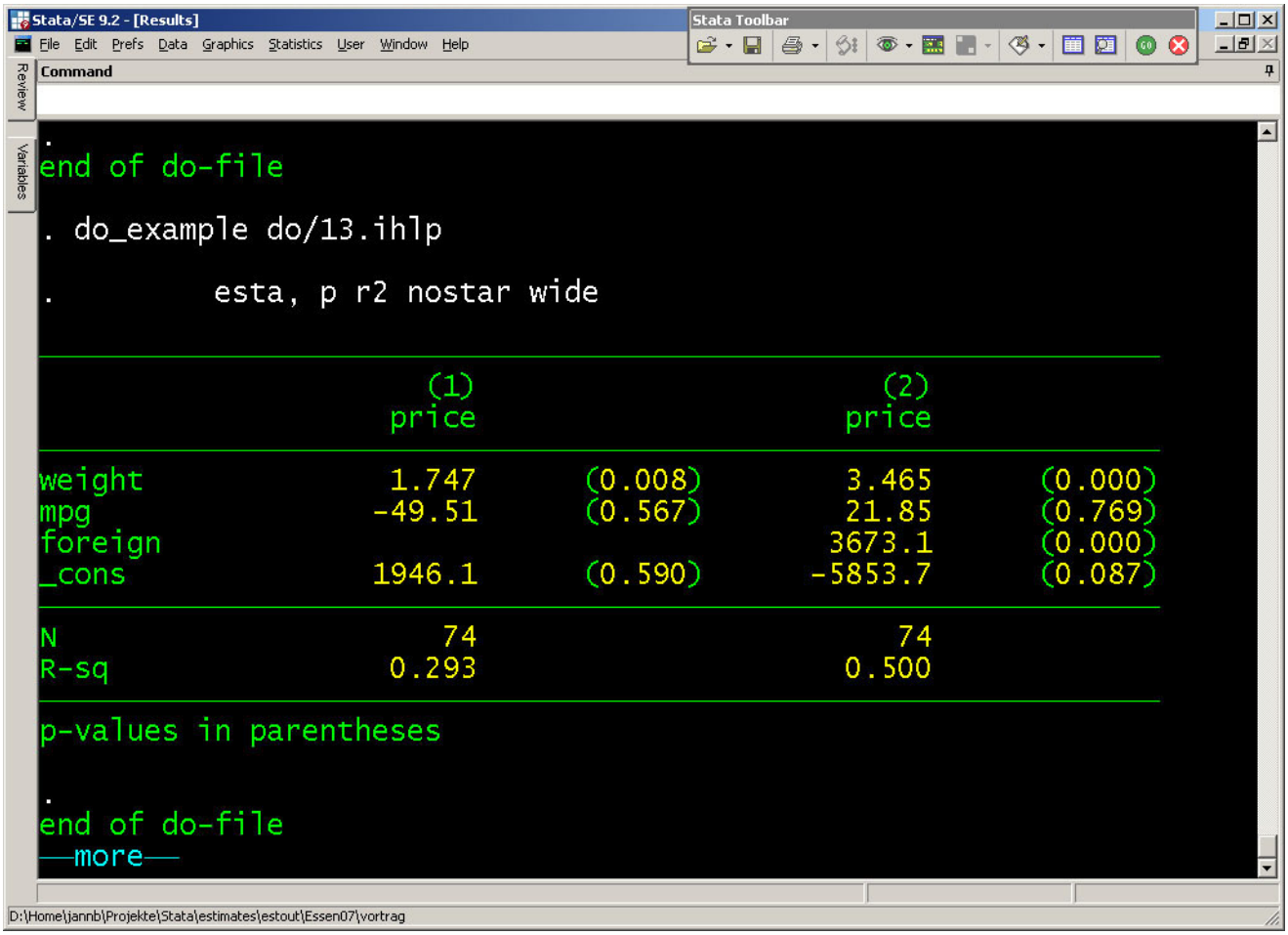
esta: Tabulating estimates simplified
Numerical display formats may be specified as
• official Stata's display formats such as %9.0g or %8.2f
• integer values such as 0, 1, 2, etc. for fixed formats
• a1, a2, ..., or a9 to cause esta choose a reasonable display format depending on the scale of the displayed number (the # in a# is the minimum number of significant digits)
The default display format depends on type of displayed statistic (e.g. a3 for point estimates and fixed format 3 for p-values and the R-squared):
esta, p r2 nostar wide
<run>
Specifying alternative formats:
esta, b(%9.0g) p(4) r2(4) nostar wide
<run>


Stata/SE 9.2 - [Results]
File Edit Prefs Data Graphics Statistics User Window Help
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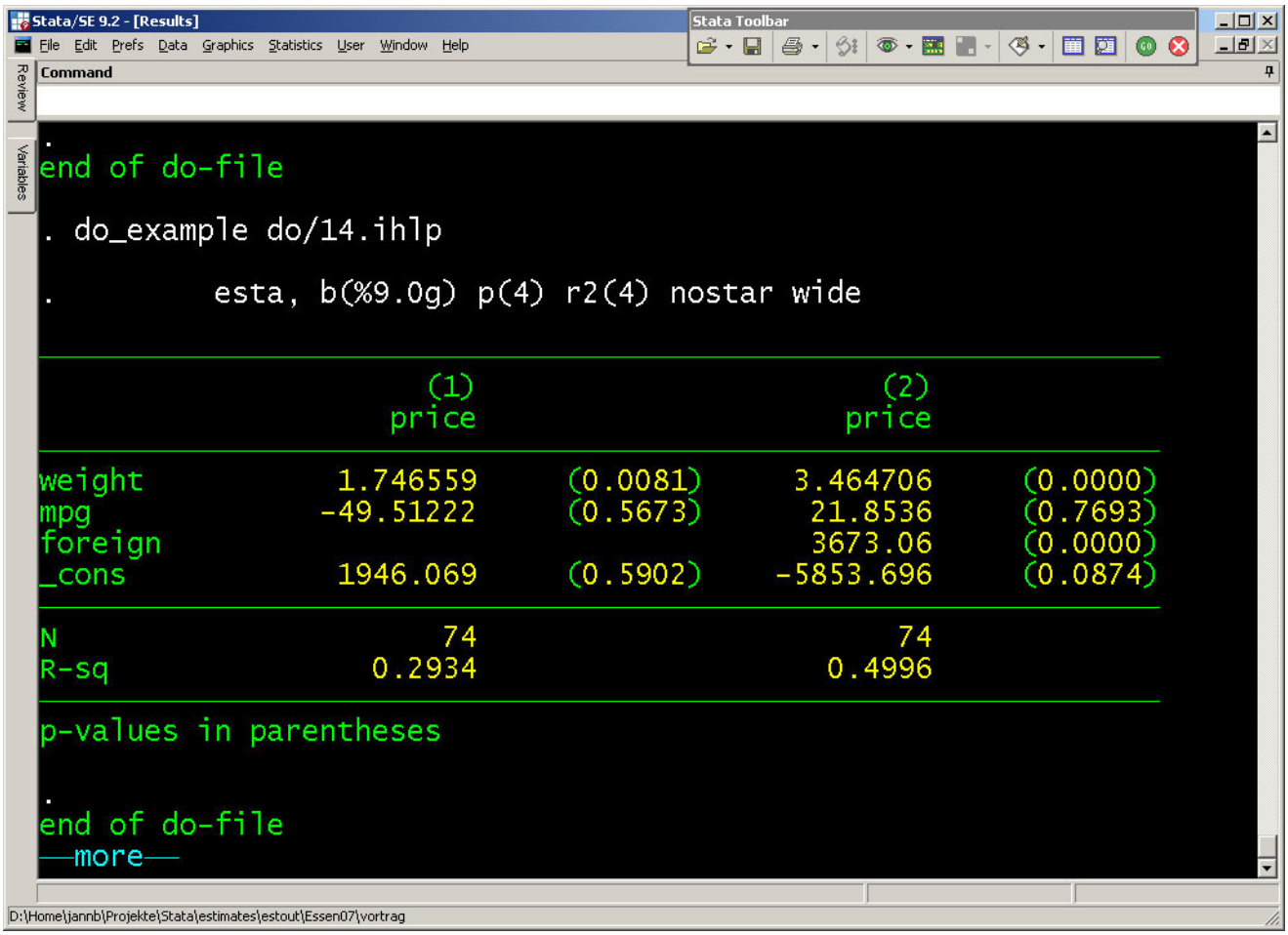
.
end of do-file
. do_example do/13.ihlp
. esta, p r2 nostar wide
(1) price
(2) price
weight 1.747 (0.008) 3.465 (0.000)
mpg -49.51 (0.567) 21.85 (0.769)
foreign 3673.1 (0.000)
_cons 1946.1 (0.590) -5853.7 (0.087)
N 74 74
R-sq 0.293 0.500
p-values in parentheses
.
end of do-file
--more--
D:\Home\jannb\Projekte\Stata\estimates\estout\Essen07\vortrag


Stata/SE 9.2 - [Results]
File Edit Prefs Data Graphics Statistics User Window Help
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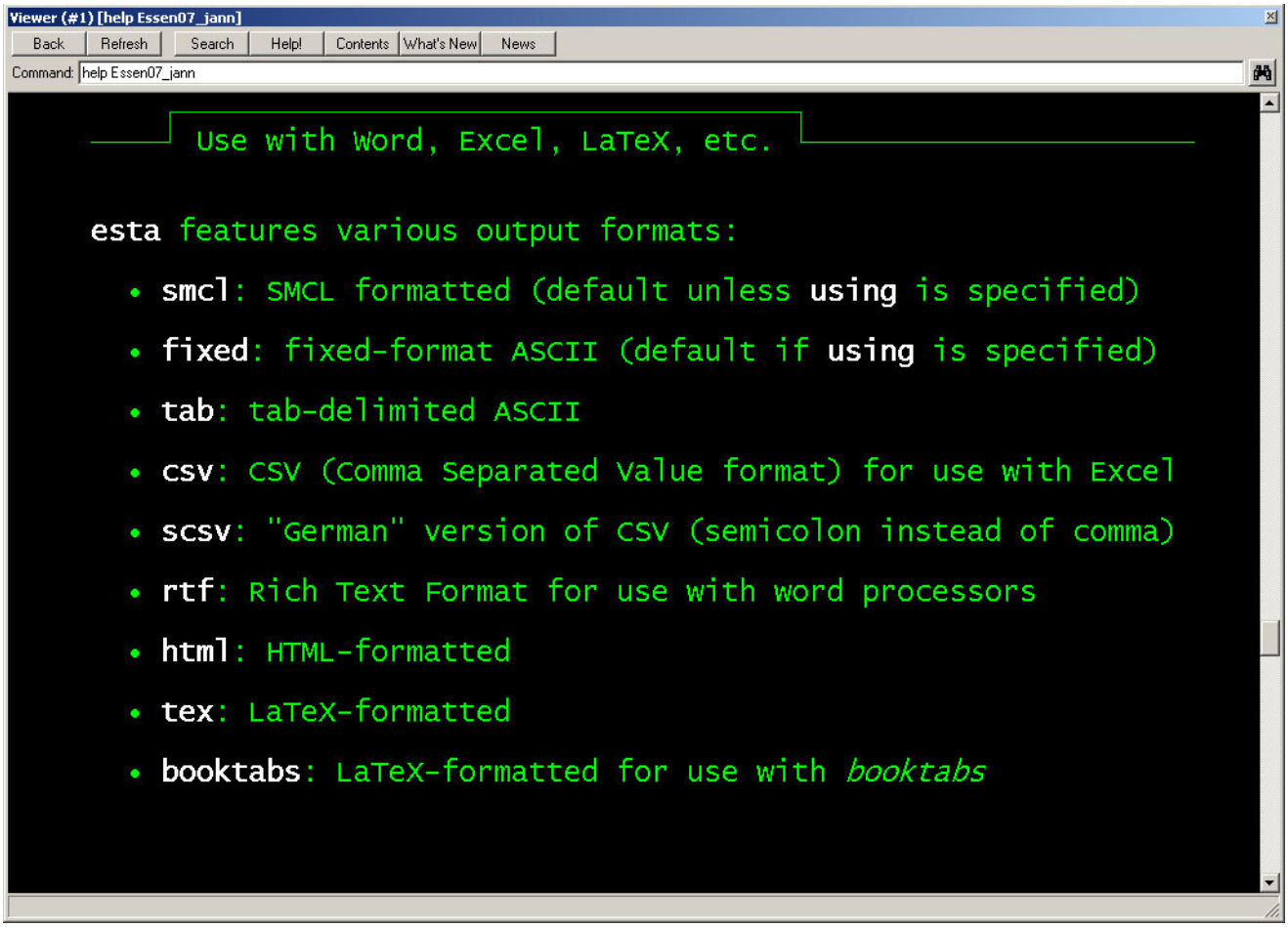
.
end of do-file
. do_example do/14.ihlp
. esta, b(%9.0g) p(4) r2(4) nostar wide
(1) price
(2) price
weight 1.746559 (0.0081) 3.464706 (0.0000)
mpg -49.51222 (0.5673) 21.8536 (0.7693)
foreign 3673.06 (0.0000)
_cons 1946.069 (0.5902) -5853.696 (0.0874)
N 74 74
R-sq 0.2934 0.4996
p-values in parentheses
.
end of do-file
--more--
D:\Home\jannb\Projekte\Stata\estimates\estout\Essen07\vortrag


Viewer (#1) [help Essen07_jann]
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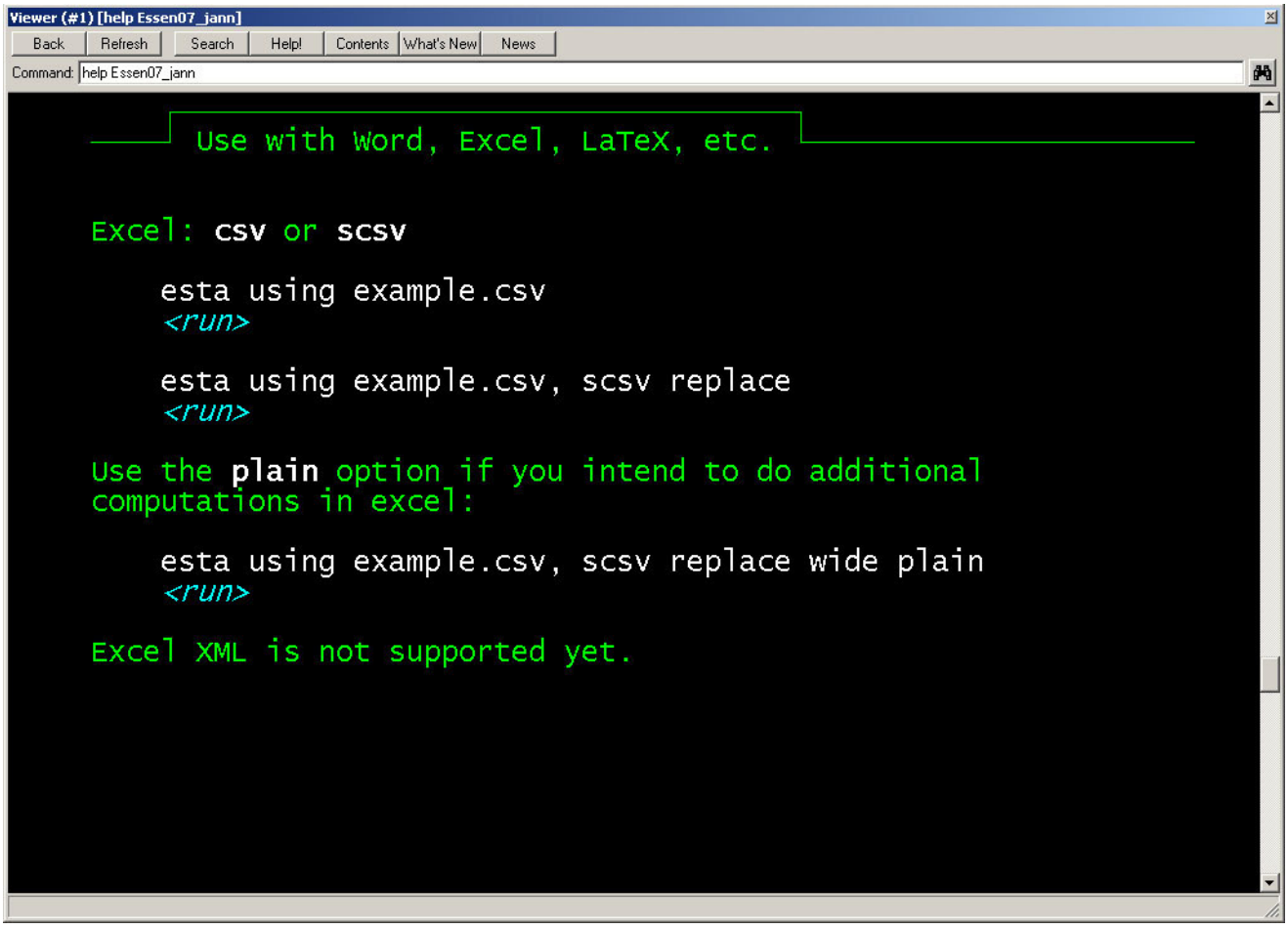
Use with Word, Excel, LaTeX, etc.
esta features various output formats:
• smcl: SMCL formatted (default unless using is specified)
• fixed: fixed-format ASCII (default if using is specified)
• tab: tab-delimited ASCII
• csv: CSV (Comma Separated Value format) for use with Excel
• scsv: "German" version of CSV (semicolon instead of comma)
• rtf: Rich Text Format for use with word processors
• html: HTML-formatted
• tex: LaTeX-formatted
• booktabs: LaTeX-formatted for use with booktabs


Viewer (#1) [help Essen07_jann]
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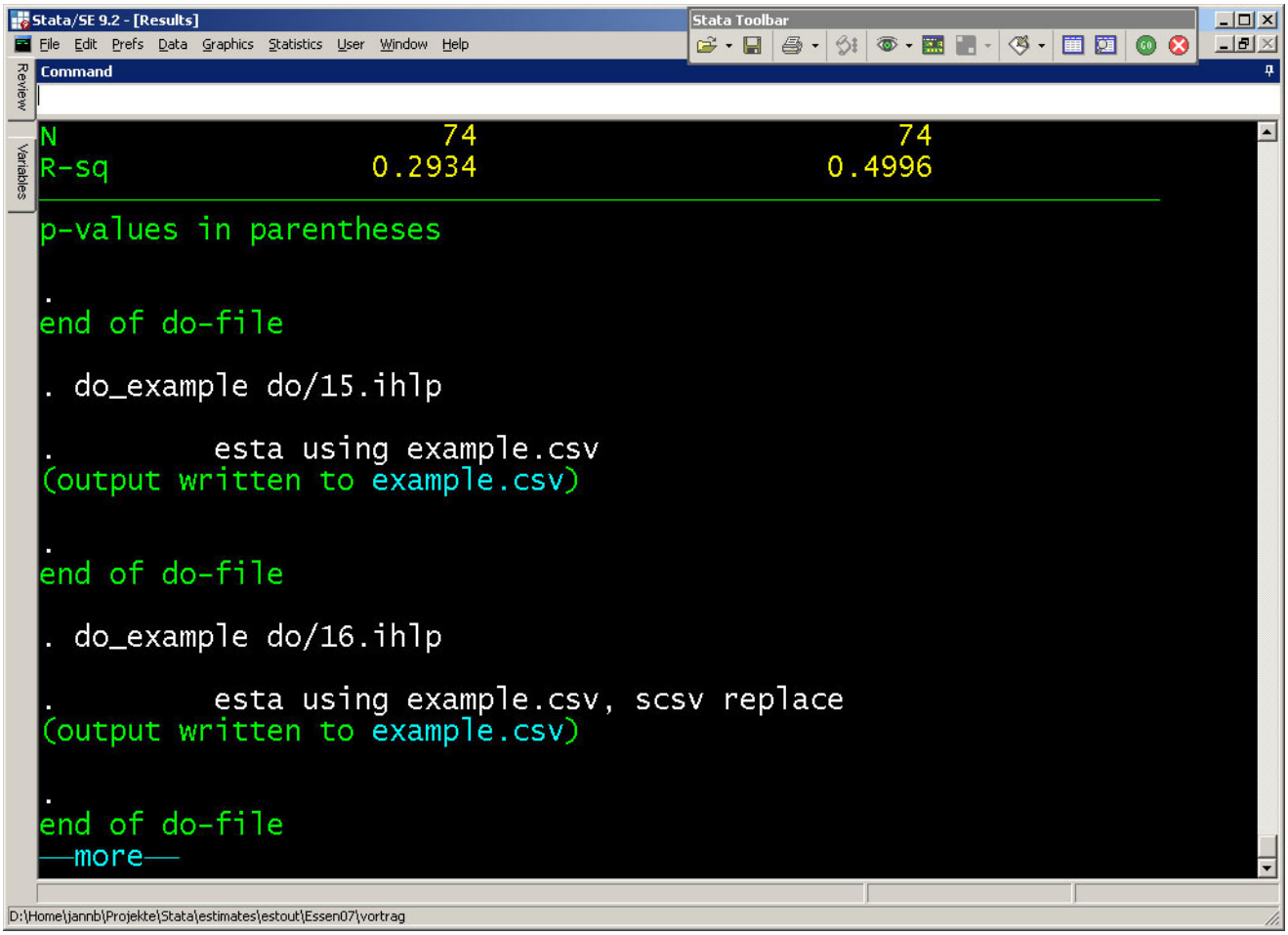
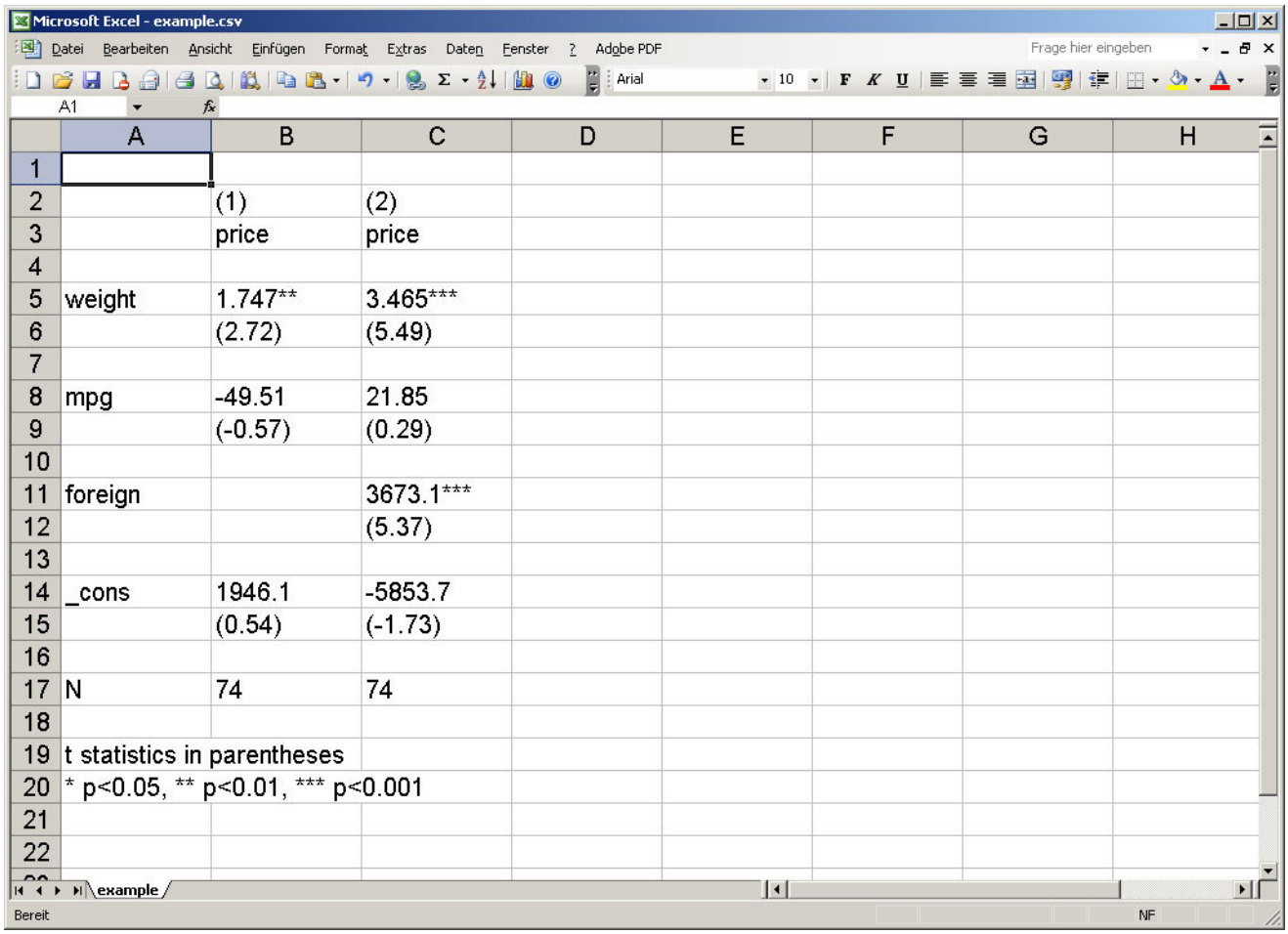
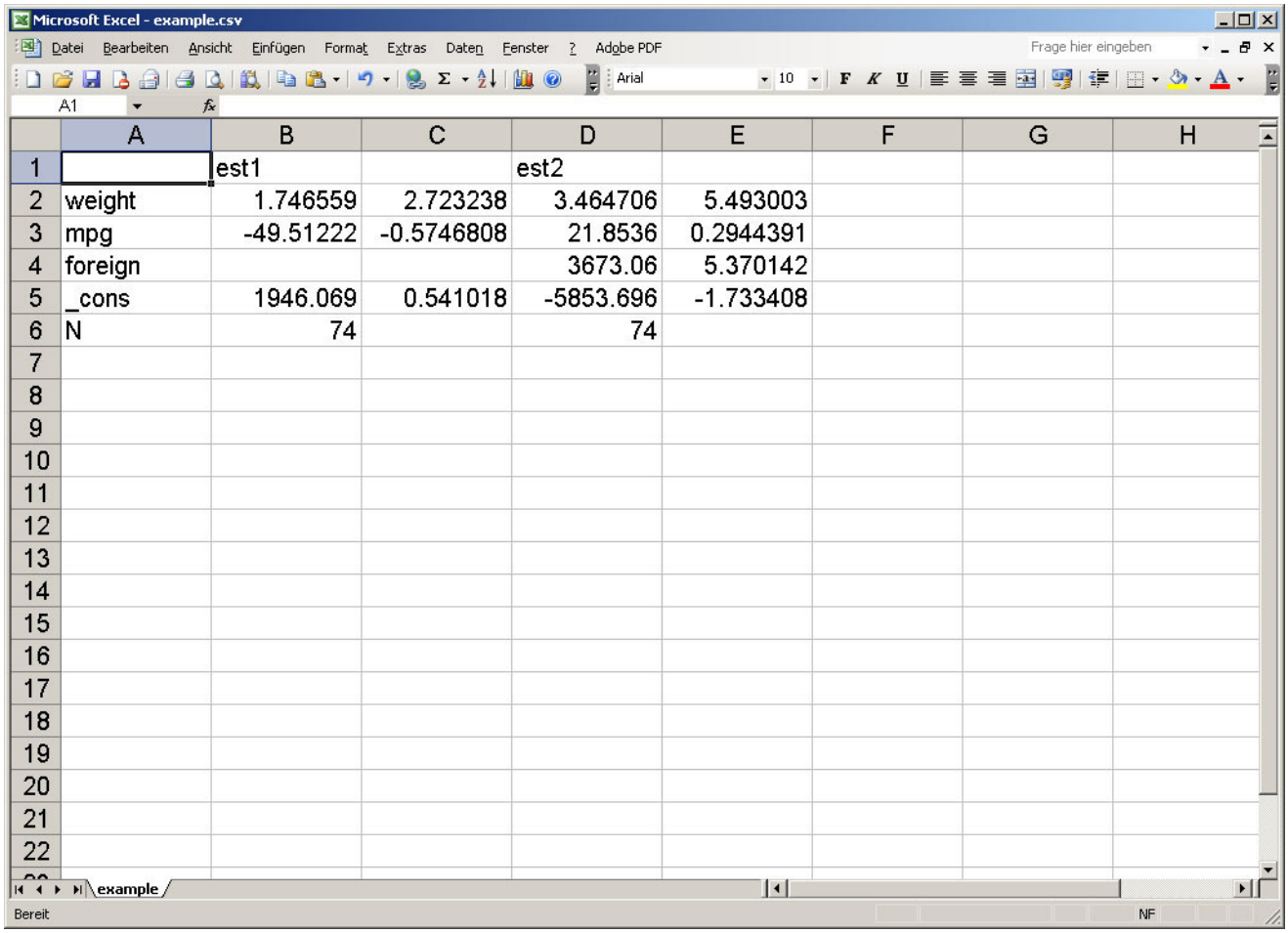
Command: help Essen07_jann
Use with Word, Excel, LaTeX, etc.
Excel: csv or scsv
esta using example.csv
<run>
esta using example.csv, scsv replace
<run>
Use the plain option if you intend to do additional computations in excel:
esta using example.csv, scsv replace wide plain
<run>
Excel XML is not supported yet.





	A	B	C
1			
2		(1)	(2)
3		price	price
4			
5	weight	1.747**	3.465***
6		(2.72)	(5.49)
7			
8	mpg	-49.51	21.85
9		(-0.57)	(0.29)
10			
11	foreign		3673.1***
12			(5.37)
13			
14	_cons	1946.1	-5853.7
15		(0.54)	(-1.73)
16			
17	N	74	74
18			
19	t statistics in parentheses		
20	* p<0.05, ** p<0.01, *** p<0.001		
21			
22			



	A	B	C	D	E	F	G	H
1		est1		est2				
2	weight	1.746559	2.723238	3.464706	5.493003			
3	mpg	-49.51222	-0.5746808	21.8536	0.2944391			
4	foreign			3673.06	5.370142			
5	_cons	1946.069	0.541018	-5853.696	-1.733408			
6	N	74		74				
7								
8								
9								
10								
11								
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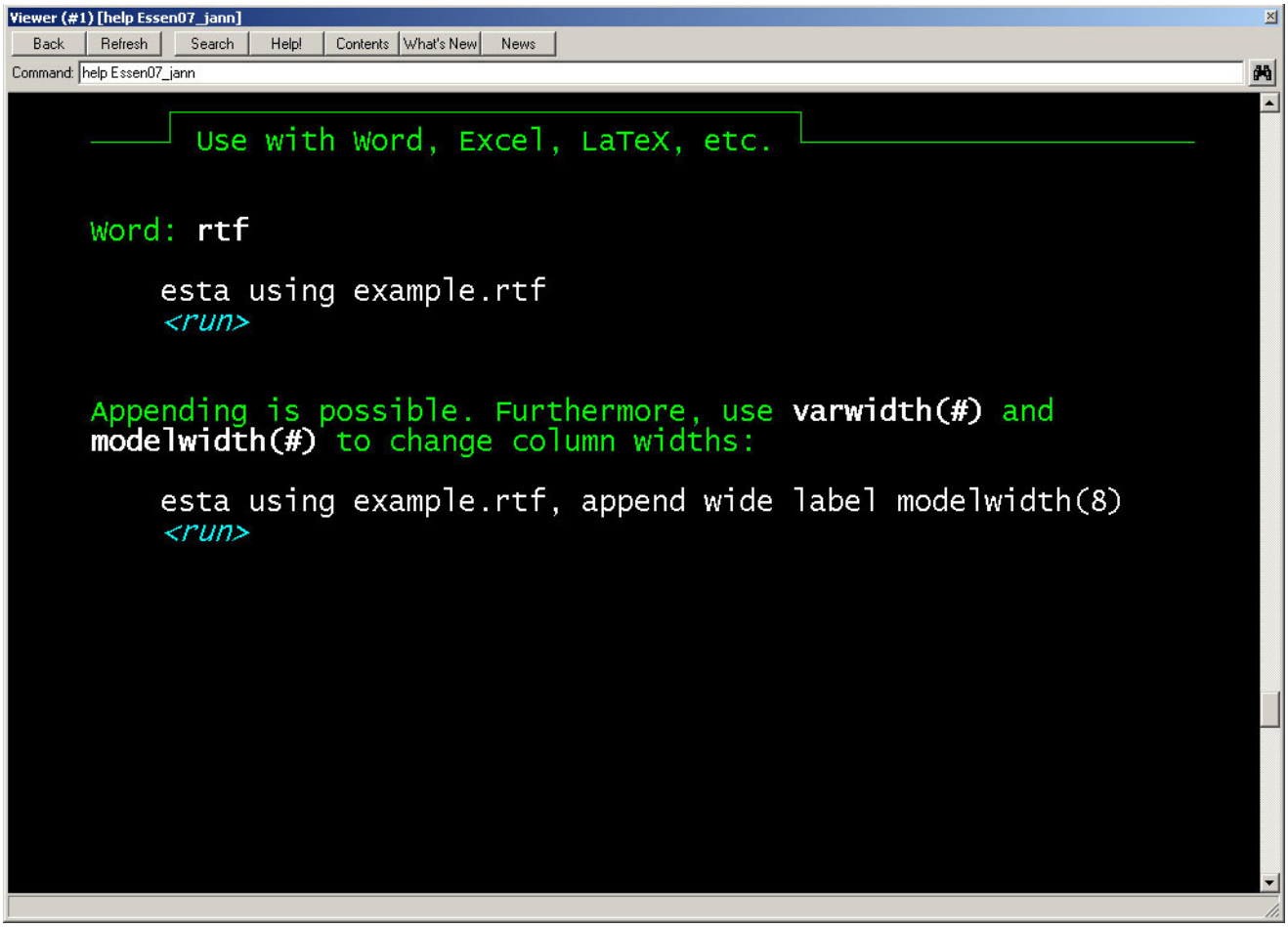
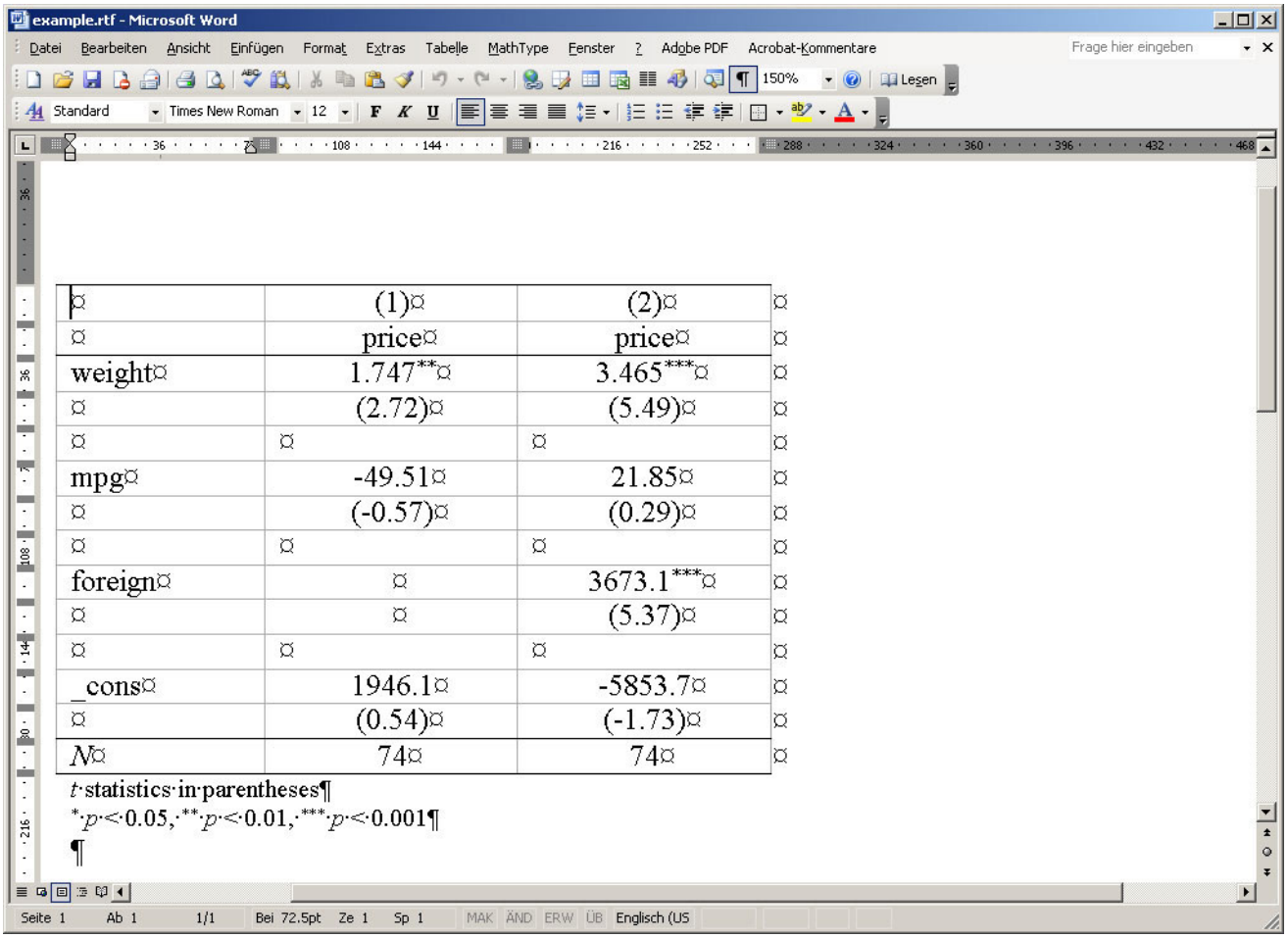
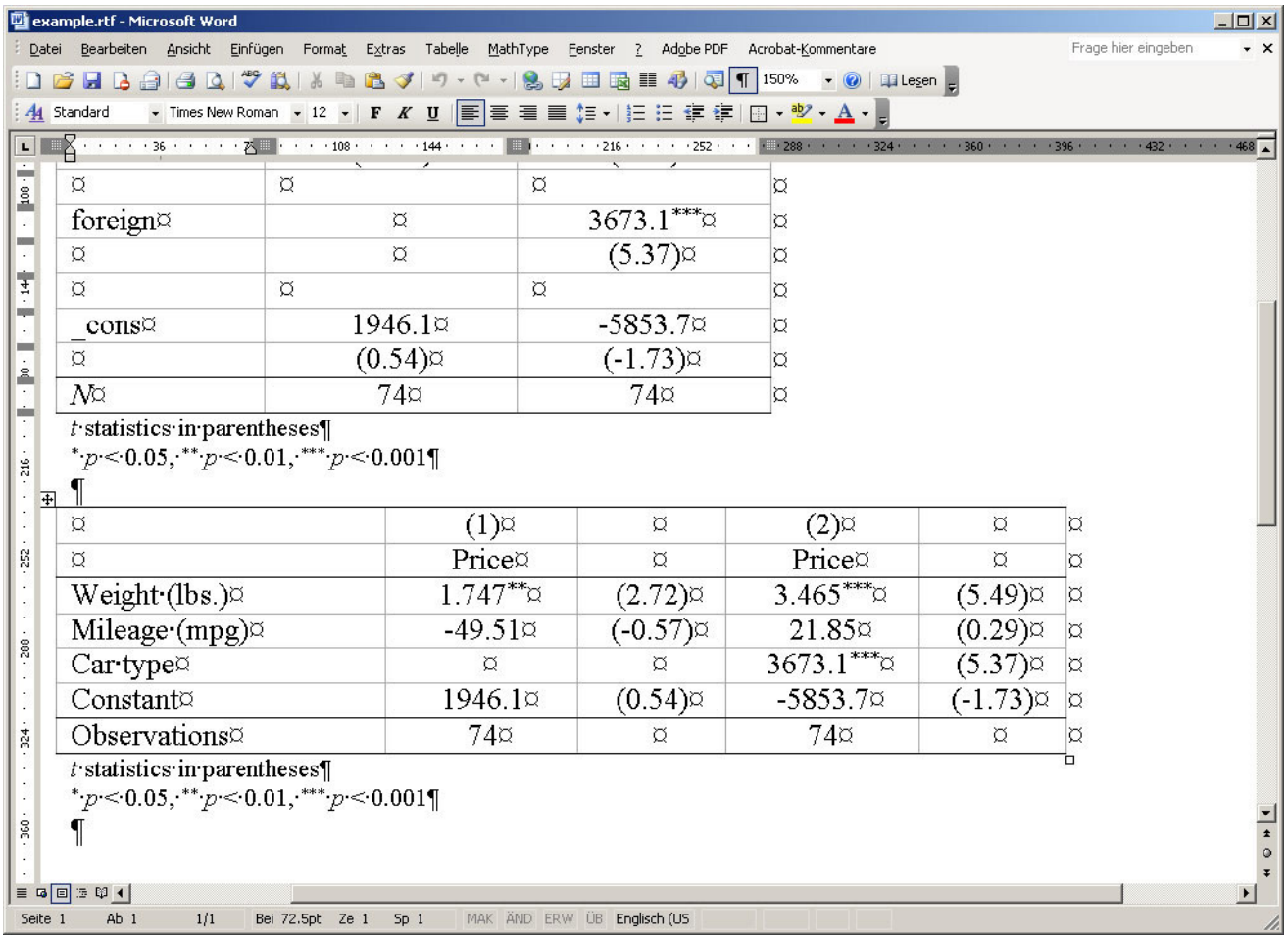




	(1)	(2)
	price	price
weight	1.747**	3.465***
	(2.72)	(5.49)
mpg	-49.51	21.85
	(-0.57)	(0.29)
foreign		3673.1***
		(5.37)
_cons	1946.1	-5853.7
	(0.54)	(-1.73)
N	74	74

t statistics in parentheses
* $p<0.05$, ** $p<0.01$, *** $p<0.001$



foreign		3673.1***		
		(5.37)		
_cons	1946.1		-5853.7	
	(0.54)		(-1.73)	
N	74		74	

t statistics in parentheses
* $p<0.05$, ** $p<0.01$, *** $p<0.001$

	(1)		(2)	
	Price		Price	
Weight (lbs.)	1.747**	(2.72)	3.465***	(5.49)
Mileage (mpg)	-49.51	(-0.57)	21.85	(0.29)
Car type			3673.1***	(5.37)
Constant	1946.1	(0.54)	-5853.7	(-1.73)
Observations	74		74	

t statistics in parentheses
* $p<0.05$, ** $p<0.01$, *** $p<0.001$

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Command: help Essen07_jann

Use with Word, Excel, LaTeX, etc.

LaTeX: tex

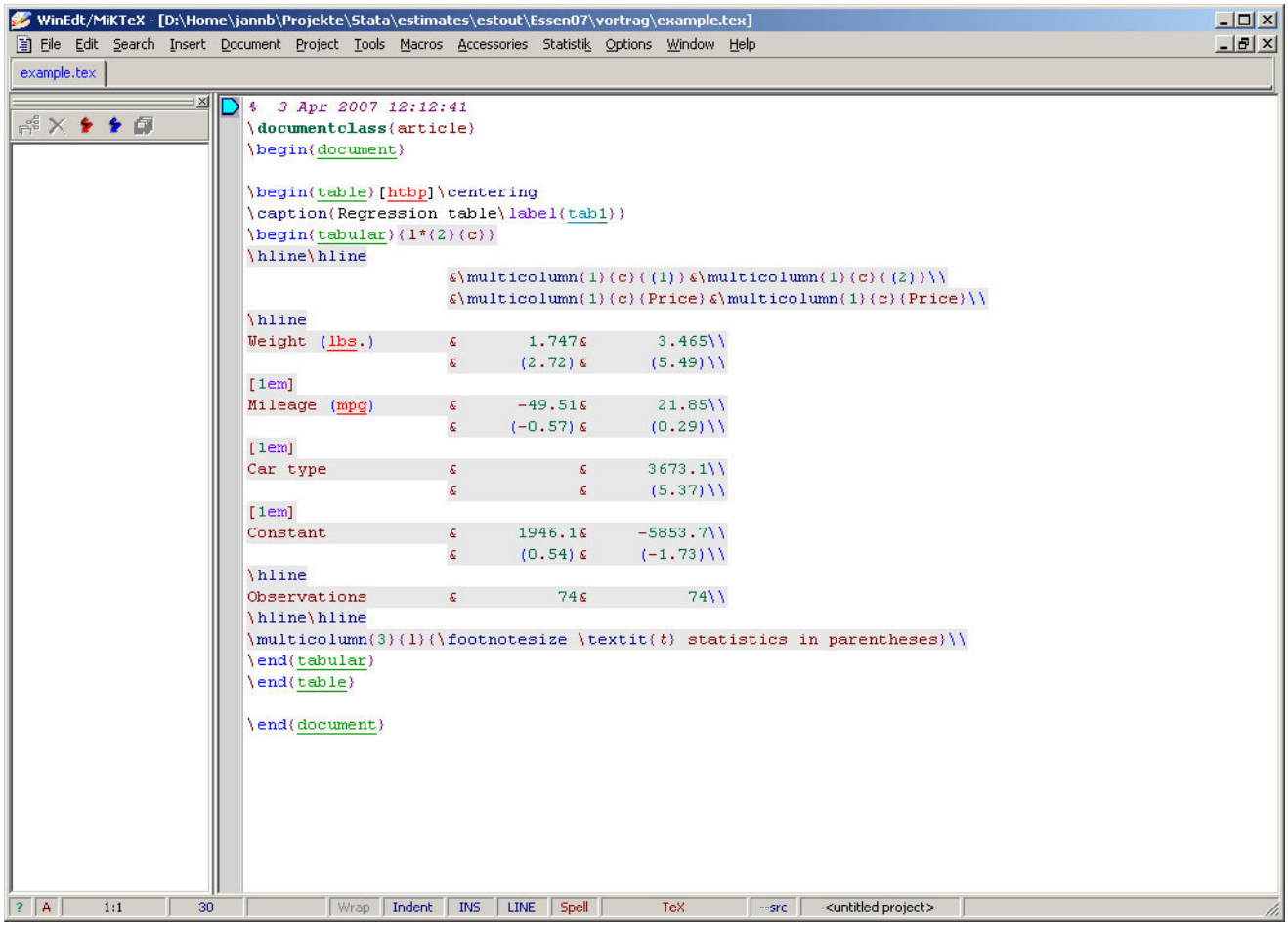
```
esta using example.tex, label nostar /*
 */ title(Regression table\label{tab1}) page
<run>

!texify.exe --pdf example.tex
winexec $AcroRd example.pdf
<run>
```

LaTeX: booktabs

```
esta using example.tex, label nostar replace booktabs /*
 */ title(Regression table\label{tab1}) page

!texify.exe --pdf example.tex
winexec $AcroRd example.pdf
<run>
```



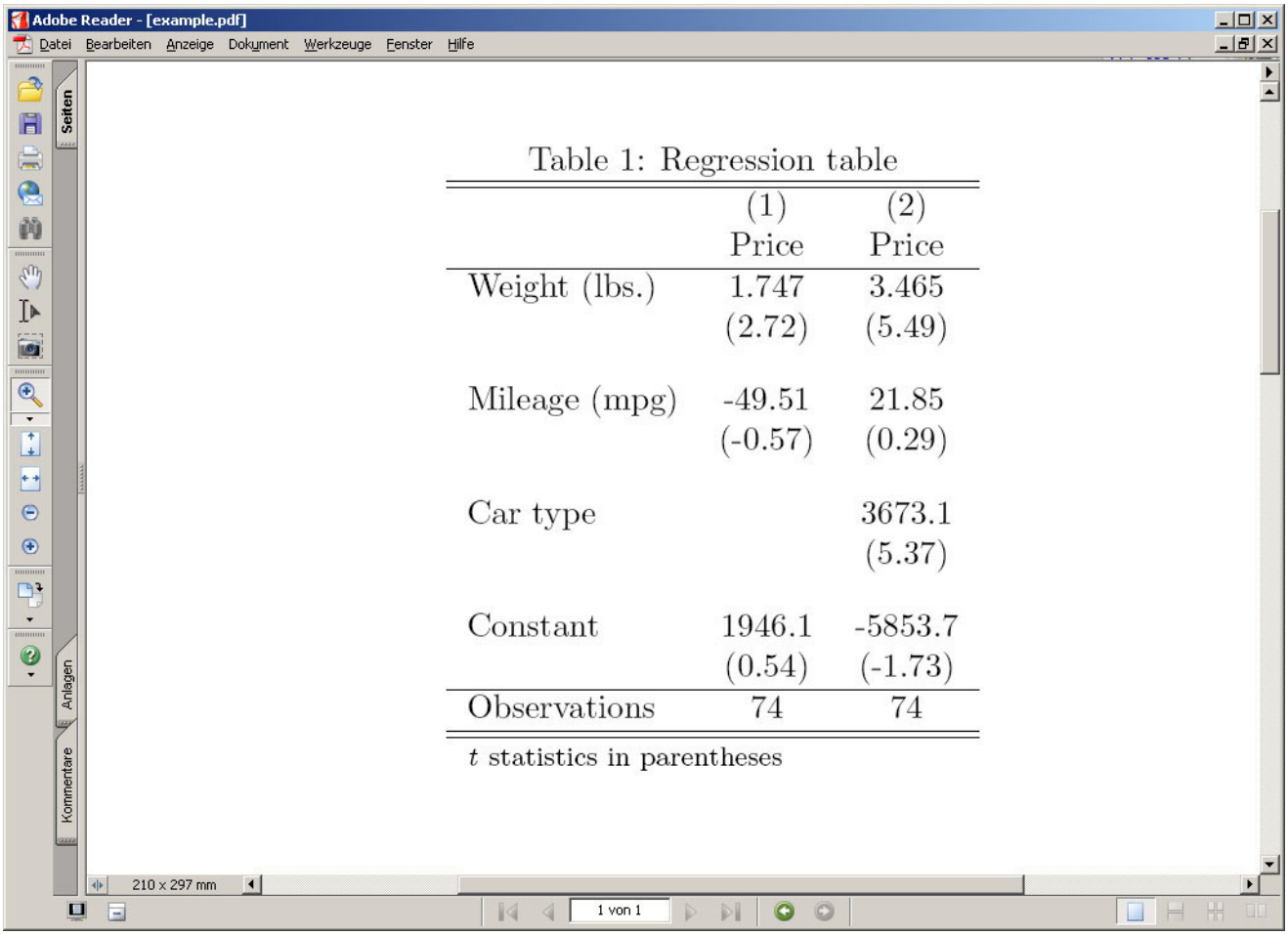


Table 1: Regression table

	(1) Price	(2) Price
Weight (lbs.)	1.747	3.465
	(2.72)	(5.49)
Mileage (mpg)	-49.51	21.85
	(-0.57)	(0.29)
Car type		3673.1
		(5.37)
Constant	1946.1	-5853.7
	(0.54)	(-1.73)
Observations	74	74

t statistics in parentheses

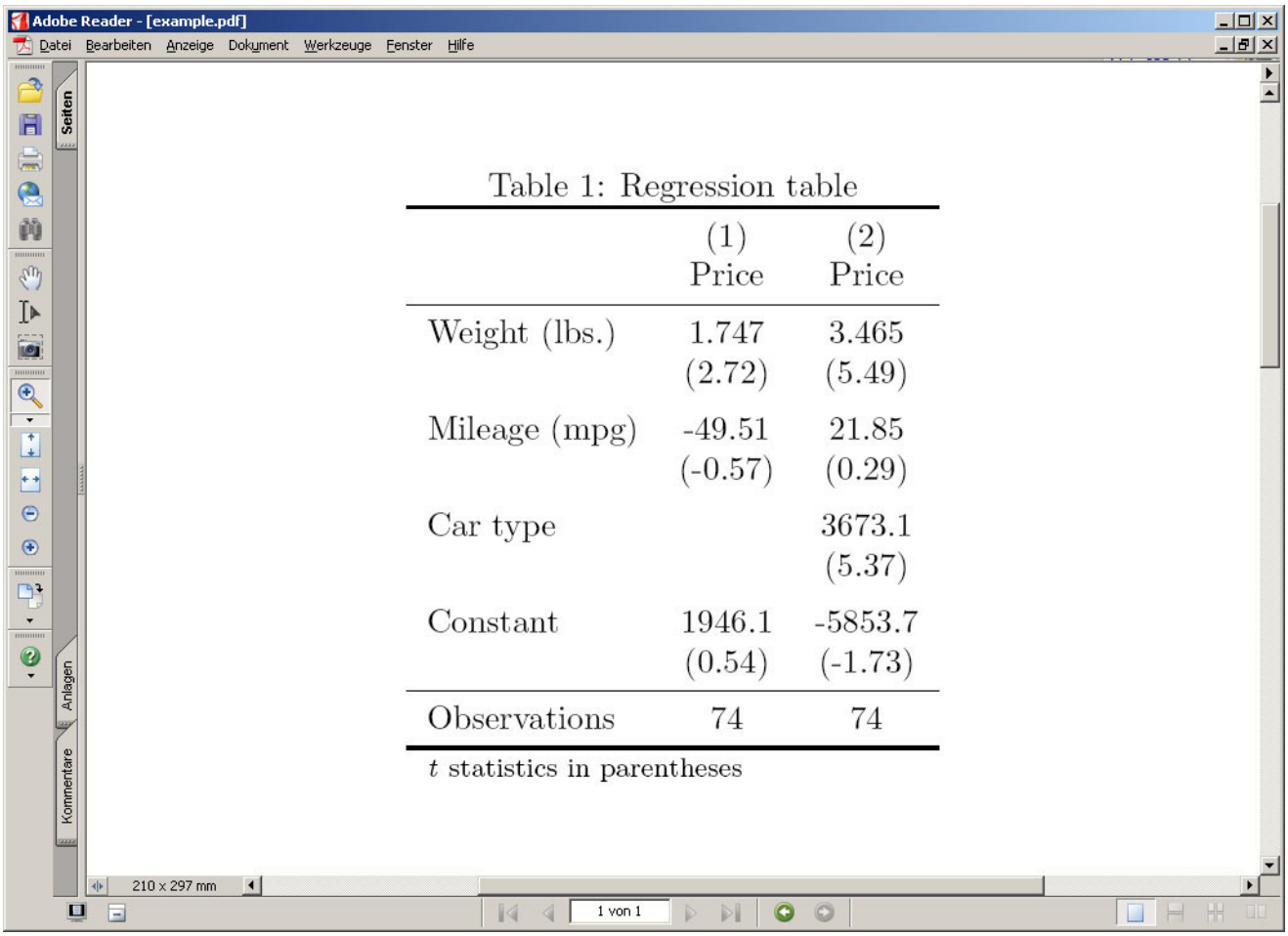


Table 1: Regression table

	(1) Price	(2) Price
Weight (lbs.)	1.747	3.465
	(2.72)	(5.49)
Mileage (mpg)	-49.51	21.85
	(-0.57)	(0.29)
Car type		3673.1
		(5.37)
Constant	1946.1	-5853.7
	(0.54)	(-1.73)
Observations	74	74

t statistics in parentheses

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Use with Word, Excel, LaTeX, etc.

Improved LaTeX table using the *dcolumn* package:

```
esta using example.tex, label replace booktabs /*
 */ alignment(D{.}{.}{-1})                     /*
 */ page(dcolumn)                              /*
 */ title(Regression table\label{tab1})

!texify.exe --pdf example.tex
winexec $AcroRd example.pdf
<run>
```

Adobe Reader - [example.pdf]

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Table 1: Regression table

	(1) Price	(2) Price
Weight (lbs.)	1.747**	3.465***
	(2.72)	(5.49)
Mileage (mpg)	−49.51	21.85
	(−0.57)	(0.29)
Car type		3673.1***
		(5.37)
Constant	1946.1	−5853.7
	(0.54)	(−1.73)
Observations	74	74

t statistics in parentheses

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

210 x 297 mm

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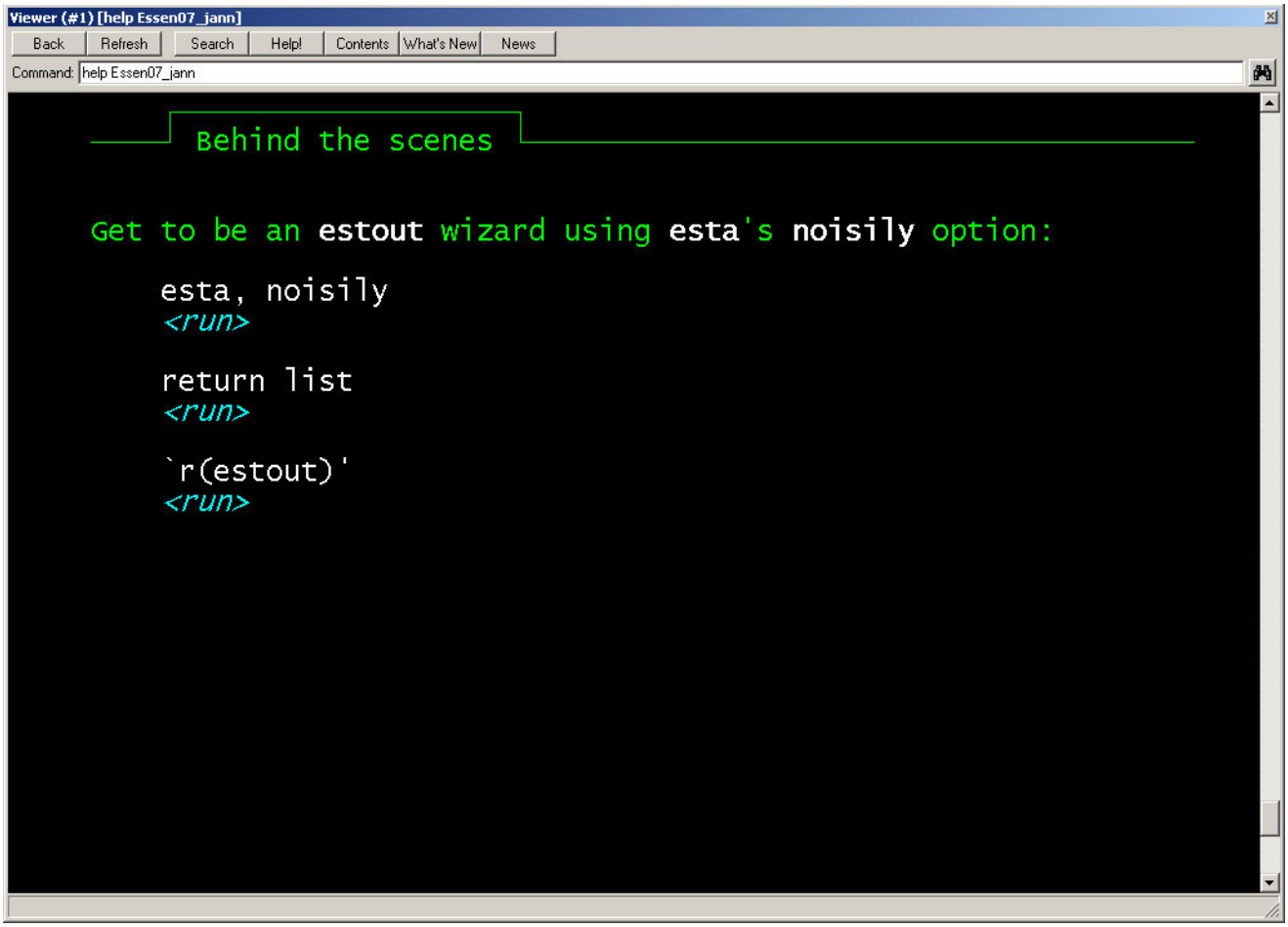
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Get to be an estout wizard using esta's noisily option:
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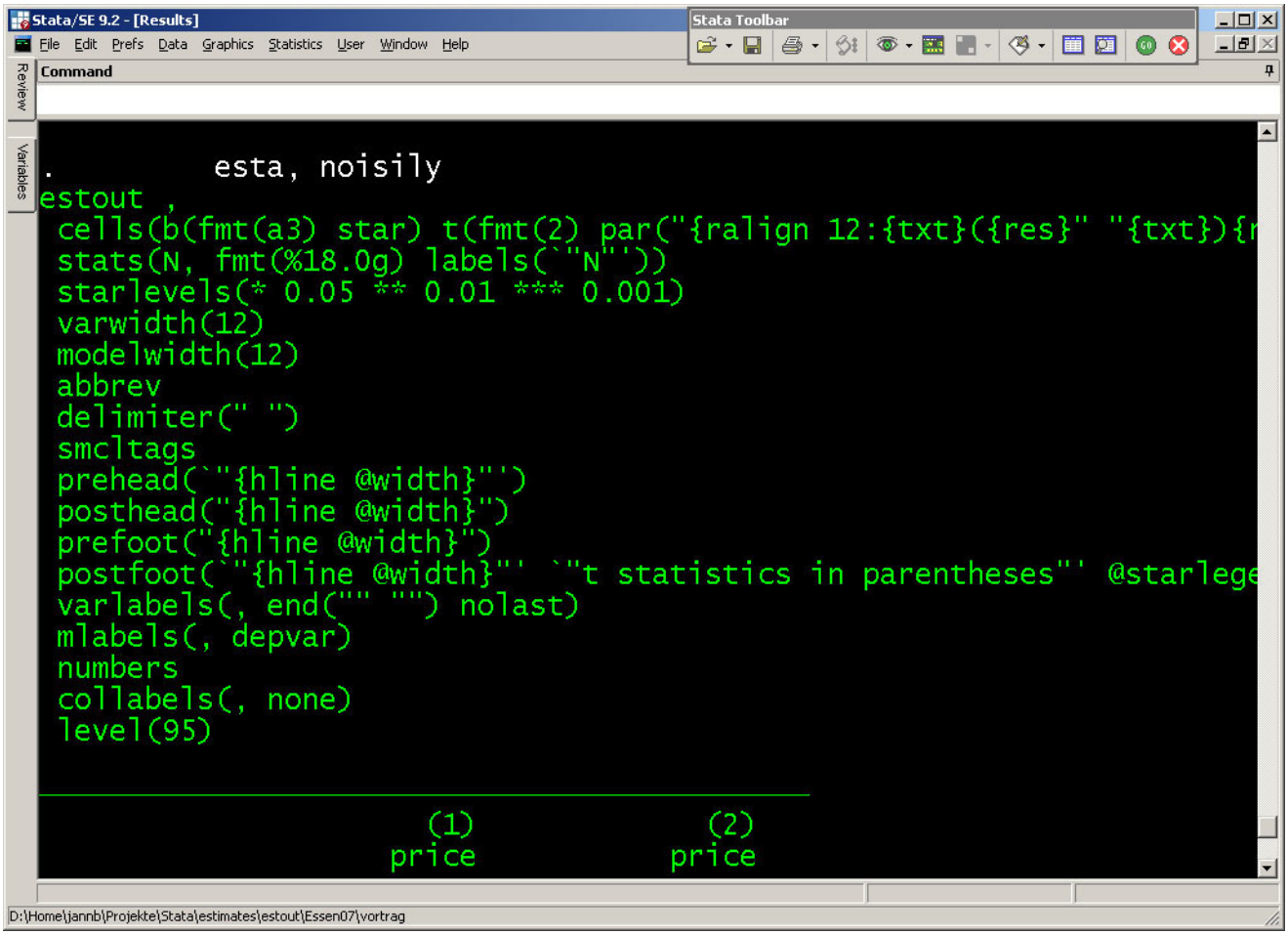
<run>
return list
<run>
`r(estout)'
<run>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. esta, noisily
estout ,
cells(b(fmt(a3) star) t(fmt(2) par("{ralign 12:{txt}({res}" "{txt}){r
stats(N, fmt(%18.0g) labels(`"N"'))
starlevels(* 0.05 ** 0.01 *** 0.001)
varwidth(12)
modelwidth(12)
abbrev
delimiter(" ")
smcltags
prehead(`"{hline @width}"')
posthead("{hline @width}")
prefoot("{hline @width}")
postfoot(`"{hline @width}"' `"t statistics in parentheses"' @starlege
varlabels(, end("" "") nolast)
mlabels(, depvar)
numbers
collabels(, none)
level(95)
(1) (2)
price price
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Thank you for listening!
<clean-up>