COMPLEX TABLES FOR PUBLICATION

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ACCIDENTAL TABLEMAKER

✺ `outreg`

✺ scratch an itch in 1990s

✺ save time and procrastinate

✺ better known for this than my research :)

MULTIPLE VERSIONS

❋ never leave well enough alone

  ❋ gave almost finished new version to Roy Wada

    ❋ `outreg2`

  ❋ recently finished a better version

    ❋ written in Mata

MY IDEAL

* granular control of all table layout and formatting

* combine tables (merge and append)

* multiple tables per file (to build whole documents)
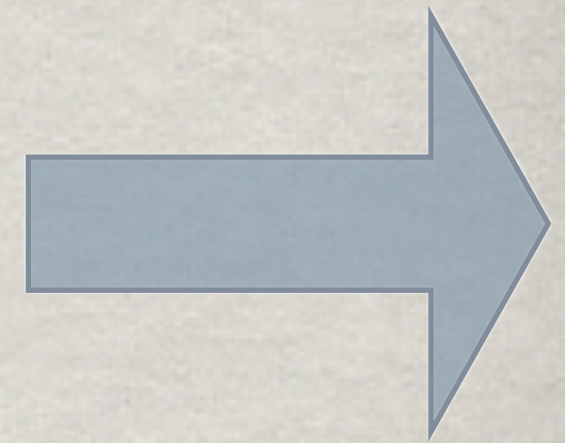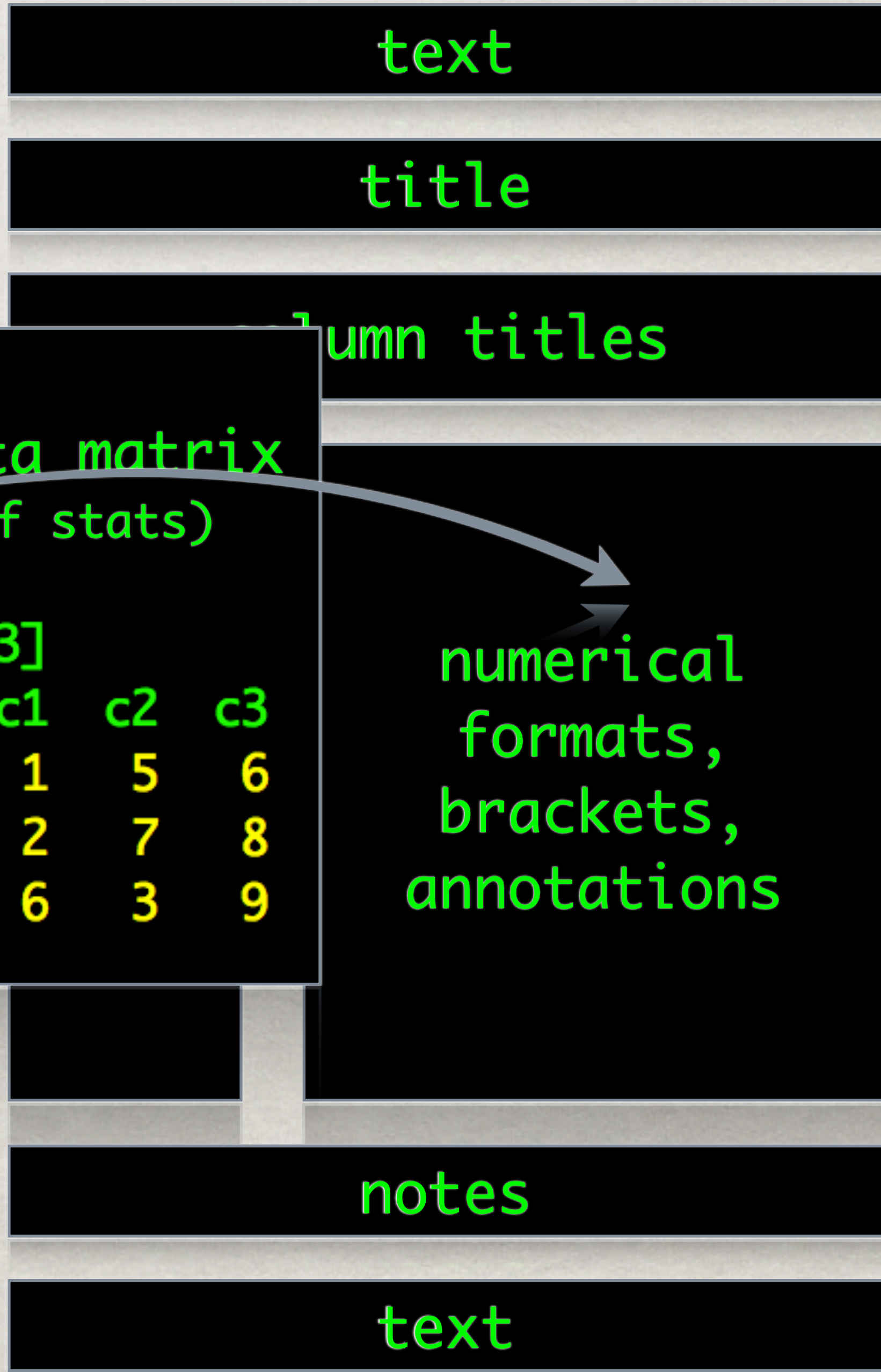
* write native documents (Word, TeX, etc.)

MY IDEAL (NOT YET)

※ object oriented structure (like Stata graphics)

   ※ all results elements accessible

※ display formatted output within Stata (like graphs)

※ set default formatting

THE TASKS

* complete formatting control:

  * layout of parts of table

  * addition of titles & text

  * font size, typeface, justification, etc.

  * borderlines, spacing between cells

FRMTTABLE.ADO

text

title

column titles

Stata matrix
(of stats)

A[3,3]
```
      c1   c2   c3
r1     1    5    6
r2     2    7    8
r3     6    3    9
```

numerical
formats,
brackets,
annotations

notes

text

CREATE MATA struct OF STRING MATRICES

struct FrmtTabl

- pretext
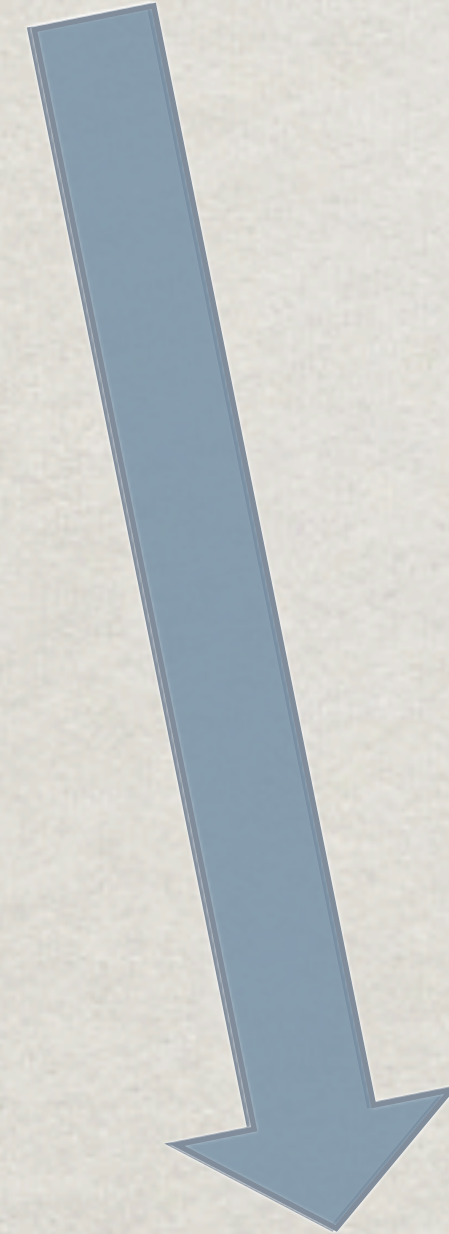- title
- body
- notes
- posttext

struct FrmtTabl + fonts

justification

border lines

spacing

etc.

Word
file

or

T_EX
file

```
. matrix A = (100,50\0,50)

. matrix list A

A[2,2]
      c1    c2
r1   100    50
r2     0    50

. frmttable, statmat(A)
```

100.00	50.00
0.00	50.00

BASIC FORMATTING

TABLE AS WORD DOCUMENT

Payoffs		
	Game 1	Game 2
Player 1	100	50
Player 2	0	50

FANCIER FORMATTING

fonts, footnotes, column span, verticle and horizontal lines

$$\mathscr{Payoffs}$$

	Day 1		Day 2	
	Game 1	Game 2	Game 3	Game 4
Player 1	100	50	25	
Player 2	0	50[a]		90
Player 3			75	
Player 4				10
Total	100	100	100	100

[a] This player left without receiving payoff

outreg USES frmttable

A Regression

	Mileage (mpg)
Length (in.)	-0.078
	(1.38)
Weight (lbs.)	-0.004
	(2.41)*
Headroom (in.)	-0.051
	(0.09)
Constant	47.841
	(7.78)**
R^2	0.66
N	74

* $p<0.05$; ** $p<0.01$

outreg has same formatting options as frmttable

>2 STATISTICS & DOUBLE STATISTICS

Put confidence interval below t statistics	
	Mileage (mpg)
Weight (lbs.)	-0.015
	(2.05)
	[-0.030 - 0.001]
Constant	58.490
	(3.83)**
	[24.906 - 92.074]
R^2	0.28
N	13

* $p<0.05$; ** $p<0.01$

MULTIPLE ESTIMATION STATISTICS

Horizontal Output like Stata's -estimates post-						
mpg	Coef.	Std. Err.	t	P>| t|	[95% Conf.	Interval]
length	-0.0784973	0.0569915	-1.38	0.17	-0.1921633	0.0351688
weight	-0.0038541	0.0015974	-2.41	0.02	-0.0070401	-0.0006682
headroom	-0.0514305	0.5554372	-0.09	0.93	-1.1592150	1.0563540
_cons	47.8407895	6.1492834	7.78	0.00	35.5764304	60.1051486

MULTIPLE TABLES PER FILE

Regression results with summary statistics

	Mileage (mpg)	Means
Length (in.)	-0.078 (1.38)	187.93 (22.27)
Weight (lbs.)	-0.004 (2.41)*	3,019.46 (777.19)
Headroom (in.)	-0.051 (0.09)	2.99 (0.85)
Mileage (mpg)		21.30 (5.79)
Constant	47.841 (7.78)**	
R^2	0.66	
N	74	

$* p<0.05; ** p<0.01$

A frequency table for car type

Car type	Frequency
Domestic	52
Foreign	22
Total	74

whole statistical appendix in a single document

3 MAIN TABLE TYPES

✳ estimation results (outreg, `estimates table`, `estout`, `outreg2`)

✳ frequencies (`tabulate`)

✳ summary statistics (`table`, `tabstat`, `tabout`)

✳ + miscellaneous other statistics

TABULATE EXAMPLE

```
. quietly tabulate rep78, matrow(values) matcell(freq)

. matrix A = values,freq

. frmttable, statmat(A) sdec(0) title("Repair Record 1978") ///
>        ctitle(Value, Frequency)
```

```
Repair Record 1978
─────────────────────────

  Value   Frequency
─────────────────────────

    1         2
    2         8
    3        30
    4        18
    5        11
─────────────────────────
```

EXAMPLE: *tblnames*
2x2 TABLE OF COEFFICIENTS

Effect of weight on MPG

	foreign	domestic
price ≥ $6000	x	x
price < $6000	x	x

```
. quietly regress mpg weight if foreign & price<6000

. outreg, nocons noauto rtitle("price < $6000") ctitle("", foreign)
```

	foreign
price < $6000	−0.015
	(2.05)

* p<0.05; ** p<0.01

```
. quietly regress mpg weight if foreign & price>=6000

. outreg, nocons noauto rtitle("price >= $6000") ctitle("", foreign) append
```

	foreign
price < $6000	−0.015
	(2.05)
price >= $6000	−0.007
	(4.55)**

* p<0.05; ** p<0.01

```
. quietly regress mpg weight if !foreign & price<6000

. outreg, nocons noauto rtitle("price < $6000") ctitle("", domestic) merge
```

	foreign	domestic
price < $6000	−0.015	−0.007
	(2.05)	(11.32)**
price >= $6000	−0.007	
	(4.55)**	

* p<0.05; ** p<0.01

WHAT WILL HAPPEN NEXT?

```
. quietly regress mpg weight if !foreign & price>=6000

. outreg, nocons noauto rtitle("price >= $6000") ctitle("", domestic) merge
```

	foreign	domestic	domestic
price < $6000	−0.015	−0.007	
	(2.05)	(11.32)**	
price >= $6000			−0.005
			(3.52)**
price >= $6000	−0.007		
	(4.55)**		

* p<0.05; ** p<0.01

NEED TWO TABLES

✳ one for first column

✳ another for second column

✳ merge them together

✳ need to be able to *name* tables to distinguish them

ALREADY HAVE FIRST COLUMN
FROM FIRST TWO REGRESSIONS

	foreign
price < $6000	−0.015
	(2.05)
price >= $6000	−0.007
	(4.55)**

* p<0.05; ** p<0.01

table has default (unspecified) name

CREATE SECOND COLUMN
WITH EXPLICIT *tblname*

```
. quietly regress mpg weight if !foreign & price<6000

. outreg, nocons noauto rtitle("price < $6000") ctitle("", domestic) store(col2)

                                                    domestic

                        price < $6000      -0.007
                                           (11.32)**

                             * p<0.05; ** p<0.01
```

```
. quietly regress mpg weight if !foreign & price>=6000

. outreg, nocons noauto rtitle("price >= $6000") ctitle("", domestic) append(col2)


                                   domestic

              price < $6000         -0.007
                                   (11.32)**
              price >= $6000        -0.005
                                    (3.52)**

                  * p<0.05; ** p<0.01
```

MERGE TWO COLUMNS

EXAMPLE: *tblnames*
TWO-STAGE REGRESSION IN LOOP

psuedo-code:

```
foreach c in coefficientset {
  stage1_regression `c'
  outreg, merge(stage1)
  stage2_regression `c'
  outreg, merge(stage2)
}
outreg using xmpl, replay(stage1)
outreg using xmpl, replay(stage2) addtable
```

COMPLEX TABLE

Table 2. Risk of Death on Cox Regression Analysis

	Model 1 [a]		
	Hazard Ratio	95% CI	P
price < $6000	-0.015	-0.007	
	(2.05)	(11.32)**	
price >= $6000	-0.007	-0.005	
	(4.55)**	(3.52)**	
Glomerular Classification			
Sclerotic	1.0 [d]	-	-
Focal	0.012	-1.275 - 1.299	0.99
Crescentic	-0.037	-0.355 - 0.282	0.82
Mixed	-0.004	-0.007 - -0.000	0.03
Chronic Interstitial Injury [e]			
0 – 30%	1.0 [d]	-	-
31 – 60%	-0.068	-0.196 - 0.061	0.30
>60	-0.063	-0.443 - 0.317	0.74

[a] Univariate Unadjusted Analysis.
[b] Model 2 Adjusted for glomerular classification, age, eGFR at presentation, female gender.
[c] Model 3 Adjusted for glomerular classification, Age, eGFR at presentation, female gender, and chronic interstitial injury.
[d] Reference group.

Further Steps

* set defaults (formatting values for FrmtTabl)

  * fonts

  * output file types

  * titles, etc.

* write to .docx & .xlsx XML formats

  * automatic column width

  * colors

  * speadsheet

Conclusion

* `outreg` and `frmttable` enable creation and combination of complex tables

* very extensive formatting control

* can be used by other .ado file writers

* what will Stata offer?