Using `stargazer` to report regression output and descriptive statistics in R

(v. 1.0)

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Introduction

As anything with R, there are many ways of exporting output into nice tables (but mostly for *LaTeX* users). Some packages are: `apsrtable, xtable, texreg, memisc, outreg` ...and counting.

At the moment, the "new kid on the block" is `stargazer`. Released by Marek Hlavac on March 3rd, 2014, version 5.0 offers a very nice, smart, and easy-to-use alternative to non-*LaTeX* users, in particular, the ability to import editable tables into a Word document.

This presentation will show some of the options `stargazer` offers, the contents are based on the documentation from the package available in the following links:

- http://cran.r-project.org/web/packages/stargazer/stargazer.pdf
- http://cran.r-project.org/web/packages/stargazer/vignettes/stargazer.pdf

The default setting produces *LaTeX* code, the additional alternatives are:

- Output as text, which allows a quick view of results
- Output as html, which produce editable tables for Word documents.

For a quick view of the results use the "text" format option

OUTPUT IN TEXT FORMAT

Descriptive statistics: in text format

```
mydata <- mtcars
install.packages("stargazer")   #Use this to install it, do this only once
library(stargazer)
stargazer(mydata, type = "text", title="Descriptive statistics", digits=1, out="table1.txt")
```

```
                   Descriptive statistics
                   ======================================
                   Statistic N   Mean    St. Dev.  Min    Max
                   mpg       32  20.1      6.0      10.4  33.9
                   cyl       32   6.2      1.8       4     8
                   disp      32 230.7    123.9      71.1 472.0
                   hp        32 146.7     68.6       52    335
                   drat      32   3.6      0.5       2.8   4.9
                   wt        32   3.2      1.0       1.5   5.4
                   qsec      32  17.8      1.8      14.5  22.9
                   vs        32   0.4      0.5       0     1
                   am        32   0.4      0.5       0     1
                   gear      32   3.7      0.7       3     5
                   carb      32   2.8      1.6       1     8
                   --------------------------------------
```

stargazer will automatically recognize the type of object, and will produce the appropriate output. In the case of data frames, it will display summary statistics .

The table will be saved in the working directory with whatever name you write in the out option. You can open this file with any word processor

```
# Same output, transposed (variables in columns)
stargazer(mydata, type = "text", title="Descriptive statistics", digits=1, out="table1.txt", flip=TRUE)
```

```
          Descriptive statistics
          ============================================================
          Statistic mpg  cyl disp    hp    drat  wt  qsec  vs   am   gear carb
          N          32  32   32     32     32   32   32   32   32    32   32
          Mean      20.1 6.2 230.7 146.7   3.6  3.2 17.8 0.4  0.4   3.7  2.8
          St. Dev.   6.0 1.8 123.9 68.6    0.5  1.0  1.8 0.5  0.5   0.7  1.6
          Min       10.4  4  71.1   52     2.8  1.5 14.5  0    0     3    1
          Max       33.9  8 472.0  335     4.9  5.4 22.9  1    1     5    8
          ------------------------------------------------------------
```

Use this option if you want the variables in columns

For more details/options type ?stargazer

Descriptive statistics: in text format, replacing variable names with labels

The table will be saved in the working directory with whatever name you write in the `out` option. You can open this file with any word processor

```
mydata <- mtcars
install.packages("stargazer")  #Use this to install it, do this only once
library(stargazer)
stargazer(mydata, type = "text", title="Descriptive statistics", digits=1, out="table1.txt",
        covariate.labels=c("Miles/(US)gallon","No. of cylinders","Displacement (cu.in.)",
                        "Gross horsepower","Rear axle ratio","Weight (lb/1000)",
                        "1/4 mile time","V/S","Transmission (0=auto, 1=manual)",
                        "Number of forward gears","Number of carburetors"))
```

Use the option `covariate.labels` to replace variable names with variable labels. Must be in same order as in the dataset.

```
Descriptive statistics
================================================================
Statistic                        N  Mean  St. Dev. Min   Max
Miles/(US)gallon                 32 20.1    6.0     10.4 33.9
No. of cylinders                 32  6.2    1.8      4    8
Displacement (cu.in.)            32 230.7  123.9    71.1 472.0
Gross horsepower                 32 146.7   68.6     52   335
Rear axle ratio                  32  3.6    0.5     2.8   4.9
Weight (lb/1000)                 32  3.2    1.0     1.5   5.4
1/4 mile time                    32 17.8    1.8     14.5 22.9
V/S                              32  0.4    0.5      0    1
Transmission (0=auto, 1=manual)  32  0.4    0.5      0    1
Number of forward gears          32  3.7    0.7      3    5
Number of carburetors            32  2.8    1.6      1    8
----------------------------------------------------------------
```

OTR

For more details/options type `?stargazer`

Descriptive statistics: in text format, selected variables

```
mydata <- mtcars
install.packages("stargazer") #Use this to install it, do this only once
library(stargazer)
stargazer(mydata[c("mpg","hp","drat")], type = "text",
          title="Descriptive statistics/selected variables", digits=1, out="table2.txt")
```

```
         Descriptive statistics/selected variables
         ===================================
         Statistic N  Mean  St. Dev. Min  Max
         mpg       32 20.1    6.0    10.4 33.9
         hp        32 146.7  68.6     52  335
         drat      32  3.6    0.5    2.8  4.9
         -----------------------------------
```

The table will be saved in the working directory with whatever name you write in the `out` option. You can open this file with any word processor

```
#same output transposed and with labels instead of variable names
stargazer(mydata[c("mpg","hp","drat")], type = "text",
          title="Descriptive statistics/selected variables", digits=1, out="table2.txt", flip=TRUE,
          covariate.labels=c("Miles/(US)gallon","Gross horsepower","Rear axle ratio"))
```

```
         Descriptive statistics/selected variables
         ==========================================================
         Statistic Miles/(US)gallon Gross horsepower Rear axle ratio
         N                32               32               32
         Mean            20.1            146.7             3.6
         St. Dev.         6.0             68.6             0.5
         Min             10.4              52              2.8
         Max             33.9             335              4.9
         ----------------------------------------------------------
```

Use the option `covariate.labels` to replace variable names with variable labels. Must be in same order as in the dataset.

Use this option if you want the variables in columns

For more details/options type `?stargazer`

Descriptive statistics: in text format, selected variables, and by group

```
mydata <- mtcars
install.packages("stargazer") #Use this to install it, do this only once
library(stargazer)
# Descriptive statistics for cars with automatic transmission
stargazer(subset(mydata[c("mpg","hp","drat")], mydata$am==0),
              title="Automatic transmission", type = "text", digits=1, out="table3.txt")
```

```
Automatic transmission
====================================
Statistic N  Mean   St. Dev.  Min   Max
mpg        19 17.1    3.8      10.4  24.4
hp         19 160.3   53.9      62   245
drat       19  3.3    0.4      2.8   3.9
------------------------------------
```

Use `subset()` to select the category

The table will be saved in the working directory with whatever name you write in the `out` option. You can open this file with any word processor

```
# Descriptive statistics for cars with manual transmission
stargazer(subset(mydata[c("mpg","hp","drat")], mydata$am==1),
              title="Manual transmission", type = "text", digits=1, out="table4.txt")
```

```
Manual transmission
====================================
Statistic N  Mean   St. Dev.  Min   Max
mpg        13 24.4    6.2      15.0  33.9
hp         13 126.8   84.1      52   335
drat       13  4.0    0.4      3.5   4.9
------------------------------------
```

Use `subset()` to select the category

OTR

For more details/options type `?stargazer`

Regression models: in text format

```
mydata$fast <- as.numeric((mydata$mpg > 20.1))  #Creating a dummy variable 1 = fast car
m1 <- lm(mpg ~ hp, data=mydata)
m2 <- lm(mpg ~ hp + drat, data=mydata)
m3 <- lm(mpg ~ hp + drat + factor(gear), data=mydata)
m4 <- glm(fast ~ hp + drat + am, family=binomial(link="logit"), data=mydata)
stargazer(m1, m2, m3, m4, type="text",
          dep.var.labels=c("Miles/(US) gallon","Fast car (=1)"),
          covariate.labels=c("Gross horsepower","Rear axle ratio","Four foward gears",
                  "Five forward gears","Type of transmission (manual=1)"), out="models.txt")
```

The table will be saved in the working directory with whatever name you write in the `out` option. You can open this file with any word processor

For the output, you have the option to use variable labels instead of variable names (according to the type of model)

For the predictors, you have the option to use variable labels instead of variable names (in order they appear)

```
==========================================================================================
                                             Dependent variable:
                         -----------------------------------------------------------------
                                     Miles/(US) gallon                      Fast car (=1)
                                              OLS                             logistic
                             (1)            (2)            (3)                  (4)
------------------------------------------------------------------------------------------
Gross horsepower          -0.068***      -0.052***      -0.064***            -0.397
                           (0.010)        (0.009)        (0.011)             (1.358)

Rear axle ratio                           4.698***       3.510*               4.248
                                           (1.192)        (1.851)            (21.106)

Four foward gears                                        -0.276
                                                          (2.135)

Five forward gears                                        3.761*
                                                          (2.161)

Type of transmission (manual=1)                                              11.743
                                                                            (359.486)

Constant                   30.099***     10.790**       16.306**             29.882
                           (1.634)        (5.078)        (6.429)             (85.238)

------------------------------------------------------------------------------------------
Observations                 32             32             32                  32
R2                          0.602          0.741          0.782
Adjusted R2                 0.589          0.723          0.749
Log Likelihood                                                               -1.953
Akaike Inf. Crit.                                                            11.906
Residual Std. Error    3.863 (df = 30)  3.170 (df = 29)  3.017 (df = 27)
F Statistic           45.460*** (df = 1; 30) 41.522*** (df = 2; 29) 24.179*** (df = 4; 27)
==========================================================================================
Note:                                                          *p<0.1; **p<0.05; ***p<0.01
```

For more details/options type
`?stargazer`

OTR

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For a nice presentation use the "html" option, open it with any word processor

OUTPUT IN HTML FORMAT

Regression models: in html format

```
mydata$fast <- as.numeric((mydata$mpg > 20.1))  #Creating a dummy variable 1 = fast car
m1 <- lm(mpg ~ hp, data=mydata)
m2 <- lm(mpg ~ hp + drat, data=mydata)
m3 <- lm(mpg ~ hp + drat + factor(gear), data=mydata)
m4 <- glm(fast ~ hp + drat + am, family=binomial(link="logit"), data=mydata)
stargazer(m1, m2, m3, m4, type="html",
          dep.var.labels=c("Miles/(US) gallon","Fast car (=1)"),
          covariate.labels=c("Gross horsepower","Rear axle ratio","Four foward gears",
                    "Five forward gears","Type of transmission (manual=1)"), out="models.htm")
```

The table will be saved in the working directory with whatever name you write in the out option. You can open this file with any word processor

For the output, you have the option to use variable labels instead of variable names (according to the type of model)

For the predictors, you have the option to use variable labels instead of variable names (in order they appear)

In the type option write html to export R results to **html.** It may be a good idea to use the appropriate extension in the out option, in this example the results will be saved in the file models.htm.

Word can easily read *.htm files , making tables easily editable. Files should look like the example shown here.

Same apply to the other procedures described in the previous section.

	Dependent variable:			
	Miles/(US) gallon			Fast car (=1)
	OLS			logistic
	(1)	(2)	(3)	(4)
Gross horsepower	-0.068***	-0.052***	-0.064***	-0.397
	(0.010)	(0.009)	(0.011)	(1.358)
Rear axle ratio		4.698***	3.510*	4.248
		(1.192)	(1.851)	(21.106)
Four foward gears			-0.276	
			(2.135)	
Five forward gears			3.761*	
			(2.161)	
Type of transmission (manual=1)				11.743
				(359.486)
Constant	30.099***	10.790**	16.306**	29.882
	(1.634)	(5.078)	(6.429)	(85.238)
Observations	32	32	32	32
R^2	0.602	0.741	0.782	
Adjusted R^2	0.589	0.723	0.749	
Log Likelihood				-1.953
Akaike Inf. Crit.				11.906
Residual Std. Error	3.863 (df = 30)	3.170 (df = 29)	3.017 (df = 27)	
F Statistic	45.460*** (df = 1; 30)	41.522*** (df = 2; 29)	24.179*** (df = 4; 27)	
Note:				*p**p***p<0.01

For more details/options type ?stargazer