A fuel consumption study of Stata's auto dataset

We conduct a study of the fuel consumption of cars in Stata's auto dataset.

```
. sysuse auto, clear
(1978 Automobile Data)
```

Perform data transformation

We generate a variable, **fuel**, that measures the fuel consumption rate in the unit of Gallons per 100 Miles.

```
. generate fuel = 100/mpg

. label variable fuel "Fuel consumption (Gallons per 100 Miles)"
```

Gallons per 100 Mile is a better measurement than Miles per Gallon. Going from a 10 Miles per Gallon car to a 20 Miles per Gallon car saves 5 Gallons per 100 Miles when Miles per Gallon increases 10. Going from a 20 Miles per Gallon car to a 40 Miles per Gallon car *only* saves 2.5 Gallons per 100 Miles when Miles per Gallon increases 20.

Examine the variables

We examine variables for possible errors in the data.

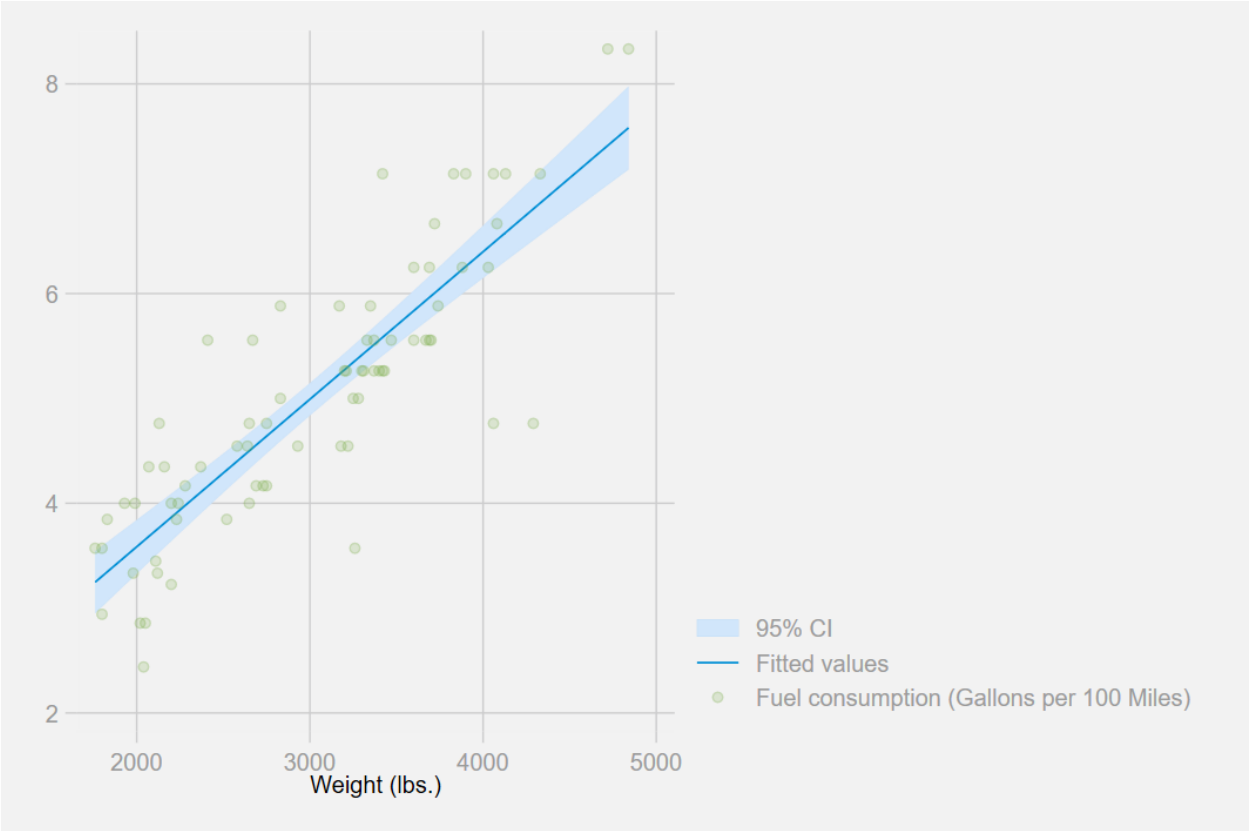
```
. describe fuel weight

              storage   display    value
variable name   type    format     label      variable label
------------------------------------------------------------------------------
fuel            float   %9.0g                 Fuel consumption (Gallons per 100
                                                Miles)
weight          int     %8.0gc                Weight (lbs.)


. summarize weight

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
      weight |         74    3019.459    777.1936       1760       4840
```

The variable **weight** has minimum value 1760.00, maximum value 4840.00, and range 3080.00.

Plot fuel consumption and vehicle weight

The graph is produced with Daniel Bischof's *538* scheme.

```
. twoway lfitci fuel weight || scatter fuel weight, mcolor(%20) scheme(538)
```



Explore relationship between fuel consumption and vehicle weight - linear regression

```
. regress fuel weight
```

```
      Source |       SS           df       MS      Number of obs   =        74
-------------+----------------------------------   F(1, 72)        =    194.71
       Model |  87.2964969         1  87.2964969   Prob > F        =    0.0000
    Residual |  32.2797639        72  .448330054   R-squared       =    0.7300
-------------+----------------------------------   Adj R-squared   =    0.7263
       Total |  119.576261        73  1.63803097   Root MSE        =    .66957
```

```
------------------------------------------------------------------------------
        fuel |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      weight |    .001407   .0001008    13.95   0.000      .001206    .0016081
       _cons |   .7707669   .3142571     2.45   0.017      .1443069    1.397227
------------------------------------------------------------------------------
```

The regression shows that for every unit increase in weight, a 0.0014 unit increase in fuel consumption is predicted.

Produce an HTML table from regression results

. _coef_table, markdown

fuel	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
weight	.001407	.0001008	13.95	0.000	.001206	.0016081
_cons	.7707669	.3142571	2.45	0.017	.1443069	1.397227

Produce a table from **estimates table**

```
. quietly regress fuel weight gear turn

. estimates store model1

. quietly regress fuel weight gear turn foreign

. estimates store model2
```

. estimates table model1 model2, varlabel b(%7.4f) stats(N r2_a) star markdown

Variable	model1	model2
Weight (lbs.)	0.0014***	0.0013***
Gear Ratio	0.1706	-0.3367
Turn Circle (ft.)	0.0243	0.0613
Car type		0.8650***
Constant	-0.5814	-0.4661
N	74	74
r2_a	0.7218	0.7637

legend: * p<0.05; ** p<0.01; *** p<0.001

References

1. Convert dynamic Markdown documents to Word or HTML
2. dyndoc manual
3. dynamic tags manual (Stata 16)
4. scheme 538
5. markdown reference