```
. clear all

. sysuse auto
(1978 Automobile Data)

.
. ** We're going to explain price of automobiles using mileage, headroom, weight,
. ** length, turning ability, displacement (engine size), and gear ratio (speed).
.
. reg price mpg headroom weight length turn displacement gear_ratio, vce(robust)

Linear regression                               Number of obs     =         74
                                                F(7, 66)          =       6.58
                                                Prob > F          =     0.0000
                                                R-squared         =     0.4709
                                                Root MSE          =     2256.3

------------------------------------------------------------------------------
             |               Robust
       price |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         mpg |  -108.6086   93.04892    -1.17   0.247    -294.3867    77.16957
    headroom |  -583.8815   298.1224    -1.96   0.054    -1179.102    11.33912
      weight |   4.782347   2.066109     2.31   0.024     .6572272    8.907467
      length |  -67.11675   56.22181    -1.19   0.237    -179.3672    45.13371
        turn |  -314.0295    152.188    -2.06   0.043    -617.8826   -10.17627
displacement |   12.08319   6.766538     1.79   0.079    -1.426637    25.59302
  gear_ratio |   2284.028   1010.053     2.26   0.027     267.3925    4300.663
       _cons |   11580.16   8035.355     1.44   0.154    -4462.939    27623.27
------------------------------------------------------------------------------

.
. ** By default Stata will test for overall significance. That is,
. ** H0: all regressor betas are zero
. ** Ha: at least one regressor beta is not zero
.
. ** Stata output shows a p-value of Prob > F = 0.0000.
. ** So we reject the null and conclude that at least one beta is nonzero.
. ** In words, we conclude that the combination of regressors does explain
. ** price at any conventional significance level.
.
. ** We could also compare the F-statistic of F(7,66) = 6.58 to the critical
. ** value. Find the critical value using the invFtail command.
.
. di invFtail(7,66,0.05)
2.1518392

.
. ** This gives a critical value of 2.1518392. The F-statistic exceeds the
. ** critical value, so we reach the same conclusion. Note that the number
. ** 7 is the number of regressors being tested, and 66 is the number of
. ** observations minus the number of things being estimated (74 - 8).
.
. ** Notice that headroom and displacement are both individually statistically
```

```
. ** insignificant at 5%. In words, headroom and displacement don't explain price
. ** when considered in isolation at 5% significance. It is possible that they
. ** do explain price when their explanatory power is combined, however.
. ** Let's test that.
.
. test headroom displacement

 ( 1)  headroom = 0
 ( 2)  displacement = 0

       F(  2,    66) =    3.24
            Prob > F =    0.0455


.
. ** H0: the beta for headroom and the beta for displacement are both zero
. ** Ha: the beta for headroom or the beta for displacement is nonzero
.
. ** This gives a p-value of Prob > F = 0.0455. So even though headroom and
. ** displacement have no explanatory power individually at 5% significance, they
. ** have combined (i.e. joint) explanatory power at 5% significance.
.
. ** We could also compare the F-statistic of F(2,66) = 3.24 to the critical
. ** value. Find the critical value using the invFtail command.
.
. di invFtail(2,66,0.05)
3.1359179

.
. ** This gives a critical value of 3.1359179. The F-statistic exceeds the
. ** critical value, so we reach the same conclusion. Note that the number
. ** 2 is the number of regressors being tested, and 66 is the number of
. ** observations minus the number of things being estimated (74 - 8).
```