# Economics 312 — Spring 2020
# Daily Problem #12 — February 17

One of the earliest (and dearest to my heart) hedonic studies was a 1927 examination by Frederick Waugh of the price of bunches of asparagus at a Boston wholesale market, as a function of characteristics of the bunches, each of which weighed approximately 18 ounces. Note that because the weight of the bunches was fixed, more stalks corresponds to smaller individual spears, not to more of this peerless vegetable. The variables in his data set are:

```
  obs:           200
-------------------------------------------------------------------------------
              storage  display     value
variable name   type   format      label      variable label
-------------------------------------------------------------------------------
green           int    %8.0g                  Amount of green on stalks in
                                                hundredths of inches
nostalks        byte   %8.0g                  Number of stalks in bunch
disperse        byte   %8.0g                  Interquartile dispersion in
                                                diameter
price           int    %8.0g                  Price of bunch in cents
-------------------------------------------------------------------------------
```

The "interquartile dispersion in diameter" is the difference in cross-sectional diameter between the stalks at the 75% and 25% percentiles within the bunch. A higher value indicates a less homogeneous set of stalks in terms of diameter.

Summary statistics are:

```
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
       green |       200      588.75     156.331       300        950
    nostalks |       200      19.555    7.792986         9         48
    disperse |       200      14.875    9.137112         0         60
       price |       200      90.095    29.47439        32        183
```

Re-estimating his regression (he didn't have access to a computer and he appears to have made calculation errors):

```
. reg price green nostalks disperse

      Source |       SS       df       MS              Number of obs =     200
-------------+------------------------------           F(  3,   196) =  173.81
       Model |  125648.449     3  41882.8164           Prob > F      =  0.0000
    Residual |  47230.7457   196  240.973193           R-squared     =  0.7268
-------------+------------------------------           Adj R-squared =  0.7226
       Total |  172879.195   199  868.739673           Root MSE      =  15.523

------------------------------------------------------------------------------
       price |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       green |   .1375982   .0070994    19.38   0.000     .1235973    .1515992
    nostalks |  -1.357256   .1508215    -9.00   0.000    -1.654698   -1.059815
    disperse |  -.3452828   .1296563    -2.66   0.008    -.6009834   -.0895823
       _cons |   40.76126   5.327837     7.65   0.000     30.25402    51.26851
------------------------------------------------------------------------------
```

with estimated coefficient variance-covariance matrix:

```
             green    nostalks    disperse       _cons
   green    .0000504
nostalks  -.00003467   .02274714
disperse   .00011905  -.00686567   .01681076
   _cons  -.03076629  -.32227884  -.18589329   28.385842
```

1. Assess this regression:
    a. Are the effects of the variables statistically significant?
    b. Interpret each coefficient in terms of "a change of XX in XXXXX, other variables constant, leads to a change of YY in price." Are the signs and magnitudes of these effects plausible?
    c. Does the intercept term of this regression have any economic interpretation?
    d. Is the overall fit reasonably good?

2. Test the following null hypotheses at the 5% significance level against the appropriate one-sided or two-sided alternative:
    a. An additional inch of green raises price by 13 cents or less.
    b. A bunch with 5 fewer stalks costs exactly 7 cents more.
    c. Adding another tenth of an inch of green exactly offsets the effect on price of having one more stalk in the bunch. (Show the formula; you don't have to do all the calculations for this one.)