Solution Set for Problem Set 6, Econ 253

5.6. All are linear regression models, barring (e) and (f). Models (e) and (f) are non-linear in parameters.

5.9 (c) If the price of coffee was zero, Americans would drink 2.69 cups of coffee per day per capita. In this case the intercept seems to make sense.

(d) If the price of coffee goes up by one dollar per pound, mean per capita daily coffee consumption will fall by 0.4795 cups.

(e) No, we can only come up with an estimate.

(f) We need data on the various pairs of X and Y. Each combination will yield a different elasticity. A common way of expressing elasticities is to compute them at the sample means of X and Y; if X* and Y* are the sample means, the elasticity can be written as $b_2(X^*/Y^*)$.

Computer exercise:

1.I investigate how price of a car depends on car's length. I find:

```
regress minprice length
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```
  Source |       SS       df       MS                  Number of obs =      48
---------+------------------------------                F(  1,    46) =   32.34
   Model |  1180.98893     1  1180.98893                Prob > F      =  0.0000
Residual |  1679.86086    46  36.5187143                R-squared     =  0.4128
---------+------------------------------                Adj R-squared =  0.4000
   Total |  2860.84979    47  60.8691444                Root MSE      =  6.0431

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minprice |      Coef.   Std. Err.       t     P>|t|       [95% Conf. Interval]
---------+--------------------------------------------------------------------
  length |   .3333426   .0586173      5.687   0.000       .2153521     .451333
   _cons |  -46.23715   11.07277     -4.176   0.000      -68.52549   -23.94882
------------------------------------------------------------------------------
```

An increase of car length by one inch leads to an increase of 333 dollars in the average car price. If we interpret the intercept mechanically, it means a car with zero length has a negative cost. This does not make such sense. It is often true that in regression analysis the intercept cannot be easily interpreted.

The assumptions are that price of a car is a linear function of its length and no other variables.

2. I choose to investigate the relationship between score and number of missed classes the coputer output is:
regress score miss

```
  Source |       SS       df       MS                  Number of obs =      27
---------+------------------------------                F(  1,    25) =    0.16
   Model |  20.5128205     1  20.5128205                Prob > F      =  0.6893
Residual |  3134.15385    25  125.366154                R-squared     =  0.0065
---------+------------------------------                Adj R-squared = -0.0332
   Total |  3154.66667    26  121.333333                Root MSE      =  11.197

------------------------------------------------------------------------------
   score |      Coef.   Std. Err.       t     P>|t|       [95% Conf. Interval]
---------+--------------------------------------------------------------------
    miss |  -.7692308   1.901665     -0.405   0.689      -4.685784    3.147322
   _cons |   55.48718   2.613589     21.230   0.000       50.10439    60.86997
------------------------------------------------------------------------------
```

The intecept is 55. This suggests that if a student did not miss any of the classes his/her expected score on the midterm is 55. The slope coefficient is -.77. This suggests that for every missed class the expected score falls by -.77 points.

The assumptions for this estimation to make sense are that the conditional expectation of student score is a linear function of classes missed and no other variables.