Economics 312 — Spring 2020
Daily Problem #7 — February 7

The following OLS regression was run using panel data for 50 states plus the District of Columbia for years 1983–1997. The dependent variable *fatalityrate* is the number of traffic fatalities per million miles traveled. The regressor *sb_usage* is the estimated rate of seatbelt usage as a fraction (0.5 means 50% usage). The seatbelt variable was not observed for all states and years, so the panel is "unbalanced."

```
. regress fatalityrate sb_usage

      Source |       SS           df       MS      Number of obs   =       556
-------------+----------------------------------   F(1, 554)       =    107.24
       Model |  .002276888         1  .002276888   Prob > F        =    0.0000
    Residual |  .011762517       554  .000021232   R-squared       =    0.1622
-------------+----------------------------------   Adj R-squared   =    0.1607
       Total |  .014039406       555  .000025296   Root MSE        =    .00461

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fatalityrate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    sb_usage |  -.0119015   .0011493   -10.36   0.000    -.0141589    -.009644
       _cons |   .0260626   .0006384    40.82   0.000     .0248086    .0273167
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```

1. Interpret the coefficient on seatbelt usage and (if it has an interpretation) the constant term in this regression. Do the results seem reasonable?

2. What would be the payoff in terms of fatalities of increasing the rate of seatbelt use by 5 percentage points in a state with 50 billion vehicle miles per year? Use the reported confidence interval to find a 95% confidence range for this effect.

3. Can you think of any problems that might arise from omitting the observations with unreported seatbelt usage?

The regression below uses the same dependent variable but the regressor is a dummy variable that is one for states/years where the legal drinking age is 21 and zero where the drinking age is lower.

```
. regress fatalityrate drinkage21

      Source |       SS           df       MS      Number of obs   =       765
-------------+----------------------------------   F(1, 763)       =     72.06
       Model |  .002510823         1  .002510823   Prob > F        =    0.0000
    Residual |  .026586021       763  .000034844   R-squared       =    0.0863
-------------+----------------------------------   Adj R-squared   =    0.0851
       Total |  .029096845       764  .000038085   Root MSE        =     .0059

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fatalityrate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  drinkage21 |  -.0056781   .0006689    -8.49   0.000    -.0069912    -.004365
       _cons |   .0265144   .0006292    42.14   0.000     .0252792    .0277497
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```

4. Interpret the coefficient on the drinkage21 variable and (if possible) the constant term. Do the results seem reasonable?

5. If a state with 50 billion vehicle miles per year could lower its legal drinking age below 21, what would you predict about the effects on fatalities?