```
      name:  <unnamed>
       log:  /Users/adgilfillan/Desktop/PS5/problem_set5.smcl
  log type:  smcl
 opened on:  19 Dec 2017, 19:53:29

 1 .
 2 . use "/Users/adgilfillan/Desktop/PS5/DinD_ex.dta"

 3 .
 4 . *Mean in NJ before law
 5 . su fte if nj==1 & after==0

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
         fte |        284    17.30106    8.877331          3         80

 6 . return list

scalars:
                  r(N) =  284
              r(sum_w) =  284
               r(mean) =  17.30105633802817
                r(Var) =  78.80701301448266
                 r(sd) =  8.877331412901214
                r(min) =  3
                r(max) =  80
                r(sum) =  4913.5

 7 . local njpre = r(mean)

 8 . display `njpre'
17.301056

 9 .
10 . *Mean in NJ after law
11 . su fte if nj==1 & after==1

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
         fte |        284    17.58363    8.411055        3.5       55.5
```

```
12 . return list

   scalars:
                  r(N) =  284
              r(sum_w) =  284
               r(mean) =  17.58362676056338
                r(Var) =  70.74585287786792
                 r(sd) =  8.41105539619541
                r(min) =  3.5
                r(max) =  55.5
                r(sum) =  4993.75

13 . local njpost = r(mean)

14 . display `njpost'
   17.583627

15 .
16 . *Mean in PA before law
17 . su fte if nj==0 & after==0

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
         fte |         65        20.3    12.16498         4.5        67.5

18 . return list

   scalars:
                  r(N) =  65
              r(sum_w) =  65
               r(mean) =  20.3
                r(Var) =  147.98671875
                 r(sd) =  12.16497919233732
                r(min) =  4.5
                r(max) =  67.5
                r(sum) =  1319.5
```

```
19 . local papre = r(mean)

20 . display `papre'
   20.3

21 .
22 . *Mean in PA after law
23 . su fte if nj==0 & after==1
```

Variable	Obs	Mean	Std. Dev.	Min	Max
fte	65	18.25385	7.877665	6	38.25

```
24 . return list

   scalars:
                  r(N) =  65
              r(sum_w) =  65
               r(mean) =  18.25384615384615
                r(Var) =  62.05760216346154
                 r(sd) =  7.877664765872025
                r(min) =  6
                r(max) =  38.25
                r(sum) =  1186.5

25 . local papost = r(mean)

26 . display `papost'
   18.253846

27 .
28 . /*Difference in Difference Estimate*/
29 . display (`njpost' - `papost') - (`njpre' - `papre')
   2.3287243

30 .
31 .
```

```
32 . /* Question 2*/
33 . reg dfte nj

      Source |       SS           df       MS      Number of obs   =        34
> 9
-------------+----------------------------------   F(1, 347)       =       3.9
> 1
       Model |  286.841779         1  286.841779   Prob > F        =     0.048
> 9
    Residual |  25485.8728       347  73.4463192   R-squared       =     0.011
> 1
-------------+----------------------------------   Adj R-squared   =     0.008
> 3
       Total |  25772.7145       348  74.0595245   Root MSE        =     8.570
> 1

------------------------------------------------------------------------------
> ─
       dfte |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval
> ]
-------------+----------------------------------------------------------------
> ─
         nj |   2.328724   1.178371     1.98   0.049     .0110768    4.64637
> 2
      _cons |  -2.046154   1.062988    -1.92   0.055    -4.136864    .044556
> 4
------------------------------------------------------------------------------
> ─

34 . reg dfte nj, r

Linear regression                               Number of obs     =        34
> 9
                                                F(1, 347)         =       2.5
> 1
                                                Prob > F          =     0.114
> 2
                                                R-squared         =     0.011
> 1
                                                Root MSE          =     8.570
> 1
```

```
------------------------------------------------------------------------------
> ------------------------------------------------------------------------------
             |               Robust
        dfte |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval
> ]
-------------+----------------------------------------------------------------
> ------------------------------------------------------------------------------
          nj |   2.328724   1.470425     1.58   0.114    -.5633425    5.22079
> 1
       _cons |  -2.046154   1.395098    -1.47   0.143    -4.790066    .697758
> 3
------------------------------------------------------------------------------
> ------------------------------------------------------------------------------

35 .
36 . /* Checking for Heteroskedasticity */
37 . su dfte if nj==1

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
        dfte |        284    .2825704    7.820849       -34         26

38 . su dfte if nj==0

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
        dfte |         65   -2.046154    11.30265     -43.5      23.75

39 .
40 . /* Question 3 */
41 . reg fte nj after njafter

      Source |       SS           df       MS      Number of obs   =        69
> 8
-------------+----------------------------------   F(3, 694)       =       2.0
> 9
       Model |  503.456802         3  167.818934   Prob > F        =     0.100
> 4
    Residual |  55766.2976       694  80.3548957   R-squared       =     0.008
> 9
-------------+----------------------------------   Adj R-squared   =     0.004
> 7
       Total |  56269.7544       697  80.7313549   Root MSE        =     8.964
> 1
```

```
------------------------------------------------------------------------------
> ─
         fte |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval
> ]
-------------+----------------------------------------------------------------
> ─
          nj |  -2.998944   1.232546    -2.43   0.015    -5.418909   -.578978
> 1
       after |  -2.046154   1.572405    -1.30   0.194    -5.133396    1.04108
> 8
     njafter |   2.328724   1.743083     1.34   0.182    -1.093624    5.75107
> 2
       _cons |       20.3   1.111858    18.26   0.000     18.11699    22.4830
> 1
------------------------------------------------------------------------------
> ─
```

```
42 . reg fte nj after njafter, r

Linear regression                               Number of obs     =         69
> 8
                                                F(3, 694)         =        1.3
> 2
                                                Prob > F          =     0.268
> 2
                                                R-squared         =     0.008
> 9
                                                Root MSE          =     8.964
> 1

------------------------------------------------------------------------------
> ─
             |               Robust
         fte |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval
> ]
-------------+----------------------------------------------------------------
> ─
          nj |  -2.998944   1.591452    -1.88   0.060    -6.123581    .125693
> 9
       after |  -2.046154   1.788875    -1.14   0.253     -5.55841    1.46610
> 3
     njafter |   2.328724   1.930761     1.21   0.228     -1.46211    6.11955
> 8
       _cons |       20.3   1.501537    13.52   0.000      17.3519     23.248
> 1
------------------------------------------------------------------------------
> ─
```

```
43 .
44 .
45 . /* Question 4 */
46 . reg fte nj after njafter, cl(sheet)

   Linear regression                               Number of obs     =         69
   > 8
                                                   F(3, 348)         =        1.2
   > 2
                                                   Prob > F          =      0.301
   > 1
                                                   R-squared         =      0.008
   > 9
                                                   Root MSE          =      8.964
   > 1

                                (Std. Err. adjusted for 349 clusters in sheet
   > )
   ------------------------------------------------------------------------------
   > -
                |               Robust
            fte |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval
   > ]
   ------------------------------------------------------------------------------
   > -
             nj |  -2.998944   1.592595    -1.88   0.061    -6.131266    .133378
   > 3
          after |  -2.046154     1.3961    -1.47   0.144    -4.792009    .699701
   > 2
        njafter |   2.328724   1.471481     1.58   0.114    -.5653903    5.22283
   > 9
          _cons |        20.3   1.502615    13.51   0.000     17.34465    23.2553
   > 5
   ------------------------------------------------------------------------------
   > -

47 .
```

```
48 . /* Using this function as a check */
49 . diff fte, t(nj) p(after) cl(sheet)

   DIFFERENCE-IN-DIFFERENCES ESTIMATION RESULTS
   ------------------------------------------------

   Number of observations in the DIFF-IN-DIFF: 698
               Before         After
      Control: 65             65           130
      Treated: 284            284          568
               349            349
   ------------------------------------------------------------------
    Outcome var.  |    fte    |  S. Err.  |   |t|   |   P>|t|
   ---------------+-----------+-----------+---------+---------------
   Before         |           |           |         |
      Control     |  20.300   |           |         |
      Treated     |  17.301   |           |         |
      Diff (T-C)  |  -2.999   |   1.593   |  -1.88  |   0.061*
   After          |           |           |         |
      Control     |  18.254   |           |         |
      Treated     |  17.584   |           |         |
      Diff (T-C)  |  -0.670   |   1.094   |   0.61  |   0.541
                  |           |           |         |
   Diff-in-Diff   |   2.329   |   1.471   |   1.58  |   0.114
   ------------------------------------------------------------------

   R-square:    0.01
   * Means and Standard Errors are estimated by linear regression
   **Clustered Std. Errors
   **Inference: *** p<0.01; ** p<0.05; * p<0.1

50 .
51 . /* Question 5*/
52 . xtreg fte nj after njafter, fe i(sheet)
   note: nj omitted because of collinearity

   Fixed-effects (within) regression               Number of obs     =        69
   > 8
   Group variable: sheet                           Number of groups  =        34
   > 9

   R-sq:                                           Obs per group:
        within  = 0.0114                                         min =
   > 2
        between = 0.0082                                         avg =        2.
   > 0
        overall = 0.0004                                         max =
   > 2
```

```
                                                F(2,347)          =       2.0
> 1
corr(u_i, Xb)  = -0.1033                        Prob > F          =     0.135
> 9

------------------------------------------------------------------------------
> ─
         fte |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval
> ]
-------------+----------------------------------------------------------------
> ─
          nj |          0  (omitted)
       after |  -2.046154   1.062988    -1.92   0.055    -4.136864    .044556
> 4
     njafter |   2.328724   1.178371     1.98   0.049     .0110768    4.64637
> 2
       _cons |    17.8596   .3243824    55.06   0.000      17.2216     18.497
> 6
-------------+----------------------------------------------------------------
> ─
     sigma_u |  7.9487206
     sigma_e |  6.0599637
         rho |  .63242037   (fraction of variance due to u_i)
------------------------------------------------------------------------------
> ─
F test that all u_i=0: F(348, 347) = 3.40                     Prob > F = 0.000
> 0

53 .
54 . /* Question 8 */
55 . clear

56 . use "/Users/adgilfillan/Desktop/PS5/safesave_slim_data.dta"

57 .
58 . /* Plot Avg. Loan Balance Comparison vs Treateant */
59 . egen meancomp = mean(loanbal) if TIKA==0, by(trend)
   (49551 missing values generated)
```

```
60 . egen meantreat = mean(loanbal) if TIKA==1, by(trend)
   (10955 missing values generated)

61 . label variable meancomp "Geneva"

62 . label variable meantreat "Tikapara and Kalyanpur"

63 . tw connected meancomp meantreat trend, sort xline(13) title("Average Loan B
   > alance")

64 .
65 . /* Create Post Variable */
66 . gen byte post = 1 if trend >= 13
   (26,301 missing values generated)

67 . replace post = 0 if post != 1
   (26,301 real changes made)

68 .
69 . /* Create Loan Balance for Comparison and Treatment */
70 . gen loanbalcomp = loanbal if TIKA == 0
   (49,551 missing values generated)

71 . gen loanbaltreat = loanbal if TIKA == 1
   (10,955 missing values generated)

72 .
73 . /* Create Average Monthly Balance for Comparison and Treatment */
74 . gen meancomppre = meancomp if post == 0
   (58,796 missing values generated)

75 . gen meantreatpre = meantreat if post == 0
   (35,915 missing values generated)

76 .
77 . /* Plan Vanilla Regression of Avg. Monthly Balance pre-treatment for both g
   > roups */
```

```
78 . reg meancomppre trend

      Source |       SS           df       MS      Number of obs   =     1,71
> 0
-------------+----------------------------------   F(1, 1708)      =  25739.6
> 6
       Model |  15698354.2         1  15698354.2   Prob > F        =    0.000
> 0
    Residual |   1041691.5     1,708  609.889635   R-squared       =    0.937
> 8
-------------+----------------------------------   Adj R-squared   =    0.937
> 7
       Total |  16740045.7     1,709  9795.22862   Root MSE        =    24.69
> 6

------------------------------------------------------------------------------
> ─
 meancomppre |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval
> ]
-------------+----------------------------------------------------------------
> ─
       trend |   38.38615   .2392617   160.44   0.000     37.91688    38.8554
> 3
       _cons |   -113.803    2.29375   -49.61   0.000    -118.3018   -109.304
> 1
------------------------------------------------------------------------------
> ─

79 . reg meantreatpre trend

      Source |       SS           df       MS      Number of obs   =    24,59
> 1
-------------+----------------------------------   F(1, 24589)     >  99999.0
> 0
       Model |   357767542         1   357767542   Prob > F        =    0.000
> 0
    Residual |  37710672.7    24,589  1533.63995   R-squared       =    0.904
> 6
-------------+----------------------------------   Adj R-squared   =    0.904
> 6
       Total |   395478214    24,590  16082.8879   Root MSE        =    39.16
> 2
```

```
------------------------------------------------------------------------------
> ─
meantreatpre |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval
> ]
-------------+----------------------------------------------------------------
> ─
       trend |   35.29128   .0730682   482.99   0.000     35.14806    35.4344
> 9
       _cons |   97.79587   .5511004   177.46   0.000     96.71568    98.8760
> 6
------------------------------------------------------------------------------
> ─

80 .
81 . /* Comparison Group pre and post */
82 . egen meanbal = mean(loanbal), by (trend)

83 . gen meancomppost = meancomp if post == 1
(51,261 missing values generated)

84 .
85 . reg meancomppre trend

      Source |       SS           df       MS      Number of obs   =     1,71
> 0
-------------+----------------------------------   F(1, 1708)      =  25739.6
> 6
       Model |  15698354.2         1  15698354.2   Prob > F        =    0.000
> 0
    Residual |   1041691.5     1,708  609.889635   R-squared       =    0.937
> 8
-------------+----------------------------------   Adj R-squared   =    0.937
> 7
       Total |  16740045.7     1,709  9795.22862   Root MSE        =    24.69
> 6

------------------------------------------------------------------------------
> ─
 meancomppre |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval
> ]
-------------+----------------------------------------------------------------
> ─
       trend |   38.38615   .2392617   160.44   0.000     37.91688    38.8554
> 3
       _cons |   -113.803    2.29375   -49.61   0.000    -118.3018   -109.304
> 1
------------------------------------------------------------------------------
> ─
```

```
86 . reg meancomppost trend

      Source |       SS           df       MS      Number of obs   =     9,24
> 5
-------------+----------------------------------   F(1, 9243)      =  74695.1
> 4
       Model |    71966268          1    71966268   Prob > F        =    0.000
> 0
    Residual |  8905321.19      9,243  963.466536   R-squared       =    0.889
> 9
-------------+----------------------------------   Adj R-squared   =    0.889
> 9
       Total |  80871589.2      9,244  8748.54924   Root MSE        =     31.0
> 4

------------------------------------------------------------------------------
> —
meancomppost |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval
> ]
-------------+----------------------------------------------------------------
> —
       trend |    32.9391   .1205218   273.30   0.000     32.70285    33.1753
> 5
       _cons |  -138.2419     2.2301   -61.99   0.000    -142.6134   -133.870
> 4
------------------------------------------------------------------------------
> —

87 .
88 . reg meancomppre trend tinpr nage

      Source |       SS           df       MS      Number of obs   =     1,71
> 0
-------------+----------------------------------   F(3, 1706)      =  8594.7
> 7
       Model |  15701188.4          3  5233729.45   Prob > F        =    0.000
> 0
    Residual |  1038857.36      1,706  608.943352   R-squared       =    0.937
> 9
-------------+----------------------------------   Adj R-squared   =    0.937
> 8
       Total |  16740045.7      1,709  9795.22862   Root MSE        =    24.67
> 7
```

```
------------------------------------------------------------------------------
> ─
 meancomppre |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval
> ]
-------------+----------------------------------------------------------------
> ─
       trend |   38.26675   .2543899   150.43   0.000      37.7678     38.765
> 7
       tinpr |   .4280649   .2554189     1.68   0.094    -.0729024    .929032
> 1
       nage |   .0727198   .0644259     1.13   0.259    -.0536423     .19908
> 2
       _cons |  -115.9216   3.035092   -38.19   0.000    -121.8745   -109.968
> 7
------------------------------------------------------------------------------
> ─
```

```
89 . reg meancomppost trend tinpr nage
```

```
      Source |       SS           df       MS      Number of obs   =     9,24
> 5
-------------+----------------------------------   F(3, 9241)      =  25110.4
> 0
       Model |  72034946.1         3  24011648.7   Prob > F        =    0.000
> 0
    Residual |  8836643.12     9,241  956.243168   R-squared       =    0.890
> 7
-------------+----------------------------------   Adj R-squared   =    0.890
> 7
       Total |  80871589.2     9,244  8748.54924   Root MSE        =    30.92
> 3

------------------------------------------------------------------------------
> ─
meancomppost |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval
> ]
-------------+----------------------------------------------------------------
> ─
       trend |   32.65694    .124942   261.38   0.000     32.41203    32.9018
> 5
       tinpr |   .6363505   .0775669     8.20   0.000     .4843022    .788398
> 7
       nage |   .0451923   .0307769     1.47   0.142    -.0151373    .105521
> 9
       _cons |  -137.7309   2.393838   -57.54   0.000    -142.4234   -133.038
> 5
------------------------------------------------------------------------------
> ─
```

```
90 .
91 .
92 . /* Difference in Difference Estimation */
93 . gen TIKApost = TIKA*post

94 . gen TIKAposttrend = TIKA*post*trend

95 . gen TIKAtrend = TIKA*trend

96 . gen posttrend = post*trend

97 .
98 . reg meanbal TIKA post TIKApost

      Source |       SS           df       MS      Number of obs   =    60,50
> 6
-------------+----------------------------------   F(3, 60502)     =  20856.6
> 2
       Model |  401096753         3   133698918   Prob > F        =    0.000
> 0
    Residual |  387840908    60,502   6410.3816   R-squared       =    0.508
> 4
-------------+----------------------------------   Adj R-squared   =    0.508
> 4
       Total |  788937660    60,505  13039.2143   Root MSE        =    80.06
> 5

------------------------------------------------------------------------------
> -
     meanbal |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval
> ]
-------------+----------------------------------------------------------------
> -
        TIKA |  -79.95769   2.002359   -39.93   0.000    -83.88232   -76.0330
> 6
        post |   90.94516   2.107641    43.15   0.000     86.81418    95.0761
> 5
    TIKApost |    75.0251   2.227029    33.69   0.000     70.66012    79.3900
> 8
       _cons |     403.75   1.936172   208.53   0.000     399.9551    407.544
> 9
------------------------------------------------------------------------------
> -
```

```
 99 .
100 . reg meanbal TIKA post trend TIKApost TIKAposttrend TIKAtrend posttrend tinp
    > r nage i.monthyear, cl(nacc)
    note: 200001.monthyear omitted because of collinearity
    note: 200010.monthyear omitted because of collinearity
    note: 200011.monthyear omitted because of collinearity

    Linear regression                               Number of obs     =     60,50
    > 6
                                                    F(2, 4921)        =
    > .
                                                    Prob > F          =
    > .
                                                    R-squared         =     1.000
    > 0
                                                    Root MSE          =
    > 0

                                  (Std. Err. adjusted for 4,922 clusters in nac
    > c)
    ------------------------------------------------------------------------------
    > ---
                 |               Robust
         meanbal |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interva
    > l]
    -------------+----------------------------------------------------------------
    > ---
            TIKA |  -4.55e-08   4.28e-09   -10.63   0.000    -5.39e-08   -3.71e-
    > 08
            post |   23.86682   1.30e-08   1.8e+09   0.000     23.86682    23.866
    > 82
           trend |   37.48143   4.13e-10   9.1e+10   0.000     37.48143    37.481
    > 43
         TIKApost |   5.67e-08   4.46e-09    12.71   0.000     4.79e-08    6.54e-
    > 08
    TIKAposttrend |  -5.38e-09   4.28e-10   -12.56   0.000    -6.22e-09   -4.54e-
    > 09
        TIKAtrend |   4.79e-09   4.19e-10    11.42   0.000     3.97e-09    5.61e-
    > 09
        posttrend |  -14.29777   7.36e-10 -1.9e+10   0.000    -14.29777   -14.297
    > 77
            tinpr |  -5.63e-12   8.48e-13    -6.64   0.000    -7.29e-12   -3.97e-
    > 12
            nage |  -3.21e-12   1.13e-12    -2.83   0.005    -5.42e-12   -9.86e-
    > 13
                 |
        monthyear |
          199903 |   53.72352   7.91e-11   6.8e+11   0.000     53.72352    53.723
    > 52
```

```
      199904 |   74.21717   6.95e-11  1.1e+12   0.000     74.21717    74.217
> 17
      199905 |   88.63531   7.10e-11  1.2e+12   0.000     88.63531    88.635
> 31
      199906 |   105.7976   7.80e-11  1.4e+12   0.000     105.7976    105.79
> 76
      199907 |   96.34862   8.01e-11  1.2e+12   0.000     96.34862    96.348
> 62
      199908 |    105.599   9.31e-11  1.1e+12   0.000      105.599     105.5
> 99
      199909 |   96.96718   1.05e-10  9.3e+11   0.000     96.96718    96.967
> 18
      199910 |   68.53623   1.12e-10  6.1e+11   0.000     68.53623    68.536
> 23
      199911 |   26.49865   8.56e-11  3.1e+11   0.000     26.49865    26.498
> 65
      199912 |    7.11952   5.70e-11  1.2e+11   0.000      7.11952     7.119
> 52
      200001 |          0  (omitted)
      200002 |   116.9034   4.50e-09  2.6e+10   0.000     116.9034    116.90
> 34
      200003 |   122.5978   3.97e-09  3.1e+10   0.000     122.5978    122.59
> 78
      200004 |   96.29385   3.45e-09  2.8e+10   0.000     96.29385    96.293
> 85
      200005 |   53.47229   2.92e-09  1.8e+10   0.000     53.47229    53.472
> 29
      200006 |    34.9827   2.39e-09  1.5e+10   0.000      34.9827     34.98
> 27
      200007 |   30.99515   1.86e-09  1.7e+10   0.000     30.99515    30.995
> 15
      200008 |   23.90259   1.33e-09  1.8e+10   0.000     23.90259    23.902
> 59
      200009 |   1.312958   8.03e-10  1.6e+09   0.000     1.312958    1.3129
> 58
      200010 |          0  (omitted)
      200011 |          0  (omitted)
             |
       _cons |    11.3913   4.28e-09  2.7e+09   0.000      11.3913     11.39
> 13
-------------+------------------------------------------------------------
> ——
```

```
101 .
102 .
103 .
104 .
105 .
106 .
107 .
108 .
109 .
110 .
    end of do-file
```