```
      name:  <unnamed>
       log:  /Users/rajdevb/Desktop/GIT_RajdevBrar/GitHub_are213/ARE213_Fall20
> 23/PSet 3/pset3_logfile.smcl
  log type:  smcl
 opened on:  19 Nov 2023, 21:06:54

 1 .
 2 .
 3 . * install programs
 4 . * do "$do_loc/Stata/Code/01_programs.do"
 5 .
 6 . * analyze
 7 . do "$do_loc/Stata/Code/02_analysis_q1.do"

 8 . * ============================================================================
   > === *
 9 . *                                                 ARE 213: Problem set 3 - Q1
   > + Q2
10 . * ============================================================================
   > === *
11 .
12 . * ============================================================================
   > === *
13 . * Load datasets
14 . * ============================================================================
   > === *
15 .
16 . * load datasets, save as global
17 .         global dta_lines  "${dta_loc}/data/pset3_lines.dta"

18 .         * 149 unique lines
19 .
20 .         global dta_cities "${dta_loc}/data/pset3_cities.dta"

21 .         * 340 unique cities
22 .
```

```
23 .         global dta_stations "${dta_loc}/data/pset3_stations.dta"

24 .         * 565 unique city-line combinations
25 .
26 .         global dta_distance "${dta_loc}/data/pset3_distances.dta"

27 .         * 115600 unique city1-city2-dist combinations
28 .
29 .
30 . * ============================================================================
   > === *
31 . * Prepare datasets
32 . * ============================================================================
   > === *
33 .         * DeltaLines= number of open lines that go through city i
34 .
35 .         * using stations dataset, merge in lines
36 .         use "${dta_stations}", clear

37 .                 merge m:1 lineid using "${dta_lines}"

    Result                           # of obs.
    -----------------------------------------
    not matched                             0
    matched                               565  (_merge==3)
    -----------------------------------------

38 .                 assert _merge==3

39 .                 drop _merge

40 .
41 .         * for each city, gen var for number of open lines
42 .                 bys cityid: egen num_openlines_temp = sum(open)

43 .                 bys cityid: egen num_openlines=max(num_openlines_temp)
```

```
44 .                 lab var num_openlines "Number of open lines in city"

45 .                 drop num_openlines_temp

46 .
47 .         * for each city, number of planned lines
48 .                 bys cityid: gen num_plannedlines = _N

49 .                 lab var num_plannedlines "Number of planned lines in city"

50 .
51 .                 rename num_openlines deltalines

52 .
53 .                 keep cityid deltalines num_plannedlines

54 .                 duplicates drop

   Duplicates in terms of all variables

   (300 observations deleted)

55 .
56 .         tempfile dta_merge

57 .         save    `dta_merge'
   file /var/folders/fz/p35j_lbj1yx73vng__9d6ync0000gn/T//S_02572.000005 saved

58 .
59 .         * starting from city-level dataset, merge in variables we just creat
   > ed
60 .         use "${dta_cities}", clear

61 .                 merge 1:1 cityid using `dta_merge'

       Result                           # of obs.
       -----------------------------------------
       not matched                            75
           from master                        75  (_merge==1)
           from using                          0  (_merge==2)

       matched                               265  (_merge==3)
       -----------------------------------------
```

```
62 .                 replace deltalines = 0 if _merge==1
(75 real changes made)

63 .                 drop _merge

64 .
65 .         tempfile city_withdeltalines

66 .         save    `city_withdeltalines'
file /var/folders/fz/p35j_lbj1yx73vng__9d6ync0000gn/T//S_02572.000006 saved

67 .
68 . * ================================================================================
> === *
69 . * ================================================================================
> === *
70 . * QUESTION 1
71 . * ================================================================================
> === *
72 . * ================================================================================
> === *
73 .
74 . * ================================================================================
> === *
75 . * 1a
76 . * ================================================================================
> === *
77 . * Represent DeltaLines_i as a shift-share variable
78 .
79 .         * Y = outcome = 2007-2016 log change in city employment
80 .         * DeltaLines= number of open lines that go through city i
81 .
82 .
83 .         * Compute DeltaLines_i for each city
84 .         * Mean/min/avg of DeltaLines_i across 340 cities?
85 .                 tabstat deltalines, stats(min max mean med sd)
```

variable	min	max	mean	p50	sd
deltalines	**0**	**7**	**.9970588**	**1**	**1.143143**

```
86 .         /*
   >                 variable |       min       max      mean       p50        sd
   >         -------------+--------------------------------------------------------
   >           deltalines |         0         7  .9970588         1  1.143143
   >         ------------------------------------------------------------------------
   >         */
87 .
88 .         * how many cities with missing data?
89 .         unique cityid if mi(empgrowth)
   Number of unique values of cityid is  65
   Number of records is  65

90 .
91 .         * and what provinces are these missing cities from?
92 .         tab province_en if mi(empgrowth)
```

province English name	Freq.	Percent	Cum.
gansu	2	3.08	3.08
guangdong	3	4.62	7.69
guizhou	5	7.69	15.38
heilongjiang	1	1.54	16.92
henan	1	1.54	18.46
hubei	6	9.23	27.69
hunan	1	1.54	29.23
inner mongolia	3	4.62	33.85
jiangsu	4	6.15	40.00
jilin	1	1.54	41.54
qinghai	7	10.77	52.31
sichuan	3	4.62	56.92
tibet	6	9.23	66.15
xinjiang	13	20.00	86.15
yunnan	9	13.85	100.00
Total	65	100.00	

```
 93 .
 94 . * ================================================================================
    > === *
 95 . * 1b
 96 . * ================================================================================
    > === *
 97 . * Estimate (1) by OLS without controls and also adding fixed effects of 30 C
    > hinese provinces.
 98 . * Use heteroskedasticity-robust standard errors.
 99 . * Is the coeffcient economically large?
100 .
101 .
102 .         replace province_en=proper(province_en)
    (340 real changes made)

103 .         lab var empgrowth "Emp growth (log-change, 2007-2016)"

104 .
105 .         encode province_en, gen(province_enc)

106 .
107 .         eststo clear

108 .
109 .         eststo: reg empgrowth deltalines  , vce(robust)

    Linear regression                               Number of obs     =        275
                                                    F(1, 273)         =      34.89
                                                    Prob > F          =     0.0000
                                                    R-squared         =     0.1235
                                                    Root MSE          =     .24025

    ------------------------------------------------------------------------------
                 |               Robust
      empgrowth |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
    -------------+----------------------------------------------------------------
      deltalines |   .0764717   .0129456     5.91   0.000     .0509859    .1019575
           _cons |   .1812033   .0213226     8.50   0.000     .1392256    .2231809
    ------------------------------------------------------------------------------

    (est1 stored)
```

```
110 .         eststo: reg empgrowth deltalines i.province_enc , vce(robust)

Linear regression                               Number of obs     =        275
                                                F(24, 244)        =          .
                                                Prob > F          =          .
                                                R-squared         =     0.4801
                                                Root MSE          =     .19572

------------------------------------------------------------------------------
> ---
             |               Robust
  empgrowth  |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interv
> al]
-------------+----------------------------------------------------------------
> ---
  deltalines |   .0495705   .0147147     3.37   0.001     .0205866    .0785
> 545
             |
province_enc |
      Beijing |   .0050034   .0690736     0.07   0.942    -.1310531      .14
> 106
    Chongqing |   .0700398   .0781418     0.90   0.371    -.0838787    .2239
> 582
       Fujian |  -.0826864   .0885755    -0.93   0.351    -.2571566    .0917
> 838
        Gansu |  -.0312127   .0699248    -0.45   0.656     -.168946    .1065
> 206
    Guangdong |   .0222266   .0756873     0.29   0.769    -.1268572    .1713
> 104
      Guangxi |  -.1003566   .0711068    -1.41   0.159    -.2404181    .0397
> 048
      Guizhou |  -.0396211    .079218    -0.50   0.617    -.1956595    .1164
> 173
        Hebei |  -.1525531   .0745966    -2.05   0.042    -.2994886   -.0056
> 176
 Heilongjiang |  -.5777725   .0862798    -6.70   0.000    -.7477208   -.4078
> 242
        Henan |   .0611924   .0692235     0.88   0.378    -.0751596    .1975
> 443
        Hubei |   .2047972     .11283     1.82   0.071    -.0174478    .4270
> 423
        Hunan |  -.1973695   .0791676    -2.49   0.013    -.3533085   -.0414
> 305
Inner Mongolia |  -.1715452   .0987305    -1.74   0.084    -.3660181    .0229
> 277
      Jiangsu |   .1620782   .0862199     1.88   0.061    -.0077521    .3319
> 084
      Jiangxi |   .0926691   .0793246     1.17   0.244    -.0635791    .2489
> 174
```

```
          Jilin |   -.161518   .0777596    -2.08   0.039    -.3146836   -.0083
> 523
       Liaoning |  -.2534235   .0713989    -3.55   0.000    -.3940604   -.1127
> 866
        Ningxia |  -.1797775   .0667367    -2.69   0.008     -.311231    -.048
> 324
        Qinghai |   .0301956   .0583123     0.52   0.605    -.0846641    .1450
> 553
        Shaanxi |  -.0173778   .0788702    -0.22   0.826    -.1727312    .1379
> 756
       Shandong |  -.0324671   .0703249    -0.46   0.645    -.1709884    .1060
> 542
       Shanghai |   .2785096   .0690736     4.03   0.000     .1424531    .4145
> 661
         Shanxi |   -.184835     .07399    -2.50   0.013    -.3305757   -.0390
> 943
        Sichuan |  -.0777822   .0915913    -0.85   0.397    -.2581927    .1026
> 283
        Tianjin |  -.1206159   .0781418    -1.54   0.124    -.2745344    .0333
> 025
          Tibet |   .1290949   .0580041     2.23   0.027     .0148423    .2433
> 475
       Xinjiang |   .0022207   .1360058     0.02   0.987    -.2656745     .270
> 116
         Yunnan |  -.0685086   .0727503    -0.94   0.347    -.2118074    .0747
> 902
       Zhejiang |  -.0095148   .0980219    -0.10   0.923    -.2025918    .1835
> 622
                |
           _cons |   .2813827   .0580041     4.85   0.000     .1671301    .3956
> 353
----------------+----------------------------------------------------------------
> ----
(est2 stored)

111 .
112 .         esttab using "${dta_loc}/1b_reg"  , nostar label  tex  replace  se w
> ide
(output written to /Users/rajdevb/Dropbox/ARE213/Pset3/1b_reg.tex)
```

```
113 .
114 .
115 .
116 .
117 . * ============================================================================
    > === *
118 . * 1c
119 . * ============================================================================
    > === *
120 .
121 .         * moving forward using nlinks at the qk
122 .         * need to merge in nlinks (nlinks unique at lineid level)
123 . preserve

124 .         * now dataset will be at city-line level
125 .         merge m:m cityid using "${dta_stations}", gen(merge1)

        Result                           # of obs.
        -----------------------------------------
        not matched                             75
            from master                         75  (merge1==1)
            from using                           0  (merge1==2)

        matched                                565  (merge1==3)
        -----------------------------------------

126 .         /*
    >                 Result                           # of obs.
    >                 -----------------------------------------
    >                 not matched                             75
    >                         from master                     75  (_merge==1)
    >                         from using                       0  (_merge==2)
    >
    >                 matched                                565  (_merge==3)
    >                 -----------------------------------------
    >         */
127 .         merge m:1 lineid using "${dta_lines}", gen(merge2)

        Result                           # of obs.
        -----------------------------------------
        not matched                             75
            from master                         75  (merge2==1)
            from using                           0  (merge2==2)

        matched                                565  (merge2==3)
        -----------------------------------------
```

```
128 .
129 .         /*
    >                 Result                           # of obs.
    >                 -----------------------------------------
    >                 not matched                             75
    >                         from master                         75  (merge2==1)
    >                         from using                           0  (merge2==2)
    >
    >                 matched                                565  (merge2==3)
    >                 -----------------------------------------
    >         */
130 .         unique cityid lineid
    Number of unique values of cityid lineid is  640
    Number of records is  640

131 .
132 .         /*
    >         Number of unique values of cityid lineid is  640
    >         Number of records is  640
    >         */
133 .
134 .
135 .         * Compute the city-level controls Qi corresponding to these qk.
136 .         tab nlinks, gen(nlinks_)
```

Number of cross-regional links created by line	Freq.	Percent	Cum.
1	**104**	**18.41**	**18.41**
2	**110**	**19.47**	**37.88**
3	**83**	**14.69**	**52.57**
4	**60**	**10.62**	**63.19**
5	**40**	**7.08**	**70.27**
6	**59**	**10.44**	**80.71**
7	**24**	**4.25**	**84.96**
8	**18**	**3.19**	**88.14**
9	**48**	**8.50**	**96.64**
18	**19**	**3.36**	**100.00**
Total	**565**	**100.00**	

```
137 .         forvalues i = 1/10 {
      2.                 bys cityid: egen Qi_`i' = sum(nlinks_`i')
      3.         }

138 .
139 .         bys cityid: egen sum_nlinks = sum(nlinks)

140 .         lab var sum_nlinks "Citylevel sum of number of links across all line
    > s"

141 .
142 .         * How many of them do you have and how do you interpret them?
143 .
144 .         tab sum_nlinks
```

Citylevel sum of number of links across all lines	Freq.	Percent	Cum.
0	75	11.72	11.72
1	11	1.72	13.44
2	23	3.59	17.03
3	35	5.47	22.50
4	36	5.62	28.12
5	38	5.94	34.06
6	37	5.78	39.84
7	23	3.59	43.44
8	21	3.28	46.72
9	29	4.53	51.25
10	35	5.47	56.72
11	22	3.44	60.16
12	24	3.75	63.91
13	14	2.19	66.09
14	14	2.19	68.28
15	17	2.66	70.94
16	3	0.47	71.41
17	14	2.19	73.59
18	17	2.66	76.25
19	3	0.47	76.72
20	11	1.72	78.44
21	14	2.19	80.62
22	10	1.56	82.19
23	10	1.56	83.75
25	3	0.47	84.22
26	17	2.66	86.88
27	22	3.44	90.31

28	**10**	**1.56**	**91.88**
29	**11**	**1.72**	**93.59**
32	**9**	**1.41**	**95.00**
34	**9**	**1.41**	**96.41**
36	**5**	**0.78**	**97.19**
37	**9**	**1.41**	**98.59**
39	**9**	**1.41**	**100.00**
Total	**640**	**100.00**	

```
145 .
146 .         keep cityid sum_nlinks Qi_*

147 .         duplicates drop

    Duplicates in terms of all variables

    (300 observations deleted)

148 .         tempfile sumnlinks_dta

149 .         save    `sumnlinks_dta'
    file /var/folders/fz/p35j_lbj1yx73vng__9d6ync0000gn/T//S_02572.000008 saved

150 . restore

151 .
152 .         merge 1:1 cityid using `sumnlinks_dta'
```

Result	# of obs.	
not matched	**0**	
matched	**340**	(_merge==3)

```
153 .         assert _merge==3
```

```
154 .         drop _merge

155 .
156 .         unique sum_nlinks
    Number of unique values of sum_nlinks is  34
    Number of records is  340

157 .         * 34
158 .
159 .
160 . * ============================================================================
    > === *
161 . * 1d
162 . * ============================================================================
    > === *
163 . * Estimate (1) by OLS controlling for Qi instead of province fixed effects.
164 . * Does including Qi change the estimates?
165 . * Does your estimate rely on Assumptions A2 and A3?
166 .
167 .         eststo clear

168 .         reg empgrowth deltalines Qi_*, vce(robust)

Linear regression                               Number of obs     =        275
                                                F(11, 263)        =       7.35
                                                Prob > F          =     0.0000
                                                R-squared         =     0.2022
                                                Root MSE          =     .23352

------------------------------------------------------------------------------
             |               Robust
  empgrowth |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  deltalines |   .0209838   .0225719     0.93   0.353    -.0234609    .0654285
        Qi_1 |    -.00063   .0232427    -0.03   0.978    -.0463954    .0451354
        Qi_2 |   .0076877   .0298461     0.26   0.797      -.05108    .0664553
        Qi_3 |   .0286205   .0297012     0.96   0.336     -.029862     .087103
        Qi_4 |   .0105053   .0344413     0.31   0.761    -.0573105    .0783211
        Qi_5 |   .0520196   .0416149     1.25   0.212    -.0299213    .1339604
        Qi_6 |   .1088843   .0299937     3.63   0.000      .049826    .1679426
        Qi_7 |   .2144605   .0466879     4.59   0.000     .1225309    .3063902
        Qi_8 |   .1418453   .0733712     1.93   0.054    -.0026244     .286315
        Qi_9 |    .061053   .0441635     1.38   0.168     -.025906     .148012
       Qi_10 |   .0864747   .0471572     1.83   0.068     -.006379    .1793283
       _cons |   .1625225   .0249329     6.52   0.000      .113429    .2116159
------------------------------------------------------------------------------
```

```
169 .
170 .         eststo: reg empgrowth deltalines Qi_*, vce(robust)

Linear regression                               Number of obs     =        275
                                                F(11, 263)        =       7.35
                                                Prob > F          =     0.0000
                                                R-squared         =     0.2022
                                                Root MSE          =     .23352

------------------------------------------------------------------------------
             |               Robust
  empgrowth |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  deltalines |   .0209838   .0225719     0.93   0.353    -.0234609    .0654285
        Qi_1 |    -.00063   .0232427    -0.03   0.978    -.0463954    .0451354
        Qi_2 |   .0076877   .0298461     0.26   0.797      -.05108    .0664553
        Qi_3 |   .0286205   .0297012     0.96   0.336     -.029862     .087103
        Qi_4 |   .0105053   .0344413     0.31   0.761    -.0573105    .0783211
        Qi_5 |   .0520196   .0416149     1.25   0.212    -.0299213    .1339604
        Qi_6 |   .1088843   .0299937     3.63   0.000      .049826    .1679426
        Qi_7 |   .2144605   .0466879     4.59   0.000     .1225309    .3063902
        Qi_8 |   .1418453   .0733712     1.93   0.054    -.0026244     .286315
        Qi_9 |    .061053   .0441635     1.38   0.168     -.025906     .148012
       Qi_10 |   .0864747   .0471572     1.83   0.068     -.006379    .1793283
       _cons |   .1625225   .0249329     6.52   0.000      .113429    .2116159
------------------------------------------------------------------------------
(est1 stored)

171 .
172 .         esttab using "${dta_loc}/1d_reg"  , nostar label  tex  replace  se w
> ide
(output written to /Users/rajdevb/Dropbox/ARE213/Pset3/1d_reg.tex)

173 . tempfile clean_dta

174 . save    `clean_dta'
file /var/folders/fz/p35j_lbj1yx73vng__9d6ync0000gn/T//S_02572.000009 saved
```

```
175 .
176 . * ============================================================================
    > === *
177 . * 1e
178 . * ============================================================================
    > === *
179 .
180 . * line-level balance tests
181 .         * regression of line-level covariates on shocks
182 .
183 .         use "${dta_lines}", clear

184 .
185 .         eststo clear

186 .
187 .         eststo clear

188 .
189 .         * gen standardized
190 .         summ open
```

Variable	Obs	Mean	Std. Dev.	Min	Max
open	**149**	**.557047**	**.4984103**	**0**	**1**

```
191 .         gen open_std =open/`r(sd)'

192 .
193 .         eststo: reg  open_std speed [aw=nlinks], vce(robust)
    (sum of wgt is 426)

    Linear regression                               Number of obs     =        149
                                                    F(1, 147)         =       0.11
                                                    Prob > F          =     0.7461
                                                    R-squared         =     0.0012
                                                    Root MSE          =     .97887
```

open_std	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
speed	**.0005566**	**.0017157**	**0.32**	**0.746**	**-.002834**	**.0039473**
_cons	**1.088448**	**.4776513**	**2.28**	**0.024**	**.1444981**	**2.032399**

```
    (est1 stored)
```

```
194 .         esttab using "${dta_loc}/1e_panel1_reg"  , nostar label  tex  replac
> e  se wide
(output written to /Users/rajdevb/Dropbox/ARE213/Pset3/1e_panel1_reg.tex)

195 .
196 . * city-level balance test
197 .         * regressions on the shift-share instrument
198 .         use `city_withdeltalines', clear

199 .
200 .         eststo clear

201 .
202 .         summ deltalines
```

Variable	Obs	Mean	Std. Dev.	Min	Max
deltalines	**340**	**.9970588**	**1.143143**	**0**	**7**

```
203 .         gen deltalines_std = deltalines/`r(sd)'

204 .
205 .         eststo: reg  deltalines_std dist_beijing, vce(robust)
```

Linear regression

Number of obs	=	**340**
F(1, 338)	=	**2.36**
Prob > F	=	**0.1254**
R-squared	=	**0.0055**
Root MSE	=	**.99873**

deltalines~d	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
dist_beijing	**-.0001127**	**.0000733**	**-1.54**	**0.125**	**-.000257**	**.0000316**
_cons	**1.013566**	**.1096256**	**9.25**	**0.000**	**.7979314**	**1.2292**

(**est1** stored)

```
206 .         esttab using "${dta_loc}/1e_panel2_reg"  , nostar label  tex  replac
    > e  se wide
    (output written to /Users/rajdevb/Dropbox/ARE213/Pset3/1e_panel2_reg.tex)

207 .
208 . * ============================================================================
    > === *
209 . * 1f
210 . * ============================================================================
    > === *
211 .
212 .         * translate .shp file into .dta
213 .         shp2dta using chn_admbnda_adm2_ocha.shp,  data("china_data") coor("c
    > hina_coordinates")  replace
    type: 5

214 .
215 .         * Display ΔLinesi on the map of China's regions to visualize your tr
    > eatment;
216 .         set graph off

217 .
218 .         spmap deltalines using "china_coordinates", id(cityid) title("Number
    >  of opened railway lines per city") ///
    >         legend(on)  fcolor(Blues2) clbreaks(0 1 2 3 4 5 6 7 8) clmethod(cust
    > om)  ///
    >         legend(label(1 "0 lines") label(2 "0 lines") label(3 "1 line") label
    >  (4 "2 lines") label (5 "3 lines") label(6 "4 lines") label(7 "5 lines") lab
    > el(8 "6 lines") label(9 "7 lines"))

219 .         graph export "1f_graph1.png", replace
    (file /Users/rajdevb/Dropbox/ARE213/Pset3/data/1f_graph1.png written in PNG fo
    > rmat)

220 .
221 . * ============================================================================
    > === *
```

```
222 . * ================================================================================
    > === *
223 . * QUESTION 2
224 . * ================================================================================
    > === *
225 . * ================================================================================
    > === *
226 .
227 .
228 .
229 . * ================================================================================
    > === *
230 . * 2a
231 . * ================================================================================
    > === *
232 .
233 .
234 . * Compute standard errors clustered by province
235 .
236 . use `clean_dta', clear

237 .
238 .         * vce(cluster clustvar) is a generalization of the vce(robust) calcu
    > lation
239 .         eststo clear

240 .         eststo: reg empgrowth deltalines Qi_* , vce(cluster province_enc)

Linear regression                               Number of obs     =        275
                                                F(11, 29)         =      18.32
                                                Prob > F          =     0.0000
                                                R-squared         =     0.2022
                                                Root MSE          =     .23352

                                  (Std. Err. adjusted for 30 clusters in province_enc)
------------------------------------------------------------------------------
             |               Robust
  empgrowth |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  deltalines |   .0209838   .0234759     0.89   0.379    -.0270298    .0689973
        Qi_1 |    -.00063   .0263325    -0.02   0.981    -.0544861    .0532261
        Qi_2 |   .0076877   .0374887     0.21   0.839    -.0689854    .0843607
        Qi_3 |   .0286205   .0349181     0.82   0.419    -.0427951    .1000361
        Qi_4 |   .0105053   .0286559     0.37   0.717    -.0481025    .0691131
        Qi_5 |   .0520196   .0577478     0.90   0.375     -.066088    .1701271
        Qi_6 |   .1088843   .0331563     3.28   0.003      .041072    .1766966
        Qi_7 |   .2144605   .0376289     5.70   0.000     .1375008    .2914202
        Qi_8 |   .1418453   .0816687     1.74   0.093    -.0251859    .3088764
        Qi_9 |    .061053   .0577329     1.06   0.299    -.0570241    .1791301
```

```
       Qi_10 |   .0864747   .0454591     1.90   0.067    -.0064995    .1794489
       _cons |   .1625225   .0520617     3.12   0.004     .0560443    .2690006
------------------------------------------------------------------------------

(est1 stored)

241 .
242 .         esttab using "${dta_loc}/2a_reg"  , nostar label  tex  replace  se w
    > ide b(4)
(output written to /Users/rajdevb/Dropbox/ARE213/Pset3/2a_reg.tex)

243 .
244 .
245 .
246 . * ============================================================================
    > === *
247 . * 2b
248 . * ============================================================================
    > === *
249 .
250 . * Compute spatially-clustered ("Conley") standard errors.
251 . * Describe any choices you have made.
252 .         eststo clear

253 .         eststo: acreg empgrowth deltalines Qi_* , spatial longitude(longitud
    > e) latitude(latitude) dist(100)
SPATIAL CORRECTION
DistCutoff: 100
LagCutoff:  0
No HAC Correction
No Absorbed FEs
Included instruments: deltalines Qi_1 Qi_2 Qi_3 Qi_4 Qi_5 Qi_6 Qi_7 Qi_8 Qi_9
> Qi_10
                                                    Number of obs =       275
Total (centered) SS     =  17.97635705              Centered R2   =    0.2022
Total (uncentered) SS   =  37.47749833              Uncentered R2 =    0.6173
Residual SS             =  14.34239542

------------------------------------------------------------------------------
   empgrowth |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  deltalines |   .0209838   .0221476     0.95   0.343    -.0224247    .0643922
        Qi_1 |    -.00063   .0258377    -0.02   0.981     -.051271     .050011
        Qi_2 |   .0076877    .029177     0.26   0.792    -.0494983    .0648736
        Qi_3 |   .0286205   .0325804     0.88   0.380    -.0352359     .092477
        Qi_4 |   .0105053   .0314412     0.33   0.738    -.0511184    .0721289
        Qi_5 |   .0520196   .0439753     1.18   0.237    -.0341705    .1382096
        Qi_6 |   .1088843   .0294766     3.69   0.000     .0511111    .1666575
        Qi_7 |   .2144605   .0440252     4.87   0.000     .1281727    .3007484
        Qi_8 |   .1418453   .0661803     2.14   0.032     .0121343    .2715562
```

Qi_9	.061053	.0455301	1.34	0.180	-.0281843	.1502903
Qi_10	.0864747	.0471772	1.83	0.067	-.005991	.1789403
_cons	.1625225	.0305963	5.31	0.000	.1025548	.2224901

(**est1** stored)

```
254 .         esttab using "${dta_loc}/2b_reg"  , nostar label  tex  replace  se w
    > ide b(4)
    (output written to /Users/rajdevb/Dropbox/ARE213/Pset3/2b_reg.tex)

255 .
256 . * ============================================================================
    > === *
257 . * 2c
258 . * ============================================================================
    > === *
259 .
260 . * generate residuals
261 .         use `clean_dta', clear

262 .         drop if mi(empgrowth) | mi(deltalines)
    (65 observations deleted)

263 .
264 .         regress empgrowth Qi_*
```

Source	SS	df	MS		
				Number of obs	= 275
				F(10, 264)	= 6.59
Model	3.59107265	10	.359107265	Prob > F	= 0.0000
Residual	14.3852844	264	.054489714	R-squared	= 0.1998
				Adj R-squared	= 0.1695
Total	17.976357	274	.065607143	Root MSE	= .23343

empgrowth	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Qi_1	.0076507	.0225862	0.34	0.735	-.0368212	.0521227
Qi_2	.0209805	.0226489	0.93	0.355	-.0236149	.0655759
Qi_3	.0382195	.0280039	1.36	0.173	-.0169199	.0933588
Qi_4	.0176592	.0351398	0.50	0.616	-.0515307	.0868492
Qi_5	.0748668	.0386938	1.93	0.054	-.0013208	.1510544
Qi_6	.1247488	.0304867	4.09	0.000	.0647209	.1847768
Qi_7	.2315522	.0499598	4.63	0.000	.1331817	.3299226
Qi_8	.1592532	.0688565	2.31	0.022	.0236755	.2948309
Qi_9	.0783255	.0363013	2.16	0.032	.0068487	.1498023
Qi_10	.1061033	.0590335	1.80	0.073	-.010133	.2223396
_cons	.16166	.0220004	7.35	0.000	.1183414	.2049786

```
265 .         predict res_y, residuals

266 .
267 .         regress deltalines Qi_*
```

Source	SS	df	MS	Number of obs	=	275
				F(10, 264)	=	76.46
Model	282.101188	10	28.2101188	Prob > F	=	0.0000
Residual	97.4042669	264	.368955556	R-squared	=	0.7433
				Adj R-squared	=	0.7336
Total	379.505455	274	1.3850564	Root MSE	=	.60742

deltalines	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Qi_1	.3946248	.0587723	6.71	0.000	.2789028	.5103469
Qi_2	.63348	.0589354	10.75	0.000	.5174369	.7495232
Qi_3	.4574445	.0728699	6.28	0.000	.3139643	.6009246
Qi_4	.3409267	.0914385	3.73	0.000	.1608852	.5209683
Qi_5	1.088805	.1006864	10.81	0.000	.890555	1.287056
Qi_6	.7560382	.0793304	9.53	0.000	.5998373	.912239
Qi_7	.8145171	.1300022	6.27	0.000	.5585439	1.07049
Qi_8	.8295898	.1791738	4.63	0.000	.4767984	1.182381
Qi_9	.8231357	.0944607	8.71	0.000	.6371434	1.009128
Qi_10	.9354194	.153613	6.09	0.000	.6329569	1.237882
_cons	-.0411011	.0572481	-0.72	0.473	-.153822	.0716198

```
268 .         predict res_d, residuals

269 .
270 .         keep cityid res_y res_d

271 .         duplicates drop

    Duplicates in terms of all variables

    (0 observations are duplicates)
```

```
272 .
273 .         count if mi(res_y)
      0

274 .         count if mi(res_d)
      0

275 .
276 .         tempfile residuals

277 .         save    `residuals' // 275 cities with data for y (empgrowth) and d
    > (deltalines)
    file /var/folders/fz/p35j_lbj1yx73vng__9d6ync0000gn/T//S_02572.00000a saved

278 .
279 .
280 . * combine all generated variables to create line-level dataset for main regr
    > ession
281 .         use "${dta_stations}", clear

282 .         gen Sik = 1

283 .         lab var Sik "Indicator: line k passes through city i"

284 .         * bys lineid: egen agg_sk = total(Sik)
285 .
286 .         merge m:1 cityid using `residuals', gen(merge_residuals)

        Result                           # of obs.
        -----------------------------------------
        not matched                            91
            from master                        52  (merge_residuals==1)
            from using                         39  (merge_residuals==2)

        matched                               513  (merge_residuals==3)
        -----------------------------------------
```

```
287 .         unique cityid if merge_residuals==3
    Number of unique values of cityid is  236
    Number of records is  513

288 .         keep if merge_residuals==3
    (91 observations deleted)

289 .
290 .         bys lineid: gen num_d = Sik * res_d

291 .         bys lineid: gen num_y = Sik * res_y

292 .         bys lineid: egen d_bar = sum(num_d)

293 .         bys lineid: egen y_bar = sum(num_y)

294 .         bys lineid: egen denom = sum(Sik)

295 .         bys lineid: replace d_bar = d_bar/denom
    (501 real changes made)

296 .         bys lineid: replace y_bar = y_bar/denom
    (501 real changes made)

297 .
298 .         gen totobs = _N

299 .         gen sk = denom/totobs

300 .
301 .         keep lineid y_bar d_bar sk

302 .
303 .         duplicates drop

    Duplicates in terms of all variables

    (365 observations deleted)
```

```
304 .
305 .         * merge in open and nlinks
306 .         merge 1:1 lineid using "${dta_lines}"
```

Result	# of obs.	
not matched	**1**	
from master	**0**	(_merge==1)
from using	**1**	(_merge==2)
matched	**148**	(_merge==3)

```
307 .
308 .         lab var y_bar "Exposure-weighted avg of residuals of empgrowth"

309 .         lab var d_bar "Exposure-weighted avg of residuals of deltalines"

310 .
311 .         eststo clear

312 .         eststo: ivregress 2sls y_bar (d_bar=open) i.nlinks [aw=sk] , robust
(sum of wgt is   1.0000e+00)

Instrumental variables (2SLS) regression          Number of obs   =        148
                                                  Wald chi2(10)   =       0.70
                                                  Prob > chi2     =     1.0000
                                                  R-squared       =     0.0152
                                                  Root MSE        =     .12767
```

y_bar	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
d_bar	**.0209838**	**.0259665**	**0.81**	**0.419**	**-.0299096**	**.0718772**
nlinks						
2	**1.48e-09**	**.0326402**	**0.00**	**1.000**	**-.0639736**	**.0639736**
3	**2.60e-09**	**.0400932**	**0.00**	**1.000**	**-.0785813**	**.0785813**
4	**1.52e-09**	**.0349928**	**0.00**	**1.000**	**-.0685846**	**.0685846**
5	**3.26e-09**	**.0535652**	**0.00**	**1.000**	**-.1049858**	**.1049858**
6	**1.07e-09**	**.0332296**	**0.00**	**1.000**	**-.0651288**	**.0651288**
7	**2.20e-09**	**.0385387**	**0.00**	**1.000**	**-.0755344**	**.0755344**
8	**1.78e-09**	**.0693076**	**0.00**	**1.000**	**-.1358403**	**.1358403**
9	**2.80e-09**	**.0575285**	**0.00**	**1.000**	**-.1127537**	**.1127537**
18	**3.04e-09**	**.024958**	**0.00**	**1.000**	**-.0489168**	**.0489168**
_cons	**-1.92e-09**	**.024958**	**-0.00**	**1.000**	**-.0489168**	**.0489168**

```
    Instrumented:  d_bar
    Instruments:   2.nlinks 3.nlinks
                   4.nlinks 5.nlinks
                   6.nlinks 7.nlinks
                   8.nlinks 9.nlinks
                   18.nlinks open
    (est1 stored)

313 .         esttab using "${dta_loc}/2c_reg",  nostar label  tex  replace  se wi
    > de b(4)
    (output written to /Users/rajdevb/Dropbox/ARE213/Pset3/2c_reg.tex)

314 .
315 .
    end of do-file

316 .
317 .
318 .
319 . log close
          name:  <unnamed>
           log:  /Users/rajdevb/Desktop/GIT_RajdevBrar/GitHub_are213/ARE213_Fall20
    > 23/PSet 3/pset3_logfile.smcl
      log type:  smcl
     closed on:  19 Nov 2023, 21:07:03
    ------------------------------------------------------------------------------
```