STaTa
Statistics/Data analysis

_____

```
     name:  <unnamed>
      log:  //Client/C$/Users/yfkas/Documents/GitHub/ARE213_Fall2023/PSet 3/Stata/pse
> t3_logfile.smcl
 log type:  smcl
opened on:  20 Nov 2023, 12:22:08
```

```
1 .
2 .
3 . // install programs
4 . // do "$do_loc/Code/01_programs.do"
5 .
6 . // analyze
7 . do "$do_loc/Code/02_q3.do"

8 . /*
> Title:          02_q3b.do
> Purpose:        Question 3.b, PSet 3
>
> Outline: Question 3.b
>
> (b) Still, let's try it out. Compute logNDi and estimate (2) by OLS without controls
> .
> Explain why this OLS may not be causal even if the specification is correct.
>
> */
9 .
10. /* -----------------------------------------------------------------------------
> 3.b.i Compute logND */
11.
12. // 1 Get list of cities with stations for lines open by 2016
13. use "$dta_loc/pset3_stations", clear

14. merge m:1 lineid using "$dta_loc/pset3_lines", nogen assert(3) keepusing(open)
```

Result	# of obs.
not matched	0
matched	565

```
15. byso cityid : egen open_i = max(open)

16. keep cityid open_i

17. duplicates drop

  Duplicates in terms of all variables

  (300 observations deleted)

18. isid cityid

19. label var open_i "City has any station open by 2016"

20. tempfile city_wline_dta

21. save    `city_wline_dta'
  file C:\Users\YFKASH~1\AppData\Local\Temp\82\ST_17c4_000001.tmp saved
```

```
22.
23. // 2 merge station dummy with matrix of cross-city distances
24. use "$dta_loc/pset3_distances", clear // distance between cities

25. rename cityid1 cityid

26. merge m:1 cityid using `city_wline_dta', assert(1 3) nogen // no cities only in usin
  > g

        Result                          # of obs.
        ─────────────────────────────────────────
        not matched                         25,500
            from master                     25,500
            from using                           0

        matched                             90,100
        ─────────────────────────────────────────

27. replace open_i = 0 if open_i == .
  (25,500 real changes made)

28.
29. // 3 find ND (nearest distance)
30. gen cond_dist = dist if open_i == 1
  (46,920 missing values generated)

31. sort cityid2 open_i cond_dist

32. byso cityid2 : egen nd = min(cond_dist)

33. gen lognd = log(nd)

34. label var lognd "log nearest distance"

35. // hist lognd
36. keep cityid2 lognd

37. duplicates drop

  Duplicates in terms of all variables

  (115,260 observations deleted)

38. isid cityid2

39. rename cityid2 cityid

40.
41. // merge in city characteristics
42. merge 1:1 cityid using "$dta_loc/pset3_cities", nogen assert(3)

        Result                          # of obs.
        ─────────────────────────────────────────
        not matched                              0
        matched                                340
        ─────────────────────────────────────────

43.
44. // save for Q3c
45. save "$dta_loc/q3b_lognd", replace
  file //Client/C$/Users/yfkas/Dropbox (Personal)/ARE213/Pset3/data/q3b_lognd.dta saved
```

```
46.
47.
48. /*3.b.i -------------------------------------------------------------------
 > Estimate (2) by OLS without controls */
49. encode province_en, gen(prov)

50.
51. sum lognd
```

Variable	Obs	Mean	Std. Dev.	Min	Max
lognd	340	4.380005	.8717383	2.692482	7.272453

```
52. reg empgrowth lognd
```

Source	SS	df	MS		Number of obs	=	275
					F(1, 273)	=	38.05
Model	2.19897546	1	2.19897546		Prob > F	=	0.0000
Residual	15.7773816	273	.057792607		R-squared	=	0.1223
					Adj R-squared	=	0.1191
Total	17.976357	274	.065607143		Root MSE	=	.2404

empgrowth	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lognd	-.1331077	.0215789	-6.17	0.000	-.1755898	-.0906255
_cons	.8279967	.0922075	8.98	0.000	.6464686	1.009525

```
53. areg empgrowth lognd, absorb(prov) //
```

Linear regression, absorbing indicators

Absorbed variable: **prov**

Number of obs	=	275
No. of categories	=	30
F(**1**, **244**)	=	11.70
Prob > F	=	0.0007
R-squared	=	0.4645
Adj R-squared	=	0.3987
Root MSE	=	0.1986

empgrowth	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lognd	-.0830188	.0242666	-3.42	0.001	-.1308176	-.0352201
_cons	.6166268	.1031008	5.98	0.000	.4135457	.8197079

F test of absorbed indicators: F(**29**, **244**) = **5.377**   Prob > F = **0.000**

```
54.
55. // cities with missing data are more remote
56. // (farther away from Beijing and from nearest city with HSR)
57. gen miss = missing(empgrowth)

58. reg lognd miss
```

Source	SS	df	MS		Number of obs	=	340
					F(1, 338)	=	56.46
Model	36.8719355	1	36.8719355		Prob > F	=	0.0000
Residual	220.74355	338	.653087425		R-squared	=	0.1431
					Adj R-squared	=	0.1406
Total	257.615485	339	.759927685		Root MSE	=	.80814

lognd	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
miss	.8374606	.1114557	7.51	0.000	.6182266	1.056695
_cons	4.219902	.0487326	86.59	0.000	4.124045	4.315759

59. reg dist_beijing miss

Source	SS	df	MS			
Model	28749484	1	28749484	Number of obs	=	340
Residual	117622406	338	347995.283	F(1, 338)	=	82.61
				Prob > F	=	0.0000
				R-squared	=	0.1964
				Adj R-squared	=	0.1940
Total	146371890	339	431775.486	Root MSE	=	589.91

dist_beijing	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
miss	739.4886	81.35853	9.09	0.000	579.4557	899.5214
_cons	1113.033	35.57299	31.29	0.000	1043.061	1183.005

```
60.
61. /*3.b.iii Threats to ID ------------------------------------------------------
  > Explain why this OLS may not be causal even if the specification is correct. */
62. // see overleaf
63.
64.
65.
66.
67.
68.
69.
70.
  end of do-file

71. do "$do_loc/Code/02_q3c.do"

72. /*
  > Title:          02_q3c.do
  > Purpose:        Question 3.c, PSet 3
  >
  > Outline: Question 3.c.i
  >
  > Briefly describe how Assumptions A1-A3 allow you to construct
  > counterfactual 2016 railway networks (i.e., sets of lines) that
  > were as likely to have happened as the realized network.
  >
  > c.i
  > Simulate 999 such counterfactual networks; make sure to set a
  > seed, such that your results can be exactly reproduced.
  >
  > Compute logNDi for each city in each simulation and average it across simulations.
  >
  > We denote this average by μi.
  >
  > c.ii
  > Report two corrected estimates of τ2: recentering by and controlling for μi.
  > Are they very different from your estimate in 3(b)?
  > What do you learn from this?
  >
  > */
73.
74.
75. /*3.c.i  ----------------------------------------------------------------
  > Estimate (2) by OLS without controls
  > We repeat part b only with randomly generated shocks g_k = open at the line level
  > */
```

```
 76.
 77. // Question: should I adjust probablity of opening by the number of links?
 78. // link stratified randomization? How do I force a positive relation between
 79. // L_k and propensity to get shocked? Not stratified for now.
 80. pause on

 81. set seed 154

 82. local T = 999

 83.
 84. use "$dta_loc/pset3_lines", clear

 85. count if open == 0 // get count of shocks to resample
       66

 86. local line_ct `r(N)' // 66

 87.
 88. forval t = 1/`T' {
    2.
 89.        dis "Simulation t = `t'"
    3.            dis "   - Randomize shocks"
    4.            // 0 randomize the shocks (line openings)
 90.        qui {
    5.
 91.                use "$dta_loc/pset3_lines", clear
    6.                isid lineid
    7.                // equal weights within nlinks
 92.                byso nlinks : gen rand = runiform()
    8.                sort nlinks rand
    9.
 93.                // keep number of open lines within nlinks levels
 94.                // For lines with multiple draws, keep higher draw
 95.                byso nlinks : egen open_ct = total(open)
   10.                sort nlinks rand
   11.                byso nlinks : egen rand_rank = rank(rand), field
   12.
 96.                // generate simulated shock
 97.                gen open_`t' = rand_rank <= open_ct
   13.                // confirm number of shocks generated equals original number
 98.                byso open_`t' : egen line_ct = rank(lineid), track
   14.                sort open_`t' line_ct
   15.
 99.                count if open_`t' == 0
   16.                assert `r(N)' == `line_ct'
   17.                sort lineid
   18.                drop open rand
   19.                rename open_`t' open
   20.                tempfile line_rand
   21.                save    `line_rand'
   22.            }
   23.
100         dis "   - Merge openness data"
   24.           qui {
   25.                // 1 Get list of cities with stations for lines open by 2016
101              use "$dta_loc/pset3_stations", clear
   26.                merge m:1 lineid using "`line_rand'", nogen assert(3) keepusing(o
  > pen)
   27.                byso cityid : egen open_i = max(open)
   28.                keep cityid open_i
   29.                duplicates drop
   30.                isid cityid
   31.                label var open_i "City has any station open by 2016"
   32.                tempfile city_wline_dta
   33.                save    `city_wline_dta'
   34.
```

```
102                   // 2 merge station dummy with matrix of cross-city distances
103                   use "$dta_loc/pset3_distances", clear // distance between cities
  35.                   rename cityid1 cityid
  36.                   merge m:1 cityid using `city_wline_dta', assert(1 3) nogen // no
> cities only in using
  37.                   replace open_i = 0 if open_i == .
  38.             }
  39.
104       dis "  - Find nearest distance to HSR city for each city"
  40.         qui {
  41.                   // 3 find ND (nearest distance)
105                   gen cond_dist = dist if open_i == 1
  42.                   sort cityid2 open_i cond_dist
  43.                   byso cityid2 : egen nd = min(cond_dist)
  44.                   gen lognd_`t' = log(nd)
  45.                   label var lognd_`t' "log nearest distance to city with HSR"
  46.
106                   // hist lognd
107                   keep cityid2 lognd_`t'
  47.                   duplicates drop
  48.                   isid cityid2
  49.                   rename cityid2 cityid
  50.         }
  51.
108       dis "  - Merge result `t'"
  52.         qui {
  53.                   tempfile lognd_dta_`t'
  54.                   save    `lognd_dta_`t''
  55.
109                   if `t' == 1 {
  56.                           use `lognd_dta_1', clear
  57.                           tempfile lognd_dta
  58.                           save    `lognd_dta', replace
  59.                   }
  60.                   else {
  61.                           use `lognd_dta'
  62.                           merge 1:1 cityid using `lognd_dta_`t'', assert(3) nogen
  63.                           tempfile lognd_dta
  64.                           save    `lognd_dta', replace
  65.                   }
  66.         }
  67. }
  Simulation t = 1
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 1
  Simulation t = 2
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 2
  Simulation t = 3
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 3
  Simulation t = 4
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 4
  Simulation t = 5
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 5
  Simulation t = 6
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 6
```

```
Simulation t = 7
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 7
Simulation t = 8
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 8
Simulation t = 9
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 9
Simulation t = 10
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 10
Simulation t = 11
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 11
Simulation t = 12
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 12
Simulation t = 13
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 13
Simulation t = 14
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 14
Simulation t = 15
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 15
Simulation t = 16
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 16
Simulation t = 17
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 17
Simulation t = 18
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 18
Simulation t = 19
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 19
Simulation t = 20
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 20
Simulation t = 21
   - Randomize shocks
```

```
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 21
Simulation t = 22
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 22
Simulation t = 23
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 23
Simulation t = 24
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 24
Simulation t = 25
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 25
Simulation t = 26
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 26
Simulation t = 27
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 27
Simulation t = 28
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 28
Simulation t = 29
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 29
Simulation t = 30
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 30
Simulation t = 31
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 31
Simulation t = 32
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 32
Simulation t = 33
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 33
Simulation t = 34
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 34
Simulation t = 35
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
```

```
   - Merge result 35
Simulation t = 36
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 36
Simulation t = 37
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 37
Simulation t = 38
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 38
Simulation t = 39
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 39
Simulation t = 40
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 40
Simulation t = 41
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 41
Simulation t = 42
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 42
Simulation t = 43
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 43
Simulation t = 44
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 44
Simulation t = 45
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 45
Simulation t = 46
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 46
Simulation t = 47
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 47
Simulation t = 48
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 48
Simulation t = 49
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 49
Simulation t = 50
```

```
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 50
Simulation t = 51
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 51
Simulation t = 52
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 52
Simulation t = 53
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 53
Simulation t = 54
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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Simulation t = 55
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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Simulation t = 56
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 56
Simulation t = 57
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 57
Simulation t = 58
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 58
Simulation t = 59
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 59
Simulation t = 60
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 60
Simulation t = 61
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 61
Simulation t = 62
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 62
Simulation t = 63
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 63
Simulation t = 64
   - Randomize shocks
   - Merge openness data
```

```
      - Find nearest distance to HSR city for each city
      - Merge result 64
Simulation t = 65
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 65
Simulation t = 66
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 66
Simulation t = 67
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 67
Simulation t = 68
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 68
Simulation t = 69
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 69
Simulation t = 70
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 70
Simulation t = 71
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 71
Simulation t = 72
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 72
Simulation t = 73
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 73
Simulation t = 74
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 74
Simulation t = 75
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 75
Simulation t = 76
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 76
Simulation t = 77
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 77
Simulation t = 78
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 78
```

```
Simulation t = 79
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 79
Simulation t = 80
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 80
Simulation t = 81
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 81
Simulation t = 82
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 82
Simulation t = 83
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 83
Simulation t = 84
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 84
Simulation t = 85
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 85
Simulation t = 86
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 86
Simulation t = 87
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 87
Simulation t = 88
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 88
Simulation t = 89
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 89
Simulation t = 90
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 90
Simulation t = 91
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 91
Simulation t = 92
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 92
Simulation t = 93
   - Randomize shocks
```

```
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 93
Simulation t = 94
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 94
Simulation t = 95
      - Randomize shocks
      - Merge openness data
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      - Find nearest distance to HSR city for each city
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      - Find nearest distance to HSR city for each city
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Simulation t = 107
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      - Find nearest distance to HSR city for each city
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Simulation t = 122
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        - Merge openness data
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Simulation t = 136
        - Randomize shocks
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Simulation t = 194
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Simulation t = 208
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Simulation t = 237
   - Randomize shocks
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Simulation t = 266
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   - Find nearest distance to HSR city for each city
   - Merge result 279
Simulation t = 280
   - Randomize shocks
   - Merge openness data
```

```
      - Find nearest distance to HSR city for each city
      - Merge result 280
Simulation t = 281
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 281
Simulation t = 282
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 282
Simulation t = 283
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 283
Simulation t = 284
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 284
Simulation t = 285
      - Randomize shocks
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      - Find nearest distance to HSR city for each city
      - Merge result 285
Simulation t = 286
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
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Simulation t = 287
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      - Find nearest distance to HSR city for each city
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Simulation t = 288
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
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Simulation t = 289
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
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Simulation t = 290
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
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Simulation t = 291
      - Randomize shocks
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      - Merge openness data
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Simulation t = 293
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 293
Simulation t = 294
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 294
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Simulation t = 295
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 295
Simulation t = 296
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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Simulation t = 297
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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Simulation t = 298
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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Simulation t = 299
   - Randomize shocks
   - Merge openness data
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Simulation t = 300
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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Simulation t = 301
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Simulation t = 307
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Simulation t = 308
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 308
Simulation t = 309
   - Randomize shocks
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    - Find nearest distance to HSR city for each city
    - Merge result 309
Simulation t = 310
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
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    - Find nearest distance to HSR city for each city
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Simulation t = 323
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
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   - Merge result 323
Simulation t = 324
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   - Merge result 337
Simulation t = 338
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        - Merge result 351
Simulation t = 352
        - Randomize shocks
        - Merge openness data
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      - Merge result 352
Simulation t = 353
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      - Merge result 366
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Simulation t = 367
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   - Merge result 367
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   - Find nearest distance to HSR city for each city
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Simulation t = 379
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Simulation t = 380
   - Randomize shocks
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   - Find nearest distance to HSR city for each city
   - Merge result 380
Simulation t = 381
   - Randomize shocks
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       - Merge openness data
       - Find nearest distance to HSR city for each city
       - Merge result 381
Simulation t = 382
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       - Merge openness data
       - Find nearest distance to HSR city for each city
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Simulation t = 383
       - Randomize shocks
       - Merge openness data
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Simulation t = 384
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       - Merge openness data
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Simulation t = 385
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       - Merge openness data
       - Find nearest distance to HSR city for each city
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       - Merge openness data
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Simulation t = 387
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       - Merge openness data
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Simulation t = 388
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       - Merge openness data
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       - Merge openness data
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Simulation t = 390
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       - Merge openness data
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       - Merge openness data
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Simulation t = 394
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       - Merge openness data
       - Find nearest distance to HSR city for each city
       - Merge result 394
Simulation t = 395
       - Randomize shocks
       - Merge openness data
       - Find nearest distance to HSR city for each city
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   - Merge result 395
Simulation t = 396
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Simulation t = 409
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   - Merge result 409
Simulation t = 410
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   - Merge openness data
   - Find nearest distance to HSR city for each city
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Simulation t = 424
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   - Merge openness data
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   - Merge result 424
Simulation t = 425
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Simulation t = 452
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   - Find nearest distance to HSR city for each city
   - Merge result 452
Simulation t = 453
   - Randomize shocks
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     - Merge openness data
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     - Merge result 453
Simulation t = 454
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     - Find nearest distance to HSR city for each city
     - Merge result 463
Simulation t = 464
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     - Merge openness data
     - Find nearest distance to HSR city for each city
     - Merge result 464
Simulation t = 465
     - Randomize shocks
     - Merge openness data
     - Find nearest distance to HSR city for each city
     - Merge result 465
Simulation t = 466
     - Randomize shocks
     - Merge openness data
     - Find nearest distance to HSR city for each city
     - Merge result 466
Simulation t = 467
     - Randomize shocks
     - Merge openness data
     - Find nearest distance to HSR city for each city

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   - Merge result 467
Simulation t = 468
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 468
Simulation t = 469
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   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 469
Simulation t = 470
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   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 470
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   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 471
Simulation t = 472
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 472
Simulation t = 473
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 473
Simulation t = 474
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 474
Simulation t = 475
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 475
Simulation t = 476
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 476
Simulation t = 477
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 477
Simulation t = 478
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 478
Simulation t = 479
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 479
Simulation t = 480
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 480
Simulation t = 481
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 481
Simulation t = 482
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      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 482
Simulation t = 483
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 483
Simulation t = 484
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 484
Simulation t = 485
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 485
Simulation t = 486
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      - Merge openness data
      - Find nearest distance to HSR city for each city
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Simulation t = 487
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      - Merge openness data
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Simulation t = 488
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      - Merge openness data
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      - Merge openness data
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Simulation t = 490
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      - Merge openness data
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      - Merge openness data
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      - Merge result 493
Simulation t = 494
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      - Find nearest distance to HSR city for each city
      - Merge result 494
Simulation t = 495
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 495
Simulation t = 496
      - Randomize shocks
      - Merge openness data
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     - Find nearest distance to HSR city for each city
     - Merge result 496
Simulation t = 497
     - Randomize shocks
     - Merge openness data
     - Find nearest distance to HSR city for each city
     - Merge result 497
Simulation t = 498
     - Randomize shocks
     - Merge openness data
     - Find nearest distance to HSR city for each city
     - Merge result 498
Simulation t = 499
     - Randomize shocks
     - Merge openness data
     - Find nearest distance to HSR city for each city
     - Merge result 499
Simulation t = 500
     - Randomize shocks
     - Merge openness data
     - Find nearest distance to HSR city for each city
     - Merge result 500
Simulation t = 501
     - Randomize shocks
     - Merge openness data
     - Find nearest distance to HSR city for each city
     - Merge result 501
Simulation t = 502
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     - Find nearest distance to HSR city for each city
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Simulation t = 503
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Simulation t = 504
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Simulation t = 506
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Simulation t = 507
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Simulation t = 508
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Simulation t = 509
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     - Merge openness data
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Simulation t = 510
     - Randomize shocks
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     - Find nearest distance to HSR city for each city
     - Merge result 510
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Simulation t = 511
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   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 511
Simulation t = 512
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   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 512
Simulation t = 513
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   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Find nearest distance to HSR city for each city
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   - Find nearest distance to HSR city for each city
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Simulation t = 516
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Simulation t = 523
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   - Merge result 523
Simulation t = 524
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   - Find nearest distance to HSR city for each city
   - Merge result 524
Simulation t = 525
   - Randomize shocks
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      - Find nearest distance to HSR city for each city
      - Merge result 525
Simulation t = 526
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      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 526
Simulation t = 527
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Simulation t = 528
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Simulation t = 538
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      - Merge result 538
Simulation t = 539
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      - Merge openness data
      - Find nearest distance to HSR city for each city
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   - Merge result 539
Simulation t = 540
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   - Merge result 540
Simulation t = 541
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Simulation t = 546
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Simulation t = 547
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Simulation t = 552
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   - Merge result 552
Simulation t = 553
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   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 553
Simulation t = 554
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 554
Simulation t = 555
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   - Merge openness data
   - Find nearest distance to HSR city for each city
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Simulation t = 556
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Simulation t = 558
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Simulation t = 564
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Simulation t = 566
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   - Merge result 566
Simulation t = 567
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 567
Simulation t = 568
   - Randomize shocks
   - Merge openness data
```

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   - Find nearest distance to HSR city for each city
   - Merge result 568
Simulation t = 569
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 569
Simulation t = 570
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   - Merge openness data
   - Find nearest distance to HSR city for each city
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Simulation t = 571
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Simulation t = 575
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Simulation t = 580
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Simulation t = 581
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Simulation t = 582
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   - Find nearest distance to HSR city for each city
   - Merge result 582
```

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Simulation t = 583
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   - Find nearest distance to HSR city for each city
   - Merge result 583
Simulation t = 584
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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Simulation t = 585
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   - Merge openness data
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Simulation t = 586
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Simulation t = 587
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Simulation t = 588
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Simulation t = 595
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   - Merge openness data
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   - Merge result 595
Simulation t = 596
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 596
Simulation t = 597
   - Randomize shocks
```

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   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 597
Simulation t = 598
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 598
Simulation t = 599
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   - Merge openness data
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   - Merge result 599
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   - Merge openness data
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Simulation t = 602
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   - Merge openness data
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Simulation t = 604
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Simulation t = 605
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Simulation t = 609
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   - Find nearest distance to HSR city for each city
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Simulation t = 610
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 610
Simulation t = 611
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Merge result 611
Simulation t = 612
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   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 612
Simulation t = 613
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Simulation t = 617
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Simulation t = 618
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   - Merge openness data
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   - Merge openness data
   - Find nearest distance to HSR city for each city
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Simulation t = 622
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 622
Simulation t = 623
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   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 623
Simulation t = 624
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 624
Simulation t = 625
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 625
Simulation t = 626
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     - Randomize shocks
     - Merge openness data
     - Find nearest distance to HSR city for each city
     - Merge result 626
Simulation t = 627
     - Randomize shocks
     - Merge openness data
     - Find nearest distance to HSR city for each city
     - Merge result 627
Simulation t = 628
     - Randomize shocks
     - Merge openness data
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     - Merge result 629
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     - Merge openness data
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Simulation t = 632
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     - Merge openness data
     - Find nearest distance to HSR city for each city
     - Merge result 632
Simulation t = 633
     - Randomize shocks
     - Merge openness data
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     - Merge result 633
Simulation t = 634
     - Randomize shocks
     - Merge openness data
     - Find nearest distance to HSR city for each city
     - Merge result 634
Simulation t = 635
     - Randomize shocks
     - Merge openness data
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     - Merge result 635
Simulation t = 636
     - Randomize shocks
     - Merge openness data
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     - Randomize shocks
     - Merge openness data
     - Find nearest distance to HSR city for each city
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Simulation t = 638
     - Randomize shocks
     - Merge openness data
     - Find nearest distance to HSR city for each city
     - Merge result 638
Simulation t = 639
     - Randomize shocks
     - Merge openness data
     - Find nearest distance to HSR city for each city
     - Merge result 639
Simulation t = 640
     - Randomize shocks
     - Merge openness data
```

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   - Find nearest distance to HSR city for each city
   - Merge result 640
Simulation t = 641
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 641
Simulation t = 642
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 642
Simulation t = 643
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   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 643
Simulation t = 644
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 644
Simulation t = 645
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 645
Simulation t = 646
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 646
Simulation t = 647
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 647
Simulation t = 648
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 648
Simulation t = 649
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 649
Simulation t = 650
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 650
Simulation t = 651
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 651
Simulation t = 652
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 652
Simulation t = 653
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 653
Simulation t = 654
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 654
```

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Simulation t = 655
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 655
Simulation t = 656
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 656
Simulation t = 657
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 657
Simulation t = 658
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 658
Simulation t = 659
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 659
Simulation t = 660
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 660
Simulation t = 661
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 661
Simulation t = 662
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 662
Simulation t = 663
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 663
Simulation t = 664
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 664
Simulation t = 665
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 665
Simulation t = 666
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 666
Simulation t = 667
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 667
Simulation t = 668
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 668
Simulation t = 669
   - Randomize shocks
```

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      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 669
Simulation t = 670
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 670
Simulation t = 671
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 671
Simulation t = 672
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 672
Simulation t = 673
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 673
Simulation t = 674
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 674
Simulation t = 675
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 675
Simulation t = 676
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 676
Simulation t = 677
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 677
Simulation t = 678
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 678
Simulation t = 679
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 679
Simulation t = 680
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 680
Simulation t = 681
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 681
Simulation t = 682
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 682
Simulation t = 683
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
```

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     - Merge result 683
Simulation t = 684
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 684
Simulation t = 685
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 685
Simulation t = 686
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 686
Simulation t = 687
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 687
Simulation t = 688
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 688
Simulation t = 689
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 689
Simulation t = 690
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 690
Simulation t = 691
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 691
Simulation t = 692
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 692
Simulation t = 693
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 693
Simulation t = 694
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 694
Simulation t = 695
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 695
Simulation t = 696
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 696
Simulation t = 697
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 697
Simulation t = 698
```

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    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 698
Simulation t = 699
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 699
Simulation t = 700
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 700
Simulation t = 701
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 701
Simulation t = 702
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 702
Simulation t = 703
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 703
Simulation t = 704
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 704
Simulation t = 705
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 705
Simulation t = 706
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 706
Simulation t = 707
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 707
Simulation t = 708
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 708
Simulation t = 709
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 709
Simulation t = 710
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 710
Simulation t = 711
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 711
Simulation t = 712
    - Randomize shocks
    - Merge openness data
```

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   - Find nearest distance to HSR city for each city
   - Merge result 712
Simulation t = 713
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 713
Simulation t = 714
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 714
Simulation t = 715
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 715
Simulation t = 716
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 716
Simulation t = 717
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 717
Simulation t = 718
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 718
Simulation t = 719
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 719
Simulation t = 720
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 720
Simulation t = 721
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 721
Simulation t = 722
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 722
Simulation t = 723
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 723
Simulation t = 724
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 724
Simulation t = 725
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 725
Simulation t = 726
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 726
```

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Simulation t = 727
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 727
Simulation t = 728
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 728
Simulation t = 729
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 729
Simulation t = 730
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 730
Simulation t = 731
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 731
Simulation t = 732
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 732
Simulation t = 733
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 733
Simulation t = 734
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 734
Simulation t = 735
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 735
Simulation t = 736
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 736
Simulation t = 737
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 737
Simulation t = 738
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 738
Simulation t = 739
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 739
Simulation t = 740
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 740
Simulation t = 741
   - Randomize shocks
```

```
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 741
Simulation t = 742
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 742
Simulation t = 743
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 743
Simulation t = 744
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 744
Simulation t = 745
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 745
Simulation t = 746
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 746
Simulation t = 747
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 747
Simulation t = 748
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 748
Simulation t = 749
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 749
Simulation t = 750
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 750
Simulation t = 751
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 751
Simulation t = 752
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 752
Simulation t = 753
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 753
Simulation t = 754
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 754
Simulation t = 755
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
```

```
   - Merge result 755
Simulation t = 756
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 756
Simulation t = 757
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 757
Simulation t = 758
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 758
Simulation t = 759
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 759
Simulation t = 760
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 760
Simulation t = 761
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 761
Simulation t = 762
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 762
Simulation t = 763
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 763
Simulation t = 764
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 764
Simulation t = 765
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 765
Simulation t = 766
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 766
Simulation t = 767
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 767
Simulation t = 768
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 768
Simulation t = 769
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 769
Simulation t = 770
```

```
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 770
Simulation t = 771
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 771
Simulation t = 772
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 772
Simulation t = 773
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 773
Simulation t = 774
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 774
Simulation t = 775
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 775
Simulation t = 776
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 776
Simulation t = 777
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 777
Simulation t = 778
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 778
Simulation t = 779
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 779
Simulation t = 780
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 780
Simulation t = 781
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 781
Simulation t = 782
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 782
Simulation t = 783
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 783
Simulation t = 784
   - Randomize shocks
   - Merge openness data
```

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   - Find nearest distance to HSR city for each city
   - Merge result 784
Simulation t = 785
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 785
Simulation t = 786
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 786
Simulation t = 787
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 787
Simulation t = 788
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 788
Simulation t = 789
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 789
Simulation t = 790
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 790
Simulation t = 791
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 791
Simulation t = 792
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 792
Simulation t = 793
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 793
Simulation t = 794
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 794
Simulation t = 795
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 795
Simulation t = 796
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 796
Simulation t = 797
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 797
Simulation t = 798
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 798
```

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Simulation t = 799
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 799
Simulation t = 800
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 800
Simulation t = 801
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 801
Simulation t = 802
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 802
Simulation t = 803
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 803
Simulation t = 804
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 804
Simulation t = 805
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 805
Simulation t = 806
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 806
Simulation t = 807
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 807
Simulation t = 808
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 808
Simulation t = 809
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 809
Simulation t = 810
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 810
Simulation t = 811
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 811
Simulation t = 812
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 812
Simulation t = 813
   - Randomize shocks
```

```
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 813
Simulation t = 814
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 814
Simulation t = 815
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 815
Simulation t = 816
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 816
Simulation t = 817
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 817
Simulation t = 818
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 818
Simulation t = 819
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 819
Simulation t = 820
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 820
Simulation t = 821
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 821
Simulation t = 822
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 822
Simulation t = 823
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 823
Simulation t = 824
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 824
Simulation t = 825
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 825
Simulation t = 826
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 826
Simulation t = 827
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
```

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      - Merge result 827
Simulation t = 828
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 828
Simulation t = 829
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 829
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 830
Simulation t = 831
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 831
Simulation t = 832
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 832
Simulation t = 833
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 833
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 834
Simulation t = 835
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 835
Simulation t = 836
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 837
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 838
Simulation t = 839
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 839
Simulation t = 840
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 840
Simulation t = 841
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 841
Simulation t = 842
```

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       - Randomize shocks
       - Merge openness data
       - Find nearest distance to HSR city for each city
       - Merge result 842
Simulation t = 843
       - Randomize shocks
       - Merge openness data
       - Find nearest distance to HSR city for each city
       - Merge result 843
Simulation t = 844
       - Randomize shocks
       - Merge openness data
       - Find nearest distance to HSR city for each city
       - Merge result 844
Simulation t = 845
       - Randomize shocks
       - Merge openness data
       - Find nearest distance to HSR city for each city
       - Merge result 845
Simulation t = 846
       - Randomize shocks
       - Merge openness data
       - Find nearest distance to HSR city for each city
       - Merge result 846
Simulation t = 847
       - Randomize shocks
       - Merge openness data
       - Find nearest distance to HSR city for each city
       - Merge result 847
Simulation t = 848
       - Randomize shocks
       - Merge openness data
       - Find nearest distance to HSR city for each city
       - Merge result 848
Simulation t = 849
       - Randomize shocks
       - Merge openness data
       - Find nearest distance to HSR city for each city
       - Merge result 849
Simulation t = 850
       - Randomize shocks
       - Merge openness data
       - Find nearest distance to HSR city for each city
       - Merge result 850
Simulation t = 851
       - Randomize shocks
       - Merge openness data
       - Find nearest distance to HSR city for each city
       - Merge result 851
Simulation t = 852
       - Randomize shocks
       - Merge openness data
       - Find nearest distance to HSR city for each city
       - Merge result 852
Simulation t = 853
       - Randomize shocks
       - Merge openness data
       - Find nearest distance to HSR city for each city
       - Merge result 853
Simulation t = 854
       - Randomize shocks
       - Merge openness data
       - Find nearest distance to HSR city for each city
       - Merge result 854
Simulation t = 855
       - Randomize shocks
       - Merge openness data
       - Find nearest distance to HSR city for each city
       - Merge result 855
Simulation t = 856
       - Randomize shocks
       - Merge openness data
```

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  - Find nearest distance to HSR city for each city
  - Merge result 856
Simulation t = 857
  - Randomize shocks
  - Merge openness data
  - Find nearest distance to HSR city for each city
  - Merge result 857
Simulation t = 858
  - Randomize shocks
  - Merge openness data
  - Find nearest distance to HSR city for each city
  - Merge result 858
Simulation t = 859
  - Randomize shocks
  - Merge openness data
  - Find nearest distance to HSR city for each city
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  - Randomize shocks
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  - Merge openness data
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  - Find nearest distance to HSR city for each city
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  - Merge openness data
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  - Merge openness data
  - Find nearest distance to HSR city for each city
  - Merge result 864
Simulation t = 865
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  - Find nearest distance to HSR city for each city
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  - Merge openness data
  - Find nearest distance to HSR city for each city
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  - Randomize shocks
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  - Merge openness data
  - Find nearest distance to HSR city for each city
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  - Merge openness data
  - Find nearest distance to HSR city for each city
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Simulation t = 870
  - Randomize shocks
  - Merge openness data
  - Find nearest distance to HSR city for each city
  - Merge result 870
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Simulation t = 871
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 871
Simulation t = 872
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Find nearest distance to HSR city for each city
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 883
Simulation t = 884
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 884
Simulation t = 885
   - Randomize shocks
```

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   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 885
Simulation t = 886
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 886
Simulation t = 887
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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Simulation t = 888
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 888
Simulation t = 889
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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Simulation t = 890
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Merge openness data
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Simulation t = 893
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   - Find nearest distance to HSR city for each city
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   - Merge openness data
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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Simulation t = 898
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 898
Simulation t = 899
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
```

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      - Merge result 899
Simulation t = 900
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 900
Simulation t = 901
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 901
Simulation t = 902
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 902
Simulation t = 903
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 903
Simulation t = 904
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 904
Simulation t = 905
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 905
Simulation t = 906
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 906
Simulation t = 907
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 907
Simulation t = 908
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 908
Simulation t = 909
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 909
Simulation t = 910
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 910
Simulation t = 911
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 911
Simulation t = 912
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 912
Simulation t = 913
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 913
Simulation t = 914
```

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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 914
Simulation t = 915
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 915
Simulation t = 916
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 916
Simulation t = 917
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 917
Simulation t = 918
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 918
Simulation t = 919
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 919
Simulation t = 920
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 920
Simulation t = 921
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 921
Simulation t = 922
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 922
Simulation t = 923
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 923
Simulation t = 924
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 924
Simulation t = 925
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 925
Simulation t = 926
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 926
Simulation t = 927
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 927
Simulation t = 928
   - Randomize shocks
   - Merge openness data
```

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      - Find nearest distance to HSR city for each city
      - Merge result 928
Simulation t = 929
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 929
Simulation t = 930
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 930
Simulation t = 931
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 931
Simulation t = 932
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 932
Simulation t = 933
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 933
Simulation t = 934
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 934
Simulation t = 935
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 935
Simulation t = 936
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 936
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      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 937
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      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 938
Simulation t = 939
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 939
Simulation t = 940
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 940
Simulation t = 941
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 941
Simulation t = 942
      - Randomize shocks
      - Merge openness data
      - Find nearest distance to HSR city for each city
      - Merge result 942
```

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Simulation t = 943
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 943
Simulation t = 944
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 944
Simulation t = 945
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 945
Simulation t = 946
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 946
Simulation t = 947
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 947
Simulation t = 948
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 948
Simulation t = 949
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 949
Simulation t = 950
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 950
Simulation t = 951
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 951
Simulation t = 952
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 952
Simulation t = 953
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 953
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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Simulation t = 955
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 955
Simulation t = 956
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 956
Simulation t = 957
   - Randomize shocks
```

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   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 957
Simulation t = 958
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 958
Simulation t = 959
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Randomize shocks
   - Merge openness data
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 964
Simulation t = 965
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 970
Simulation t = 971
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
```

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        - Merge result 971
Simulation t = 972
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 972
Simulation t = 973
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Merge openness data
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   - Merge result 978
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   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Find nearest distance to HSR city for each city
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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   - Randomize shocks
   - Merge openness data
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   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
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Simulation t = 984
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 984
Simulation t = 985
   - Randomize shocks
   - Merge openness data
   - Find nearest distance to HSR city for each city
   - Merge result 985
Simulation t = 986
```

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    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 986
Simulation t = 987
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 987
Simulation t = 988
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
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    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
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    - Randomize shocks
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    - Randomize shocks
    - Merge openness data
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    - Merge result 991
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    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
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    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
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    - Merge openness data
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    - Randomize shocks
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    - Merge openness data
    - Find nearest distance to HSR city for each city
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Simulation t = 998
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 998
Simulation t = 999
    - Randomize shocks
    - Merge openness data
    - Find nearest distance to HSR city for each city
    - Merge result 999
```

```
110
111
112
113 // save
114 compress
    (0 bytes saved)

115 save "$dta_loc/q3c_lognd_i", replace
  file //Client/C$/Users/yfkas/Dropbox (Personal)/ARE213/Pset3/data/q3c_lognd_i.dta save
  > d

116
117
118
119
120
121
122
  end of do-file

123 do "$do_loc/Code/02_q3cii.do"

124 /*
  > Title:          02_q3c.do
  > Purpose:        Question 3.c, PSet 3
  >
  > Outline: Question 3.c.ii
  >
  > Briefly describe how Assumptions A1-A3 allow you to construct
  > counterfactual 2016 railway networks (i.e., sets of lines) that
  > were as likely to have happened as the realized network.
  >
  > c.ii
  > Report two corrected estimates of τ2: recentering by and controlling for μi.
  > Are they very different from your estimate in 3(b)?
  > What do you learn from this?
  >
  > */
125
126 /*3.c.ii -----------------------------------------------------------------
  > Estimate (2) by OLS without controls */
127
128 eststo clear

129 use "$dta_loc/q3c_lognd_i", clear

130
131 egen mu_i = rowmean(lognd_*)

132 label var mu_i "Expected log nearest distance"

133 drop lognd_*

134
135 // merge lognd from 3b
136 merge 1:1 cityid using "$dta_loc/q3b_lognd", keepusing(lognd) assert(3) nogen
```

Result	# of obs.
not matched	0
matched	340

```
137 // merge dependent variable
138 merge 1:1 cityid using "$dta_loc/pset3_cities", nogen assert(3)
```

Result	# of obs.
not matched	0
matched	340

```
139
140 // Approach 1: demeaned
141 gen ztilde = lognd-mu_i

142 label var lognd "Log nearest distance"

143 label var ztilde "Log nearest distance (recentered)"

144 label var empgrowth "Employment growth"

145
146
147 /*Regressions ---------------------------------------------------------------
  > */
148
149 // Approach 0: recall 3b results
150 eststo: reg empgrowth lognd
```

Source	SS	df	MS		Number of obs	=	275
					F(1, 273)	=	38.05
Model	2.19897546	1	2.19897546		Prob > F	=	0.0000
Residual	15.7773816	273	.057792607		R-squared	=	0.1223
					Adj R-squared	=	0.1191
Total	17.976357	274	.065607143		Root MSE	=	.2404

empgrowth	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
lognd	-.1331077	.0215789	-6.17	0.000	-.1755898	-.0906255
_cons	.8279967	.0922075	8.98	0.000	.6464686	1.009525

(**est1** stored)

```
151
152 // Approach 1: demeaned
153 eststo: reg empgrowth ztilde // recentering
```

Source	SS	df	MS		Number of obs	=	275
					F(1, 273)	=	9.31
Model	.593007441	1	.593007441		Prob > F	=	0.0025
Residual	17.3833496	273	.063675273		R-squared	=	0.0330
					Adj R-squared	=	0.0294
Total	17.976357	274	.065607143		Root MSE	=	.25234

empgrowth	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
ztilde	-.1474426	.0483146	-3.05	0.002	-.2425592	-.0523261
_cons	.2678817	.0152255	17.59	0.000	.2379073	.297856

(**est2** stored)

```
154
155 // Approach 2: control function
156 ststo: reg empgrowth lognd mu_i // controlling
```

Source	SS	df	MS
Model	2.2159479	2	1.10797395
Residual	15.7604091	272	.057942681
Total	17.976357	274	.065607143

```
Number of obs   =        275
F(2, 272)       =      19.12
Prob > F        =     0.0000
R-squared       =     0.1233
Adj R-squared   =     0.1168
Root MSE        =     .24071
```

empgrowth	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
lognd	-.1107576	.0466068	-2.38	0.018	-.2025136	-.0190017
mu_i	-.0309002	.0570938	-0.54	0.589	-.1433021	.0815017
_cons	.8637452	.1135216	7.61	0.000	.6402525	1.087238

(**est3** stored)

```
157
158 // Q3 table
159 esttab using "$do_loc/Tables/table_3c.tex",                    ///
  >         style(tex)
  >                     ///
  >         nogaps
  >                     ///
  >         nobaselevels
  >            ///
  >         label
  >            ///
  >         varwidth(50)
  >            ///
  >         wrap
  >                     ///
  >         cells (b(fmt(2)) se(fmt(2) par))                              ///
  >         stats(N,
  >                     ///
  >                fmt(%9.0f)
  >            ///
  >                labels("Observations"))        ///
  >         eqlabel(none) ///
  >         replace
  (output written to //Client/C$/Users/yfkas/Documents/GitHub/ARE213_Fall2023/PSet_3/Sta
  > ta/Tables/table_3c.tex)

160
161
162
163
164
  end of do-file

165
166
167
168 log close
        name:  <unnamed>
         log:  //Client/C$/Users/yfkas/Documents/GitHub/ARE213_Fall2023/PSet 3/Stata/pse
  > t3_logfile.smcl
    log type:  smcl
   closed on:  20 Nov 2023, 12:31:12
```