



Project: Monthly 2021

```
1 . import excel "C:\Users\loren\OneDrive - Politecnico di Torino\Tesi magistrale\Lorenzo\STA
> TA\Matrice W.xlsx", sheet("Monthly 2021 bilanciato") firstrow clear
(4 vars, 643 obs)
```

```
2 . do "C:\Users\loren\OneDrive - Politecnico di Torino\Tesi magistrale\Lorenzo\STATA\Matrice
> W.do"
```

```
3 . duplicates report Longitude Latitude, inspect
```

Duplicates in terms of **Longitude Latitude**

copies	observations	surplus
1	584	0
2	22	11
3	21	14
4	16	12

```
4 . duplicates tag Longitude Latitude, gen(tag)
```

Duplicates in terms of **Longitude Latitude**

```
5 . set seed 10000
```

```
6 . gen double shuffle1 = runiform(0.00000001,0.00000002)
```

```
7 . replace Longitude = Longitude +shuffle1 if tag>0
(59 real changes made)
```

```
8 . replace Latitude = Latitude +shuffle1 if tag>0
(59 real changes made)
```

```
9 . spset PropertyID, coord(Longitude Latitude) coordsys(latlong, kilometers)
    Sp dataset
           data: cross sectional
    spatial-unit id: _ID (equal to PropertyID)
           coordinates: _CY, _CX (latitude-and-longitude, kilometers)
    linked shapefile: none
```

```
10 . spmatrix create idistance W, vtruncate(0.125) normalize(row)
    weighting matrix W already exists
    r(110);
```

end of do-file

r(110);

```
11 . import excel "C:\Users\loren\OneDrive - Politecnico di Torino\Tesi magistrale\Lorenzo\STA
> TA\Dataset 2021 bilanciato con dummy.xlsx", sheet("Monthly 2021 con variabili") firstrow
> clear
(29 vars, 7,716 obs)
```

```
12 . import excel "C:\Users\loren\OneDrive - Politecnico di Torino\Tesi magistrale\Lorenzo\STA
> TA\Dataset 2021 bilanciato con dummy.xlsx", sheet("Monthly 2021 con variabili") firstrow
> clear
(29 vars, 7,716 obs)
```

```
13 . do "C:\Users\loren\OneDrive - Politecnico di Torino\Tesi magistrale\Lorenzo\STATA\STATA s
> pxtregress con variabili aggiuntive.do"
```

14 . describe

Contains data

obs: 7,716

vars: 29

variable name	storage type	display format	value label	variable label
PropertyID	long	%10.0g		Property ID
ReportingMonth	long	%10.0g		Reporting Month
Febbraio	byte	%10.0g		Febbraio
Marzo	byte	%10.0g		Marzo
Aprile	byte	%10.0g		Aprile
Maggio	byte	%10.0g		Maggio
Giugno	byte	%10.0g		Giugno
Luglio	byte	%10.0g		Luglio
Agosto	byte	%10.0g		Agosto
Settembre	byte	%10.0g		Settembre
Ottobre	byte	%10.0g		Ottobre
Novembre	byte	%10.0g		Novembre
Dicembre	byte	%10.0g		Dicembre
ADR	double	%10.0g		ADR
OCR	double	%10.0g		OCR
Latitude	double	%10.0g		Latitude
Longitude	double	%10.0g		Longitude
MaxGuest	byte	%10.0g		MaxGuest
Review	int	%10.0g		Review
HostID	long	%10.0g		HostID
Numerodipropert	byte	%10.0g		Numero di property dell'host
Multihost	byte	%10.0g		Multihost
SuperMultihost	byte	%10.0g		SuperMultihost
PrivateRoom	byte	%10.0g		PrivateRoom
Home	byte	%10.0g		Home
Hotel	byte	%10.0g		Hotel
SharedRoom	byte	%10.0g		SharedRoom
Centro	byte	%10.0g		Centro
District	str51	%51s		District

Sorted by:

Note: Dataset has changed since last saved.

15 . assert PropertyID!=.

16 . assert ReportingMonth!=.

17 . bysort PropertyID ReportingMonth: assert _N==1

18 . xtset, clear

19 . xtset PropertyID ReportingMonth
 panel variable: **PropertyID (strongly balanced)**
 time variable: **ReportingMonth, 44197 to 44531, but with gaps**
 delta: **1 unit**

20 . bysort PropertyID (ReportingMonth): assert Latitude == Latitude[1]

21 . bysort PropertyID (ReportingMonth): assert Longitude == Longitude[1]

22 . spbalance, balance
 (data already strongly balanced)

23 . duplicates report Longitude Latitude, inspect

Duplicates in terms of **Longitude Latitude**

copies	observations	surplus
12	7008	6424
24	264	253
36	252	245
48	192	188

24 . duplicates tag Longitude Latitude, gen(tag)

Duplicates in terms of **Longitude Latitude**

25 . set seed 10000

26 . gen double shuffle1 = runiform(0.00000001,0.00000002)

27 . replace Longitude = Longitude +shuffle1 if tag>0
(7,716 real changes made)

28 . replace Latitude = Latitude +shuffle1 if tag>0
(7,716 real changes made)

29 . spset PropertyID, coord(Longitude Latitude) coordsys(latlong, kilometers)
Sp dataset
 data: panel
 spatial-unit id: _ID (equal to PropertyID)
 time id: ReportingMonth (see xtset)
 coordinates: _CY, _CX (latitude-and-longitude, kilometers)
 linked shapefile: none

30 . spxtregress OCR ADR Febbraio Marzo Aprile Maggio Giugno Luglio Agosto Settembre Ottobre N
> ovembre Dicembre MaxGuest Review Centro Multihost SuperMultihost PrivateRoom Home Hotel,
> re dvarlag(W) ivarlag(W: ADR)
(7716 observations)
(7716 observations used)
(data contain 643 panels (places))
(weighting matrix defines 643 places)

Fitting starting values:

Iteration 0: log likelihood = **1805.2426**
Iteration 1: log likelihood = **1805.2994**
Iteration 2: log likelihood = **1805.2994**

Optimizing concentrated log likelihood:

initial: log likelihood = **1390.4902**
improve: log likelihood = **1390.4902**
rescale: log likelihood = **1390.4902**
rescale eq: log likelihood = **1390.4902**
Iteration 0: log likelihood = **1390.4902**
Iteration 1: log likelihood = **1393.7839**
Iteration 2: log likelihood = **1393.919**
Iteration 3: log likelihood = **1393.9191**

Optimizing unconcentrated log likelihood:

Iteration 0: log likelihood = **1393.9191**
Iteration 1: log likelihood = **1393.9191** (backed up)

Random-effects spatial regression	Number of obs	=	7,716
Group variable: PropertyID	Number of groups	=	643
	Obs per group	=	12

	Wald chi2(22)	=	6869.17
	Prob > chi2	=	0.0000
Log likelihood = 1393.9191	Pseudo R2	=	0.4516

OCR	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
OCR						
ADR	.0013763	.0000419	32.86	0.000	.0012942	.0014584
Febbraio	.0026708	.0104468	0.26	0.798	-.0178046	.0231462
Marzo	.0084287	.0104501	0.81	0.420	-.0120532	.0289106
Aprile	.0038353	.0104578	0.37	0.714	-.0166615	.0243321
Maggio	.0127193	.0105316	1.21	0.227	-.0079222	.0333608
Giugno	.0684564	.0114378	5.99	0.000	.0460386	.0908742
Luglio	.1775019	.0138038	12.86	0.000	.1504469	.2045569
Agosto	.3445672	.0196069	17.57	0.000	.3061384	.382996
Settembre	.1649581	.0131795	12.52	0.000	.1391268	.1907894
Ottobre	.1085795	.0116172	9.35	0.000	.0858103	.1313488
Novembre	.0701028	.0108638	6.45	0.000	.0488101	.0913955
Dicembre	.0361496	.0109485	3.30	0.001	.0146909	.0576082
MaxGuest	-.014741	.0029366	-5.02	0.000	-.0204967	-.0089853
Review	.0018243	.0001594	11.45	0.000	.0015119	.0021366
Centro	-.0381358	.0109813	-3.47	0.001	-.0596588	-.0166128
Multihost	.0254283	.0136253	1.87	0.062	-.0012767	.0521333
SuperMultihost	.0380721	.0132403	2.88	0.004	.0121216	.0640226
PrivateRoom	.1688083	.1329752	1.27	0.204	-.0918183	.429435
Home	.1690366	.1328771	1.27	0.203	-.0913977	.429471
Hotel	.2548483	.1351409	1.89	0.059	-.010023	.5197196
_cons	-.1347585	.133827	-1.01	0.314	-.3970545	.1275376
W						
ADR	-.0001166	.0001497	-0.78	0.436	-.0004101	.0001768
OCR	.1983505	.0260277	7.62	0.000	.1473371	.2493638
/sigma_u	.1205144	.0040495			.1128332	.1287184
/sigma_e	.1871896	.0015767			.1841248	.1903055

Wald test of spatial terms: chi2(2) = 59.10 Prob > chi2 = 0.0000

31 . estat impact

progress : 5% 10% 15% 20% 25% 30% 35% 40% 45% 50% 55% 60%
65% 70% 75% 80% 85% 90% 95% 100%

Average impacts Number of obs = 7,716

	Delta-Method		z	P> z	[95% Conf. Interval]	
	dy/dx	Std. Err.				
direct						
ADR	.0013788	.0000419	32.89	0.000	.0012966	.001461
Febbraio	.0026794	.0104805	0.26	0.798	-.0178619	.0232207
Marzo	.0084558	.0104837	0.81	0.420	-.0120918	.0290035
Aprile	.0038477	.0104914	0.37	0.714	-.016715	.0244104
Maggio	.0127603	.0105649	1.21	0.227	-.0079465	.0334671
Giugno	.068677	.0114607	5.99	0.000	.0462144	.0911396
Luglio	.1780739	.0137754	12.93	0.000	.1510746	.2050731
Agosto	.3456776	.019481	17.74	0.000	.3074955	.3838597
Settembre	.1654897	.0131536	12.58	0.000	.139709	.1912703
Ottobre	.1089294	.0116204	9.37	0.000	.0861538	.131705
Novembre	.0703287	.0108843	6.46	0.000	.0489959	.0916615
Dicembre	.036266	.0109796	3.30	0.001	.0147465	.0577856
MaxGuest	-.0147885	.002946	-5.02	0.000	-.0205627	-.0090144
Review	.0018301	.0001598	11.45	0.000	.0015169	.0021434
Centro	-.0382587	.0110166	-3.47	0.001	-.0598509	-.0166666
Multihost	.0255103	.0136693	1.87	0.062	-.0012811	.0523017
SuperMultihost	.0381948	.0132823	2.88	0.004	.0121619	.0642276
PrivateRoom	.1693523	.1334037	1.27	0.204	-.0921142	.4308188
Home	.1695813	.1333054	1.27	0.203	-.0916925	.4308552
Hotel	.2556695	.1355765	1.89	0.059	-.0100555	.5213946
indirect						
ADR	.0001925	.0001791	1.07	0.282	-.0001585	.0005435
Febbraio	.0006522	.0025518	0.26	0.798	-.0043491	.0056536
Marzo	.0020583	.0025676	0.80	0.423	-.0029741	.0070908
Aprile	.0009366	.0025543	0.37	0.714	-.0040697	.0059429

Wald chi2(14) = 6428.42
 Prob > chi2 = 0.0000
 Pseudo R2 = 0.3902

Log likelihood = 1805.2994

OCR	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
OCR						
ADR	.0013241	.0000447	29.61	0.000	.0012364	.0014117
Febbraio	.0028165	.0104452	0.27	0.787	-.0176556	.0232886
Marzo	.0081325	.010449	0.78	0.436	-.0123472	.0286122
Aprile	.0034025	.0104579	0.33	0.745	-.0170946	.0238995
Maggio	.0130205	.0105466	1.23	0.217	-.0076505	.0336916
Giugno	.0691493	.0116039	5.96	0.000	.0464061	.0918925
Luglio	.1779193	.0142477	12.49	0.000	.1499945	.2058442
Agosto	.3450983	.0206262	16.73	0.000	.3046717	.3855249
Settembre	.1647962	.0135212	12.19	0.000	.1382952	.1912972
Ottobre	.1081782	.0117609	9.20	0.000	.0851272	.1312292
Novembre	.0696779	.0109121	6.39	0.000	.0482906	.0910653
Dicembre	.0368528	.011042	3.34	0.001	.0152109	.0584947
MaxGuest	0	(omitted)				
Review	0	(omitted)				
Centro	0	(omitted)				
Multihost	0	(omitted)				
SuperMultihost	0	(omitted)				
PrivateRoom	0	(omitted)				
Home	0	(omitted)				
Hotel	0	(omitted)				
W						
ADR	-.0001542	.0001642	-0.94	0.348	-.0004759	.0001676
OCR	.2091149	.0270143	7.74	0.000	.1561678	.2620619
/sigma_e	.1871353	.0015758			.1840721	.1902495

Wald test of spatial terms: chi2(2) = 60.43 Prob > chi2 = 0.0000

35 . estimates store fixed

36 . hausman fixed random

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fixed	(B) random		
ADR	.0013241	.0013763	-.0000522	.0000157
Febbraio	.0028165	.0026708	.0001457	.
Marzo	.0081325	.0084287	-.0002962	.
Aprile	.0034025	.0038353	-.0004328	.000047
Maggio	.0130205	.0127193	.0003012	.0005637
Giugno	.0691493	.0684564	.0006929	.0019559
Luglio	.1779193	.1775019	.0004175	.0035285
Agosto	.3450983	.3445672	.000531	.0064039
Settembre	.1647962	.1649581	-.000162	.0030204
Ottobre	.1081782	.1085795	-.0004013	.0018331
Novembre	.0696779	.0701028	-.0004248	.0010256
Dicembre	.0368528	.0361496	.0007032	.0014336

b = consistent under Ho and Ha; obtained from spxtregress
 B = inconsistent under Ha, efficient under Ho; obtained from spxtregress

Test: Ho: difference in coefficients not systematic

chi2(12) = (b-B)'[(V_b-V_B)^(-1)](b-B)
 = 14.00
 Prob>chi2 = 0.3010
 (V_b-V_B is not positive definite)

37 . moransi ADR, lat(Latitude) lon(Longitude) swm(pow 2) dist(.) dunit(km)
Size of spatial weight matrix: **7716 * 7716**

Completed: 10%
Completed: 20%
Completed: 30%
Completed: 40%
Completed: 50%
Completed: 60%
Completed: 70%
Completed: 80%
Completed: 90%
Completed: 100%

Distance by Vincenty formula (unit: km)

Moran's I Statistic Number of Obs = **7716**

Variable	Moran's I	E(I)	SE(I)	Z(I)	p-value
ADR	0.43038	-0.00013	0.01159	37.13424	0.00000

Null Hypothesis: Spatial Randomization

38 . moransi ADR if Febbraio==1, lat(Latitude) lon(Longitude) swm(pow 2) dist(.) dunit(km)
Size of spatial weight matrix: **643 * 643**

Completed: 10%
Completed: 20%
Completed: 30%
Completed: 40%
Completed: 50%
Completed: 60%
Completed: 70%
Completed: 80%
Completed: 90%
Completed: 100%

Distance by Vincenty formula (unit: km)

Moran's I Statistic Number of Obs = **643**

Variable	Moran's I	E(I)	SE(I)	Z(I)	p-value
ADR	0.04585	-0.00156	0.02349	2.01839	0.04355

Null Hypothesis: Spatial Randomization

39 . moransi ADR if Marzo==1, lat(Latitude) lon(Longitude) swm(pow 2) dist(.) dunit(km)
Size of spatial weight matrix: **643 * 643**

Completed: 10%
Completed: 20%
Completed: 30%
Completed: 40%
Completed: 50%
Completed: 60%
Completed: 70%
Completed: 80%
Completed: 90%
Completed: 100%

Distance by Vincenty formula (unit: km)

Moran's I Statistic Number of Obs = 643

Variable	Moran's I	E(I)	SE(I)	Z(I)	p-value
ADR	0.03581	-0.00156	0.02464	1.51624	0.12946

Null Hypothesis: Spatial Randomization

40 . moransi ADR if Aprile==1, lat(Latitude) lon(Longitude) swm(pow 2) dist(.) dunit(km)
Size of spatial weight matrix: 643 * 643

Completed: 10%
Completed: 20%
Completed: 30%
Completed: 40%
Completed: 50%
Completed: 60%
Completed: 70%
Completed: 80%
Completed: 90%
Completed: 100%

Distance by Vincenty formula (unit: km)

Moran's I Statistic Number of Obs = 643

Variable	Moran's I	E(I)	SE(I)	Z(I)	p-value
ADR	0.04680	-0.00156	0.02436	1.98521	0.04712

Null Hypothesis: Spatial Randomization

41 . moransi ADR if Maggio==1, lat(Latitude) lon(Longitude) swm(pow 2) dist(.) dunit(km)
Size of spatial weight matrix: 643 * 643

Completed: 10%
Completed: 20%
Completed: 30%
Completed: 40%
Completed: 50%
Completed: 60%
Completed: 70%
Completed: 80%
Completed: 90%
Completed: 100%

Distance by Vincenty formula (unit: km)

Moran's I Statistic Number of Obs = 643

Variable	Moran's I	E(I)	SE(I)	Z(I)	p-value
ADR	0.05550	-0.00156	0.02494	2.28816	0.02213

Null Hypothesis: Spatial Randomization

42 . moransi ADR if Giugno==1, lat(Latitude) lon(Longitude) swm(pow 2) dist(.) dunit(km)
Size of spatial weight matrix: 643 * 643

Completed: 10%
Completed: 20%
Completed: 30%
Completed: 40%
Completed: 50%
Completed: 60%
Completed: 70%
Completed: 80%
Completed: 90%
Completed: 100%

Distance by Vincenty formula (unit: km)

Moran's I Statistic Number of Obs = 643

Variable	Moran's I	E(I)	SE(I)	Z(I)	p-value
ADR	0.06371	-0.00156	0.02493	2.61822	0.00884

Null Hypothesis: Spatial Randomization

43 . moransi ADR if Luglio==1, lat(Latitude) lon(Longitude) swm(pow 2) dist(.) dunit(km)
Size of spatial weight matrix: 643 * 643

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Completed: 10%
Completed: 20%
Completed: 30%
Completed: 40%
Completed: 50%
Completed: 60%
Completed: 70%
Completed: 80%
Completed: 90%
Completed: 100%
```

Distance by Vincenty formula (unit: km)

Moran's I Statistic Number of Obs = 643

Variable	Moran's I	E(I)	SE(I)	Z(I)	p-value
ADR	0.04340	-0.00156	0.02490	1.80516	0.07105

Null Hypothesis: Spatial Randomization

44 . moransi ADR if Agosto==1, lat(Latitude) lon(Longitude) swm(pow 2) dist(.) dunit(km)
Size of spatial weight matrix: 643 * 643

```
Completed: 10%
Completed: 20%
Completed: 30%
Completed: 40%
Completed: 50%
Completed: 60%
Completed: 70%
Completed: 80%
Completed: 90%
Completed: 100%
```

Distance by Vincenty formula (unit: km)

Moran's I Statistic Number of Obs = 643

Variable	Moran's I	E(I)	SE(I)	Z(I)	p-value
ADR	0.03677	-0.00156	0.02504	1.53093	0.12579

Null Hypothesis: Spatial Randomization

45 . moransi ADR if Settembre==1, lat(Latitude) lon(Longitude) swm(pow 2) dist(.) dunit(km)
Size of spatial weight matrix: 643 * 643

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Completed: 10%
Completed: 20%
Completed: 30%
Completed: 40%
Completed: 50%
Completed: 60%
Completed: 70%
Completed: 80%
Completed: 90%
Completed: 100%
```

Distance by Vincenty formula (unit: km)

Moran's I Statistic					Number of Obs = 643
Variable	Moran's I	E(I)	SE(I)	Z(I)	p-value
ADR	0.06647	-0.00156	0.02477	2.74686	0.00602

Null Hypothesis: Spatial Randomization

46 . moransi ADR if Ottobre==1, lat(Latitude) lon(Longitude) swm(pow 2) dist(.) dunit(km)
Size of spatial weight matrix: **643 * 643**

Completed: 10%
Completed: 20%
Completed: 30%
Completed: 40%
Completed: 50%
Completed: 60%
Completed: 70%
Completed: 80%
Completed: 90%
Completed: 100%

Distance by Vincenty formula (unit: km)

Moran's I Statistic					Number of Obs = 643
Variable	Moran's I	E(I)	SE(I)	Z(I)	p-value
ADR	0.07046	-0.00156	0.02484	2.89892	0.00374

Null Hypothesis: Spatial Randomization

47 . moransi ADR if Novembre==1, lat(Latitude) lon(Longitude) swm(pow 2) dist(.) dunit(km)
Size of spatial weight matrix: **643 * 643**

Completed: 10%
Completed: 20%
Completed: 30%
Completed: 40%
Completed: 50%
Completed: 60%
Completed: 70%
Completed: 80%
Completed: 90%
Completed: 100%

Distance by Vincenty formula (unit: km)

Moran's I Statistic					Number of Obs = 643
Variable	Moran's I	E(I)	SE(I)	Z(I)	p-value
ADR	0.07199	-0.00156	0.02480	2.96510	0.00303

Null Hypothesis: Spatial Randomization

```
48 . moransi ADR if Dicembre==1, lat(Latitude) lon(Longitude) swm(pow 2) dist(.) dunit(km)
Size of spatial weight matrix: 643 * 643
```

Completed: 10%
Completed: 20%
Completed: 30%
Completed: 40%
Completed: 50%
Completed: 60%
Completed: 70%
Completed: 80%
Completed: 90%
Completed: 100%

Distance by Vincenty formula (unit: km)

Moran's I Statistic Number of Obs = 643

Variable	Moran's I	E(I)	SE(I)	Z(I)	p-value
ADR	0.07786	-0.00156	0.02492	3.18740	0.00144

Null Hypothesis: Spatial Randomization

```
49 .
```