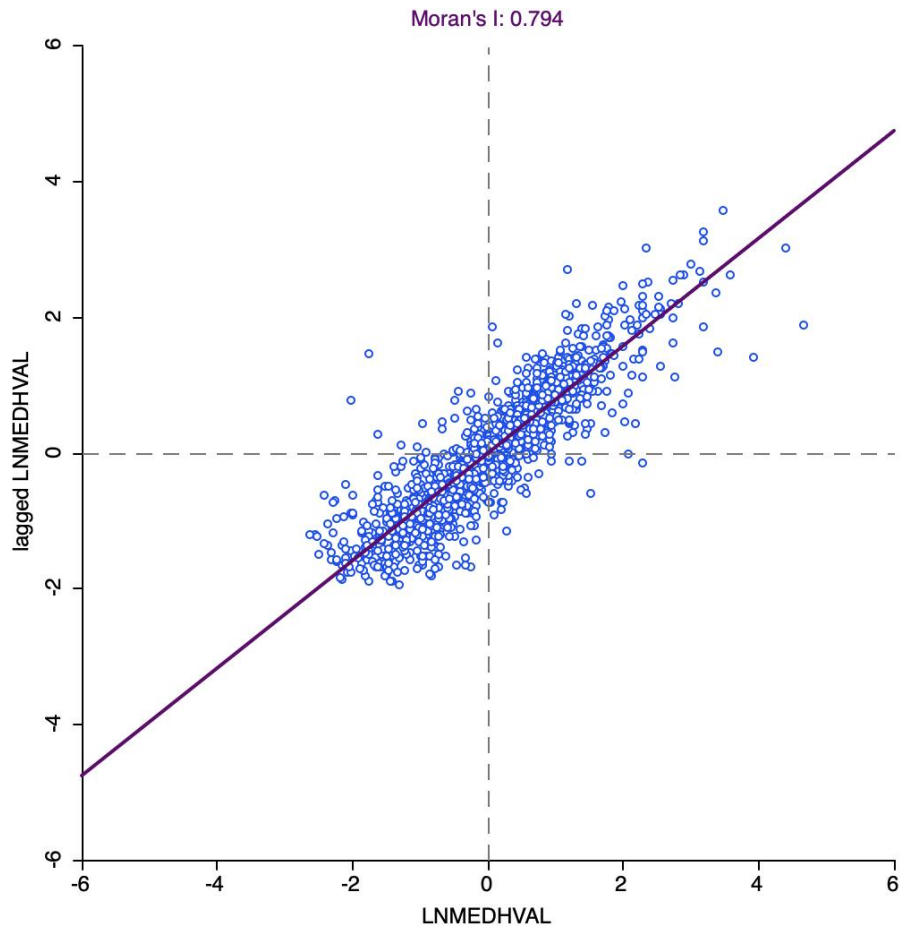


MUSA5000

Assignment #2: OLS, Spatial Lag, Spatial Error, and Geographically Weighted Regressions

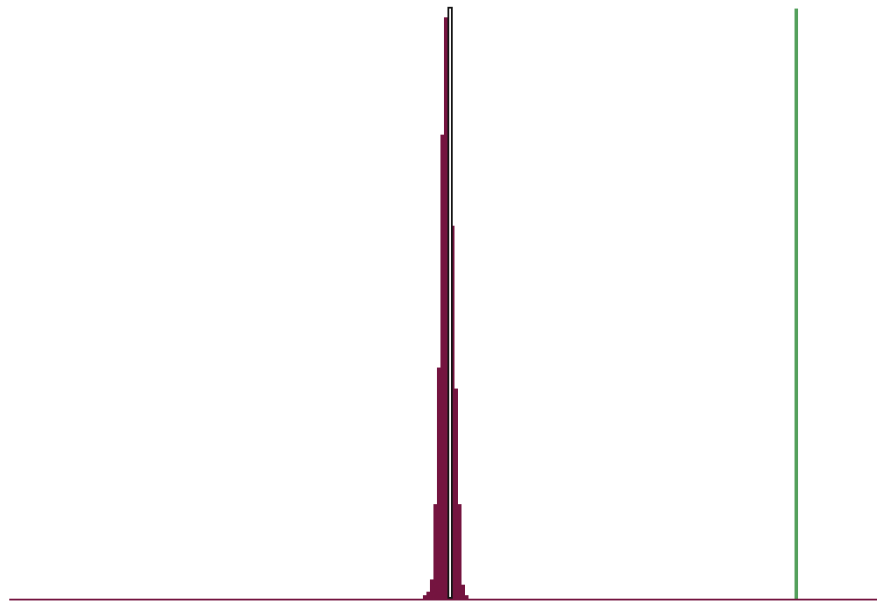
Akira Di Sandro, Sofia Fasullo, Amy Solano

### Figures from GeoDa



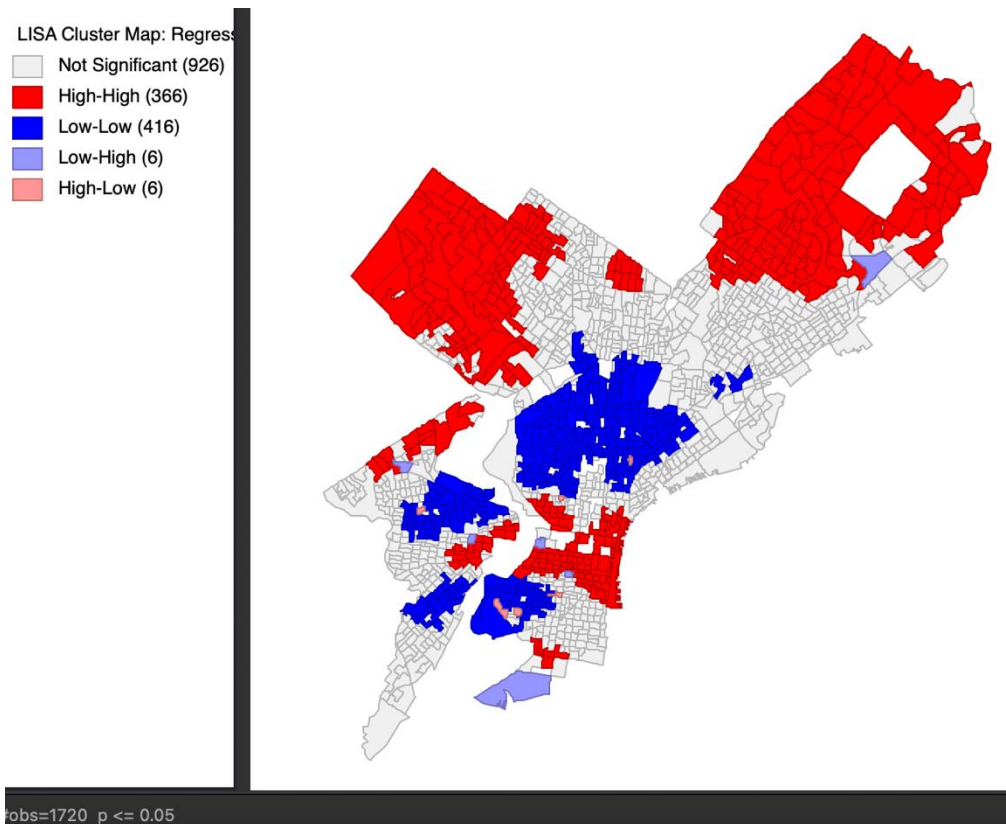
Scatter plot of Global Moran's I of Median House Value (log-transformed; LNMEDHVAL)

permutations: 999  
pseudo p-value: 0.001000



I: 0.7936 E[I]: -0.0006 mean: -0.0007 sd: 0.0138 z-value: 57.5194

Random Permutations Test for Global Moran's I of Median House Value (log-transformed;  
LNMEDHVAL)

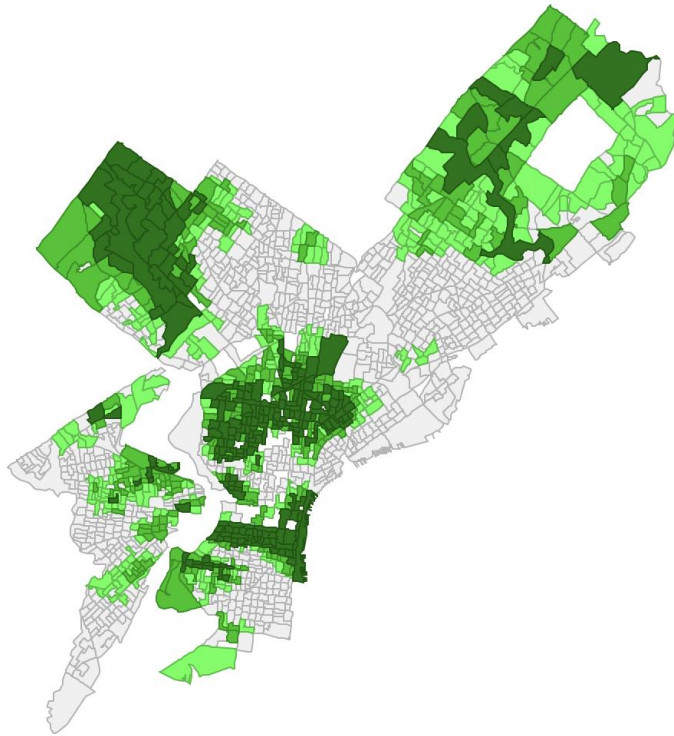


Local Moran's I results for Median House Value (log-transformed; LNMEDHVAL)

Cluster Map

LISA Significance Map: R

Not Significant (926)
$p = 0.05$ (309)
$p = 0.01$ (230)
$p = 0.001$ (255)



Local Moran's I results for Median House Value (log-transformed; LNMEDHVAL)

Significance Map

## SUMMARY OF OUTPUT: ORDINARY LEAST SQUARES ESTIMATION

Data set : RegressionData

Dependent Variable : LNMEDHVAL Number of Observations: 1720

Mean dependent var : 10.882 Number of Variables : 5

S.D. dependent var : 0.62972 Degrees of Freedom : 1715

R-squared : 0.662300 F-statistic : 840.869

Adjusted R-squared : 0.661513 Prob(F-statistic) : 0

Sum squared residual: 230.332 Log likelihood : -711.493

Sigma-square : 0.134304 Akaike info criterion: 1432.99

S.E. of regression : 0.366475 Schwarz criterion : 1460.24

Sigma-square ML : 0.133914

S.E of regression ML: 0.365942

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Variable	Coefficient	Std.Error	t-Statistic	Probability
<hr/>				
CONSTANT	11.1138	0.0465318	238.843	0.00000
PCTBACHMOR	0.0209095	0.000543184	38.4944	0.00000
PCTVACANT	-0.0191563	0.000977851	-19.5902	0.00000
PCTSINGLES	0.00297695	0.000703155	4.23371	0.00002
LNNBELPOV	-0.0789035	0.0084567	-9.3303	0.00000

---

## REGRESSION DIAGNOSTICS

MULTICOLLINEARITY CONDITION NUMBER 12.990609

#### TEST ON NORMALITY OF ERRORS

TEST	DF	VALUE	PROB
Jarque-Bera	2	778.9646	0.00000

#### DIAGNOSTICS FOR HETEROSKEDASTICITY

##### RANDOM COEFFICIENTS

TEST	DF	VALUE	PROB
Breusch-Pagan test	4	162.9108	0.00000
Koenker-Bassett test	4	61.6992	0.00000

##### SPECIFICATION ROBUST TEST

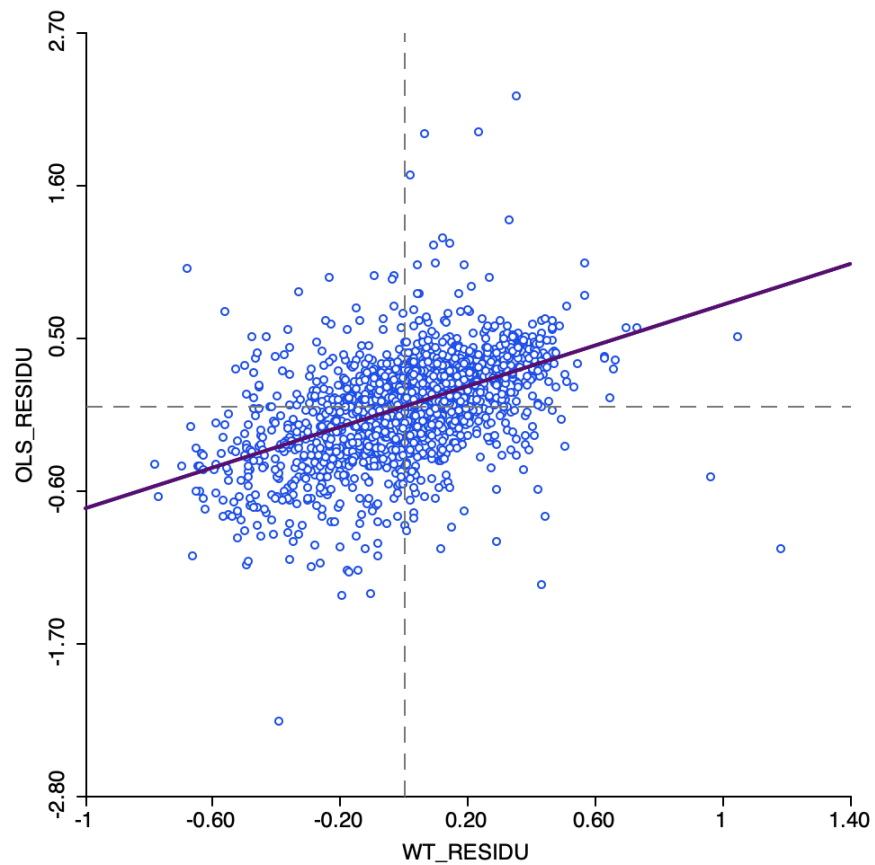
TEST	DF	VALUE	PROB
White	14	111.3224	0.00000

#### DIAGNOSTICS FOR SPATIAL DEPENDENCE

FOR WEIGHT MATRIX : RegressionData

(row-standardized weights)

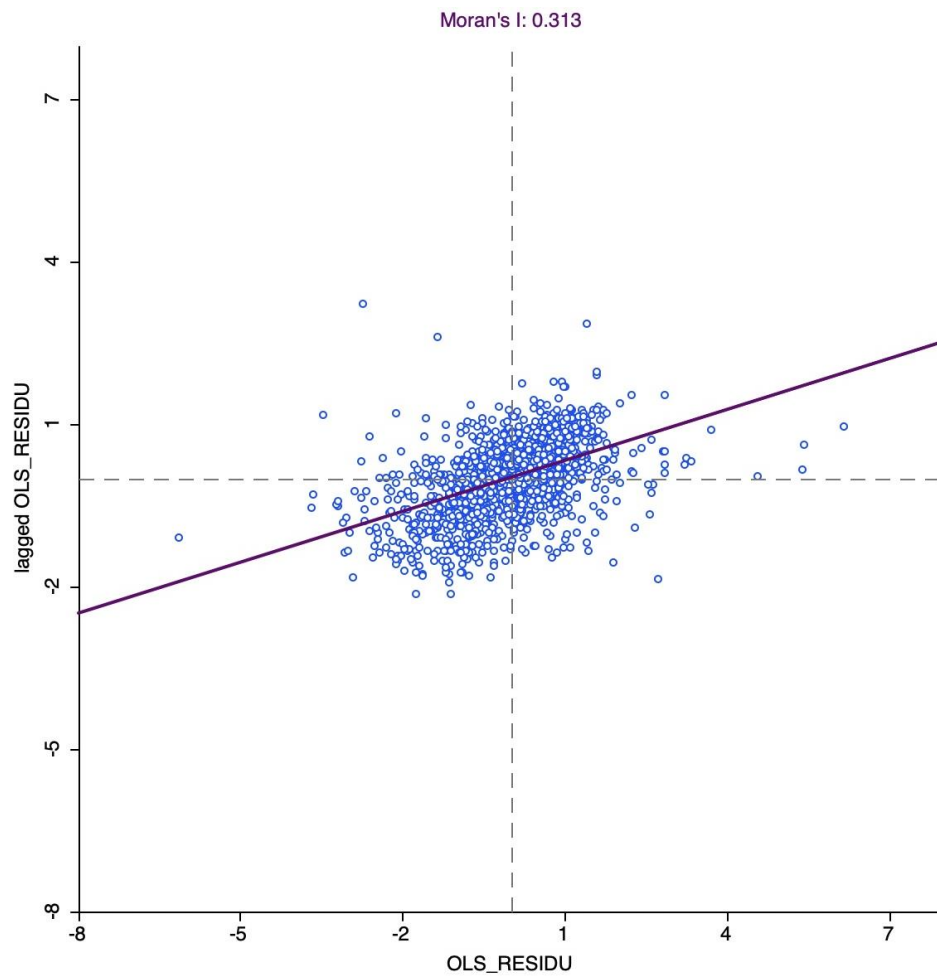
TEST	MI/DF	VALUE	PROB
Moran's I (error)	0.3129	22.3664	0.00000
Lagrange Multiplier (lag)	1	930.1626	0.00000
Robust LM (lag)	1	441.1061	0.00000
Lagrange Multiplier (error)	1	490.5691	0.00000
Robust LM (error)	1	1.5126	0.21875
Lagrange Multiplier (SARMA)	2	931.6751	0.00000



#obs	R^2	const a	std-err a	t-stat a	p-value a	slope b	std-err b	t-stat b	p-value b
1720	0.229	-0.005	0.008	-0.605	0.545	0.733	0.032	22.617	0
0	0	0	0	0	0	0	0	0	0
1720	0.229	-0.005	0.008	-0.605	0.545	0.733	0.032	22.617	0

Chow test for sel/unsel regression subsets: can't compute

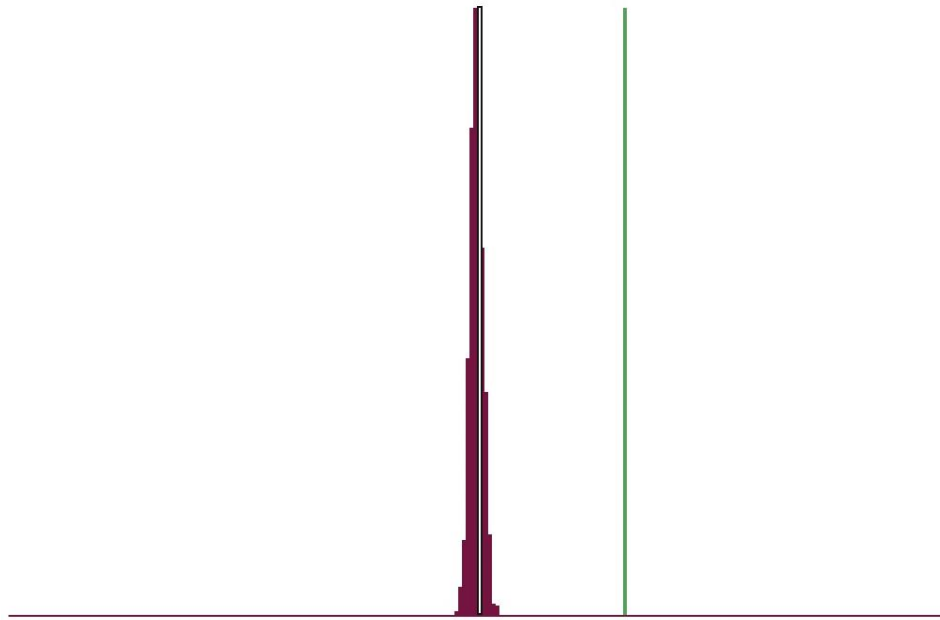
Scatter plot of OLS\_RESIDU and WT\_RESIDU



Scatter plot of Global Moran's I of OLS\_RESIDU



permutations: 999  
pseudo p-value: 0.001000



I: 0.3129 E[I]: -0.0006 mean: -0.0007 sd: 0.0136 z-value: 23.1094

Random Permutations Test for Global Moran's I of OLS\_RESIDU

## SUMMARY OF OUTPUT: SPATIAL LAG MODEL - MAXIMUM LIKELIHOOD ESTIMATION

Data set : HW02\_RegressionData

Spatial Weight : HW02\_RegressionData

Dependent Variable : LNMEDHVAL Number of Observations: 1720

Mean dependent var : 10.882 Number of Variables : 6

S.D. dependent var : 0.62972 Degrees of Freedom : 1714

Lag coeff. (Rho) : 0.651097

R-squared : 0.818564 Log likelihood : -255.74

Sq. Correlation : - Akaike info criterion : 523.48

Sigma-square : 0.071948 Schwarz criterion : 556.18

S.E of regression : 0.268231

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Variable	Coefficient	Std.Error	z-value	Probability
<hr/>				
W_LNMEDHVAL	0.651097	0.0180501	36.0716	0.00000
CONSTANT	3.89846	0.201114	19.3843	0.00000
PCTBACHMOR	0.00851381	0.000521935	16.312	0.00000
PCTVACANT	-0.0085294	0.000743667	-11.4694	0.00000
PCTSINGLES	0.00203342	0.00051577	3.9425	0.00008
LNNBELPOV	-0.0340547	0.00629287	-5.41163	0.00000

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## REGRESSION DIAGNOSTICS

### DIAGNOSTICS FOR HETEROSKEDASTICITY

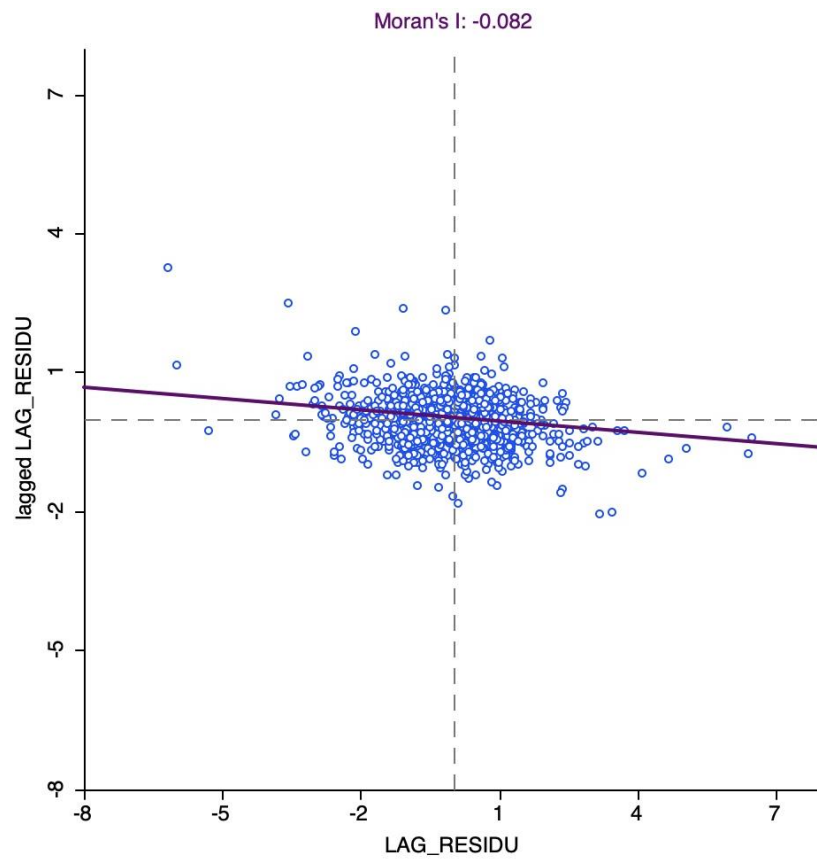
## RANDOM COEFFICIENTS

TEST	DF	VALUE	PROB
Breusch-Pagan test	4	220.3884	0.00000

## DIAGNOSTICS FOR SPATIAL DEPENDENCE

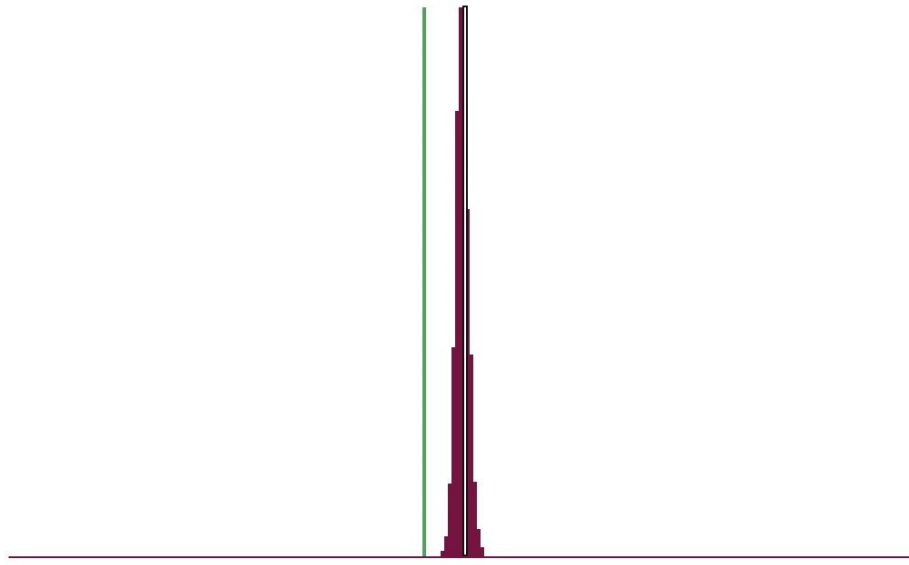
SPATIAL LAG DEPENDENCE FOR WEIGHT MATRIX : HW02\_RegressionData

TEST	DF	VALUE	PROB
Likelihood Ratio Test	1	911.5067	0.00000



Scatter plot of Global Moran's I of LAG\_RESIDU

permutations: 999  
pseudo p-value: 0.001000



I: -0.0824 E[I]: -0.0006 mean: -0.0004 sd: 0.0140 z-value: -5.8778

Random Permutations Test of Global Moran's I of LAG\_RESIDU

## SUMMARY OF OUTPUT: SPATIAL ERROR MODEL - MAXIMUM LIKELIHOOD ESTIMATION

Data set : HW02\_RegressionData

Spatial Weight : HW02\_RegressionData

Dependent Variable : LNMEDHVAL Number of Observations: 1720

Mean dependent var : 10.882000 Number of Variables : 5

S.D. dependent var : 0.629720 Degrees of Freedom : 1715

Lag coeff. (Lambda) : 0.814918

R-squared : 0.806957 R-squared (BUSE) :-

Sq. Correlation :- Log likelihood : -372.690368

Sigma-square : 0.0765508 Akaike info criterion : 755.381

S.E of regression : 0.276678 Schwarz criterion : 782.631

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Variable	Coefficient	Std.Error	z-value	Probability
<hr/>				
CONSTANT	10.9064	0.0534678	203.981	0.00000
PCTBACHMOR	0.00981293	0.000728964	13.4615	0.00000
PCTVACANT	-0.00578308	0.000886701	-6.52201	0.00000
PCTSINGLES	0.00267792	0.000620832	4.31343	0.00002
LNNBELPOV	-0.0345341	0.00708933	-4.87127	0.00000
LAMBDA	0.814918	0.016373	49.7719	0.00000

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## REGRESSION DIAGNOSTICS

### DIAGNOSTICS FOR HETEROSKEDASTICITY

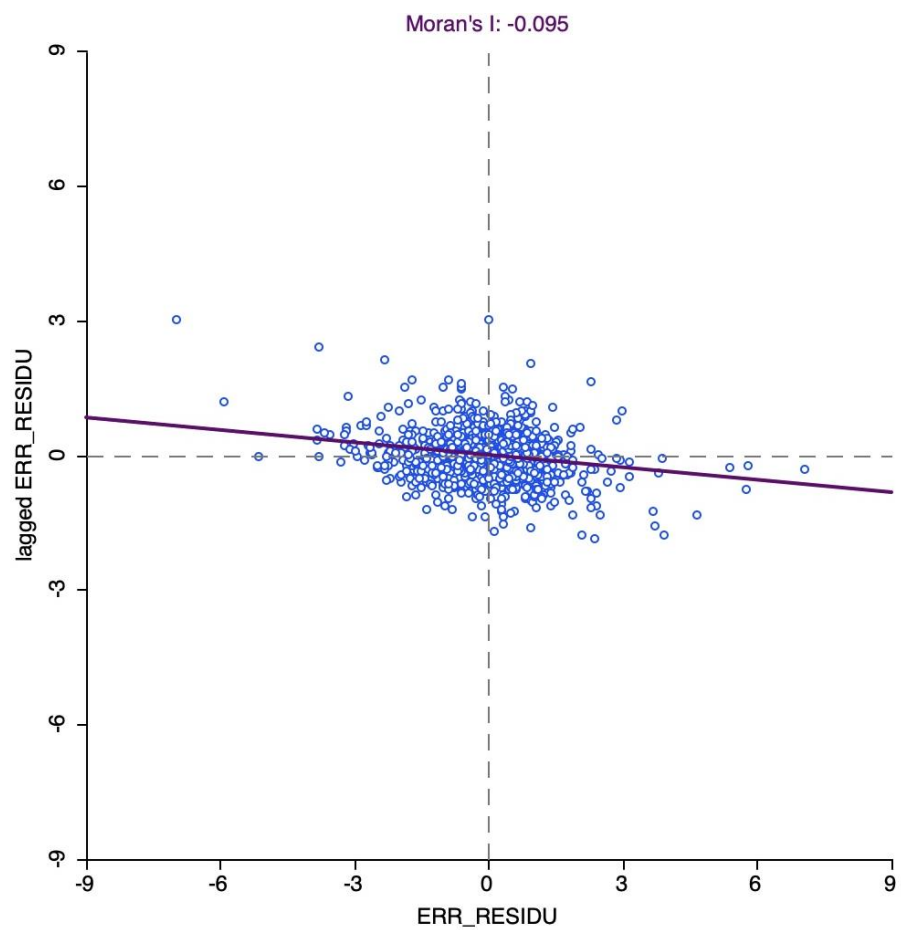
## RANDOM COEFFICIENTS

TEST	DF	VALUE	PROB
Breusch-Pagan test	4	210.9923	0.00000

## DIAGNOSTICS FOR SPATIAL DEPENDENCE

SPATIAL ERROR DEPENDENCE FOR WEIGHT MATRIX : HW02\_RegressionData

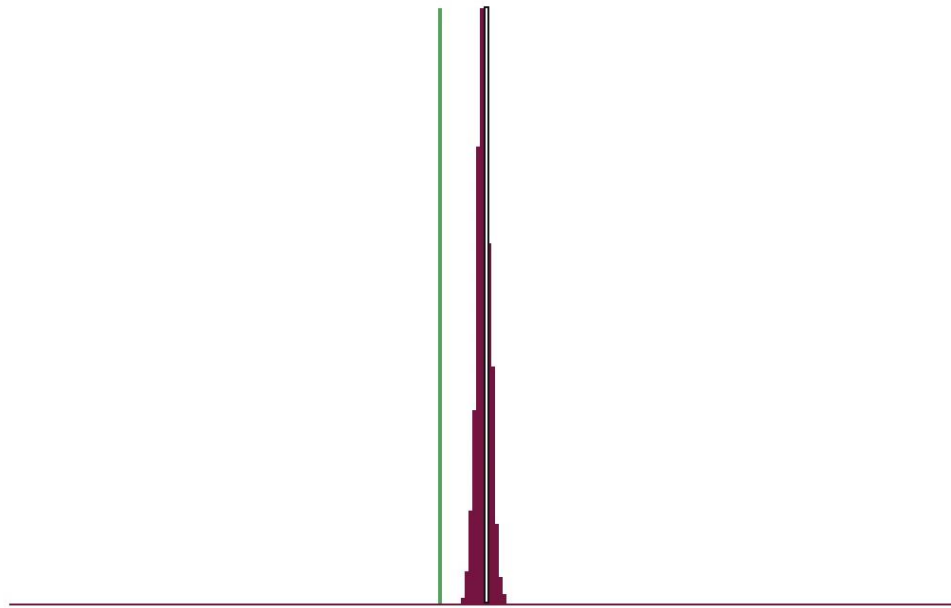
TEST	DF	VALUE	PROB
Likelihood Ratio Test	1	677.6059	0.00000



Scatter Plot of Global Moran's I of ERR\_RESIDU

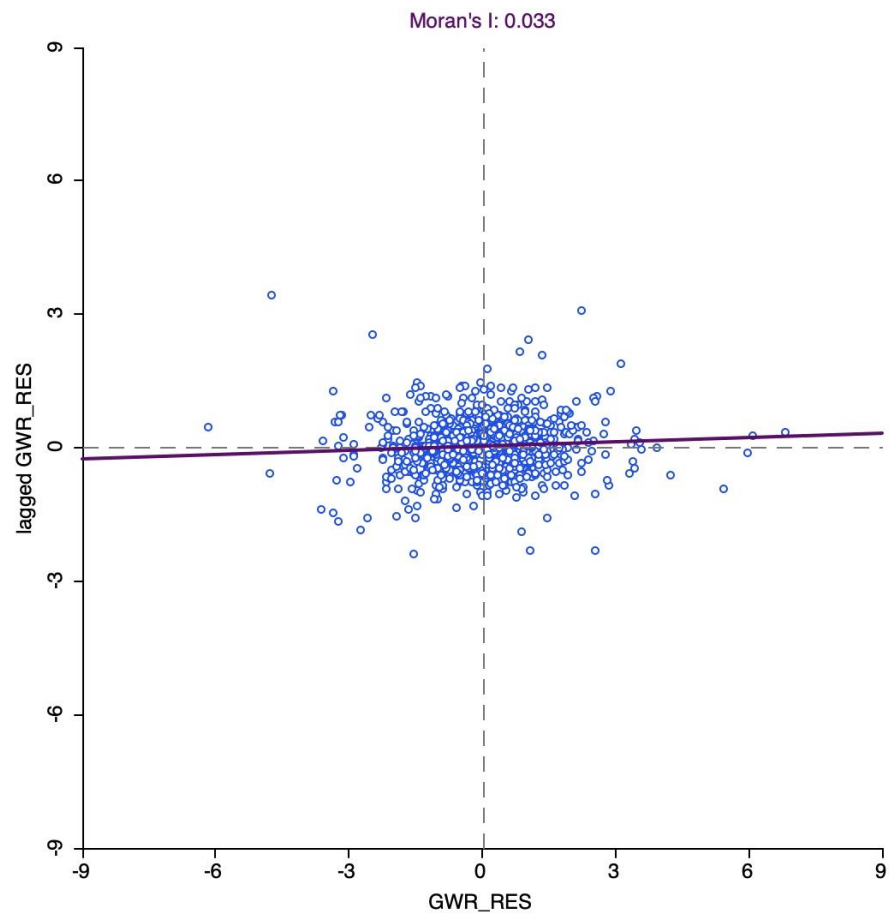


permutations: 999  
pseudo p-value: 0.001000



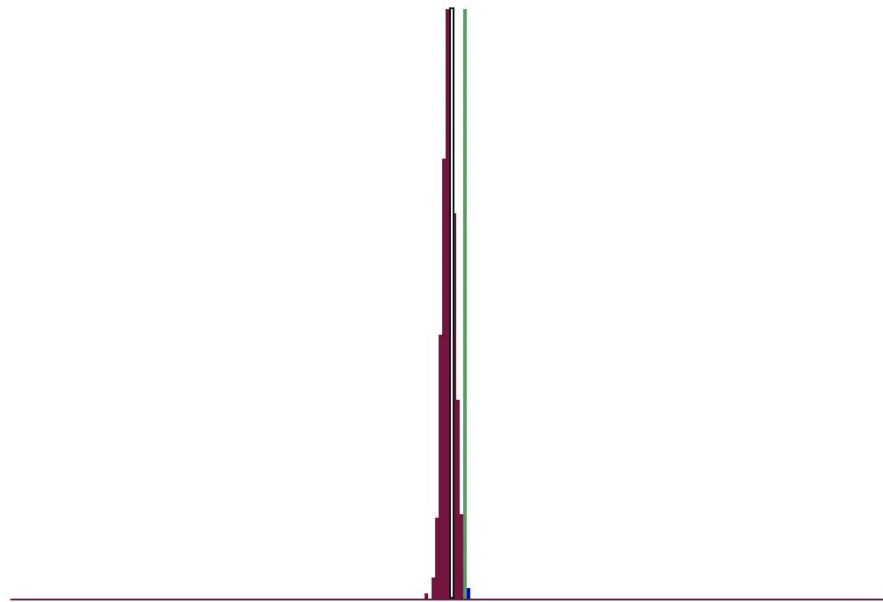
I: -0.0945 E[I]: -0.0006 mean: -0.0003 sd: 0.0142 z-value: -6.6546

Random Permutations Test of Global Moran's I of ERR\_RESIDU



Scatter Plot of Global Moran's I of GWR\_RESIDU

permutations: 999  
pseudo p-value: 0.010000



I: 0.0334 E[I]: -0.0006 mean: -0.0008 sd: 0.0141 z-value: 2.4340

Random Permutations Test of Global Moran's I of GWR\_RESIDU