

ESTIMATION RESULTS FOR THE HET-SCAN TEST APPLICATION WITH HOUSE PRICE IN MADRID

- **Description of the models' variables:**

| Variable | Description | Source | Units | Period |
|--|--|----------------------|-----------------------|----------|
| Structural characteristics of the dwellings | | | | |
| <i>lpri</i> | Sale price | Idealista | Euros (logs) | Jan.2015 |
| <i>flo1</i> | Third and higher floors plus houses | Idealista | 0-1 | Jan.2015 |
| <i>flbs</i> | Basement and semi-basement | Idealista | 0-1 | Jan.2015 |
| <i>flb0</i> | Basement, semi-basement and ground floor | Idealista | 0-1 | Jan.2015 |
| <i>atti</i> | Attic | Idealista | 0-1 | Jan.2015 |
| <i>hous</i> | House (detached, semi-detached, row) | Idealista | 0-1 | Jan.2015 |
| <i>deta</i> | Detached house | Idealista | 0-1 | Jan.2015 |
| <i>sdet</i> | Semi-detached house | Idealista | 0-1 | Jan.2015 |
| <i>hflo</i> | House floors | Idealista | number | Jan.2015 |
| <i>hplo</i> | House on a plot | Idealista | 0-1 | Jan.2015 |
| <i>dupl</i> | Duplex | Idealista | 0-1 | Jan.2015 |
| <i>beds</i> | Bedsit | Idealista | 0-1 | Jan.2015 |
| <i>lsqm</i> | Surface | Idealista | m ² (logs) | Jan.2015 |
| <i>bedr</i> | Bedrooms | Idealista | number | Jan.2015 |
| <i>refb</i> | Refurbished | Idealista | 0-1 | Jan.2015 |
| <i>refo</i> | Needs renovation | Idealista | 0-1 | Jan.2015 |
| <i>new</i> | New | Idealista | 0-1 | Jan.2015 |
| <i>nele</i> | Building without elevator | Idealista | 0-1 | Jan.2015 |
| <i>inne</i> | All the rooms are facing an inner courtyard | Idealista | 0-1 | Jan.2015 |
| <i>outd</i> | All the rooms are facing outdoor public areas | Idealista | 0-1 | Jan.2015 |
| <i>gara</i> | Garage space | Idealista | 0-1 | Jan.2015 |
| <i>terr</i> | Dwelling with terrace | Idealista | 0-1 | Jan.2015 |
| <i>view</i> | Nice views | Idealista | 0-1 | Jan.2015 |
| Variables of accessibility | | | | |
| <i>dcbd</i> | Distance to the business center (CBD) | Self-elaboration | Km | 2015 |
| <i>dsol</i> | Distance to the historical center | Self-elaboration | Km | 2015 |
| <i>dm30</i> | Distance to closest entrance to the M-30 | Self-elaboration | Km | 2015 |
| <i>dm40</i> | Distance to closest entrance to the M-40 | Self-elaboration | Km | 2015 |
| <i>dmet</i> | Distance to the closest metro station | Self elab./C.Madrid | Km | 2015 |
| <i>dtra</i> | Distance to the closest train station | Self elab./C.Madrid | Km | 2013 |
| <i>dhub</i> | Distance to closest intermodal transportation hub | Self-elaboration | Km | 2013 |
| <i>dair</i> | Distance to the international airport | Self elab./C.Madrid | Km | 2015 |
| <i>dpar</i> | Distance to the closest green area (over 1 Ha.) | Self elab./C.Madrid | Km | 2013 |
| <i>dhip</i> | Distance to closest hypermarket | Self elab./C.Madrid | Km | 2011 |
| <i>dsho</i> | Distance to closest shopping center | Self elab./C.Madrid | Km | 2014 |
| <i>dkil</i> | Distance to closest 'category killer' center | Self elab./C.Madrid | Km | 2014 |
| <i>dser</i> | Distance to service providers' outlets (retailing, hotels and restaurants) | Self.elab./SABI | Km | 2013 |
| <i>hot5</i> | Distance to closest 5-star hotel | Self elab./C.Madrid | Km | 2015 |
| Characteristics of the social environment | | | | |
| <i>dend</i> | Density of dwellings offered per street track | Self elab./Idealista | % | Jan.2015 |
| <i>denp</i> | Population density per census tract | Self elab./ Census | % | 2014 |
| Spatial characteristics | | | | |
| <i>D1-7</i> | District 1 to 7 | C. Madrid | - | - |
| <i>N1-43</i> | Neighborhood 1 to 43 | C. Madrid | - | - |
| <i>xcoo</i> | Longitude coordinate | Self.elab./GIS | Km (UTM) | - |
| <i>xyco</i> | Longitude × Latitude coordinate | Self-elaboration | Km ² (UTM) | - |

- **Models' main results:**

| Variable | Basic model | Spatial submarkets | Submarkets & interactions | SEM model (W = 5 nn) | SAR model (W = 5 nn) | SARAR model (W = 5 nn) |
|---------------------------------|-------------|--------------------|---------------------------|----------------------|----------------------|------------------------|
| Estimation | OLS | OLS | OLS | GMM | S2SLS | GMM-KPHET |
| C | 18.858*** | 81.293*** | 9.1510*** | 9.4348*** | 7.1459*** | 7.2043*** |
| Structural variables: | | | | | | |
| <i>flo1</i> | 0.0716*** | - | - | - | - | - |
| <i>flbs</i> | -0.2644*** | -0.3135*** | -0.1936* | -0.1985** | -0.1872* | -0.2065** |
| <i>atti</i> | 0.1097*** | 0.1414*** | 0.1441*** | 0.1495*** | 0.1498*** | 0.1536*** |
| <i>hous</i> | 0.0829* | 0.1159*** | - | - | - | - |
| <i>deta</i> | 0.4537*** | 0.4158*** | 0.5889*** | 0.5858*** | 0.5602*** | 0.5591*** |
| <i>sdet</i> | 0.2734*** | 0.2536*** | 0.4129*** | 0.4114*** | 0.3920*** | 0.3894*** |
| <i>hflo</i> | -0.2114*** | -0.1649*** | -0.0886* | -0.0822* | -0.0937* | -0.1105** |
| <i>hpl</i> | 0.3250*** | 0.2579** | - | - | - | - |
| <i>dupl</i> | - | 0.0455** | - | - | - | - |
| <i>beds</i> | -0.0443** | -0.0540*** | - | - | - | - |
| <i>lsqm</i> | 0.5461*** | 0.5362*** | 0.9685*** | 0.9241*** | 0.9103*** | 0.9103*** |
| <i>lsqm²</i> | 3.1090*** | 3.7073*** | - | - | - | - |
| <i>lsqm³</i> | 4.3483*** | 4.3431*** | - | - | - | - |
| <i>refb</i> | 0.0349*** | 0.0350*** | - | - | - | - |
| <i>refo</i> | -0.2045*** | -0.1989*** | -0.1905*** | -0.1863*** | -0.1908*** | -0.1901*** |
| <i>new</i> | 0.1201*** | 0.1286*** | 0.2453*** | 0.1787*** | 0.1710*** | 0.1560*** |
| <i>nele</i> | -0.1452*** | -0.1328*** | - | - | - | - |
| <i>inne</i> | -0.0912*** | -0.1009*** | - | - | - | - |
| <i>gara</i> | 0.0690*** | 0.0731*** | 0.0763*** | 0.0654*** | 0.0728*** | 0.0669*** |
| <i>view</i> | 0.0533*** | 0.0648*** | - | - | - | - |
| Accessibility variables: | | | | | | |
| <i>dcbd</i> | -1.0462*** | -0.9121*** | -0.6163*** | -0.6294*** | -0.4598*** | -0.4675*** |
| <i>dcbd²</i> | 0.5487** | -0.2248** | -0.7276 | -0.8299*** | -0.6347*** | -0.6488*** |
| <i>dcbd³</i> | -0.0862 | -0.1984 | -0.9745* | -1.0609*** | -0.8029*** | -0.8185*** |
| <i>dsol</i> | -0.0002*** | -0.0002*** | - | - | - | - |
| <i>dm40</i> | -2.1518*** | - | - | - | - | - |
| <i>dm40²</i> | -1.1631*** | - | - | - | - | - |
| <i>dm40³</i> | -1.2777*** | - | - | - | - | - |
| <i>dmet</i> | 0.0353 | 0.0075 | - | - | - | - |
| <i>dmet²</i> | 0.1348*** | 0.1240** | - | - | - | - |
| <i>dmet³</i> | -0.1309*** | -0.1740*** | - | - | - | - |
| <i>dtra</i> | -0.2060*** | -0.3332*** | -0.0001*** | -0.0001*** | -0.0001*** | -0.0001*** |
| <i>dtra²</i> | -0.0066 | 0.1250** | - | - | - | - |
| <i>dtra³</i> | 0.5395*** | -0.3029*** | - | - | - | - |
| <i>dhub</i> | -0.0035 | 0.0001*** | - | - | - | - |
| <i>dhub²</i> | 0.1846*** | - | - | - | - | - |
| <i>dhub³</i> | -0.6052*** | - | - | - | - | - |
| <i>dair</i> | 0.4979 | -0.2766** | -0.6787*** | -0.7397*** | -0.5306*** | -0.5360*** |
| <i>dair²</i> | -2.5555** | -1.6784*** | -0.2104*** | -0.2813*** | -0.1497*** | -0.1732*** |
| <i>dair³</i> | -6.1841*** | -1.5028*** | -0.1880*** | -0.2214*** | -0.1208** | -0.1241** |
| <i>dpar</i> | -0.1830*** | -0.0994** | - | - | - | - |
| <i>dpar²</i> | -0.1091*** | -0.1540*** | - | - | - | - |
| <i>dpar³</i> | -0.3436*** | -0.1371** | - | - | - | - |
| <i>dhip</i> | 0.3504*** | 0.2854** | - | - | - | - |
| <i>dhip²</i> | -0.1194 | -0.6967*** | - | - | - | - |
| <i>dhip³</i> | 0.4639*** | 0.0935 | - | - | - | - |
| <i>dsho</i> | 0.1498*** | 0.2526*** | - | - | - | - |
| <i>dsho²</i> | -0.3148*** | -0.1522*** | - | - | - | - |
| <i>dsho³</i> | -0.0653 | 0.1659** | - | - | - | - |
| <i>dkil</i> | -0.0001*** | -0.2340*** | - | - | - | - |
| <i>dkil²</i> | - | -0.1287* | - | - | - | - |
| <i>dkil³</i> | - | 0.1322 | - | - | - | - |

| Variable | Basic model | Spatial submarkets | Submarkets & interactions | SEM model (W = 5 nn) | SAR model (W = 5 nn) | SARAR model (W = 5 nn) |
|---|-------------|--------------------|---------------------------|----------------------|----------------------|------------------------|
| <i>hot5</i> | -0.2505*** | - | 0.0001*** | 0.0001*** | 0.0001*** | 0.0001*** |
| <i>hot5</i> | 0.6882*** | - | - | - | - | - |
| <i>hot5</i> | -0.2294 | - | - | - | - | - |
| Geographical variables: | | | | | | |
| <i>xcoo</i> | 8.4072*** | - | - | - | - | - |
| <i>xcoo</i> ² | 17.720*** | - | - | - | - | - |
| <i>xcoo</i> ³ | 13.604*** | - | - | - | - | - |
| <i>xycoo</i> | -11.833*** | -0.31·e-10*** | - | - | - | - |
| <i>xycoo</i> ² | -20.667*** | - | - | - | - | - |
| <i>xycoo</i> ³ | -19.381*** | - | - | - | - | - |
| Interaction variables: | | | | | | |
| <i>flbs×refb</i> | - | - | 0.4059*** | 0.3592*** | 0.3851*** | 0.3723*** |
| <i>lsqm×inne</i> | - | - | -0.0207*** | -0.0230*** | -0.0220*** | -0.0235*** |
| <i>new×dser</i> | - | - | -0.0017*** | -0.0012** | -0.0013** | -0.0011** |
| <i>outd×nele</i> | - | - | -0.1895*** | -0.1470*** | -0.1650*** | -0.1472*** |
| <i>terr×nele</i> | - | - | -0.0902** | -0.0761*** | -0.0750** | -0.0704** |
| <i>view×nele</i> | - | - | -0.1102** | -0.1198** | -0.1155** | -0.1171*** |
| <i>dm30×flbs</i> | - | - | -0.0001* | -0.0001** | -0.0001** | -0.0001** |
| <i>hot5×dend</i> | - | - | -0.80·e-5*** | -0.49·e-5*** | -0.57·e-5*** | -0.44·e-5*** |
| Spatial submarkets with interaction variables: | | | | | | |
| D1 | - | -0.1634*** | - | - | - | - |
| N2 | - | -0.1047*** | - | - | - | - |
| N4 | - | 0.0982*** | - | - | - | - |
| N1×new | - | - | 0.2984*** | 0.3088*** | 0.3008*** | 0.3101*** |
| N2×bedr×hot5 | - | - | 0.48·e-4*** | 0.39·e-4** | -0.44·e-4*** | -0.41·e-4*** |
| N2×dsol×hot5 | - | - | -0.89·e-7** | -1.33·e-7** | - | - |
| N3×deta | - | - | -0.6290** | -0.5207** | -0.4562* | - |
| N4×bedr×hot5 | - | - | -0.0001** | -0.0001* | -0.0001* | - |
| N5×deta | - | - | 0.4774* | 0.5450** | 0.5998** | 0.6652*** |
| D2 | - | -0.1126*** | -0.1120*** | -0.0941*** | -0.0770*** | -0.0663*** |
| N7 | - | -0.1503*** | - | - | - | - |
| N9 | - | -0.1015*** | - | - | - | - |
| N10 | - | 0.2157*** | - | - | - | - |
| N12 | - | -0.1257*** | - | - | - | - |
| N14 | - | -0.0761*** | - | - | - | - |
| N14×flb0 | - | - | -0.2566*** | -0.2415*** | -0.2420*** | -0.2409*** |
| N16 | - | -0.1486*** | - | - | - | - |
| N20 | - | 0.1473*** | 0.2533*** | 0.2017*** | 0.1872*** | 0.1639*** |
| N22 | - | -0.1998*** | - | - | - | - |
| N25 | - | 0.1738*** | - | - | - | - |
| N21×nele | - | - | 0.1452* | - | - | - |
| N23×deta | - | - | -0.5820*** | -0.4556*** | -0.4609*** | -0.3839*** |
| N28 | - | -0.0900*** | - | - | - | - |
| N30 | - | 0.1311*** | - | - | - | - |
| N26×lsqm | - | - | -0.0585** | - | -0.0521* | - |
| N26×deta | - | - | 0.5881*** | 0.3768** | 0.6060*** | 0.4129*** |
| N26×hot5 | - | - | 0.0003** | - | 0.0002* | - |
| N28×dupl | - | - | 0.3231*** | 0.2311** | 0.2642*** | 0.2136** |
| N30×lsqm | - | - | 0.0460*** | 0.0452*** | 0.0349*** | 0.0345*** |
| D6 | - | -0.3298*** | - | - | - | - |
| N32 | - | 0.1453*** | - | - | - | - |
| N33 | - | 0.2717*** | - | - | - | - |
| N34 | - | 0.3145*** | 0.6951*** | 0.9053*** | 0.5983*** | 0.6806*** |
| N35 | - | - | -0.0679** | - | - | - |
| N37 | - | - | -0.1432*** | -0.1594*** | -0.1018*** | -0.1109*** |
| N32×refo | - | - | -0.1455*** | -0.1359*** | -0.1332*** | -0.1417*** |
| N32×view | - | - | 0.2163** | 0.1975** | 0.1978* | 0.1795** |
| N32×lsqm×dmet | - | - | -0.0001* | -0.0001* | - | -0.0001*** |
| N32×lsqm×dpar | - | - | -0.0001*** | -0.0001** | -0.0001*** | - |
| N34×dm30 | - | - | -0.0003*** | -0.0004*** | -0.0002** | -0.0003*** |

| Variable | Basic model | Spatial submarkets | Submarkets & interactions | SEM model (W = 5 nn) | SAR model (W = 5 nn) | SARAR model (W = 5 nn) |
|---|-------------|--------------------|---------------------------|----------------------|----------------------|------------------------|
| N36×new | - | - | -0.1925** | - | - | - |
| N37×deta | - | - | -0.3936** | -0.2961** | -0.2645* | - |
| N38 | - | -0.1103*** | - | - | - | - |
| N40 | - | -0.0672** | - | - | - | - |
| N43 | - | 0.1206*** | - | - | - | - |
| Spatial variables: | | | | | | |
| Rho | - | - | - | - | 0.1652*** | 0.1618*** |
| Lambda | - | - | - | 0.4056*** | - | 0.2684*** |
| Goodness-of-fit and diagnostics: | | | | | | |
| Adj. R ² | 0.8653 | 0.8669 | 0.8491 | - | - | - |
| Condition # | 4753 | 22829 | 64 | - | - | - |
| Jarque-Bera | 27.43*** | 34.12*** | 38.66*** | - | - | - |
| Breusch-P. | 247.09*** | 284.91*** | 11.297 | - | - | - |
| Koenker-Bas. | 212.04*** | 240.35*** | 12.108 | - | - | - |
| Quasi-White | - | - | - | 59.047** | 59.180** | 48.302** |
| RLMe, 2nn | 107.90*** | 76.43*** | 162.85*** | - | - | - |
| RLMI, 2nn | 79.41*** | 67.81*** | 112.69*** | - | - | - |
| RLMe, 5nn | 240.73*** | 141.10*** | 357.56*** | - | - | - |
| RLMI, 5nn | 113.96*** | 99.49*** | 202.10*** | - | - | - |
| RLMe, 6nn | 198.08*** | 107.49*** | 200.82*** | - | - | - |
| RLMI, 6nn | 118.64*** | 89.90*** | 320.01*** | - | - | - |
| RLMe, 30nn | 538.00*** | 196.46*** | 1535.40*** | - | - | - |
| RLMI, 30nn | 118.64*** | 98.88*** | 273.70*** | - | - | - |
| RLMe, dinv | 154.38*** | 94.39*** | 273.20*** | - | - | - |
| RLMI, dinv | 88.81*** | 88.38*** | 230.31*** | - | - | - |
| Moran's I | - | - | - | 0.2612*** | 0.1236*** | -0.0043 |
| Anselin-Kele. | - | - | - | - | 158.281*** | - |
| MLC, cases | Low, 1903 | Low, 1270 | Low, 1253 | Low, 27 | Low, 1231 | Low, 816 |
| MLC, lik | 7784*** | 7836*** | 7464*** | 7431*** | 7750*** | 7877*** |
| SC1, cases | High, 1859 | High, 1834 | Low, 19 | Low, 588 | High, 182 | High, 475 |
| SC1, lik | 7776*** | 7821*** | 7451*** | 7420*** | 7738*** | 7869*** |
| SC2, cases | High, 36 | Low, 57 | High, 411 | High, 2471 | High, 373 | High, 122 |
| SC2, lik | 7772** | 7811** | 7449*** | 7417*** | 7732*** | 7857** |
| SC3, cases | High, 48 | High, 36 | Low, 2 | Low, 368 | - | - |
| SC3, lik | 7769* | 7809* | 7442* | 7416*** | - | - |
| SC4, cases | - | - | - | Low, 22 | - | - |
| SC4, lik | - | - | - | 7406* | - | - |

- **Scan-het results for the SARAR model with several W matrices:**

| | 2 n. n. | 5 n. n. | 6 n. n. | 30 n. n. | dinv |
|------------|-----------|-----------|-----------|-----------|------------|
| MLC, cases | Low, 810 | Low, 816 | Low, 1231 | Low, 810 | Low, 819 |
| MLC, lik | 7782*** | 7877*** | 7705*** | 7890*** | 7666*** |
| SC1, cases | High, 475 | High, 475 | High, 182 | High, 475 | High, 2387 |
| SC1, lik | 7774*** | 7869*** | 7692*** | 7880*** | 7661*** |
| SC2, cases | Low, 188 | High, 122 | High, 373 | High, 122 | Low, 83 |
| SC2, lik | 7760* | 7857** | 7685** | 7866*** | 7649** |
| SC3, cases | High, 122 | - | - | Low, 29 | - |
| SC3, lik | 7760* | - | - | 7863* | - |

1. OLS Baseline hedonic model with structural, contextual and spline variables

```
spline_ols2 <- lm(LPRICE ~ FL_1+FL_B+ATTIC+HOUSE+DETACH+SEMIDE+HPLOT+HFLOOR+BEDSIT+
  bs(LM2B,3)+REFORM+NEW+REFURB+NOLIFT+INTERIOR+VIEWS+GARAGE+
  bs(DISCEN,3)+DISSOL+bs(MINM40,3)+bs(MINMETRO,3)+bs(MINHUB,3)+
  bs(MINCERCA,3)+bs(MINAIRP,3)+bs(DISPAK,3)+bs(MINCC,3)+MINCCESP+
  bs(DISHPER,3)+bs(MINHOT5,3)+bs(XCOO,3)+
  bs(XYCOO,3), data=ALMHOUSE)
```

REGRESSION

SUMMARY OF OUTPUT: ORDINARY LEAST SQUARES

```
-----
Data set           :sgspline.dbf
Weights matrix     :File: kn2.gwt
Dependent Variable :      LPRICE
Mean dependent var :      12.5984
S.D. dependent var :      0.6759
R-squared          :      0.8667
Adjusted R-squared :      0.8653
Sum squared residual:    337.414
Sigma-square       :      0.062
S.E. of regression :      0.248
Sigma-square ML    :      0.061
S.E of regression ML:    0.2468

Number of Observations:      5541
Number of Variables   :      58
Degrees of Freedom    :      5483

F-statistic           :      625.4251
Prob(F-statistic)    :      0
Log likelihood        :      -108.765
Akaike info criterion :      333.530
Schwarz criterion    :      717.486
-----
```

| Variable | Coefficient | Std.Error | t-Statistic | Probability |
|----------|-------------|-----------|-------------|-------------|
| CONSTANT | 18.8576139 | 1.1935960 | 15.7989928 | 0.0000000 |
| FL_1 | 0.0716352 | 0.0071988 | 9.9510654 | 0.0000000 |
| FL_B | -0.2644163 | 0.0413936 | -6.3878565 | 0.0000000 |
| ATTIC | 0.1096936 | 0.0138396 | 7.9260442 | 0.0000000 |
| HOUSE | 0.0828876 | 0.0449860 | 1.8425205 | 0.0654530 |
| DETACH | 0.4537337 | 0.0819923 | 5.5338573 | 0.0000000 |
| SEMIDE | 0.2734279 | 0.0707183 | 3.8664375 | 0.0001117 |
| HFLOOR | -0.2113979 | 0.0523639 | -4.0370899 | 0.0000549 |
| HPLOT | 0.3250425 | 0.1165560 | 2.7887229 | 0.0053099 |
| BEDSIT | -0.0443194 | 0.0189023 | -2.3446547 | 0.0190802 |
| LMESP1 | 0.5460610 | 0.1480502 | 3.6883503 | 0.0002279 |
| LMESP2 | 3.1090041 | 0.0790964 | 39.3065032 | 0.0000000 |
| LMESP3 | 4.3482940 | 0.1718925 | 25.2965852 | 0.0000000 |
| REFURB | 0.0349051 | 0.0107826 | 3.2371637 | 0.0012144 |
| REFORM | -0.2045488 | 0.0091652 | -22.3180145 | 0.0000000 |
| NEW | 0.1200993 | 0.0150661 | 7.9714748 | 0.0000000 |
| NOLIFT | -0.1452314 | 0.0101386 | -14.3246375 | 0.0000000 |
| INTERIOR | -0.0912330 | 0.0097326 | -9.3739506 | 0.0000000 |
| GARAGE | 0.0690090 | 0.0189244 | 3.6465655 | 0.0002682 |
| VIEWS | 0.0533011 | 0.0182999 | 2.9126409 | 0.0035983 |
| CENSP1 | -1.0462391 | 0.1022962 | -10.2275434 | 0.0000000 |
| CENSP2 | 0.5486683 | 0.2417687 | 2.2693933 | 0.0232831 |
| CENSP3 | -0.0861528 | 0.4263245 | -0.2020826 | 0.8398596 |
| DISSOL | -0.0002219 | 0.0000504 | -4.4063019 | 0.0000107 |
| M40ESP1 | -2.1518302 | 0.2443315 | -8.8070110 | 0.0000000 |
| M40ESP2 | -1.1630803 | 0.1846762 | -6.2979450 | 0.0000000 |
| M40ESP3 | -1.2776597 | 0.1886924 | -6.7711256 | 0.0000000 |
| METSP1 | 0.0352933 | 0.0464233 | 0.7602487 | 0.4471386 |
| METSP2 | 0.1347541 | 0.0426807 | 3.1572581 | 0.0016012 |
| METSP3 | -0.1308897 | 0.0500924 | -2.6129667 | 0.0090005 |
| CERSP1 | -0.2059851 | 0.0651484 | -3.1617812 | 0.0015766 |
| CERSP2 | -0.0065917 | 0.0629323 | -0.1047430 | 0.9165835 |
| CERSP3 | 0.5395211 | 0.1145112 | 4.7115127 | 0.0000025 |
| HUBSP1 | -0.0035467 | 0.0527562 | -0.0672288 | 0.9464020 |
| HUBSP2 | 0.1845608 | 0.0678973 | 2.7182341 | 0.0065838 |
| HUBSP3 | -0.6051907 | 0.0944822 | -6.4053420 | 0.0000000 |
| AIRPSP1 | 0.4978964 | 0.9223348 | 0.5398217 | 0.5893419 |
| AIRPSP2 | -2.5554550 | 1.1262762 | -2.2689417 | 0.0233106 |
| AIRPSP3 | -6.1840700 | 1.2917974 | -4.7871826 | 0.0000017 |
| PARKSP1 | -0.1830453 | 0.0449268 | -4.0743027 | 0.0000468 |

| | | | | |
|----------|-------------|-----------|------------|-----------|
| PARKSP2 | -0.1091055 | 0.0443733 | -2.4588110 | 0.0139705 |
| PARKSP3 | -0.3436178 | 0.0574696 | -5.9791283 | 0.0000000 |
| HIPSP1 | 0.3503613 | 0.1167123 | 3.0019223 | 0.0026949 |
| HIPSP2 | -0.1194447 | 0.1151357 | -1.0374255 | 0.2995834 |
| HIPSP3 | 0.4638780 | 0.1255483 | 3.6948170 | 0.0002222 |
| CCSP1 | 0.1497506 | 0.0630996 | 2.3732413 | 0.0176670 |
| CCSP2 | -0.3148309 | 0.0558678 | -5.6352833 | 0.0000000 |
| CCSP3 | -0.0653148 | 0.0670118 | -0.9746760 | 0.3297640 |
| MINCCESP | -0.0000761 | 0.0000204 | -3.7282001 | 0.0001948 |
| HOTSP1 | -0.2504728 | 0.0714372 | -3.5061956 | 0.0004582 |
| HOTSP2 | 0.6881693 | 0.0872238 | 7.8896970 | 0.0000000 |
| HOTSP3 | -0.2294151 | 0.1591748 | -1.4412783 | 0.1495632 |
| XCOSP1 | 8.4071916 | 2.0056795 | 4.1916923 | 0.0000281 |
| XCOSP2 | 17.7197577 | 3.4854146 | 5.0839742 | 0.0000004 |
| XCOSP3 | 13.6040480 | 3.6235956 | 3.7542953 | 0.0001756 |
| XYCSP1 | -11.8333380 | 2.5947685 | -4.5604601 | 0.0000052 |
| XYCSP2 | -20.6670045 | 4.3456947 | -4.7557424 | 0.0000020 |
| XYCSP3 | -19.3814057 | 4.5900057 | -4.2225232 | 0.0000245 |

REGRESSION DIAGNOSTICS

MULTICOLLINEARITY CONDITION NUMBER 4752.530

TEST ON NORMALITY OF ERRORS

| TEST | DF | VALUE | PROB |
|-------------|----|--------|--------|
| Jarque-Bera | 2 | 27.431 | 0.0000 |

DIAGNOSTICS FOR HETEROSKEDASTICITY

RANDOM COEFFICIENTS

| TEST | DF | VALUE | PROB |
|----------------------|----|---------|--------|
| Breusch-Pagan test | 57 | 247.088 | 0.0000 |
| Koenker-Bassett test | 57 | 212.038 | 0.0000 |

DIAGNOSTICS FOR SPATIAL DEPENDENCE File: kn2.gwt

| TEST | MI/DF | VALUE |
|-----------------------------|--------|---------|
| Moran's I (error) | 0.2156 | 18.127 |
| Lagrange Multiplier (lag) | 1 | 276.270 |
| Robust LM (lag) | 1 | 79.406 |
| Lagrange Multiplier (error) | 1 | 304.766 |
| Robust LM (error) | 1 | 107.901 |
| Lagrange Multiplier (SARMA) | 2 | 384.171 |

DIAGNOSTICS FOR SPATIAL DEPENDENCE File: kn5.gwt

| TEST | MI/DF | VALUE |
|-----------------------------|--------|---------|
| Moran's I (error) | 0.1806 | 23.983 |
| Lagrange Multiplier (lag) | 1 | 388.255 |
| Robust LM (lag) | 1 | 113.961 |
| Lagrange Multiplier (error) | 1 | 515.027 |
| Robust LM (error) | 1 | 240.733 |
| Lagrange Multiplier (SARMA) | 2 | 628.988 |

DIAGNOSTICS FOR SPATIAL DEPENDENCE File: kn6.gwt

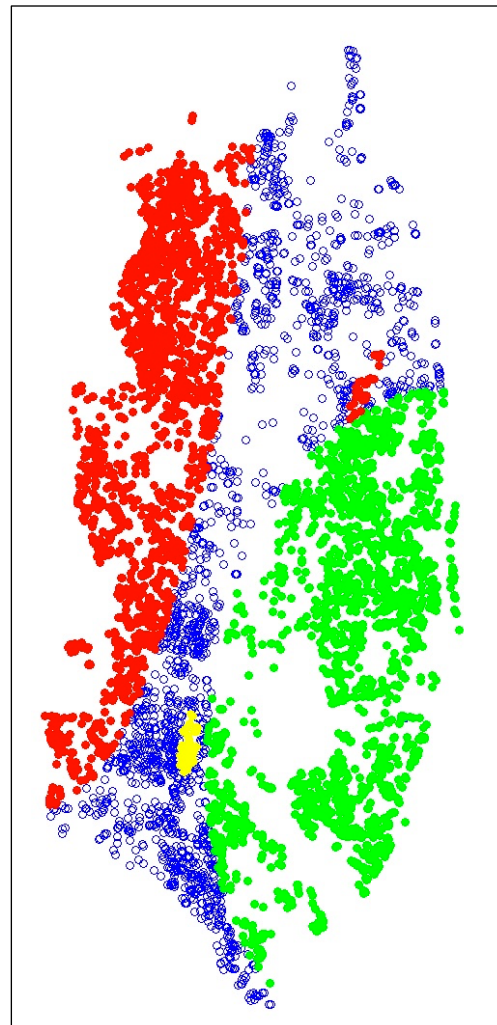
| TEST | MI/DF | VALUE |
|-----------------------------|--------|---------|
| Moran's I (error) | 0.1540 | 21.763 |
| Lagrange Multiplier (lag) | 1 | 324.290 |
| Robust LM (lag) | 1 | 105.936 |
| Lagrange Multiplier (error) | 1 | 416.432 |
| Robust LM (error) | 1 | 198.078 |
| Lagrange Multiplier (SARMA) | 2 | 522.368 |

DIAGNOSTICS FOR SPATIAL DEPENDENCE File: kn30.gwt

| TEST | MI/DF | VALUE |
|-----------------------------|--------|---------|
| Moran's I (error) | 0.0924 | 33.041 |
| Lagrange Multiplier (lag) | 1 | 354.757 |
| Robust LM (lag) | 1 | 118.643 |
| Lagrange Multiplier (error) | 1 | 774.118 |
| Robust LM (error) | 1 | 538.004 |
| Lagrange Multiplier (SARMA) | 2 | 892.761 |

DIAGNOSTICS FOR SPATIAL DEPENDENCE File: dinv.gwt

| TEST | MI/DF | VALUE |
|------|-------|-------|
|------|-------|-------|



| | | | |
|-----------------------------|--------|---------|--------|
| Moran's I (error) | 0.0924 | 33.041 | 0.0000 |
| Lagrange Multiplier (lag) | 1 | 354.757 | 0.0000 |
| Robust LM (lag) | 1 | 118.643 | 0.0000 |
| Lagrange Multiplier (error) | 1 | 774.118 | 0.0000 |
| Robust LM (error) | 1 | 538.004 | 0.0000 |
| Lagrange Multiplier (SARMA) | 2 | 892.761 | 0.0000 |

2. OLS hedonic model with spatial submarkets

```
submkt_ols2<-lm(LPRICE ~
FL_B+ATTIC+HOUSE+DETACH+SEMIDE+HPLOT+HFLOOR+BEDSIT+DUPLEX+bs(LM2B,3)+REFORM+NEW+REFURB+NO
LIFT+INTERIOR+VIEWS+GARAGE+bs(DISCEN,3)+DISSOL+bs(MINMETRO,3)+MINHUB+bs(MINCERCA,3)+bs(MINAIRP,3)
)+ bs(DISPARK,3)+bs(MINCC,3)+bs(MINCCESP,3)+bs(DISHIPER,3)+
XYCOO+D1+N2+N4+N7+D2+N9+N10+N12+N14+N16+N20+N22+N25+N28+N30+D6+N32+N33+N34+N38+N40+N43
, data=ALMHOUSE)
```

----- SUMMARY OF OUTPUT: ORDINARY LEAST SQUARES -----

```
Data set           :sgspline.dbf
Dependent Variable :   LPRICE           Number of Observations:   5541
Mean dependent var :   12.5984         Number of Variables      :    69
S.D. dependent var :    0.6759         Degrees of Freedom       :   5472
R-squared          :    0.8686
Adjusted R-squared :    0.8669
Sum squared residual:  332.660         F-statistic              :   531.8284
Sigma-square       :    0.061          Prob(F-statistic)       :    0
S.E. of regression :    0.247          Log likelihood           :   -69.453
Sigma-square ML    :    0.060          Akaike info criterion   :   276.907
S.E of regression ML:  0.2450          Schwarz criterion        :   733.682
```

| Variable | Coefficient | Std.Error | t-Statistic | Probability |
|----------|-------------|------------|-------------|-------------|
| CONSTANT | 81.2927855 | 10.9544291 | 7.4209970 | 0.0000000 |
| FL_B | -0.3134815 | 0.0410647 | -7.6338474 | 0.0000000 |
| ATTIC | 0.1413870 | 0.0134359 | 10.5230707 | 0.0000000 |
| HOUSE | 0.1159323 | 0.0447405 | 2.5912182 | 0.0095891 |
| DETACH | 0.4158438 | 0.0816721 | 5.0916242 | 0.0000004 |
| SEMIDE | 0.2536402 | 0.0705369 | 3.5958523 | 0.0003262 |
| HFLOOR | -0.1648629 | 0.0520334 | -3.1684061 | 0.0015412 |
| HPLOT | 0.2578575 | 0.1160393 | 2.2221559 | 0.0263135 |
| DUPLEX | 0.0454754 | 0.0208935 | 2.1765282 | 0.0295584 |
| BEDSIT | -0.0539646 | 0.0188268 | -2.8663722 | 0.0041679 |
| LMESP1 | 0.5362348 | 0.1477599 | 3.6290944 | 0.0002870 |
| LMESP2 | 3.0703311 | 0.0789124 | 38.9080766 | 0.0000000 |
| LMESP3 | 4.3431490 | 0.1712909 | 25.3553969 | 0.0000000 |
| REFURB | 0.0349672 | 0.0107332 | 3.2578586 | 0.0011294 |
| REFORM | -0.1989118 | 0.0091392 | -21.7646333 | 0.0000000 |
| NEW | 0.1285911 | 0.0150977 | 8.5172565 | 0.0000000 |
| NOLIFT | -0.1328219 | 0.0101355 | -13.1045692 | 0.0000000 |
| INTERIOR | -0.1009083 | 0.0096979 | -10.4052138 | 0.0000000 |
| GARAGE | 0.0730768 | 0.0188069 | 3.8856300 | 0.0001033 |
| VIEWS | 0.0647846 | 0.0181240 | 3.5745132 | 0.0003539 |
| CENSP1 | -0.9121495 | 0.1167511 | -7.8127732 | 0.0000000 |
| CENSP2 | -0.2248254 | 0.1177096 | -1.9100009 | 0.0561853 |
| CENSP3 | -0.1984264 | 0.1565001 | -1.2678994 | 0.2048878 |
| DISSOL | -0.0002482 | 0.0000331 | -7.5015489 | 0.0000000 |
| METSP1 | 0.0074522 | 0.0440775 | 0.1690699 | 0.8657479 |
| METSP2 | 0.1240354 | 0.0426443 | 2.9086007 | 0.0036451 |
| METSP3 | -0.1739536 | 0.0501584 | -3.4680886 | 0.0005282 |
| CERSP1 | -0.3332079 | 0.0678598 | -4.9102365 | 0.0000009 |
| CERSP2 | 0.1249502 | 0.0617569 | 2.0232598 | 0.0430949 |
| CERSP3 | -0.3029414 | 0.0768895 | -3.9399586 | 0.0000825 |
| MINHUB | 0.0000970 | 0.0000193 | 5.0197549 | 0.0000005 |
| AIRPSP1 | -0.2766346 | 0.1338208 | -2.0672010 | 0.0387621 |
| AIRPSP2 | -1.6784312 | 0.2143788 | -7.8292765 | 0.0000000 |
| AIRPSP3 | -1.5028184 | 0.2404347 | -6.2504217 | 0.0000000 |
| PARKSP1 | -0.0993595 | 0.0446130 | -2.2271448 | 0.0259781 |
| PARKSP2 | -0.1539616 | 0.0457649 | -3.3641862 | 0.0007730 |

| | | | | |
|---------|------------|-----------|------------|-----------|
| PARKSP3 | -0.1371233 | 0.0548250 | -2.5011102 | 0.0124095 |
| HIPSP1 | 0.2853921 | 0.1151478 | 2.4784845 | 0.0132241 |
| HIPSP2 | -0.6966969 | 0.0798017 | -8.7303466 | 0.0000000 |
| HIPSP3 | 0.0934623 | 0.1042273 | 0.8967162 | 0.3699098 |
| CCSP1 | 0.2525976 | 0.0652649 | 3.8703419 | 0.0001099 |
| CCSP2 | -0.1522230 | 0.0582206 | -2.6145877 | 0.0089580 |
| CCSP3 | 0.1659194 | 0.0671441 | 2.4710929 | 0.0135003 |
| CCESP1 | -0.2339874 | 0.0713478 | -3.2795315 | 0.0010463 |
| CCESP2 | -0.1287435 | 0.0786923 | -1.6360359 | 0.1018896 |
| CCESP3 | 0.1321717 | 0.0936042 | 1.4120268 | 0.1579989 |
| XYCOO | -0.0000000 | 0.0000000 | -6.2618288 | 0.0000000 |
| D1 | -0.1633969 | 0.0306619 | -5.3289947 | 0.0000001 |
| N2 | -0.1047389 | 0.0228626 | -4.5812401 | 0.0000047 |
| N4 | 0.0981566 | 0.0304887 | 3.2194401 | 0.0012919 |
| D2 | -0.1126060 | 0.0321540 | -3.5020799 | 0.0004653 |
| N7 | -0.1502991 | 0.0388297 | -3.8707284 | 0.0001098 |
| N9 | -0.1015098 | 0.0306533 | -3.3115424 | 0.0009338 |
| N10 | 0.2157247 | 0.0433689 | 4.9741784 | 0.0000007 |
| N12 | -0.1256733 | 0.0329364 | -3.8156371 | 0.0001373 |
| N14 | -0.0761176 | 0.0269778 | -2.8214874 | 0.0047974 |
| N16 | -0.1485716 | 0.0390318 | -3.8064271 | 0.0001425 |
| N20 | 0.1472854 | 0.0391901 | 3.7582336 | 0.0001729 |
| N22 | -0.1998112 | 0.0265840 | -7.5162152 | 0.0000000 |
| N25 | 0.1737984 | 0.0360111 | 4.8262503 | 0.0000014 |
| N28 | -0.0899906 | 0.0298911 | -3.0106199 | 0.0026190 |
| N30 | 0.1311184 | 0.0358403 | 3.6584021 | 0.0002562 |
| D6 | -0.3298179 | 0.0352809 | -9.3483445 | 0.0000000 |
| N32 | 0.1453157 | 0.0302772 | 4.7995141 | 0.0000016 |
| N33 | 0.2716655 | 0.0335456 | 8.0983889 | 0.0000000 |
| N34 | 0.3145200 | 0.0286136 | 10.9919898 | 0.0000000 |
| N38 | -0.1102744 | 0.0349884 | -3.1517416 | 0.0016318 |
| N40 | -0.0672484 | 0.0322319 | -2.0863897 | 0.0369895 |
| N43 | 0.1205925 | 0.0326900 | 3.6889776 | 0.0002273 |

REGRESSION DIAGNOSTICS

MULTICOLLINEARITY CONDITION NUMBER 22828.646

TEST ON NORMALITY OF ERRORS

| TEST | DF | VALUE | PROB |
|-------------|----|--------|--------|
| Jarque-Bera | 2 | 34.116 | 0.0000 |

DIAGNOSTICS FOR HETEROSKEDASTICITY

RANDOM COEFFICIENTS

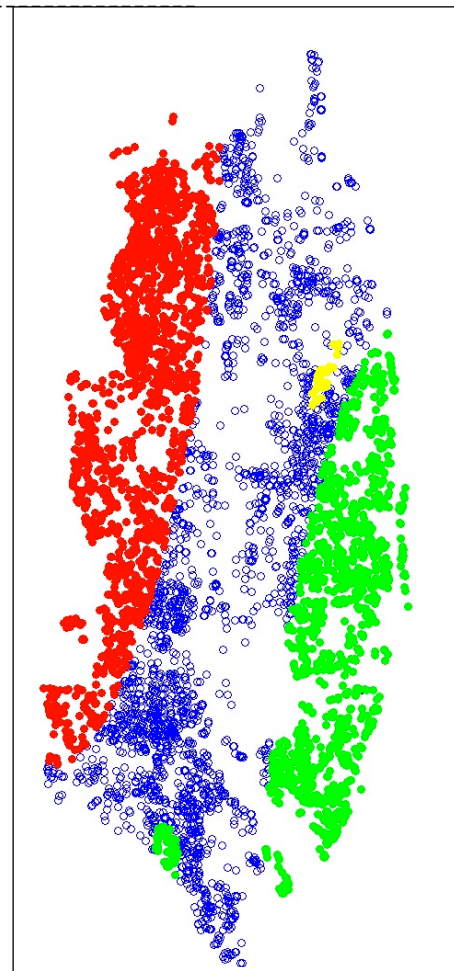
| TEST | DF | VALUE | PROB |
|----------------------|----|---------|--------|
| Breusch-Pagan test | 68 | 284.905 | 0.0000 |
| Koenker-Bassett test | 68 | 240.353 | 0.0000 |

> lm.LMtests(submkt_ols2, kn2s, test="all")

| TEST | MI/DF | VALUE | PROB |
|-----------------------------|--------|---------|--------|
| Moran's I (error) | 0.1876 | 16.010 | 0.0000 |
| Lagrange Multiplier (lag) | 1 | 222.246 | 0.0000 |
| Robust LM (lag) | 1 | 67.813 | 0.0000 |
| Lagrange Multiplier (error) | 1 | 230.866 | 0.0000 |
| Robust LM (error) | 1 | 76.433 | 0.0000 |
| Lagrange Multiplier (SARMA) | 2 | 298.679 | 0.0000 |

> lm.LMtests(submkt_ols2, kn5s, test="all")

| TEST | MI/DF | VALUE | PROB |
|-----------------------------|--------|---------|--------|
| Moran's I (error) | 0.1465 | 19.919 | 0.0000 |
| Lagrange Multiplier (lag) | 1 | 297.533 | 0.0000 |
| Robust LM (lag) | 1 | 99.491 | 0.0000 |
| Lagrange Multiplier (error) | 1 | 339.144 | 0.0000 |
| Robust LM (error) | 1 | 141.102 | 0.0000 |
| Lagrange Multiplier (SARMA) | 2 | 438.635 | 0.0000 |



```
> lm.LMtests(submkt_ols2, kn6s, test="all")
```

| TEST | MI/DF | VALUE | PROB |
|-----------------------------|--------|---------|--------|
| Moran's I (error) | 0.1209 | 17.583 | 0.0000 |
| Lagrange Multiplier (lag) | 1 | 239.208 | 0.0000 |
| Robust LM (lag) | 1 | 89.904 | 0.0000 |
| Lagrange Multiplier (error) | 1 | 256.795 | 0.0000 |
| Robust LM (error) | 1 | 107.491 | 0.0000 |
| Lagrange Multiplier (SARMA) | 2 | 346.699 | 0.0000 |

```
> lm.LMtests(submkt_ols2, kn30s, test="all")
```

| TEST | MI/DF | VALUE | PROB |
|-----------------------------|--------|---------|--------|
| Moran's I (error) | 0.0601 | 23.166 | 0.0000 |
| Lagrange Multiplier (lag) | 1 | 230.104 | 0.0000 |
| Robust LM (lag) | 1 | 98.883 | 0.0000 |
| Lagrange Multiplier (error) | 1 | 327.684 | 0.0000 |
| Robust LM (error) | 1 | 196.463 | 0.0000 |
| Lagrange Multiplier (SARMA) | 2 | 426.567 | 0.0000 |

```
> lm.LMtests(submkt_ols2, dinvs, test="all")
```

| TEST | MI/DF | VALUE | PROB |
|-----------------------------|--------|---------|--------|
| Moran's I (error) | 0.0601 | 23.166 | 0.0000 |
| Lagrange Multiplier (lag) | 1 | 230.104 | 0.0000 |
| Robust LM (lag) | 1 | 98.883 | 0.0000 |
| Lagrange Multiplier (error) | 1 | 327.684 | 0.0000 |
| Robust LM (error) | 1 | 196.463 | 0.0000 |
| Lagrange Multiplier (SARMA) | 2 | 426.567 | 0.0000 |

3. OLS hedonic model with spatial submarkets and interaction variables

a) Best model in terms of goodness-of-fit and homoscedasticity assumption

```
submkt_ols <- lm(LPRICE ~
FL_B+ATTIC+DETACH+SEMIDE+HFLOOR+LM2B+REFORM+NEW+GARAGE+bs(DISCEN,3)+MINCERCA+bs(MINAIRP,3)+
MINHOT5+D2+N20+N34+N35+N37+FLBREFUR+FL_B:MINM30+LM2B:INTERIOR+NEW:MINSERV+NOLIFT:EXTERIOR+
NOLIFT:TERRACE+NOLIFT:VIEWS+MINHOT5:DENSDWEL+N1:NEW+N3:DETACH+N5:DETACH+N14:FL_0+N21:NOLIFT+
N23:DETACH+N26:LM2B+N26:DETACH+N26:MINHOT5+N30:LM2B+N32VIEW+N34:MINM30+N36:NEW+N37:DETAC
H+N32:LM2B:MINMETRO+N32:LM2B:DISPARK+N2:MINHOT5:DORM+N2:MINHOT5:DISSOL+N4:MINHOT5:DORM+N
32:REFORM+N28:DUPLEX, data=ALMHOUSE)
```

Coefficients:

| | Estimate | Std. Error | t value | Pr(> t) | |
|-------------------|------------|------------|---------|----------|-----|
| (Intercept) | 9.151e+00 | 6.372e-02 | 143.618 | < 2e-16 | *** |
| FL_B | -1.936e-01 | 1.134e-01 | -1.708 | 0.087764 | . |
| ATTIC | 1.441e-01 | 1.434e-02 | 10.046 | < 2e-16 | *** |
| DETACH | 5.889e-01 | 7.829e-02 | 7.522 | 6.25e-14 | *** |
| SEMIDE | 4.129e-01 | 5.995e-02 | 6.887 | 6.35e-12 | *** |
| HFLOOR | -8.857e-02 | 5.333e-02 | -1.661 | 0.096767 | . |
| LM2B | 9.685e-01 | 7.477e-03 | 129.540 | < 2e-16 | *** |
| REFORM | -1.905e-01 | 9.689e-03 | -19.665 | < 2e-16 | *** |
| NEW | 2.453e-01 | 3.324e-02 | 7.379 | 1.83e-13 | *** |
| GARAGE | 7.628e-02 | 1.999e-02 | 3.816 | 0.000137 | *** |
| bs(DISCEN, 3)1 | -6.163e-01 | 7.697e-02 | -8.008 | 1.42e-15 | *** |
| bs(DISCEN, 3)2 | -7.276e-01 | 5.117e-02 | -14.221 | < 2e-16 | *** |
| bs(DISCEN, 3)3 | -9.745e-01 | 7.243e-02 | -13.454 | < 2e-16 | *** |
| MINCERCA | -9.444e-05 | 9.327e-06 | -10.125 | < 2e-16 | *** |
| bs(MINAIRP, 3)1 | -6.787e-01 | 7.866e-02 | -8.628 | < 2e-16 | *** |
| bs(MINAIRP, 3)2 | -2.104e-01 | 4.415e-02 | -4.766 | 1.93e-06 | *** |
| bs(MINAIRP, 3)3 | -1.880e-01 | 5.218e-02 | -3.603 | 0.000317 | *** |
| MINHOT5 | 1.096e-04 | 1.121e-05 | 9.779 | < 2e-16 | *** |
| D2 | -1.120e-01 | 1.834e-02 | -6.105 | 1.10e-09 | *** |
| N20 | 2.533e-01 | 3.647e-02 | 6.946 | 4.20e-12 | *** |
| N34 | 6.951e-01 | 2.020e-01 | 3.441 | 0.000583 | *** |
| N35 | -6.790e-02 | 3.450e-02 | -1.968 | 0.049133 | * |
| N37 | -1.432e-01 | 2.150e-02 | -6.658 | 3.06e-11 | *** |
| FLBREFUR | 4.059e-01 | 1.107e-01 | 3.667 | 0.000248 | *** |
| FL_B:MINM30 | -1.110e-04 | 6.163e-05 | -1.801 | 0.071765 | . |
| LM2B:INTERIOR | -2.073e-02 | 2.417e-03 | -8.576 | < 2e-16 | *** |
| NEW:MINSERV | -1.683e-03 | 4.746e-04 | -3.546 | 0.000394 | *** |
| NOLIFT:EXTERIOR | -1.895e-01 | 2.220e-02 | -8.535 | < 2e-16 | *** |
| NOLIFT:TERRACE | -9.019e-02 | 3.753e-02 | -2.403 | 0.016288 | * |
| NOLIFT:VIEWS | -1.102e-01 | 5.113e-02 | -2.155 | 0.031186 | * |
| MINHOT5:DENSDWEL | -7.982e-06 | 1.042e-06 | -7.657 | 2.24e-14 | *** |
| NEW:N1 | 2.984e-01 | 6.643e-02 | 4.491 | 7.23e-06 | *** |
| MINHOT5:N2:DORM | -4.826e-05 | 1.587e-05 | -3.042 | 0.002364 | ** |
| MINHOT5:N2:DISSOL | -8.943e-08 | 4.394e-08 | -2.035 | 0.041897 | * |
| DETACH:N3 | -6.290e-01 | 2.685e-01 | -2.342 | 0.019197 | * |
| MINHOT5:DORM:N4 | -8.257e-05 | 3.360e-05 | -2.457 | 0.014029 | * |
| DETACH:N5 | 4.774e-01 | 2.681e-01 | 1.781 | 0.074967 | . |
| N14:FL_0 | -2.566e-01 | 7.790e-02 | -3.294 | 0.000994 | *** |
| NOLIFT:N21 | 1.452e-01 | 8.844e-02 | 1.642 | 0.100614 | . |
| DETACH:N23 | -5.820e-01 | 1.607e-01 | -3.621 | 0.000296 | *** |
| LM2B:N26 | -5.853e-02 | 3.088e-02 | -1.895 | 0.058144 | . |
| DETACH:N26 | 5.881e-01 | 2.172e-01 | 2.708 | 0.006792 | ** |
| MINHOT5:N26 | 3.210e-04 | 1.465e-04 | 2.192 | 0.028442 | * |
| N28:DUPLEX | 3.231e-01 | 8.501e-02 | 3.801 | 0.000146 | *** |
| LM2B:N30 | 4.604e-02 | 6.105e-03 | 7.541 | 5.41e-14 | *** |
| VIEWS:N32 | 2.163e-01 | 1.119e-01 | 1.934 | 0.053191 | . |
| REFORM:N32 | -1.455e-01 | 5.185e-02 | -2.806 | 0.005035 | ** |
| LM2B:N32:MINMETRO | -6.544e-05 | 4.125e-05 | -1.586 | 0.112691 | . |

```

LM2B:N32:DISPARK  -8.677e-05  2.514e-05  -3.452  0.000561  ***
N34:MINM30        -2.649e-04  9.437e-05  -2.807  0.005025  **
NEW:N36           -1.925e-01  1.018e-01  -1.891  0.058687  .
DETACH:N37        -3.936e-01  1.689e-01  -2.330  0.019841  *

```

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.2626 on 5489 degrees of freedom
Multiple R-squared: 0.8505, Adjusted R-squared: 0.8491
F-statistic: 612.2 on 51 and 5489 DF, p-value: < 2.2e-16

```

> extractAIC(spline_ols)
[1] 17.00 -14102.67

```

```

> kappa(submkt_ols)
[1] 17299869

```

```

> jarque.bera.test(submkt_ols$res)
data: submkt_ols$res
X-squared = 38.656, df = 2, p-value = 4.035e-09

```

```

> bptest(submkt_ols)
data: submkt_ols
BP = 11.297, df = 51, p-value = 1
Breusch-Pagan test      51      14.585
Koenker-Bassett test   51      12.108

```

```

> lm.LMtests(submkt_ols, kn2s, test="all")
LMerr = 460.61, df = 1, p-value < 2.2e-16
LMlag = 410.46, df = 1, p-value < 2.2e-16
RLMerr = 162.85, df = 1, p-value < 2.2e-16
RLMlag = 112.69, df = 1, p-value < 2.2e-16
SARMA = 573.31, df = 2, p-value < 2.2e-16

```

```

> lm.LMtests(submkt_ols, kn5s, test="all")
LMerr = 800.8, df = 1, p-value < 2.2e-16
LMlag = 645.34, df = 1, p-value < 2.2e-16
RLMerr = 357.56, df = 1, p-value < 2.2e-16
RLMlag = 202.1, df = 1, p-value < 2.2e-16
SARMA = 1002.9, df = 2, p-value < 2.2e-16

```

```

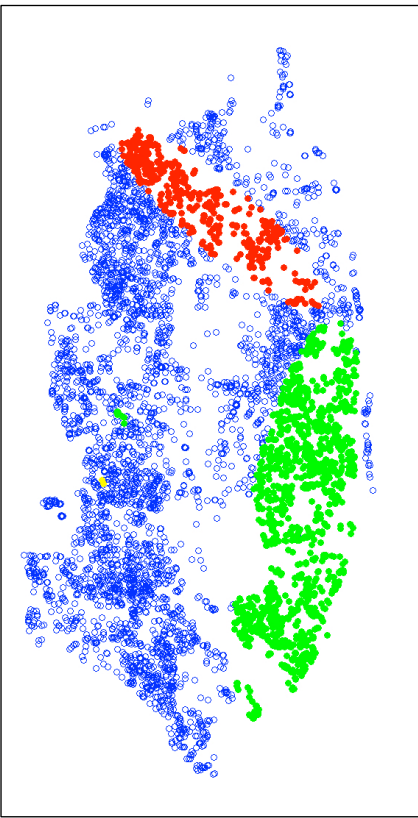
> lm.LMtests(submkt_ols, kn30s, test="all")
LMerr = 2123, df = 1, p-value < 2.2e-16
LMlag = 861.23, df = 1, p-value < 2.2e-16
RLMerr = 1535.4, df = 1, p-value < 2.2e-16
RLMlag = 273.7, df = 1, p-value < 2.2e-16
SARMA = 2396.7, df = 2, p-value < 2.2e-16

```

```

> lm.LMtests(submkt_ols, dinvs, test="all")
LMerr = 795.52, df = 1, p-value < 2.2e-16
LMlag = 752.63, df = 1, p-value < 2.2e-16
RLMerr = 273.2, df = 1, p-value < 2.2e-16
RLMlag = 230.31, df = 1, p-value < 2.2e-16
SARMA = 1025.8, df = 2, p-value < 2.2e-16

```



DIAGNOSTICS FOR SPATIAL DEPENDENCE: KN6S

| TEST | MI/DF | VALUE | PROB |
|-----------------------------|----------|----------------|---------------|
| Moran's I (error) | 0.1992 | 27.340 | 0.0000 |
| Lagrange Multiplier (lag) | 1 | 578.071 | 0.0000 |
| Robust LM (lag) | 1 | 200.819 | 0.0000 |
| Lagrange Multiplier (error) | 1 | 697.259 | 0.0000 |
| Robust LM (error) | 1 | 320.007 | 0.0000 |
| Lagrange Multiplier (SARMA) | 2 | 898.078 | 0.0000 |

MULTICOLLINEARITY CONDITION NUMBER 63.570

4. SEM model (GMM)

```
SEM_kn2s <- GMerrorsar(LPRICE~FL_B+ATTIC+DETACH+SEMIDE+LM2B+REFORM+NEW+
  GARAGE+bs(DISCEN,3)+MINCERCA+bs(MINAIRP,3)+MINHOT5+
  D2+N20+N34+N37+
  FLBREFUR+FL_B:MINM30+LM2B:INTERIOR+NEW:MINSERV+
  NOLIFT:EXTERIOR+NOLIFT:TERRACE+NOLIFT:VIEWS+
  MINHOT5:DENSDWEL+
  N1:NEW+N3:DETACH+N5:DETACH+N14:FL_0+
  N23:DETACH+N26:DETACH+N30:LM2B+
  N34:MINM30+N37:DETACH+N32:LM2B:MINMETRO+
  N32:LM2B:DISPARK+N2:MINHOT5:DORM+N2:MINHOT5:DISSOL+
  N4:MINHOT5:DORM+N32:REFORM+N28:DUPLEX
  , data=ALMHOUSE,
  listw=kn2s, returnHcov=FALSE, method="nlminb", verbose=TRUE)
```

Coefficients: (GM standard errors)

| | Estimate | Std. Error | z value | Pr(> z) |
|-------------------|-------------|------------|----------|-----------|
| (Intercept) | 9.3399e+00 | 7.6205e-02 | 122.5621 | < 2.2e-16 |
| FL_B | -2.0156e-01 | 1.0485e-01 | -1.9225 | 0.0545449 |
| ATTIC | 1.4491e-01 | 1.3428e-02 | 10.7913 | < 2.2e-16 |
| DETACH | 4.9897e-01 | 5.4051e-02 | 9.2315 | < 2.2e-16 |
| SEMIDE | 4.0356e-01 | 5.9461e-02 | 6.7870 | 1.145e-11 |
| LM2B | 9.3834e-01 | 7.5800e-03 | 123.7910 | < 2.2e-16 |
| REFORM | -1.8744e-01 | 9.1541e-03 | -20.4757 | < 2.2e-16 |
| NEW | 2.2356e-01 | 3.9654e-02 | 5.6379 | 1.721e-08 |
| GARAGE | 6.5347e-02 | 1.8767e-02 | 3.4821 | 0.0004976 |
| bs(DISCEN, 3)1 | -6.0385e-01 | 9.8051e-02 | -6.1585 | 7.342e-10 |
| bs(DISCEN, 3)2 | -7.9669e-01 | 6.2870e-02 | -12.6721 | < 2.2e-16 |
| bs(DISCEN, 3)3 | -1.0335e+00 | 9.0266e-02 | -11.4496 | < 2.2e-16 |
| MINCERCA | -1.0082e-04 | 1.1545e-05 | -8.7324 | < 2.2e-16 |
| bs(MINAIRP, 3)1 | -7.5804e-01 | 9.7644e-02 | -7.7633 | 8.216e-15 |
| bs(MINAIRP, 3)2 | -2.4637e-01 | 5.5533e-02 | -4.4365 | 9.144e-06 |
| bs(MINAIRP, 3)3 | -2.3345e-01 | 6.6554e-02 | -3.5076 | 0.0004521 |
| MINHOT5 | 1.2450e-04 | 1.3209e-05 | 9.4252 | < 2.2e-16 |
| D2 | -1.0244e-01 | 2.3304e-02 | -4.3961 | 1.102e-05 |
| N20 | 2.2921e-01 | 4.4236e-02 | 5.1815 | 2.201e-07 |
| N34 | 8.4818e-01 | 2.5049e-01 | 3.3861 | 0.0007089 |
| N37 | -1.5587e-01 | 2.6969e-02 | -5.7795 | 7.491e-09 |
| FLBREFUR | 3.7020e-01 | 1.0238e-01 | 3.6158 | 0.0002995 |
| FL_B:MINM30 | -9.8747e-05 | 5.7120e-05 | -1.7288 | 0.0838532 |
| LM2B:INTERIOR | -2.1597e-02 | 2.3051e-03 | -9.3690 | < 2.2e-16 |
| NEW:MINSERV | -1.6410e-03 | 5.8218e-04 | -2.8187 | 0.0048214 |
| NOLIFT:EXTERIOR | -1.6272e-01 | 2.0735e-02 | -7.8477 | 4.219e-15 |
| NOLIFT:TERRACE | -7.5861e-02 | 3.5058e-02 | -2.1639 | 0.0304755 |
| NOLIFT:VIEWS | -8.6645e-02 | 4.5889e-02 | -1.8881 | 0.0590084 |
| MINHOT5:DENSDWEL | -6.5381e-06 | 1.1496e-06 | -5.6871 | 1.292e-08 |
| NEW:N1 | 3.0913e-01 | 8.2685e-02 | 3.7386 | 0.0001850 |
| DETACH:N3 | -6.1750e-01 | 2.5071e-01 | -2.4630 | 0.0137786 |
| DETACH:N5 | 5.3855e-01 | 2.5011e-01 | 2.1532 | 0.0313011 |
| N14:FL_0 | -2.5092e-01 | 7.5568e-02 | -3.3205 | 0.0008986 |
| DETACH:N23 | -4.9845e-01 | 1.5131e-01 | -3.2943 | 0.0009867 |
| DETACH:N26 | 4.4788e-01 | 1.8265e-01 | 2.4522 | 0.0141997 |
| LM2B:N30 | 4.6332e-02 | 7.7671e-03 | 5.9651 | 2.445e-09 |
| N34:MINM30 | -3.3973e-04 | 1.1659e-04 | -2.9139 | 0.0035694 |
| DETACH:N37 | -4.1209e-01 | 1.5175e-01 | -2.7155 | 0.0066167 |
| REFORM:N32 | -1.5380e-01 | 4.8700e-02 | -3.1582 | 0.0015877 |
| N28:DUPLEX | 2.3802e-01 | 9.9400e-02 | 2.3946 | 0.0166397 |
| LM2B:N32:MINMETRO | -8.7142e-05 | 5.2188e-05 | -1.6698 | 0.0949601 |
| LM2B:N32:DISPARK | -8.3654e-05 | 3.1077e-05 | -2.6918 | 0.0071067 |
| MINHOT5:N2:DORM | -3.9762e-05 | 1.6827e-05 | -2.3629 | 0.0181308 |

```

MINHOT5:N2:DISSOL -1.2193e-07  5.1063e-08  -2.3878  0.0169490
MINHOT5:DORM:N4    -7.1354e-05  3.8082e-05  -1.8737  0.0609750

```

```

Lambda: 0.26816 (standard error): 0.02267 (z-value): 11.829
Residual variance (sigma squared): 0.061729, (sigma: 0.24845)
GM argmin sigma squared: 0.062001
Number of observations: 5541
Number of parameters estimated: 47

```

```

> white_SEM_val
[1] 58.31891
> dchisq(white_SEM_val, df = white_SEM_df)
[1] 0.01415301 0.00000000 0.01415301

```

```

> moran.test(res.SEMkn2s, listw=kn2s)
Moran I statistic standard deviate = 23.335, p-value < 2.2e-16

```

```

SEM_kn5s <- GMerrorsar(LPRICE~FL_B+ATTIC+DETACH+SEMIDE+HFLOOR+LM2B+REFORM+NEW+
  GARAGE+bs(DISCEN, 3)+MINCERCA+bs(MINAIRP, 3)+MINHOT5+
  D2+N20+N34+N37+
  FLBREFUR+FL_B:MINM30+LM2B:INTERIOR+NEW:MINSERV+
  NOLIFT:EXTERIOR+NOLIFT:TERRACE+NOLIFT:VIEWS+
  MINHOT5:DENSDWEL+
  N1:NEW+N3:DETACH+N5:DETACH+N14:FL_0+
  N23:DETACH+N26:DETACH+N30:LM2B+
  N32:VIEWS+N34:MINM30+N37:DETACH+N32:LM2B:MINMETRO+
  N32:LM2B:DISPARK+N2:MINHOT5:DORM+N2:MINHOT5:DISSOL+
  N4:MINHOT5:DORM+N32:REFORM+N28:DUPLEX
, data=ALMHOUSE,
listw=kn5s, returnHcov=FALSE, method="nlminb", verbose=TRUE)

```

Coefficients: (GM standard errors)

| | Estimate | Std. Error | z value | Pr(> z) |
|-----------------|-------------|------------|----------|-----------|
| (Intercept) | 9.4348e+00 | 8.7189e-02 | 108.2104 | < 2.2e-16 |
| FL_B | -1.9850e-01 | 1.0333e-01 | -1.9210 | 0.0547296 |
| ATTIC | 1.4950e-01 | 1.3250e-02 | 11.2831 | < 2.2e-16 |
| DETACH | 5.8584e-01 | 7.4591e-02 | 7.8539 | 3.997e-15 |
| SEMIDE | 4.1138e-01 | 5.7505e-02 | 7.1538 | 8.440e-13 |
| HFLOOR | -8.2187e-02 | 4.9030e-02 | -1.6762 | 0.0936902 |
| LM2B | 9.2405e-01 | 7.5707e-03 | 122.0560 | < 2.2e-16 |
| REFORM | -1.8625e-01 | 9.0231e-03 | -20.6415 | < 2.2e-16 |
| NEW | 1.7870e-01 | 4.1612e-02 | 4.2944 | 1.751e-05 |
| GARAGE | 6.5430e-02 | 1.8486e-02 | 3.5394 | 0.0004010 |
| bs(DISCEN, 3)1 | -6.2943e-01 | 1.1634e-01 | -5.4101 | 6.299e-08 |
| bs(DISCEN, 3)2 | -8.2989e-01 | 7.5114e-02 | -11.0485 | < 2.2e-16 |
| bs(DISCEN, 3)3 | -1.0609e+00 | 1.0733e-01 | -9.8843 | < 2.2e-16 |
| MINCERCA | -1.0397e-04 | 1.3874e-05 | -7.4938 | 6.684e-14 |
| bs(MINAIRP, 3)1 | -7.3970e-01 | 1.1659e-01 | -6.3447 | 2.229e-10 |
| bs(MINAIRP, 3)2 | -2.8130e-01 | 6.6611e-02 | -4.2230 | 2.411e-05 |
| bs(MINAIRP, 3)3 | -2.2135e-01 | 7.9421e-02 | -2.7871 | 0.0053183 |
| MINHOT5 | 1.2021e-04 | 1.5754e-05 | 7.6306 | 2.331e-14 |
| D2 | -9.4094e-02 | 2.7489e-02 | -3.4230 | 0.0006193 |
| N20 | 2.0169e-01 | 4.9478e-02 | 4.0763 | 4.575e-05 |
| N34 | 9.0531e-01 | 2.7406e-01 | 3.3033 | 0.0009554 |
| N37 | -1.5937e-01 | 3.1270e-02 | -5.0965 | 3.460e-07 |
| FLBREFUR | 3.5923e-01 | 1.0070e-01 | 3.5674 | 0.0003606 |
| FL_B:MINM30 | -1.0954e-04 | 5.6426e-05 | -1.9412 | 0.0522289 |
| LM2B:INTERIOR | -2.3037e-02 | 2.2703e-03 | -10.1470 | < 2.2e-16 |
| NEW:MINSERV | -1.2012e-03 | 6.2761e-04 | -1.9139 | 0.0556286 |
| NOLIFT:EXTERIOR | -1.4696e-01 | 2.0502e-02 | -7.1678 | 7.621e-13 |
| NOLIFT:TERRACE | -7.6087e-02 | 3.4530e-02 | -2.2035 | 0.0275605 |
| NOLIFT:VIEWS | -1.1976e-01 | 4.6596e-02 | -2.5701 | 0.0101667 |

```

MINHOT5:DENSDWEL -4.8735e-06 1.1767e-06 -4.1418 3.446e-05
NEW:N1 3.0879e-01 9.6329e-02 3.2056 0.0013477
DETACH:N3 -5.2074e-01 2.4580e-01 -2.1186 0.0341279
DETACH:N5 5.4495e-01 2.4529e-01 2.2216 0.0263080
N14:FL_0 -2.4147e-01 7.3116e-02 -3.3026 0.0009579
DETACH:N23 -4.5563e-01 1.4885e-01 -3.0610 0.0022061
DETACH:N26 3.7678e-01 1.8171e-01 2.0735 0.0381226
LM2B:N30 4.5173e-02 8.9096e-03 5.0701 3.976e-07
VIEWS:N32 1.9746e-01 1.0195e-01 1.9368 0.0527680
N34:MINM30 -3.6794e-04 1.2740e-04 -2.8880 0.0038766
DETACH:N37 -2.9608e-01 1.5654e-01 -1.8914 0.0585652
REFORM:N32 -1.3593e-01 4.7946e-02 -2.8350 0.0045821
N28:DUPLICATE 2.3110e-01 1.1120e-01 2.0782 0.0376946
LM2B:N32:MINMETRO -1.0716e-04 5.9860e-05 -1.7902 0.0734141
LM2B:N32:DISPARK -7.7905e-05 3.5419e-05 -2.1995 0.0278416
MINHOT5:N2:DORM -3.9475e-05 1.6756e-05 -2.3559 0.0184755
MINHOT5:N2:DISSOL -1.3307e-07 5.5155e-08 -2.4127 0.0158360
MINHOT5:DORM:N4 -6.7806e-05 3.9667e-05 -1.7094 0.0873824

```

```

Lambda: 0.4056 (standard error): 0.038879 (z-value): 10.432
Residual variance (sigma squared): 0.059999, (sigma: 0.24495)
GM argmin sigma squared: 0.06018
Number of observations: 5541
Number of parameters estimated: 49

```

```

> white_SEM_kn5_val
[1] 59.0467
> dchisq(white_SEM_kn5_val, df = white_SEM_kn5_df)
[1] 0.01684994 0.00000000 0.01684994

```

```

> moran.test(res.SEMkn5s, listw=kn5s)
Moran I statistic standard deviate = 32.874, p-value < 2.2e-16
alternative hypothesis: greater
sample estimates:
Moran I statistic      Expectation      Variance
  2.612425e-01      -1.805054e-04      6.323786e-05

```

REGRESSION

SUMMARY OF OUTPUT: SPATIALLY WEIGHTED LEAST SQUARES (HET)

```

Data set      : sgwhmap.dbf
Weights matrix : File: kn5.gwt
Dependent Variable : LPRICE      Number of Observations: 5541
Mean dependent var : 12.5984     Number of Variables : 44
S.D. dependent var : 0.6759      Degrees of Freedom : 5497
Pseudo R-squared : 0.8486
N. of iterations : 1            Step1c computed : Yes

```

| Variable | Coefficient | Std. Error | z-Statistic | Probability |
|----------|-------------|------------|-------------|-------------|
| CONSTANT | 9.4358047 | 0.0896088 | 105.2999333 | 0.0000000 |
| AIRPSP1 | -0.7278531 | 0.1225768 | -5.9379355 | 0.0000000 |
| AIRPSP2 | -0.2919692 | 0.0707225 | -4.1283795 | 0.0000365 |
| AIRPSP3 | -0.2169883 | 0.0797602 | -2.7205098 | 0.0065181 |
| ATTIC | 0.1503069 | 0.0131029 | 11.4713076 | 0.0000000 |
| CENSP1 | -0.6201848 | 0.1198707 | -5.1737807 | 0.0000002 |
| CENSP2 | -0.8249469 | 0.0764144 | -10.7956974 | 0.0000000 |
| CENSP3 | -1.0547522 | 0.1098965 | -9.5976833 | 0.0000000 |
| D2 | -0.0916952 | 0.0275839 | -3.3242326 | 0.0008866 |
| DETACH | 0.4992154 | 0.0567528 | 8.7963161 | 0.0000000 |
| FLBM30 | -0.0001083 | 0.0000458 | -2.3657004 | 0.0179960 |
| FLBREFUR | 0.3562781 | 0.1088928 | 3.2718234 | 0.0010686 |
| FL_B | -0.2009303 | 0.0941092 | -2.1350768 | 0.0327547 |
| GARAGE | 0.0650562 | 0.0170460 | 3.8165004 | 0.0001354 |

| | | | | |
|-----------|------------|-----------|-------------|-----------|
| HOTDDW | -0.0000048 | 0.0000014 | -3.4642058 | 0.0005318 |
| LM2B | 0.9221276 | 0.0082113 | 112.3000711 | 0.0000000 |
| LM2INT | -0.0229796 | 0.0022653 | -10.1443350 | 0.0000000 |
| MINCERCA | -0.0001037 | 0.0000151 | -6.8768637 | 0.0000000 |
| MINHOT5 | 0.0001197 | 0.0000171 | 6.9830789 | 0.0000000 |
| N14FLO | -0.2366148 | 0.0957935 | -2.4700514 | 0.0135094 |
| N1NEW | 0.3098333 | 0.1039085 | 2.9817913 | 0.0028657 |
| N20 | 0.2023348 | 0.0577330 | 3.5046637 | 0.0004572 |
| N23DET | -0.4471169 | 0.1216705 | -3.6748162 | 0.0002380 |
| N26DET | 0.4221693 | 0.0810800 | 5.2068272 | 0.0000002 |
| N28DUP | 0.2254154 | 0.1208132 | 1.8658175 | 0.0620669 |
| N2HOTDOR | -0.0000386 | 0.0000177 | -2.1792041 | 0.0293165 |
| N2HOTSOL | -0.0000001 | 0.0000001 | -2.3364447 | 0.0194681 |
| N30LM2 | 0.0449108 | 0.0088361 | 5.0826472 | 0.0000004 |
| N32LMPARK | -0.0001353 | 0.0000169 | -7.9957755 | 0.0000000 |
| N32REF | -0.1358639 | 0.0528072 | -2.5728288 | 0.0100871 |
| N32VIEW | 0.1999473 | 0.1101858 | 1.8146387 | 0.0695795 |
| N34 | 0.9068959 | 0.2712630 | 3.3432350 | 0.0008281 |
| N34M30 | -0.0003695 | 0.0001273 | -2.9030539 | 0.0036954 |
| N37 | -0.1610318 | 0.0364710 | -4.4153371 | 0.0000101 |
| N37DET | -0.3758431 | 0.1476931 | -2.5447579 | 0.0109354 |
| N3DET | -0.5090110 | 0.0771777 | -6.5953089 | 0.0000000 |
| N5DET | 0.5538764 | 0.0645058 | 8.5864620 | 0.0000000 |
| NEW | 0.1785592 | 0.0345681 | 5.1654395 | 0.0000002 |
| NEWSER | -0.0011839 | 0.0004887 | -2.4226455 | 0.0154080 |
| NLIFEXT | -0.1458673 | 0.0206736 | -7.0557245 | 0.0000000 |
| NLIFTERR | -0.0762062 | 0.0360076 | -2.1163933 | 0.0343114 |
| NLIFVIEW | -0.1229898 | 0.0483959 | -2.5413242 | 0.0110433 |
| REFORM | -0.1864927 | 0.0089606 | -20.8125704 | 0.0000000 |
| SEMIDE | 0.4112573 | 0.0497131 | 8.2726102 | 0.0000000 |
| lambda | 0.4532978 | 0.0147285 | 30.7768291 | 0.0000000 |

===== END OF REPORT =====

REGRESSION

SUMMARY OF OUTPUT: SPATIALLY WEIGHTED LEAST SQUARES (HOM)

Data set : sgwhmap.dbf
Weights matrix : **File: kn6.gwt**
 Dependent Variable : LPRICE Number of Observations: 5541
 Mean dependent var : 12.5984 Number of Variables : 47
 S.D. dependent var : 0.6759 Degrees of Freedom : 5494
 Pseudo R-squared : 0.8490
 N. of iterations : 1

| Variable | Coefficient | Std.Error | z-Statistic | Probability |
|----------|-------------|-----------|-------------|-------------|
| CONSTANT | 9.3993882 | 0.0873882 | 107.5589912 | 0.0000000 |
| AIRPSP1 | -0.7114719 | 0.1174655 | -6.0568582 | 0.0000000 |
| AIRPSP2 | -0.2731907 | 0.0677941 | -4.0297086 | 0.0000558 |
| AIRPSP3 | -0.2059999 | 0.0801490 | -2.5702101 | 0.0101637 |
| ATTIC | 0.1514833 | 0.0132092 | 11.4680550 | 0.0000000 |
| CENSP1 | -0.6105984 | 0.1173073 | -5.2051189 | 0.0000002 |
| CENSP2 | -0.8321183 | 0.0763244 | -10.9023910 | 0.0000000 |
| CENSP3 | -1.0432749 | 0.1081478 | -9.6467515 | 0.0000000 |
| D2 | -0.0904363 | 0.0277162 | -3.2629429 | 0.0011026 |
| DETACH | 0.5972452 | 0.0757248 | 7.8870462 | 0.0000000 |
| FLBM30 | -0.0001305 | 0.0000565 | -2.3080944 | 0.0209939 |
| FLBREFUR | 0.3463433 | 0.1010391 | 3.4278128 | 0.0006085 |
| FL_B | -0.1750004 | 0.1036325 | -1.6886628 | 0.0912841 |
| GARAGE | 0.0680918 | 0.0184502 | 3.6905811 | 0.0002237 |
| HFLOOR | -0.0882371 | 0.0495759 | -1.7798397 | 0.0751022 |

| | | | | |
|-----------|------------|-----------|-------------|-----------|
| HOTDDW | -0.0000044 | 0.0000011 | -3.8321616 | 0.0001270 |
| LM2B | 0.9274707 | 0.0074632 | 124.2718486 | 0.0000000 |
| LM2INT | -0.0231118 | 0.0022627 | -10.2141675 | 0.0000000 |
| MINCERCA | -0.0001029 | 0.0000141 | -7.2789063 | 0.0000000 |
| MINHOT5 | 0.0001159 | 0.0000160 | 7.2609005 | 0.0000000 |
| N14FLO | -0.2382549 | 0.0730907 | -3.2597180 | 0.0011152 |
| N1NEW | 0.3101117 | 0.0975049 | 3.1804731 | 0.0014703 |
| N20 | 0.2154355 | 0.0480821 | 4.4805798 | 0.0000074 |
| N23DET | -0.4777418 | 0.1496144 | -3.1931535 | 0.0014073 |
| N26DET | 0.4150295 | 0.1831609 | 2.2659277 | 0.0234558 |
| N28DUP | 0.2494481 | 0.1112081 | 2.2430736 | 0.0248921 |
| N2HOTDOR | -0.0000427 | 0.0000166 | -2.5779162 | 0.0099398 |
| N2HOTSOL | -0.0000001 | 0.0000001 | -2.2014089 | 0.0277071 |
| N30LM2 | 0.0445014 | 0.0086791 | 5.1274443 | 0.0000003 |
| N32LMETR | -0.0001036 | 0.0000590 | -1.7556280 | 0.0791519 |
| N32LMPARK | -0.0000752 | 0.0000350 | -2.1495642 | 0.0315897 |
| N32REF | -0.1262378 | 0.0478205 | -2.6398281 | 0.0082948 |
| N32VIEW | 0.1837035 | 0.1027161 | 1.7884590 | 0.0737020 |
| N34 | 0.8018981 | 0.2612036 | 3.0700110 | 0.0021405 |
| N34M30 | -0.0003130 | 0.0001223 | -2.5598886 | 0.0104706 |
| N37 | -0.1521174 | 0.0315368 | -4.8234854 | 0.0000014 |
| N37DET | -0.3487357 | 0.1556584 | -2.2403907 | 0.0250656 |
| N3DET | -0.5357540 | 0.2449698 | -2.1870210 | 0.0287410 |
| N4HOTDOR | -0.0000719 | 0.0000395 | -1.8221799 | 0.0684277 |
| N5DET | 0.5140625 | 0.2475448 | 2.0766447 | 0.0378344 |
| NEW | 0.1627800 | 0.0398880 | 4.0809281 | 0.0000449 |
| NEWSER | -0.0010079 | 0.0005993 | -1.6818292 | 0.0926020 |
| NLIFEXT | -0.1461071 | 0.0205834 | -7.0983107 | 0.0000000 |
| NLIFTERR | -0.0816766 | 0.0345786 | -2.3620566 | 0.0181739 |
| NLIFVIEW | -0.1217454 | 0.0468588 | -2.5981299 | 0.0093733 |
| REFORM | -0.1863533 | 0.0090182 | -20.6640789 | 0.0000000 |
| SEMIDE | 0.4216302 | 0.0561649 | 7.5070105 | 0.0000000 |
| lambda | 0.4171090 | 0.0134390 | 31.0373138 | 0.0000000 |

 ===== END OF REPORT =====

5. SAR model (S2SLS)

```
SAR_kn2s <- stsls(LPRICE~FL_B+ATTIC+DETACH+SEMIDE+HFLOOR+LM2B+REFORM+NEW+
GARAGE+bs(DISCEN,3)+MINCERCA+bs(MINAIRP,3)+MINHOT5+
D2+N20+N34+N37+
FLBREFUR+FL_B:MINM30+LM2B:INTERIOR+NEW:MINSERV+
NOLIFT:EXTERIOR+NOLIFT:TERRACE+NOLIFT:VIEWS+
MINHOT5:DENSDWEL+
N1:NEW+N3:DETACH+N5:DETACH+N14:FL_0+
N23:DETACH+N26:LM2B+N26:DETACH+N26:MINHOT5+N30:LM2B+
N34:MINM30+N37:DETACH+N32:LM2B:MINMETRO+
N32:LM2B:DISPARK+N2:MINHOT5:DORM+
N4:MINHOT5:DORM+N32:REFORM+N28:DUPLEX
, data=ALMHOUSE, listw=kn2s)
```

Coefficients:

| | Estimate | Std. Error | t value | Pr(> t) |
|-------------------|-------------|------------|----------|-----------|
| Rho | 9.9438e-02 | 8.6466e-03 | 11.5003 | < 2.2e-16 |
| (Intercept) | 7.9815e+00 | 1.1809e-01 | 67.5904 | < 2.2e-16 |
| FL_B | -1.8181e-01 | 1.0916e-01 | -1.6656 | 0.0957862 |
| ATTIC | 1.4820e-01 | 1.3829e-02 | 10.7169 | < 2.2e-16 |
| DETACH | 5.7778e-01 | 7.5642e-02 | 7.6383 | 2.198e-14 |
| SEMIDE | 3.9145e-01 | 5.7934e-02 | 6.7569 | 1.410e-11 |
| HFLOOR | -9.5357e-02 | 5.1533e-02 | -1.8504 | 0.0642573 |
| LM2B | 9.2842e-01 | 7.9878e-03 | 116.2299 | < 2.2e-16 |
| REFORM | -1.9041e-01 | 9.3540e-03 | -20.3562 | < 2.2e-16 |
| NEW | 1.9513e-01 | 3.2193e-02 | 6.0614 | 1.349e-09 |
| GARAGE | 7.1817e-02 | 1.9310e-02 | 3.7192 | 0.0001999 |
| bs(DISCEN, 3)1 | -5.2970e-01 | 7.4555e-02 | -7.1048 | 1.205e-12 |
| bs(DISCEN, 3)2 | -6.9255e-01 | 4.8121e-02 | -14.3918 | < 2.2e-16 |
| bs(DISCEN, 3)3 | -8.9553e-01 | 6.8764e-02 | -13.0232 | < 2.2e-16 |
| MINCERCA | -8.3991e-05 | 8.8920e-06 | -9.4457 | < 2.2e-16 |
| bs(MINAIRP, 3)1 | -6.2402e-01 | 7.4145e-02 | -8.4162 | < 2.2e-16 |
| bs(MINAIRP, 3)2 | -1.7190e-01 | 4.2563e-02 | -4.0388 | 5.373e-05 |
| bs(MINAIRP, 3)3 | -1.6767e-01 | 5.0091e-02 | -3.3473 | 0.0008161 |
| MINHOT5 | 1.0433e-04 | 1.0137e-05 | 10.2921 | < 2.2e-16 |
| D2 | -8.6706e-02 | 1.7289e-02 | -5.0151 | 5.301e-07 |
| N20 | 2.0918e-01 | 3.5415e-02 | 5.9066 | 3.492e-09 |
| N34 | 6.5576e-01 | 1.9486e-01 | 3.3653 | 0.0007645 |
| N37 | -1.2088e-01 | 2.0807e-02 | -5.8097 | 6.258e-09 |
| FLBREFUR | 3.6843e-01 | 1.0687e-01 | 3.4475 | 0.0005657 |
| FL_B:MINM30 | -1.2022e-04 | 5.9432e-05 | -2.0228 | 0.0430891 |
| LM2B:INTERIOR | -2.1136e-02 | 2.3350e-03 | -9.0517 | < 2.2e-16 |
| NEW:MINSERV | -1.4438e-03 | 4.5838e-04 | -3.1498 | 0.0016339 |
| NOLIFT:EXTERIOR | -1.7310e-01 | 2.1501e-02 | -8.0509 | 8.882e-16 |
| NOLIFT:TERRACE | -7.8213e-02 | 3.6250e-02 | -2.1576 | 0.0309600 |
| NOLIFT:VIEWS | -8.7589e-02 | 4.8038e-02 | -1.8233 | 0.0682531 |
| MINHOT5:DENSDWEL | -6.6435e-06 | 1.0102e-06 | -6.5765 | 4.817e-11 |
| NEW:N1 | 3.0734e-01 | 6.3950e-02 | 4.8059 | 1.541e-06 |
| DETACH:N3 | -4.5619e-01 | 2.5990e-01 | -1.7552 | 0.0792174 |
| DETACH:N5 | 5.5790e-01 | 2.5914e-01 | 2.1529 | 0.0313272 |
| N14:FL_0 | -2.4859e-01 | 7.5262e-02 | -3.3030 | 0.0009567 |
| DETACH:N23 | -4.8381e-01 | 1.5556e-01 | -3.1101 | 0.0018700 |
| LM2B:N26 | -5.8929e-02 | 2.9842e-02 | -1.9747 | 0.0483032 |
| DETACH:N26 | 5.5468e-01 | 2.0988e-01 | 2.6429 | 0.0082207 |
| MINHOT5:N26 | 2.9689e-04 | 1.4156e-04 | 2.0973 | 0.0359637 |
| LM2B:N30 | 3.8959e-02 | 5.9270e-03 | 6.5731 | 4.926e-11 |
| N34:MINM30 | -2.5218e-04 | 9.1079e-05 | -2.7688 | 0.0056269 |
| DETACH:N37 | -3.3128e-01 | 1.6331e-01 | -2.0286 | 0.0425032 |
| REFORM:N32 | -1.4460e-01 | 4.9999e-02 | -2.8922 | 0.0038260 |
| N28:DUPLEX | 2.9520e-01 | 8.2128e-02 | 3.5944 | 0.0003251 |
| LM2B:N32:MINMETRO | -6.6936e-05 | 3.9823e-05 | -1.6808 | 0.0927959 |

```
LM2B:N32:DISPARK -6.2557e-05 2.4224e-05 -2.5824 0.0098103
MINHOT5:N2:DORM -5.4621e-05 1.1011e-05 -4.9607 7.024e-07
MINHOT5:DORM:N4 -7.5415e-05 3.2470e-05 -2.3226 0.0202015
```

Residual variance (sigma squared): 0.064385, (sigma: 0.25374)

```
> white_SAR_val
[1] 58.85278
> dchisq(white_SAR_val, df = white_SAR_df)
[1] 0.0193958 0.0000000 0.0193958
```

```
> moran.test(res.SAR_kn2s, listw=kn2s)
Moran I statistic standard deviate = 14.151, p-value < 2.2e-16
```

```
-----
SAR_kn5s <- stsls(LPRICE~FL_B+ATTIC+DETACH+SEMIDE+HFLOOR+LM2B+REFORM+NEW+
GARAGE+bs(DISCEN, 3)+MINCERCA+bs(MINAIRP, 3)+MINHOT5+
D2+N20+N34+N37+
FLBREFUR+FL_B:MINM30+LM2B:INTERIOR+NEW:MINSERV+
NOLIFT:EXTERIOR+NOLIFT:TERRACE+NOLIFT:VIEWS+
MINHOT5:DENSDWEL+
N1:NEW+N5:DETACH+N14:FL_0+
N23:DETACH+N26:LM2B+N26:DETACH+N26:MINHOT5+N30:LM2B+
N32:VIEWS+N34:MINM30+N37:DETACH+
N32:LM2B:DISPARK+N2:MINHOT5:DORM+
N4:MINHOT5:DORM+N32:REFORM+N28:DUPLEX
, data=ALMHOUSE, listw=kn5s)
```

Coefficients:

| | Estimate | Std. Error | t value | Pr(> t) |
|------------------|-------------|------------|----------|-----------|
| Rho | 1.6519e-01 | 1.0095e-02 | 16.3627 | < 2.2e-16 |
| (Intercept) | 7.1459e+00 | 1.3639e-01 | 52.3946 | < 2.2e-16 |
| FL_B | -1.8717e-01 | 1.0741e-01 | -1.7425 | 0.0814128 |
| ATTIC | 1.4981e-01 | 1.3620e-02 | 10.9997 | < 2.2e-16 |
| DETACH | 5.6022e-01 | 7.3715e-02 | 7.5997 | 2.975e-14 |
| SEMIDE | 3.9197e-01 | 5.6994e-02 | 6.8775 | 6.091e-12 |
| HFLOOR | -9.3744e-02 | 5.0702e-02 | -1.8489 | 0.0644710 |
| LM2B | 9.1028e-01 | 7.8563e-03 | 115.8661 | < 2.2e-16 |
| REFORM | -1.9080e-01 | 9.2037e-03 | -20.7312 | < 2.2e-16 |
| NEW | 1.7104e-01 | 3.1732e-02 | 5.3902 | 7.038e-08 |
| GARAGE | 7.2791e-02 | 1.8999e-02 | 3.8314 | 0.0001274 |
| bs(DISCEN, 3)1 | -4.5976e-01 | 7.3575e-02 | -6.2489 | 4.133e-10 |
| bs(DISCEN, 3)2 | -6.3471e-01 | 4.7624e-02 | -13.3275 | < 2.2e-16 |
| bs(DISCEN, 3)3 | -8.0290e-01 | 6.8121e-02 | -11.7865 | < 2.2e-16 |
| MINCERCA | -7.9062e-05 | 8.7498e-06 | -9.0358 | < 2.2e-16 |
| bs(MINAIRP, 3)1 | -5.3063e-01 | 7.3372e-02 | -7.2320 | 4.758e-13 |
| bs(MINAIRP, 3)2 | -1.4965e-01 | 4.1916e-02 | -3.5703 | 0.0003566 |
| bs(MINAIRP, 3)3 | -1.2082e-01 | 4.9451e-02 | -2.4433 | 0.0145549 |
| MINHOT5 | 9.0184e-05 | 1.0053e-05 | 8.9708 | < 2.2e-16 |
| D2 | -7.6968e-02 | 1.7031e-02 | -4.5193 | 6.204e-06 |
| N20 | 1.8723e-01 | 3.4867e-02 | 5.3699 | 7.877e-08 |
| N34 | 5.9826e-01 | 1.9180e-01 | 3.1191 | 0.0018139 |
| N37 | -1.0177e-01 | 2.0533e-02 | -4.9564 | 7.181e-07 |
| FLBREFUR | 3.8507e-01 | 1.0513e-01 | 3.6628 | 0.0002495 |
| FL_B:MINM30 | -1.2210e-04 | 5.8482e-05 | -2.0879 | 0.0368100 |
| LM2B:INTERIOR | -2.1957e-02 | 2.2981e-03 | -9.5543 | < 2.2e-16 |
| NEW:MINSERV | -1.2792e-03 | 4.5125e-04 | -2.8348 | 0.0045861 |
| NOLIFT:EXTERIOR | -1.6496e-01 | 2.1159e-02 | -7.7961 | 6.439e-15 |
| NOLIFT:TERRACE | -7.4977e-02 | 3.5682e-02 | -2.1012 | 0.0356199 |
| NOLIFT:VIEWS | -1.1553e-01 | 4.8459e-02 | -2.3840 | 0.0171255 |
| MINHOT5:DENSDWEL | -5.6951e-06 | 9.9707e-07 | -5.7118 | 1.118e-08 |
| NEW:N1 | 3.0081e-01 | 6.2929e-02 | 4.7802 | 1.751e-06 |

```

DETACH:N5          5.9976e-01  2.5476e-01  2.3542  0.0185619
N14:FL_0          -2.4200e-01  7.4053e-02 -3.2679  0.0010833
DETACH:N23        -4.6087e-01  1.5262e-01 -3.0198  0.0025298
LM2B:N26          -5.2099e-02  2.9368e-02 -1.7740  0.0760598
DETACH:N26         6.0604e-01  2.0624e-01  2.9386  0.0032973
MINHOT5:N26       2.3707e-04  1.3937e-04  1.7010  0.0889480
LM2B:N30          3.4939e-02  5.8389e-03  5.9839  2.179e-09
VIEWS:N32         1.9781e-01  1.0628e-01  1.8613  0.0627052
N34:MINM30       -2.3077e-04  8.9641e-05 -2.5744  0.0100405
DETACH:N37        -2.6448e-01  1.6050e-01 -1.6479  0.0993744
REFORM:N32        -1.3317e-01  4.9240e-02 -2.7045  0.0068402
N28:DUPLEX        2.6420e-01  8.0859e-02  3.2674  0.0010854
LM2B:N32:DISPARK -8.5352e-05  1.0707e-05 -7.9715  1.554e-15
MINHOT5:N2:DORM  -4.3813e-05  1.0869e-05 -4.0309  5.557e-05
MINHOT5:DORM:N4  -6.2189e-05  3.1967e-05 -1.9454  0.0517279

```

Residual variance (sigma squared): 0.062343, (sigma: 0.24969)

```
> white_SAR_kn5_val
```

```
[1] 59.18018
```

```
> dchisq(white_SAR_kn5_val, df = white_SAR_kn5_df)
```

```
[1] 0.01658357 0.00000000 0.01658357
```

```
> moran.test(res.SAR_kn5s, listw=kn5s)
```

Moran I statistic standard deviate = 15.531, p-value < 2.2e-16

alternative hypothesis: greater

sample estimates:

| | | |
|-------------------|---------------|--------------|
| Moran I statistic | Expectation | Variance |
| 1.233220e-01 | -1.805054e-04 | 6.323754e-05 |

Anselin-Kelejian Test 1 158.281 0.0000

REGRESSION

SUMMARY OF OUTPUT: SPATIAL TWO STAGE LEAST SQUARES

Data set : sgwhmap.dbf

Weights matrix :File: kn6.gwt

| | | | |
|-----------------------------|---------|---------------------------|------|
| Dependent Variable : | LPRICE | Number of Observations: | 5541 |
| Mean dependent var : | 12.5984 | Number of Variables : | 47 |
| S.D. dependent var : | 0.6759 | Degrees of Freedom : | 5494 |
| Pseudo R-squared : | 0.8630 | | |
| Spatial Pseudo R-squared: | 0.8557 | | |

| Variable | Coefficient | Std.Error | z-Statistic | Probability |
|----------|-------------|-----------|-------------|-------------|
| CONSTANT | 7.2260297 | 0.1379890 | 52.3667076 | 0.0000000 |
| AIRPSP1 | -0.5196864 | 0.0737450 | -7.0470730 | 0.0000000 |
| AIRPSP2 | -0.1491384 | 0.0420234 | -3.5489394 | 0.0003868 |
| AIRPSP3 | -0.1088179 | 0.0496850 | -2.1901546 | 0.0285130 |
| ATTIC | 0.1505817 | 0.0136501 | 11.0315474 | 0.0000000 |
| CENSP1 | -0.4539436 | 0.0738356 | -6.1480299 | 0.0000000 |
| CENSP2 | -0.6374515 | 0.0477750 | -13.3427886 | 0.0000000 |
| CENSP3 | -0.8003450 | 0.0684218 | -11.6972256 | 0.0000000 |
| D2 | -0.0786960 | 0.0170637 | -4.6119047 | 0.0000040 |
| DETACH | 0.5583822 | 0.0738703 | 7.5589520 | 0.0000000 |
| FLBM30 | -0.0001263 | 0.0000586 | -2.1546194 | 0.0311916 |
| FLBREFUR | 0.3973202 | 0.1053478 | 3.7715108 | 0.0001623 |
| FL_B | -0.1804158 | 0.1076353 | -1.6761776 | 0.0937034 |
| GARAGE | 0.0767304 | 0.0190376 | 4.0304593 | 0.0000557 |

| | | | | |
|-----------|------------|-----------|-------------|-----------|
| HFLOOR | -0.0909377 | 0.0508076 | -1.7898460 | 0.0734787 |
| HOTDDW | -0.0000059 | 0.0000010 | -5.8919088 | 0.0000000 |
| LM2B | 0.9210801 | 0.0076529 | 120.3563880 | 0.0000000 |
| LM2INT | -0.0219918 | 0.0023032 | -9.5484252 | 0.0000000 |
| MINCERCA | -0.0000788 | 0.0000088 | -8.9801320 | 0.0000000 |
| MINHOT5 | 0.0000899 | 0.0000101 | 8.9054324 | 0.0000000 |
| N14FL0 | -0.2457473 | 0.0742069 | -3.3116522 | 0.0009275 |
| N1NEW | 0.2986649 | 0.0630632 | 4.7359607 | 0.0000022 |
| N20 | 0.1984547 | 0.0348834 | 5.6890874 | 0.0000000 |
| N23DET | -0.4999887 | 0.1528655 | -3.2707758 | 0.0010725 |
| N26DET | 0.6029640 | 0.2066677 | 2.9175529 | 0.0035279 |
| N26HOT | 0.0002324 | 0.0001397 | 1.6636672 | 0.0961790 |
| N26LM2 | -0.0485479 | 0.0294341 | -1.6493727 | 0.0990713 |
| N28DUP | 0.2519457 | 0.0810856 | 3.1071568 | 0.0018890 |
| N2HOTDOR | -0.0000458 | 0.0000109 | -4.2055601 | 0.0000260 |
| N30LM2 | 0.0358407 | 0.0058489 | 6.1277346 | 0.0000000 |
| N32LMPARK | -0.0000852 | 0.0000108 | -7.9183092 | 0.0000000 |
| N32REF | -0.1317014 | 0.0493446 | -2.6690155 | 0.0076074 |
| N32VIEW | 0.1915953 | 0.1065081 | 1.7988808 | 0.0720375 |
| N34 | 0.6472132 | 0.1921108 | 3.3689576 | 0.0007545 |
| N34M30 | -0.0002519 | 0.0000898 | -2.8049737 | 0.0050321 |
| N37 | -0.0993138 | 0.0206095 | -4.8188322 | 0.0000014 |
| N37DET | -0.2926839 | 0.1607807 | -1.8203922 | 0.0686993 |
| N4HOTDOR | -0.0000624 | 0.0000320 | -1.9472806 | 0.0515011 |
| N5DET | 0.5898462 | 0.2552866 | 2.3105257 | 0.0208591 |
| NEW | 0.1825639 | 0.0317353 | 5.7527160 | 0.0000000 |
| NEWSER | -0.0013388 | 0.0004521 | -2.9616198 | 0.0030603 |
| NLIFEXT | -0.1691372 | 0.0211911 | -7.9815300 | 0.0000000 |
| NLIFTERR | -0.0814562 | 0.0357501 | -2.2784867 | 0.0226976 |
| NLIFVIEW | -0.1196587 | 0.0485631 | -2.4639815 | 0.0137403 |
| REFORM | -0.1932989 | 0.0092233 | -20.9575735 | 0.0000000 |
| SEMIDE | 0.3942354 | 0.0571113 | 6.9029292 | 0.0000000 |
| W_LPRICE | 0.1544161 | 0.0099678 | 15.4915649 | 0.0000000 |

Instrumented: W_LPRICE

Instruments: W_AIRPSP1, W_AIRPSP2, W_AIRPSP3, W_ATTIC, W_CENSP1, W_CENSP2,
W_CENSP3, W_D2, W_DETACH, W_FLBM30, W_FLBREFUR, W_FL_B,
W_GARAGE, W_HFLOOR, W_HOTDDW, W_LM2B, W_LM2INT, W_MINCERCA,
W_MINHOT5, W_N14FL0, W_N1NEW, W_N20, W_N23DET, W_N26DET,
W_N26HOT, W_N26LM2, W_N28DUP, W_N2HOTDOR, W_N30LM2,
W_N32LMPARK, W_N32REF, W_N32VIEW, W_N34, W_N34M30, W_N37,
W_N37DET, W_N4HOTDOR, W_N5DET, W_NEW, W_NEWSER, W_NLIFEXT,
W_NLIFTERR, W_NLIFVIEW, W_REFORM, W_SEMIDE

DIAGNOSTICS FOR SPATIAL DEPENDENCE

| TEST | MI/DF | VALUE | PROB |
|-----------------------|-------|---------|--------|
| Anselin-Kelejian Test | 1 | 111.055 | 0.0000 |

===== END OF REPORT =====

6. SARAR model (GMM-HAC)

```
SARAR_kn2s <- gstsIs(LPRICE~FL_B+ATTIC+DETACH+SEMIDE+HFLOOR+LM2B+REFORM+NEW+
GARAGE+bs(DISCEN,3)+MINCERCA+bs(MINAIRP,3)+MINHOT5+
D2+N20+N34+N37+
FLBREFUR+FL_B:MINM30+LM2B:INTERIOR+NEW:MINSERV+
NOLIFT:EXTERIOR+NOLIFT:TERRACE+NOLIFT:VIEWS+
MINHOT5:DENSDWEL+
N1:NEW+N2:MINHOT5:DORM+N3:DETACH+N4:MINHOT5:DORM+
N5:DETACH+N14:FL_0+N23:DETACH+N26:DETACH+N30:LM2B+
N32:LM2B:DISPARK+N34:MINM30+N37:DETACH
, data=ALMHOUSE, listw=kn2s)
```

Coefficients: (GM standard errors)

| | Estimate | Std. Error | z value | Pr(> z) |
|------------------|-------------|------------|----------|-----------|
| Rho_Wy | 1.0857e-01 | 8.7051e-03 | 12.4715 | < 2.2e-16 |
| (Intercept) | 7.9029e+00 | 1.3118e-01 | 60.2463 | < 2.2e-16 |
| FL_B | -1.8295e-01 | 1.0633e-01 | -1.7206 | 0.0853321 |
| ATTIC | 1.6794e-01 | 1.5314e-02 | 10.9671 | < 2.2e-16 |
| DETACH | 5.7343e-01 | 7.5381e-02 | 7.6071 | 2.798e-14 |
| SEMIDE | 4.0838e-01 | 5.9167e-02 | 6.9021 | 5.124e-12 |
| HFLOOR | -8.1001e-02 | 4.9695e-02 | -1.6300 | 0.1031087 |
| LM2B | 9.2559e-01 | 7.7157e-03 | 119.9619 | < 2.2e-16 |
| REFORM | -2.0272e-01 | 9.7313e-03 | -20.8318 | < 2.2e-16 |
| NEW | 1.8977e-01 | 3.6703e-02 | 5.1703 | 2.337e-07 |
| GARAGE | 6.5985e-02 | 1.8956e-02 | 3.4810 | 0.0004996 |
| bs(DISCEN, 3)1 | -5.3938e-01 | 8.8984e-02 | -6.0615 | 1.349e-09 |
| bs(DISCEN, 3)2 | -6.8278e-01 | 5.7202e-02 | -11.9361 | < 2.2e-16 |
| bs(DISCEN, 3)3 | -8.4107e-01 | 8.2186e-02 | -10.2338 | < 2.2e-16 |
| MINCERCA | -8.4690e-05 | 1.0486e-05 | -8.0762 | 6.661e-16 |
| bs(MINAIRP, 3)1 | -6.2847e-01 | 8.9288e-02 | -7.0387 | 1.941e-12 |
| bs(MINAIRP, 3)2 | -1.8360e-01 | 5.1057e-02 | -3.5959 | 0.0003232 |
| bs(MINAIRP, 3)3 | -1.4059e-01 | 6.0364e-02 | -2.3290 | 0.0198595 |
| MINHOT5 | 7.5606e-05 | 1.1747e-05 | 6.4361 | 1.226e-10 |
| D2 | -8.3843e-02 | 2.0947e-02 | -4.0026 | 6.265e-05 |
| N20 | 1.7139e-01 | 4.1083e-02 | 4.1717 | 3.023e-05 |
| N34 | 6.9939e-01 | 2.2963e-01 | 3.0457 | 0.0023210 |
| N37 | -6.9152e-02 | 2.4169e-02 | -2.8612 | 0.0042209 |
| FLBREFUR | 3.5803e-01 | 1.0382e-01 | 3.4486 | 0.0005636 |
| FL_B:MINM30 | -1.1340e-04 | 5.7914e-05 | -1.9580 | 0.0502269 |
| LM2B:INTERIOR | -2.1715e-02 | 2.3178e-03 | -9.3688 | < 2.2e-16 |
| NEW:MINSERV | -1.2010e-03 | 5.3387e-04 | -2.2496 | 0.0244749 |
| NOLIFT:EXTERIOR | -1.5217e-01 | 2.1274e-02 | -7.1529 | 8.498e-13 |
| NOLIFT:TERRACE | -6.1623e-02 | 3.5834e-02 | -1.7197 | 0.0854924 |
| NOLIFT:VIEWS | -8.0849e-02 | 4.6767e-02 | -1.7288 | 0.0838480 |
| MINHOT5:DENSDWEL | -6.7288e-06 | 1.1035e-06 | -6.0979 | 1.075e-09 |
| NEW:N1 | 2.7825e-01 | 7.5626e-02 | 3.6793 | 0.0002339 |
| DETACH:N3 | -4.5950e-01 | 2.5414e-01 | -1.8081 | 0.0705967 |
| DETACH:N5 | 5.8556e-01 | 2.5334e-01 | 2.3113 | 0.0208136 |
| N14:FL_0 | -2.3625e-01 | 7.5563e-02 | -3.1265 | 0.0017688 |
| DETACH:N23 | -4.2873e-01 | 1.5305e-01 | -2.8012 | 0.0050910 |
| DETACH:N26 | 3.5246e-01 | 1.8611e-01 | 1.8938 | 0.0582509 |
| LM2B:N30 | 3.7061e-02 | 7.1080e-03 | 5.2140 | 1.848e-07 |
| N34:MINM30 | -2.6005e-04 | 1.0699e-04 | -2.4306 | 0.0150758 |
| DETACH:N37 | -6.1115e-03 | 1.7480e-01 | -0.0350 | 0.9721101 |
| D2:VIEWS | 1.4086e-01 | 5.6235e-02 | 2.5049 | 0.0122495 |
| VIEWS:D5 | 7.0662e-02 | 4.1234e-02 | 1.7137 | 0.0865921 |
| REFORM:D5 | 4.7623e-02 | 2.4153e-02 | 1.9717 | 0.0486387 |
| NOLIFT:D1 | -6.0259e-02 | 1.7410e-02 | -3.4612 | 0.0005378 |
| NOLIFT:D3 | -1.0739e-01 | 5.7173e-02 | -1.8783 | 0.0603450 |
| ATTIC:D6 | -9.4621e-02 | 3.1651e-02 | -2.9895 | 0.0027942 |
| D6:HOUSE | -2.9684e-01 | 8.3286e-02 | -3.5641 | 0.0003650 |
| MINHOT5:N2:DORM | -4.8422e-05 | 1.2397e-05 | -3.9058 | 9.393e-05 |
| MINHOT5:DORM:N4 | -5.8474e-05 | 3.6266e-05 | -1.6124 | 0.1068814 |

Lambda: 0.18549
 Residual variance (sigma squared): 0.062144, (sigma: 0.24929)
 GM argmin sigma squared: 0.061837
 Number of observations: 5541
 Number of parameters estimated: 51

```
> white_val
[1] 41.22239
> dchisq(white_val, df = white_df)
[1] 0.03114672 0.00000000 0.03114672
```

```
> moran.test(resid_kn2s, listw=kn2s)
Moran I statistic standard deviate = 0.27402, p-value = 0.392
```

```
SARAR_kn5s <- gsts1s(LPRICE~FL_B+ATTIC+DETACH+SEMIDE+HFLOOR+LM2B+REFORM+NEW+
  GARAGE+bs(DISCEN,3)+MINCERCA+bs(MINAIRP,3)+MINHOT5+
  D2+N20+N34+N37+
  FLBREFUR+FL_B:MINM30+LM2B:INTERIOR+NEW:MINSERV+
  NOLIFT:EXTERIOR+NOLIFT:TERRACE+NOLIFT:VIEWS+
  MINHOT5:DENSDWEL+
  N1:NEW+N5:DETACH+N14:FL_0+
  N23:DETACH+N26:DETACH+N30:LM2B+
  N32:REFORM+N32:VIEWS+N34:MINM30+N32:LM2B:MINMETRO+
  N2:MINHOT5:DORM+N28:DUPLEX
  , data=ALMHOUSE, listw=kn5s)
```

Coefficients: (GM standard errors)

| | Estimate | Std. Error | z value | Pr(> z) |
|------------------|-------------|------------|----------|-----------|
| Rho_Wy | 1.6177e-01 | 1.1328e-02 | 14.2804 | < 2.2e-16 |
| (Intercept) | 7.2043e+00 | 1.6578e-01 | 43.4571 | < 2.2e-16 |
| FL_B | -2.0647e-01 | 1.0396e-01 | -1.9861 | 0.0470261 |
| ATTIC | 1.5356e-01 | 1.3285e-02 | 11.5592 | < 2.2e-16 |
| DETACH | 5.5910e-01 | 7.3173e-02 | 7.6408 | 2.154e-14 |
| SEMIDE | 3.8942e-01 | 5.6879e-02 | 6.8464 | 7.572e-12 |
| HFLOOR | -1.1054e-01 | 4.7027e-02 | -2.3507 | 0.0187392 |
| LM2B | 9.1030e-01 | 7.5297e-03 | 120.8958 | < 2.2e-16 |
| REFORM | -1.9011e-01 | 9.0155e-03 | -21.0869 | < 2.2e-16 |
| NEW | 1.5601e-01 | 3.7550e-02 | 4.1546 | 3.258e-05 |
| GARAGE | 6.6878e-02 | 1.8527e-02 | 3.6097 | 0.0003066 |
| bs(DISCEN, 3)1 | -4.6748e-01 | 9.5992e-02 | -4.8700 | 1.116e-06 |
| bs(DISCEN, 3)2 | -6.4879e-01 | 6.1886e-02 | -10.4837 | < 2.2e-16 |
| bs(DISCEN, 3)3 | -8.1850e-01 | 8.9290e-02 | -9.1667 | < 2.2e-16 |
| MINCERCA | -7.8777e-05 | 1.1272e-05 | -6.9886 | 2.777e-12 |
| bs(MINAIRP, 3)1 | -5.3601e-01 | 9.6193e-02 | -5.5723 | 2.514e-08 |
| bs(MINAIRP, 3)2 | -1.7318e-01 | 5.4556e-02 | -3.1744 | 0.0015015 |
| bs(MINAIRP, 3)3 | -1.2407e-01 | 6.5031e-02 | -1.9078 | 0.0564119 |
| MINHOT5 | 8.8123e-05 | 1.3057e-05 | 6.7490 | 1.489e-11 |
| D2 | -6.6306e-02 | 2.2057e-02 | -3.0061 | 0.0026461 |
| N20 | 1.6386e-01 | 4.3163e-02 | 3.7964 | 0.0001468 |
| N34 | 6.8055e-01 | 2.3755e-01 | 2.8648 | 0.0041722 |
| N37 | -1.1090e-01 | 2.6200e-02 | -4.2329 | 2.307e-05 |
| FLBREFUR | 3.7229e-01 | 1.0141e-01 | 3.6711 | 0.0002415 |
| FL_B:MINM30 | -1.1373e-04 | 5.6714e-05 | -2.0053 | 0.0449285 |
| LM2B:INTERIOR | -2.3508e-02 | 2.2660e-03 | -10.3739 | < 2.2e-16 |
| NEW:MINSERV | -1.1339e-03 | 5.5242e-04 | -2.0526 | 0.0401129 |
| NOLIFT:EXTERIOR | -1.4717e-01 | 2.0587e-02 | -7.1486 | 8.766e-13 |
| NOLIFT:TERRACE | -7.0399e-02 | 3.4658e-02 | -2.0313 | 0.0422279 |
| NOLIFT:VIEWS | -1.1706e-01 | 4.6834e-02 | -2.4995 | 0.0124379 |
| MINHOT5:DENSDWEL | -4.3727e-06 | 1.1112e-06 | -3.9352 | 8.312e-05 |
| NEW:N1 | 3.1013e-01 | 8.0703e-02 | 3.8428 | 0.0001216 |
| DETACH:N5 | 6.6520e-01 | 2.4642e-01 | 2.6995 | 0.0069448 |
| N14:FL_0 | -2.4085e-01 | 7.3015e-02 | -3.2987 | 0.0009715 |
| DETACH:N23 | -3.8392e-01 | 1.4801e-01 | -2.5938 | 0.0094913 |

```

DETACH:N26          4.1293e-01  1.8125e-01  2.2782  0.0227128
LM2B:N30            3.4513e-02  7.4995e-03  4.6020  4.184e-06
REFORM:N32         -1.4169e-01  4.7488e-02 -2.9837  0.0028479
VIEWS:N32          1.7949e-01  1.0234e-01  1.7538  0.0794714
N34:MINM30        -2.7093e-04  1.1070e-04 -2.4473  0.0143911
N28:DUPLEX         2.1355e-01  9.8999e-02  2.1571  0.0309987
LM2B:N32:MINMETRO -1.4881e-04  2.2324e-05 -6.6659  2.631e-11
MINHOT5:N2:DORM   -4.1012e-05  1.2669e-05 -3.2371  0.0012077

```

```

Lambda: 0.26838
Residual variance (sigma squared): 0.059505, (sigma: 0.24394)
GM argmin sigma squared: 0.059289
Number of observations: 5541
Number of parameters estimated: 45

```

```

Lambda: 0.26837
Residual variance (sigma squared): 0.059493, (sigma: 0.24391)
GM argmin sigma squared: 0.05926
Number of observations: 5541
Number of parameters estimated: 46

```

```

> white_kn5s_val
[1] 48.30156
> dchisq(white_kn5s_val, df = white_kn5s_df)
[1] 0.03279888 0.00000000 0.03279888
> moran.test(resid_kn5s, kn5s)
Moran I statistic standard deviate = -0.51267, p-value = 0.6959
Moran I statistic      Expectation      Variance
-4.257330e-03         -1.805054e-04         6.323613e-05

```

REGRESSION

SUMMARY OF OUTPUT: SPATIALLY WEIGHTED TWO STAGE LEAST SQUARES (HET)

```

Data set      : sgwhmap.dbf
Weights matrix : File: kn6.gwt
Dependent Variable : LPRICE
Mean dependent var : 12.5984
S.D. dependent var : 0.6759
Pseudo R-squared : 0.8624
Spatial Pseudo R-squared: 0.8548
N. of iterations : 1
Number of Observations: 5541
Number of Variables : 43
Degrees of Freedom : 5498
Step1c computed : Yes

```

| Variable | Coefficient | Std. Error | z-Statistic | Probability |
|----------|-------------|------------|-------------|-------------|
| CONSTANT | 7.2609303 | 0.1643473 | 44.1804090 | 0.0000000 |
| AIRPSP1 | -0.5063149 | 0.0938159 | -5.3968967 | 0.0000001 |
| AIRPSP2 | -0.1727704 | 0.0530489 | -3.2568108 | 0.0011267 |
| AIRPSP3 | -0.1007799 | 0.0609587 | -1.6532497 | 0.0982800 |
| ATTIC | 0.1559816 | 0.0131506 | 11.8611368 | 0.0000000 |
| CENSP1 | -0.4488746 | 0.0931069 | -4.8210680 | 0.0000014 |
| CENSP2 | -0.6552168 | 0.0581273 | -11.2721014 | 0.0000000 |
| CENSP3 | -0.8052236 | 0.0852375 | -9.4468260 | 0.0000000 |
| D2 | -0.0681363 | 0.0207991 | -3.2759278 | 0.0010532 |
| DETACH | 0.5627075 | 0.0817141 | 6.8862917 | 0.0000000 |
| FLBM30 | -0.0001327 | 0.0000464 | -2.8598186 | 0.0042388 |
| FLBREFUR | 0.3744511 | 0.1065256 | 3.5151265 | 0.0004395 |
| FL_B | -0.1803495 | 0.0948400 | -1.9016178 | 0.0572211 |
| GARAGE | 0.0724567 | 0.0175919 | 4.1187546 | 0.0000381 |
| HFLOOR | -0.0895057 | 0.0502852 | -1.7799608 | 0.0750824 |
| HOTDDW | -0.0000043 | 0.0000012 | -3.5447620 | 0.0003930 |
| LM2B | 0.9190472 | 0.0080144 | 114.6741283 | 0.0000000 |
| LM2INT | -0.0235862 | 0.0023212 | -10.1614144 | 0.0000000 |

| | | | | |
|----------|------------|-----------|-------------|-----------|
| MINCERCA | -0.0000788 | 0.0000112 | -7.0133960 | 0.0000000 |
| MINHOT5 | 0.0000865 | 0.0000130 | 6.6753853 | 0.0000000 |
| N14FLO | -0.2407467 | 0.0942874 | -2.5533287 | 0.0106699 |
| N1NEW | 0.3062007 | 0.0816345 | 3.7508729 | 0.0001762 |
| N20 | 0.1860598 | 0.0428672 | 4.3403747 | 0.0000142 |
| N23DET | -0.4612291 | 0.1197418 | -3.8518634 | 0.0001172 |
| N26DET | 0.4306459 | 0.1131167 | 3.8070927 | 0.0001406 |
| N28DUP | 0.2170295 | 0.0782738 | 2.7726955 | 0.0055594 |
| N2HOTDOR | -0.0000436 | 0.0000130 | -3.3588635 | 0.0007826 |
| N30LM2 | 0.0346770 | 0.0069104 | 5.0181072 | 0.0000005 |
| N32LMETR | -0.0001413 | 0.0000236 | -5.9783769 | 0.0000000 |
| N32REF | -0.1415012 | 0.0534268 | -2.6485063 | 0.0080848 |
| N34 | 0.6743415 | 0.2090917 | 3.2250994 | 0.0012593 |
| N34M30 | -0.0002636 | 0.0000985 | -2.6772616 | 0.0074227 |
| N37 | -0.1029759 | 0.0279213 | -3.6880735 | 0.0002260 |
| N37DET | -0.2743736 | 0.1581128 | -1.7353033 | 0.0826871 |
| N5DET | 0.6107102 | 0.0599373 | 10.1891456 | 0.0000000 |
| NEW | 0.1567661 | 0.0290130 | 5.4033129 | 0.0000001 |
| NEWSER | -0.0010481 | 0.0003812 | -2.7491132 | 0.0059757 |
| NLIFEXT | -0.1506853 | 0.0207514 | -7.2614405 | 0.0000000 |
| NLIFERR | -0.0812899 | 0.0360010 | -2.2579885 | 0.0239464 |
| NLIFVIEW | -0.1056893 | 0.0445440 | -2.3726950 | 0.0176588 |
| REFORM | -0.1919160 | 0.0090134 | -21.2921827 | 0.0000000 |
| SEMIDE | 0.3990183 | 0.0473994 | 8.4182057 | 0.0000000 |
| W_LPRICE | 0.1526898 | 0.0111078 | 13.7462092 | 0.0000000 |
| lambda | 0.2529929 | 0.0203660 | 12.4223088 | 0.0000000 |

Instrumented: W_LPRICE

Instruments: W_AIRPSP1, W_AIRPSP2, W_AIRPSP3, W_ATTIC, W_CENSP1, W_CENSP2,
W_CENSP3, W_D2, W_DETACH, W_FLBM30, W_FLBREFUR, W_FL_B,
W_GARAGE, W_HFLOOR, W_HOTDDW, W_LM2B, W_LM2INT, W_MINCERCA,
W_MINHOT5, W_N14FLO, W_N1NEW, W_N20, W_N23DET, W_N26DET,
W_N28DUP, W_N2HOTDOR, W_N30LM2, W_N32LMETR, W_N32REF, W_N34,
W_N34M30, W_N37, W_N37DET, W_N5DET, W_NEW, W_NEWSER, W_NLIFEXT,
W_NLIFERR, W_NLIFVIEW, W_REFORM, W_SEMIDE

===== END OF REPORT =====