> dim(shanghai)

[1] 35502 21

一共21个变量，35502个观测数据

> str(shanghai)

tibble [35,502 × 21] (S3: tbl\_df/tbl/data.frame)

$ name : chr [1:35502] "Heart of French Concession / Home" "French Concession Yongkang area" "【sidihome】The minimalist business apt In jing’an" "Sublet 1BR in Shanghai July 1-Aug 1" ...

$ host\_name : chr [1:35502] "Jia" "Jia" "Leon" "Michael" ...

$ District : chr [1:35502] "Xuhui District" "Xuhui District" "Putuo District" "Jing'an District" ...

$ latitude : num [1:35502] 31.2 31.2 31.2 31.2 31.2 ...

$ longitude : num [1:35502] 121 121 121 121 121 ...

$ room\_type : chr [1:35502] "Entire home/apt" "Entire home/apt" "Entire home/apt" "Entire home/apt" ...

$ price : num [1:35502] 452 517 355 323 500 160 324 435 407 162 ...

$ minimum\_nights : num [1:35502] 3 3 3 30 1 2 3 1 1 1 ...

$ Distance to Xin Tiandi : num [1:35502] 2593 2537 3977 4457 2448 ...

$ Distance to Jing'an Temple : num [1:35502] 1623 1423 2352 1795 485 ...

$ Distance to People's Square : num [1:35502] 3207 3108 3556 4417 2742 ...

$ Distance to Disney : num [1:35502] 21029 21138 23364 23869 21651 ...

$ Distance to the Bund : num [1:35502] 4721 4627 4446 5686 4238 ...

$ Distance to Lujiazui : num [1:35502] 6040 5991 6283 7461 5804 ...

$ Distance to Tianzifang : num [1:35502] 1764 1832 4757 4615 2358 ...

$ Distance to Pentagonal Field : num [1:35502] 12005 11858 9476 11390 11135 ...

$ Distance to Hongqiao Airport : num [1:35502] 10259 10259 11003 9166 10364 ...

$ Distance to Pudong Airport : num [1:35502] 10939 10850 9791 11485 10419 ...

$ Distance to Shanghai Railway Station : num [1:35502] 4338 4147 1317 3141 3213 ...

$ Distance to Shanghai South Railway Station: num [1:35502] 6468 6642 10082 8563 7531 ...

$ Distance to Shanghai West Railway Station : num [1:35502] 6184 6000 3058 3005 5145 ...

房价描述性统计

> summary(spatial\_data$price)

Min. 1st Qu. Median Mean 3rd Qu. Max.

32.0 228.0 339.0 735.3 550.0 70780.0

自变量描述性统计

> summary(spatial\_data[-5])

District latitude longitude room\_type Distance to Xin Tiandi

Length:35502 Min. :30.71 Min. :120.9 Length:35502 Min. : 28.44

Class :character 1st Qu.:31.14 1st Qu.:121.4 Class :character 1st Qu.: 4220.27

Mode :character Median :31.20 Median :121.5 Mode :character Median :13355.78

Mean :31.20 Mean :121.5 Mean :15060.56

3rd Qu.:31.23 3rd Qu.:121.7 3rd Qu.:21599.49

Max. :31.83 Max. :121.9 Max. :70905.87

Distance to Jing'an Temple Distance to People's Square Distance to Disney Distance to the Bund

Min. : 42.8 Min. : 48.83 Min. : 35.98 Min. : 38.29

1st Qu.: 3987.2 1st Qu.: 4280.84 1st Qu.: 6943.52 1st Qu.: 4751.90

Median :12941.9 Median :13415.58 Median :20235.72 Median :13616.11

Mean :15666.1 Mean :15196.01 Mean :19953.11 Mean :15403.19

3rd Qu.:23739.1 3rd Qu.:21879.59 3rd Qu.:24711.56 3rd Qu.:21469.43

Max. :69822.9 Max. :70099.85 Max. :85892.03 Max. :69696.17

Distance to Lujiazui Distance to Tianzifang Distance to Pentagonal Field Distance to Hongqiao Airport

Min. : 145.5 Min. : 30.8 Min. : 122.7 Min. : 764.8

1st Qu.: 5733.0 1st Qu.: 4349.1 1st Qu.:10671.9 1st Qu.:10970.3

Median :13882.9 Median :13238.1 Median :17816.9 Median :17381.2

Mean :15496.0 Mean :15050.4 Mean :19432.4 Mean :21183.2

3rd Qu.:20319.4 3rd Qu.:21413.8 3rd Qu.:24616.0 3rd Qu.:30965.3

Max. :70671.4 Max. :72116.4 Max. :71847.0 Max. :71588.8

Distance to Pudong Airport Distance to Shanghai Railway Station Distance to Shanghai South Railway Station

Min. : 79.97 Min. : 96.99 Min. : 224.9

1st Qu.: 9590.85 1st Qu.: 4890.72 1st Qu.: 8716.8

Median :16342.74 Median :13796.94 Median :14218.6

Mean :17808.43 Mean :16231.67 Mean :17594.7

3rd Qu.:21615.74 3rd Qu.:24242.01 3rd Qu.:23482.7

Max. :71093.41 Max. :67476.91 Max. :76780.4

Distance to Shanghai West Railway Station

Min. : 283.4

1st Qu.: 7043.9

Median :13261.3

Mean :18159.2

3rd Qu.:27705.0

Max. :65624.5

区域统计

> table(X$District)

Baoshan District Changning District Chongming District Fengxian District Hongkou District

626 1321 1307 276 930

Huangpu District Jiading District Jing'an District Jinshan District Minhang District

4433 790 2265 179 2122

Pudong District Putuo District Qingpu District Songjiang District Xuhui District

13765 793 1135 1199 3502

Yangpu District

859

区域统计比例

> round(prop.table(table(spatial\_data$District)),4)

Baoshan District Changning District Chongming District Fengxian District Hongkou District

0.0176 0.0372 0.0368 0.0078 0.0262

Huangpu District Jiading District Jing'an District Jinshan District Minhang District

0.1249 0.0223 0.0638 0.0050 0.0598

Pudong District Putuo District Qingpu District Songjiang District Xuhui District

0.3877 0.0223 0.0320 0.0338 0.0986

Yangpu District

0.0242

房间类型统计

> table(X$room\_type)

Entire home/apt Private room Shared room

19844 14686 972

房间类型统计比例

> round(prop.table(table(spatial\_data$room\_type)),4)

Entire home/apt Private room Shared room

0.5590 0.4137 0.0274

OLS回归模型

> model\_ols <- lm(price~., data = spatial\_data)

> summary(model\_ols)

Call:

lm(formula = price ~ ., data = spatial\_data)

Residuals:

Min 1Q Median 3Q Max

-1893 -498 -313 -21 69975

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 8.795e+04 4.576e+04 1.922 0.054636 .

DistrictChangning District 1.374e+02 1.322e+02 1.039 0.298704

DistrictChongming District 8.098e+02 2.320e+02 3.490 0.000483 \*\*\*

DistrictFengxian District -6.595e+01 2.027e+02 -0.325 0.744874

DistrictHongkou District -6.422e+00 1.337e+02 -0.048 0.961692

DistrictHuangpu District 1.562e+02 1.441e+02 1.084 0.278225

DistrictJiading District -8.946e+01 1.271e+02 -0.704 0.481378

DistrictJing'an District 7.177e+01 1.345e+02 0.534 0.593571

DistrictJinshan District -6.400e+01 2.665e+02 -0.240 0.810217

DistrictMinhang District -2.892e+01 1.543e+02 -0.187 0.851290

DistrictPudong District -1.279e+02 1.467e+02 -0.872 0.383384

DistrictPutuo District 3.516e+02 1.355e+02 2.596 0.009433 \*\*

DistrictQingpu District 4.662e+02 1.824e+02 2.556 0.010580 \*

DistrictSongjiang District 3.031e+02 1.863e+02 1.627 0.103751

DistrictXuhui District 6.197e+01 1.354e+02 0.458 0.647299

DistrictYangpu District -4.511e+01 1.399e+02 -0.322 0.747186

latitude 5.129e+02 5.244e+02 0.978 0.328048

longitude -8.487e+02 2.874e+02 -2.953 0.003147 \*\*

room\_typePrivate room -5.582e+02 2.376e+01 -23.497 < 2e-16 \*\*\*

room\_typeShared room -5.988e+02 6.553e+01 -9.138 < 2e-16 \*\*\*

`Distance to Xin Tiandi` 3.353e-01 1.660e-01 2.020 0.043344 \*

`Distance to Jing'an Temple` -6.961e-02 3.819e-02 -1.822 0.068389 .

`Distance to People's Square` -3.047e-01 1.673e-01 -1.821 0.068671 .

`Distance to Disney` -2.180e-02 3.125e-03 -6.975 3.12e-12 \*\*\*

`Distance to the Bund` 3.419e-01 9.500e-02 3.599 0.000320 \*\*\*

`Distance to Lujiazui` -3.282e-01 6.423e-02 -5.111 3.23e-07 \*\*\*

`Distance to Tianzifang` -5.279e-02 6.538e-02 -0.808 0.419369

`Distance to Pentagonal Field` -2.889e-02 2.637e-02 -1.095 0.273392

`Distance to Hongqiao Airport` -1.858e-02 1.536e-02 -1.210 0.226455

`Distance to Pudong Airport` 1.039e-01 2.990e-02 3.474 0.000514 \*\*\*

`Distance to Shanghai Railway Station` -3.974e-02 5.044e-02 -0.788 0.430768

`Distance to Shanghai South Railway Station` 3.978e-02 1.297e-02 3.067 0.002167 \*\*

`Distance to Shanghai West Railway Station` 4.906e-02 3.798e-02 1.292 0.196476

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1973 on 35469 degrees of freedom

Multiple R-squared: 0.02907, Adjusted R-squared: 0.0282

F-statistic: 33.19 on 32 and 35469 DF, p-value: < 2.2e-16

首先看模型的p值，小于0.05，说明自变量和因变量是有显著统计意义（自变量对因变量有影响）的。

再看自变量的p值，数值越小说明对因变量（airbnb房价）的影响越有显著统计意义，

* p值数值越接近0拟合度越高，一般数值小于0.05说明有统计显著意义
* 请用p值对比区域，p值后面带星号说明此自变量有统计意义

最后看模型的R平方， R平方处于0-1之间，越靠近1说明更多的数据可以被这个模型解释（拟合度越高），越靠近0说明越少的数据被这个模型解释（拟合度越低）。

在OLS回归中， 我们考虑的是自变量对因变量均值的影响，而在分位数回归我们考虑自变量对多个分位点（因变量分布）的影响。

Quantile regression is an extension of linear regression when the conditions of linear regression are not met(linearity, independence, or normality), it is used

分位数回归是线性回归的一种延伸，当线性回归的条件（原始数据是否线性，原始数据是否独立，原始数据是否正态分布）不能被满足时，可以使用分位数回归

Quantile regression tends to resist the influence of outlier

分位数回归可以抵御极值的影响

> summary(quantreg)

Call: rq(formula = price ~ ., tau = qs, data = spatial\_data)

tau: [1] 0.1

Coefficients:

Value Std. Error t value Pr(>|t|)

(Intercept) 23282.57185 3317.86652 7.01733 0.00000

DistrictChangning District 39.14611 6.85246 5.71271 0.00000

DistrictChongming District 163.60526 18.32122 8.92982 0.00000

DistrictFengxian District 18.88349 15.89947 1.18768 0.23497

DistrictHongkou District 53.82144 7.53536 7.14252 0.00000

DistrictHuangpu District 52.18257 8.78352 5.94096 0.00000

DistrictJiading District -51.91510 7.92827 -6.54810 0.00000

DistrictJing'an District 33.10419 6.97973 4.74290 0.00000

DistrictJinshan District -15.10792 34.60836 -0.43654 0.66245

DistrictMinhang District 5.96778 8.49712 0.70233 0.48248

DistrictPudong District 5.28193 8.57838 0.61573 0.53808

DistrictPutuo District 40.67547 5.86171 6.93919 0.00000

DistrictQingpu District 28.49382 10.91147 2.61136 0.00902

DistrictSongjiang District -21.29722 9.80800 -2.17141 0.02991

DistrictXuhui District 78.08193 7.67945 10.16764 0.00000

DistrictYangpu District 72.73624 8.39398 8.66528 0.00000

latitude -9.50275 40.95108 -0.23205 0.81650

longitude -187.97595 22.15930 -8.48294 0.00000

room\_typePrivate room -62.10451 1.59423 -38.95586 0.00000

room\_typeShared room -145.61796 1.47949 -98.42428 0.00000

`Distance to Xin Tiandi` 0.03949 0.01490 2.65081 0.00803

`Distance to Jing'an Temple` -0.02542 0.00266 -9.56575 0.00000

`Distance to People's Square` -0.03065 0.01477 -2.07605 0.03790

`Distance to Disney` -0.00477 0.00023 -20.39161 0.00000

`Distance to the Bund` 0.02658 0.00903 2.94327 0.00325

`Distance to Lujiazui` -0.04145 0.00530 -7.81529 0.00000

`Distance to Tianzifang` -0.00651 0.00495 -1.31529 0.18842

`Distance to Pentagonal Field` -0.00300 0.00107 -2.80812 0.00499

`Distance to Hongqiao Airport` -0.00641 0.00075 -8.58506 0.00000

`Distance to Pudong Airport` 0.01856 0.00126 14.73242 0.00000

`Distance to Shanghai Railway Station` 0.00819 0.00294 2.78286 0.00539

`Distance to Shanghai South Railway Station` 0.01836 0.00066 27.63573 0.00000

`Distance to Shanghai West Railway Station` 0.00784 0.00166 4.71576 0.00000

Call: rq(formula = price ~ ., tau = qs, data = spatial\_data)

tau: [1] 0.2

Coefficients:

Value Std. Error t value Pr(>|t|)

(Intercept) 33654.60516 3632.53828 9.26476 0.00000

DistrictChangning District 24.39884 6.97434 3.49837 0.00047

DistrictChongming District 257.09861 18.70550 13.74455 0.00000

DistrictFengxian District 0.38315 11.01270 0.03479 0.97225

DistrictHongkou District 51.21354 7.92306 6.46386 0.00000

DistrictHuangpu District 46.99066 8.16683 5.75384 0.00000

DistrictJiading District -51.04658 6.54710 -7.79683 0.00000

DistrictJing'an District 22.72079 7.69331 2.95332 0.00315

DistrictJinshan District 53.53236 26.89012 1.99078 0.04651

DistrictMinhang District 7.22550 8.66469 0.83390 0.40434

DistrictPudong District 29.77382 7.63249 3.90093 0.00010

DistrictPutuo District 34.86598 6.11337 5.70324 0.00000

DistrictQingpu District 36.61098 10.82826 3.38106 0.00072

DistrictSongjiang District -28.08054 11.43528 -2.45561 0.01407

DistrictXuhui District 79.88556 7.52975 10.60932 0.00000

DistrictYangpu District 82.33444 6.89666 11.93831 0.00000

latitude -92.34801 44.08759 -2.09465 0.03621

longitude -251.81372 23.01606 -10.94078 0.00000

room\_typePrivate room -78.26618 1.64241 -47.65335 0.00000

room\_typeShared room -177.21724 1.79000 -99.00400 0.00000

`Distance to Xin Tiandi` 0.02457 0.01201 2.04566 0.04080

`Distance to Jing'an Temple` -0.03165 0.00239 -13.22005 0.00000

`Distance to People's Square` -0.01245 0.01145 -1.08767 0.27675

`Distance to Disney` -0.00559 0.00019 -29.34549 0.00000

`Distance to the Bund` 0.00263 0.00667 0.39453 0.69319

`Distance to Lujiazui` -0.03132 0.00384 -8.14801 0.00000

`Distance to Tianzifang` -0.00187 0.00408 -0.45741 0.64738

`Distance to Pentagonal Field` -0.00603 0.00083 -7.28490 0.00000

`Distance to Hongqiao Airport` -0.00625 0.00093 -6.72762 0.00000

`Distance to Pudong Airport` 0.02407 0.00113 21.36624 0.00000

`Distance to Shanghai Railway Station` 0.01642 0.00314 5.22693 0.00000

`Distance to Shanghai South Railway Station` 0.02143 0.00087 24.71756 0.00000

`Distance to Shanghai West Railway Station` 0.00690 0.00220 3.13713 0.00171

Call: rq(formula = price ~ ., tau = qs, data = spatial\_data)

tau: [1] 0.3

Coefficients:

Value Std. Error t value Pr(>|t|)

(Intercept) 35991.72734 4055.99447 8.87371 0.00000

DistrictChangning District 34.06153 6.97114 4.88608 0.00000

DistrictChongming District 320.50523 20.37644 15.72921 0.00000

DistrictFengxian District -6.11103 12.24608 -0.49902 0.61777

DistrictHongkou District 55.67329 7.71613 7.21519 0.00000

DistrictHuangpu District 53.44727 8.97083 5.95789 0.00000

DistrictJiading District -32.36586 7.05236 -4.58937 0.00000

DistrictJing'an District 25.42283 6.58651 3.85983 0.00011

DistrictJinshan District 67.35925 23.00594 2.92791 0.00341

DistrictMinhang District 8.00173 7.33668 1.09065 0.27544

DistrictPudong District 40.60855 8.60701 4.71808 0.00000

DistrictPutuo District 42.99479 5.90957 7.27545 0.00000

DistrictQingpu District 84.19861 13.61630 6.18366 0.00000

DistrictSongjiang District -11.78702 9.86868 -1.19439 0.23233

DistrictXuhui District 92.22063 7.36228 12.52609 0.00000

DistrictYangpu District 79.21375 7.83418 10.11130 0.00000

latitude -78.43086 46.07516 -1.70224 0.08872

longitude -274.37656 27.20113 -10.08695 0.00000

room\_typePrivate room -95.22721 1.71902 -55.39622 0.00000

room\_typeShared room -206.83052 2.28334 -90.58248 0.00000

`Distance to Xin Tiandi` 0.04140 0.01399 2.95892 0.00309

`Distance to Jing'an Temple` -0.03481 0.00307 -11.33244 0.00000

`Distance to People's Square` -0.03365 0.01746 -1.92770 0.05390

`Distance to Disney` -0.00581 0.00025 -23.69457 0.00000

`Distance to the Bund` 0.00792 0.00923 0.85796 0.39092

`Distance to Lujiazui` -0.02993 0.00479 -6.24634 0.00000

`Distance to Tianzifang` -0.00307 0.00504 -0.60936 0.54229

`Distance to Pentagonal Field` -0.00594 0.00162 -3.66722 0.00025

`Distance to Hongqiao Airport` -0.00611 0.00062 -9.78578 0.00000

`Distance to Pudong Airport` 0.02291 0.00232 9.85794 0.00000

`Distance to Shanghai Railway Station` 0.01722 0.00299 5.76683 0.00000

`Distance to Shanghai South Railway Station` 0.02129 0.00091 23.51929 0.00000

`Distance to Shanghai West Railway Station` 0.00954 0.00145 6.56432 0.00000

Call: rq(formula = price ~ ., tau = qs, data = spatial\_data)

tau: [1] 0.4

Coefficients:

Value Std. Error t value Pr(>|t|)

(Intercept) 46578.77344 5231.94888 8.90276 0.00000

DistrictChangning District 15.89965 9.32764 1.70457 0.08828

DistrictChongming District 460.04652 31.48988 14.60935 0.00000

DistrictFengxian District -47.01857 16.37711 -2.87099 0.00409

DistrictHongkou District 43.39993 10.25335 4.23276 0.00002

DistrictHuangpu District 42.54770 11.51801 3.69401 0.00022

DistrictJiading District -32.54571 7.42780 -4.38161 0.00001

DistrictJing'an District 14.03125 8.99244 1.56034 0.11869

DistrictJinshan District 54.89268 24.41953 2.24790 0.02459

DistrictMinhang District -19.60395 10.54057 -1.85986 0.06291

DistrictPudong District 42.43849 11.63704 3.64685 0.00027

DistrictPutuo District 33.11239 8.38857 3.94732 0.00008

DistrictQingpu District 104.84549 15.23516 6.88181 0.00000

DistrictSongjiang District -46.08166 12.86007 -3.58331 0.00034

DistrictXuhui District 73.29856 9.62606 7.61459 0.00000

DistrictYangpu District 58.29511 12.41279 4.69638 0.00000

latitude -236.07892 65.64534 -3.59628 0.00032

longitude -320.46298 33.96866 -9.43408 0.00000

room\_typePrivate room -114.26025 2.04940 -55.75294 0.00000

room\_typeShared room -236.02629 2.49639 -94.54698 0.00000

`Distance to Xin Tiandi` 0.04494 0.01943 2.31273 0.02074

`Distance to Jing'an Temple` -0.03806 0.00341 -11.17305 0.00000

`Distance to People's Square` -0.05732 0.01808 -3.16984 0.00153

`Distance to Disney` -0.00576 0.00030 -18.91812 0.00000

`Distance to the Bund` 0.01655 0.00895 1.84907 0.06446

`Distance to Lujiazui` -0.02701 0.00564 -4.78875 0.00000

`Distance to Tianzifang` 0.00393 0.00721 0.54601 0.58506

`Distance to Pentagonal Field` -0.00859 0.00166 -5.17186 0.00000

`Distance to Hongqiao Airport` -0.00687 0.00100 -6.88819 0.00000

`Distance to Pudong Airport` 0.02199 0.00183 12.02943 0.00000

`Distance to Shanghai Railway Station` 0.02423 0.00370 6.54768 0.00000

`Distance to Shanghai South Railway Station` 0.02117 0.00113 18.64896 0.00000

`Distance to Shanghai West Railway Station` 0.01105 0.00191 5.79346 0.00000

Call: rq(formula = price ~ ., tau = qs, data = spatial\_data)

tau: [1] 0.5

Coefficients:

Value Std. Error t value Pr(>|t|)

(Intercept) 47178.12462 6643.77078 7.10111 0.00000

DistrictChangning District 13.98334 8.69865 1.60753 0.10795

DistrictChongming District 604.86241 38.68529 15.63546 0.00000

DistrictFengxian District -72.21688 16.35326 -4.41605 0.00001

DistrictHongkou District 22.87196 8.00847 2.85597 0.00429

DistrictHuangpu District 47.42812 10.80169 4.39081 0.00001

DistrictJiading District -24.90263 8.35642 -2.98006 0.00288

DistrictJing'an District 10.19382 8.42620 1.20978 0.22637

DistrictJinshan District 30.27381 30.11709 1.00520 0.31481

DistrictMinhang District -22.84600 11.00536 -2.07590 0.03791

DistrictPudong District 29.44309 10.59653 2.77856 0.00546

DistrictPutuo District 34.83296 5.13589 6.78227 0.00000

DistrictQingpu District 156.54997 18.05756 8.66950 0.00000

DistrictSongjiang District -44.67842 15.89758 -2.81039 0.00495

DistrictXuhui District 72.92879 9.63744 7.56724 0.00000

DistrictYangpu District 35.50992 10.45859 3.39529 0.00069

latitude -314.25855 76.50139 -4.10788 0.00004

longitude -304.84648 43.56923 -6.99683 0.00000

room\_typePrivate room -135.01715 2.41367 -55.93844 0.00000

room\_typeShared room -265.14459 3.15015 -84.16898 0.00000

`Distance to Xin Tiandi` 0.03720 0.02309 1.61097 0.10720

`Distance to Jing'an Temple` -0.04729 0.00378 -12.51430 0.00000

`Distance to People's Square` -0.06504 0.02203 -2.95226 0.00316

`Distance to Disney` -0.00565 0.00033 -17.33708 0.00000

`Distance to the Bund` 0.03921 0.00855 4.58830 0.00000

`Distance to Lujiazui` -0.04274 0.00614 -6.95659 0.00000

`Distance to Tianzifang` 0.01685 0.00846 1.99194 0.04638

`Distance to Pentagonal Field` -0.01221 0.00132 -9.23474 0.00000

`Distance to Hongqiao Airport` -0.00778 0.00120 -6.49407 0.00000

`Distance to Pudong Airport` 0.02539 0.00165 15.40126 0.00000

`Distance to Shanghai Railway Station` 0.02438 0.00384 6.34944 0.00000

`Distance to Shanghai South Railway Station` 0.02148 0.00140 15.29307 0.00000

`Distance to Shanghai West Railway Station` 0.01623 0.00224 7.24029 0.00000

Call: rq(formula = price ~ ., tau = qs, data = spatial\_data)

tau: [1] 0.6

Coefficients:

Value Std. Error t value Pr(>|t|)

(Intercept) 47284.32969 11632.09374 4.06499 0.00005

DistrictChangning District 35.52680 12.17316 2.91845 0.00352

DistrictChongming District 781.52258 105.71876 7.39247 0.00000

DistrictFengxian District -79.23840 26.81078 -2.95547 0.00312

DistrictHongkou District 45.39766 13.40001 3.38788 0.00071

DistrictHuangpu District 73.89276 16.02018 4.61248 0.00000

DistrictJiading District -52.06377 11.34141 -4.59059 0.00000

DistrictJing'an District 31.20838 10.74179 2.90532 0.00367

DistrictJinshan District 40.15645 56.36921 0.71238 0.47623

DistrictMinhang District -0.96348 16.90387 -0.05700 0.95455

DistrictPudong District 33.76298 17.41223 1.93904 0.05250

DistrictPutuo District 58.35876 11.13172 5.24257 0.00000

DistrictQingpu District 221.23285 27.34537 8.09032 0.00000

DistrictSongjiang District -24.29273 22.93239 -1.05932 0.28946

DistrictXuhui District 103.65692 13.38339 7.74519 0.00000

DistrictYangpu District 51.10898 16.24130 3.14685 0.00165

latitude -88.77149 157.86986 -0.56231 0.57391

longitude -363.65113 76.64426 -4.74466 0.00000

room\_typePrivate room -167.12682 3.59992 -46.42518 0.00000

room\_typeShared room -307.81680 3.94488 -78.02949 0.00000

`Distance to Xin Tiandi` 0.04540 0.03035 1.49589 0.13469

`Distance to Jing'an Temple` -0.04979 0.00477 -10.43941 0.00000

`Distance to People's Square` -0.10495 0.03191 -3.28898 0.00101

`Distance to Disney` -0.00561 0.00053 -10.58214 0.00000

`Distance to the Bund` 0.09083 0.01481 6.13486 0.00000

`Distance to Lujiazui` -0.08334 0.01024 -8.13500 0.00000

`Distance to Tianzifang` 0.02862 0.01093 2.61899 0.00882

`Distance to Pentagonal Field` -0.01400 0.00198 -7.07402 0.00000

`Distance to Hongqiao Airport` -0.00667 0.00193 -3.46040 0.00054

`Distance to Pudong Airport` 0.03649 0.00240 15.22415 0.00000

`Distance to Shanghai Railway Station` 0.02811 0.00537 5.23706 0.00000

`Distance to Shanghai South Railway Station` 0.02141 0.00218 9.82675 0.00000

`Distance to Shanghai West Railway Station` 0.01616 0.00336 4.81205 0.00000

Call: rq(formula = price ~ ., tau = qs, data = spatial\_data)

tau: [1] 0.7

Coefficients:

Value Std. Error t value Pr(>|t|)

(Intercept) 92261.44710 19838.71206 4.65058 0.00000

DistrictChangning District 79.38645 25.48497 3.11503 0.00184

DistrictChongming District 1564.73941 110.80316 14.12179 0.00000

DistrictFengxian District -86.48300 70.60305 -1.22492 0.22061

DistrictHongkou District 74.10051 26.12587 2.83629 0.00457

DistrictHuangpu District 115.42004 26.96333 4.28063 0.00002

DistrictJiading District -68.63508 21.83108 -3.14391 0.00167

DistrictJing'an District 39.93806 25.60257 1.55992 0.11879

DistrictJinshan District -63.94487 81.25683 -0.78695 0.43132

DistrictMinhang District 51.53686 28.34996 1.81788 0.06909

DistrictPudong District 79.75518 31.04050 2.56939 0.01019

DistrictPutuo District 78.55074 24.25901 3.23800 0.00120

DistrictQingpu District 297.12952 45.12996 6.58386 0.00000

DistrictSongjiang District 65.14419 49.84996 1.30681 0.19129

DistrictXuhui District 145.86446 25.93678 5.62385 0.00000

DistrictYangpu District 40.94230 33.23012 1.23208 0.21793

latitude -245.98026 216.11316 -1.13820 0.25504

longitude -693.22971 127.84221 -5.42254 0.00000

room\_typePrivate room -223.11629 5.09313 -43.80735 0.00000

room\_typeShared room -377.88487 5.35598 -70.55379 0.00000

`Distance to Xin Tiandi` 0.05585 0.02722 2.05149 0.04023

`Distance to Jing'an Temple` -0.05771 0.00688 -8.39304 0.00000

`Distance to People's Square` -0.16186 0.03365 -4.81062 0.00000

`Distance to Disney` -0.00600 0.00086 -6.95641 0.00000

`Distance to the Bund` 0.15083 0.01999 7.54510 0.00000

`Distance to Lujiazui` -0.11827 0.01742 -6.78979 0.00000

`Distance to Tianzifang` 0.04770 0.00736 6.48021 0.00000

`Distance to Pentagonal Field` -0.01793 0.00232 -7.73357 0.00000

`Distance to Hongqiao Airport` -0.00290 0.00263 -1.10042 0.27116

`Distance to Pudong Airport` 0.04235 0.00539 7.85186 0.00000

`Distance to Shanghai Railway Station` 0.03385 0.00700 4.83793 0.00000

`Distance to Shanghai South Railway Station` 0.02364 0.00197 12.02512 0.00000

`Distance to Shanghai West Railway Station` 0.01496 0.00567 2.63707 0.00837

Call: rq(formula = price ~ ., tau = qs, data = spatial\_data)

tau: [1] 0.8

Coefficients:

Value Std. Error t value Pr(>|t|)

(Intercept) 156800.61074 36746.82397 4.26705 0.00002

DistrictChangning District 94.08212 35.87725 2.62233 0.00874

DistrictChongming District 2038.55261 150.72440 13.52503 0.00000

DistrictFengxian District 0.33257 131.61139 0.00253 0.99798

DistrictHongkou District 80.84057 40.44291 1.99888 0.04563

DistrictHuangpu District 125.58953 35.55532 3.53223 0.00041

DistrictJiading District -74.45161 39.36819 -1.89116 0.05861

DistrictJing'an District 67.80369 32.69248 2.07398 0.03809

DistrictJinshan District -416.59659 121.94942 -3.41614 0.00064

DistrictMinhang District 30.74442 40.79720 0.75359 0.45110

DistrictPudong District 50.58085 37.88035 1.33528 0.18179

DistrictPutuo District 98.04188 34.83091 2.81480 0.00488

DistrictQingpu District 437.58026 101.38710 4.31594 0.00002

DistrictSongjiang District 531.66395 119.98481 4.43109 0.00001

DistrictXuhui District 142.51666 34.39371 4.14368 0.00003

DistrictYangpu District -15.88195 42.69033 -0.37203 0.70988

latitude -802.55936 357.54109 -2.24466 0.02480

longitude -1080.50505 257.39623 -4.19783 0.00003

room\_typePrivate room -350.39174 9.17379 -38.19486 0.00000

room\_typeShared room -507.11303 10.30798 -49.19615 0.00000

`Distance to Xin Tiandi` 0.07574 0.06165 1.22853 0.21926

`Distance to Jing'an Temple` -0.08716 0.01200 -7.26432 0.00000

`Distance to People's Square` -0.24311 0.05003 -4.85913 0.00000

`Distance to Disney` -0.00454 0.00171 -2.65260 0.00799

`Distance to the Bund` 0.26858 0.02655 10.11715 0.00000

`Distance to Lujiazui` -0.23307 0.02782 -8.37916 0.00000

`Distance to Tianzifang` 0.09067 0.01978 4.58473 0.00000

`Distance to Pentagonal Field` -0.02984 0.00620 -4.81316 0.00000

`Distance to Hongqiao Airport` -0.00347 0.00478 -0.72496 0.46848

`Distance to Pudong Airport` 0.06910 0.00883 7.82948 0.00000

`Distance to Shanghai Railway Station` 0.06005 0.01185 5.06744 0.00000

`Distance to Shanghai South Railway Station` 0.03233 0.00343 9.43747 0.00000

`Distance to Shanghai West Railway Station` 0.01425 0.00878 1.62293 0.10461

Call: rq(formula = price ~ ., tau = qs, data = spatial\_data)

tau: [1] 0.9

Coefficients:

Value Std. Error t value Pr(>|t|)

(Intercept) 41248.03428 68249.81658 0.60437 0.54560

DistrictChangning District 13.12570 80.80355 0.16244 0.87096

DistrictChongming District 2375.84169 304.99041 7.78989 0.00000

DistrictFengxian District 814.96059 380.05313 2.14433 0.03201

DistrictHongkou District -2.88706 72.85659 -0.03963 0.96839

DistrictHuangpu District 61.19750 84.91446 0.72070 0.47110

DistrictJiading District -92.32888 84.48531 -1.09284 0.27447

DistrictJing'an District 34.30455 78.04788 0.43953 0.66028

DistrictJinshan District -233.42531 467.27954 -0.49954 0.61740

DistrictMinhang District -74.01814 108.90213 -0.67968 0.49671

DistrictPudong District -152.05598 86.08101 -1.76643 0.07733

DistrictPutuo District 96.67255 92.77856 1.04197 0.29743

DistrictQingpu District 1147.88574 178.97047 6.41383 0.00000

DistrictSongjiang District 1368.14163 244.25061 5.60138 0.00000

DistrictXuhui District 4.77293 82.76455 0.05767 0.95401

DistrictYangpu District -131.85702 76.33766 -1.72729 0.08412

latitude -551.08033 699.50113 -0.78782 0.43081

longitude -187.35600 442.98387 -0.42294 0.67234

room\_typePrivate room -777.82347 25.14902 -30.92858 0.00000

room\_typeShared room -928.45079 25.80768 -35.97576 0.00000

`Distance to Xin Tiandi` 0.05170 0.02080 2.48555 0.01294

`Distance to Jing'an Temple` -0.12145 0.02243 -5.41398 0.00000

`Distance to People's Square` -0.21894 0.03283 -6.66827 0.00000

`Distance to Disney` -0.01016 0.00390 -2.60117 0.00929

`Distance to the Bund` 0.40425 0.03548 11.39223 0.00000

`Distance to Lujiazui` -0.43351 0.04114 -10.53817 0.00000

`Distance to Tianzifang` 0.13579 0.01587 8.55879 0.00000

`Distance to Pentagonal Field` -0.03182 0.00892 -3.56541 0.00036

`Distance to Hongqiao Airport` -0.03192 0.01302 -2.45130 0.01424

`Distance to Pudong Airport` 0.11970 0.01119 10.70140 0.00000

`Distance to Shanghai Railway Station` 0.07207 0.02102 3.42842 0.00061

`Distance to Shanghai South Railway Station` 0.05613 0.00923 6.08349 0.00000

`Distance to Shanghai West Railway Station` 0.01698 0.02293 0.74049 0.45901

通过以上9种分位，可以看出随着分位数的增加，自变量的参数在不停的变化。

比如：经纬度的系数变化趋势 是 随着分位数的增大而减少。说明高价位的房屋更不容易收到经纬度的影响，而低价位的房屋更容易收到经纬度影响。

比如：房屋类型（私人房，共享房）的系数变化趋势 是 随着分位数的增大而减少。说明高价位的房屋更不容易收到房屋类型的影响，而低价位的房屋更容易收到房屋类型额影响。