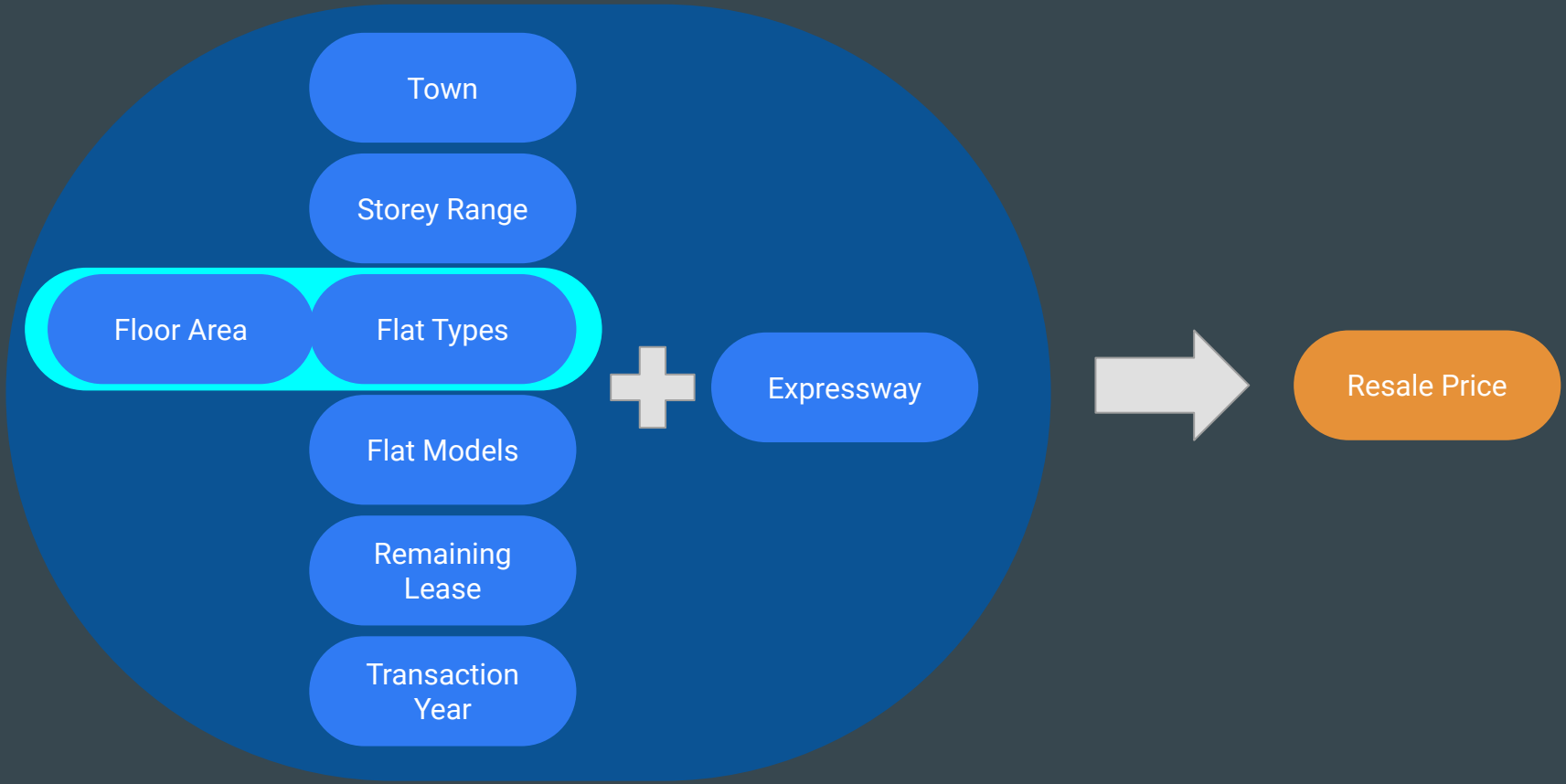
Living Near Expressways

...

Hypothesis

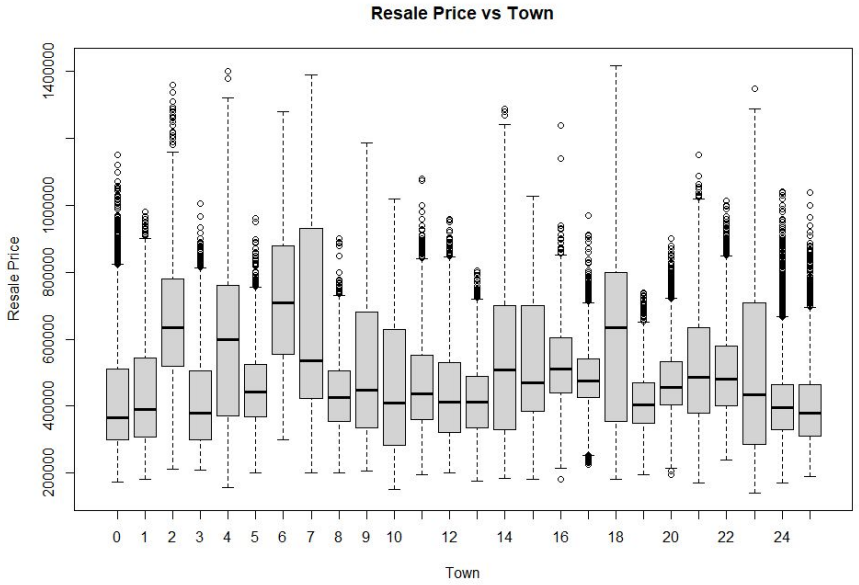
Do Living Near Expressways Increase or Decrease
My HDB Flat's Value?

Approach


Town
Storey Range
Floor Area
Flat Types
Flat Models
Remaining Lease
Transaction Year
Expressway
Resale Price

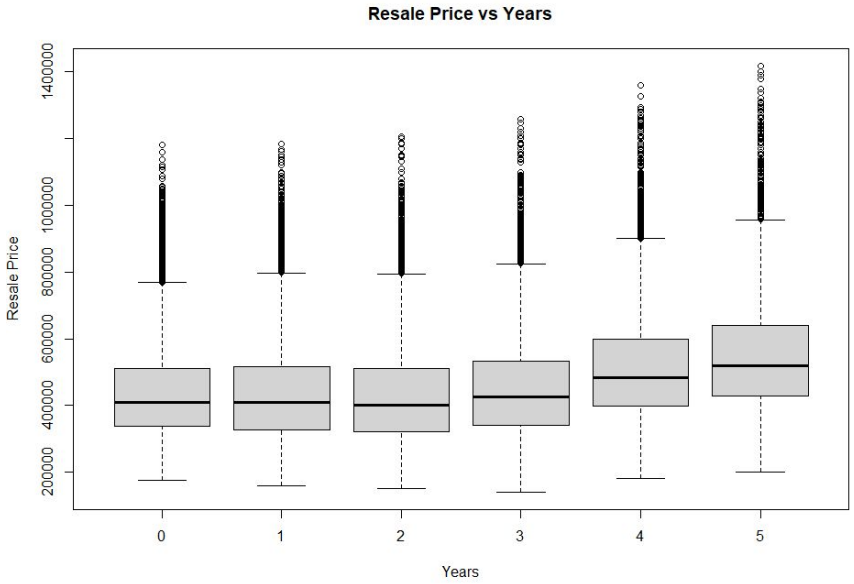
Towns

- E.g. Pasir Ris, Jurong, Punggol



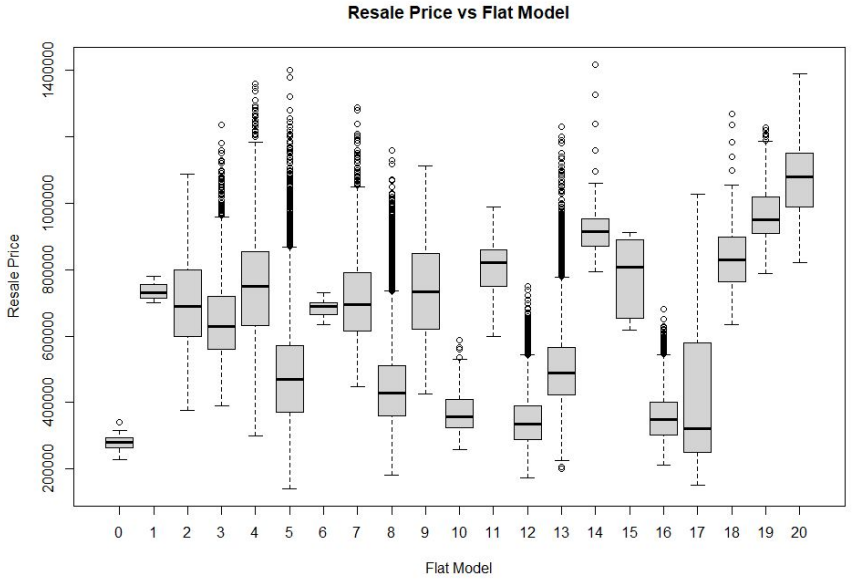
Transaction Year

- E.g. 2017, 2019



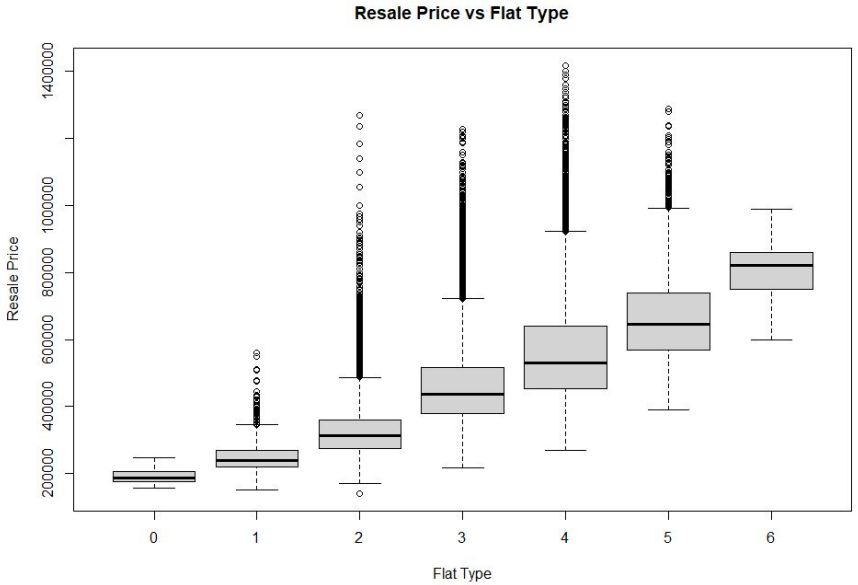
Flat Models

- E.g. New Generation, Improved



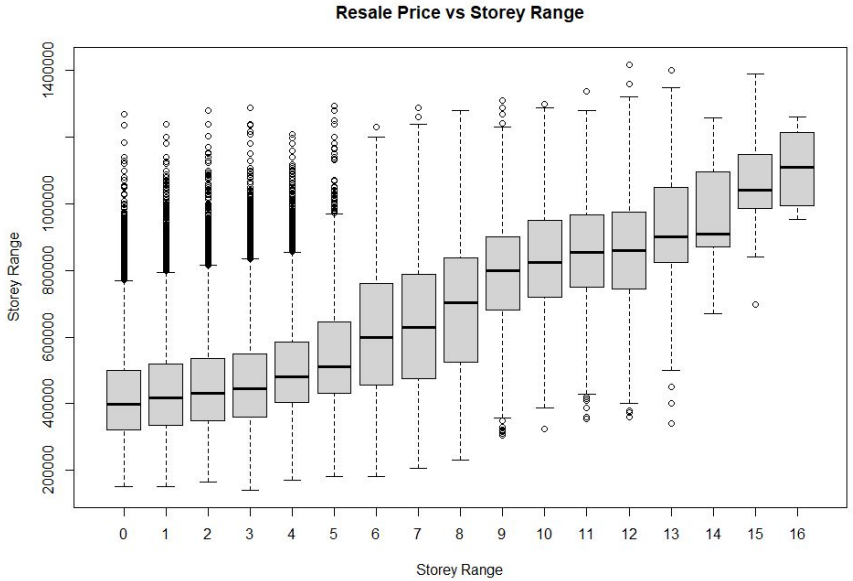
Flat Types

- E.g. 2 Room, 3 Room, Executive



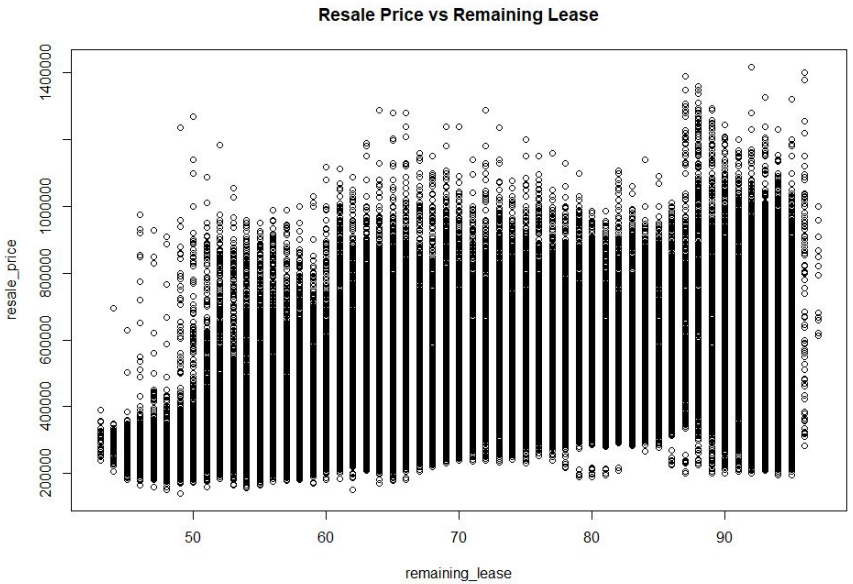
Storey Ranges

- E.g. 10 to 12, 1 to 3, 4 to 6



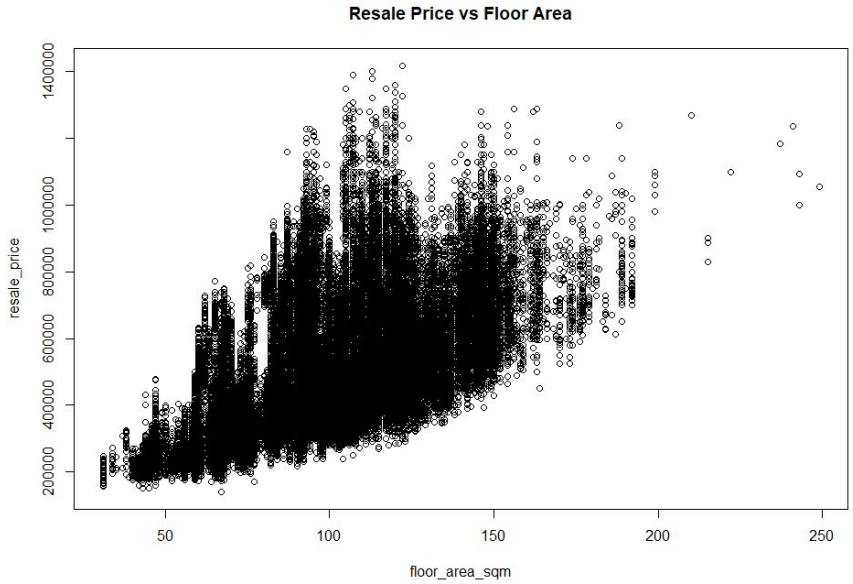
Remaining Lease

- E.g. 62 years, 55 years



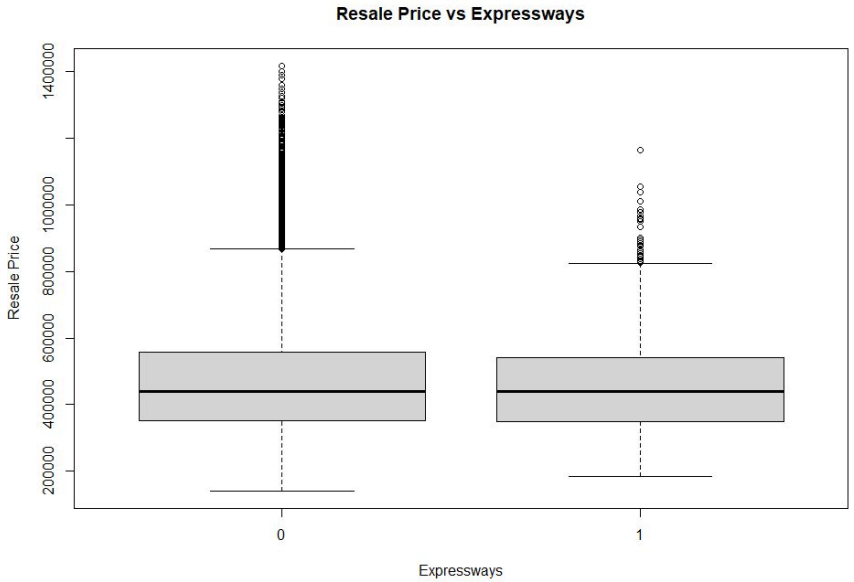
Floor Area

- E.g. 44.0, 52.0, 67.0

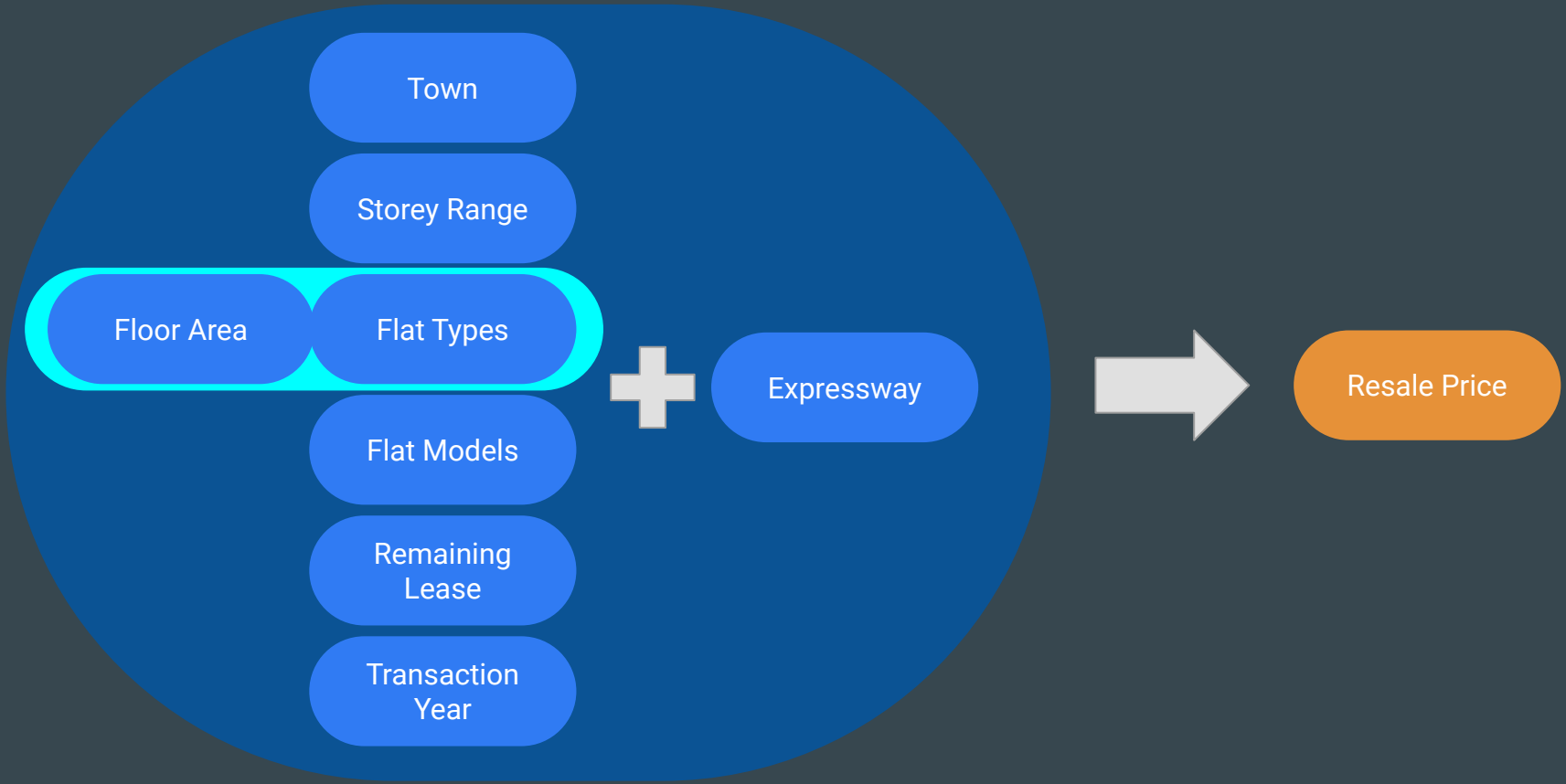


Expressways

- E.g. Yes (1) or No (0)



Approach


Town
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Expressway
Resale Price

Near Expressways?

Block + Street Name	Latitude	Longitude
Bishan	1.378	130.843

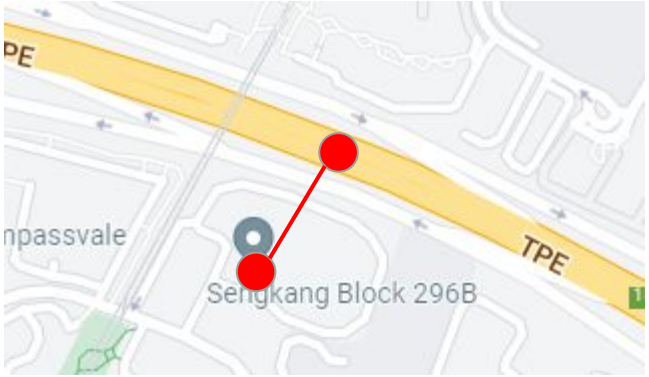
Expressway	Latitude	Longitude
PIE	1.378	130.843

Near Expressways?

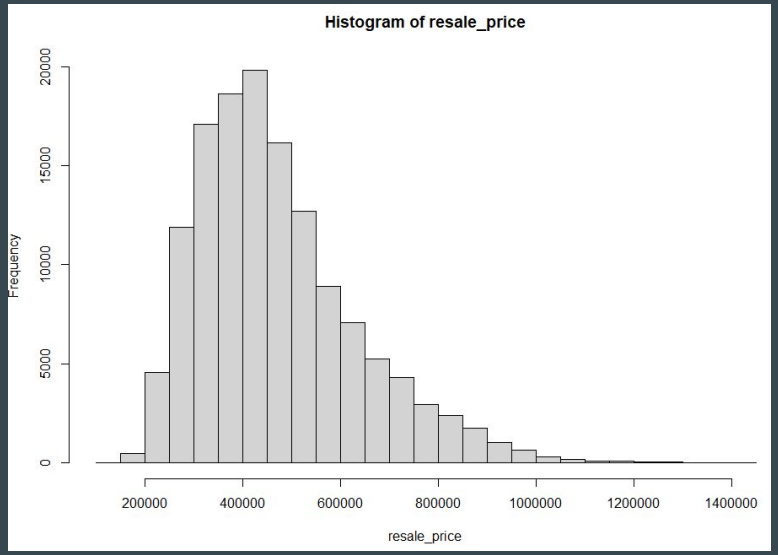
Block + Street Name	Latitude	Longitude	Expressway
2 Bishan	1.378	130.843	PIE
5 Punggol	1.483	132.457	NaN

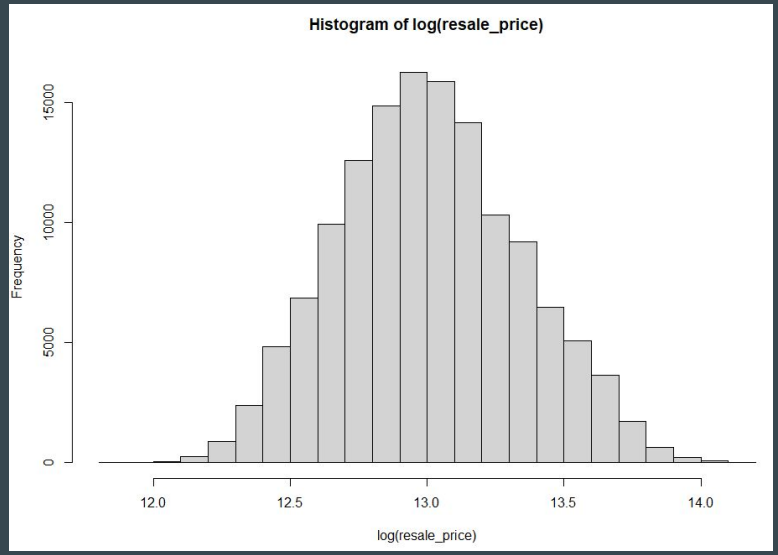
Near Expressways?

- Round Latitude and Longitude to 3 decimal places
- I.e. 0.001 -> 111 metres



Transformation of Resale Price





Multicollinearity

Variance Inflation Factor (VIF)	Significance
• VIF of Floor Area = 11.242 and Flat Types = 11.270 • Floor Area and Flat Types are correlated	• Cannot trust our coefficient estimates

Approach


Town
Storey Range
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Expressway
Resale Price

Regression

- Estimates of Coefficient of Expressway (Name) = -0.0622
- Resale Price Negative Correlated with Expressway
- Anova Test shows Significance of Expressway affecting Resale Price

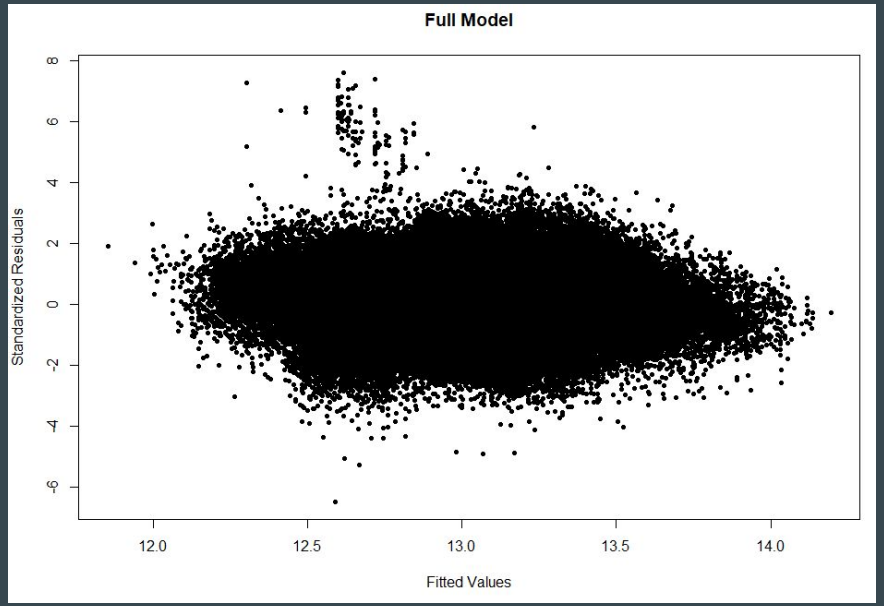
Anova Table (Type II tests)

Response: log(resale_price)

	Sum Sq	Df	F value	Pr(>F)	
month	946.9	5	14438.2	< 2.2e-16	***
town	2598.3	25	7923.6	< 2.2e-16	***
flat_type	3846.0	5	58642.0	< 2.2e-16	***
storey_range	228.3	16	1087.8	< 2.2e-16	***
flat_model	320.5	19	1286.1	< 2.2e-16	***
remaining_lease	597.0	1	45516.1	< 2.2e-16	***
Name	8.8	1	672.5	< 2.2e-16	***
Residuals	1785.2	136099			

Model Diagnostics

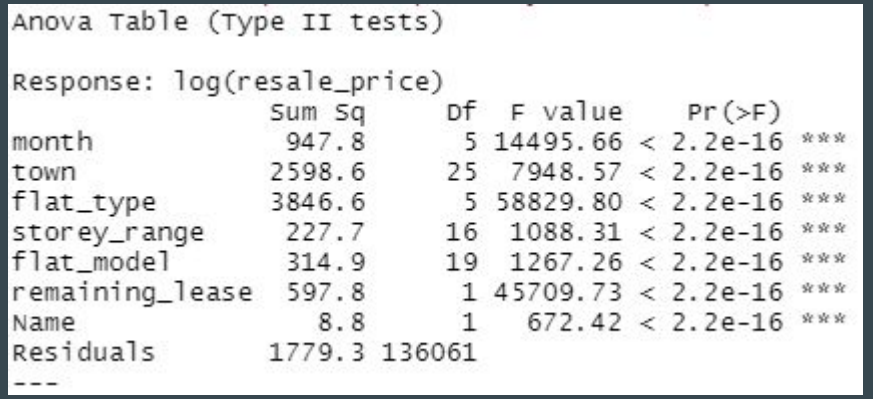
- Random Pattern in Residuals implies Errors are not Correlated
- Mean of Residuals = 0
- Possible Outliers (> 3 or <-3)



Removing of Outliers

- High Leverage Points +
- High Cook's Distance +
- Residual Standard Error >3 or <-3

- Coefficient Estimate is still significant
- Relationship does not change
  - Still Negative (-0.0621)



Anova Table (Type II tests)

Response: log(resale_price)

	Sum Sq	Df	F value	Pr(>F)	
month	947.8	5	14495.66	< 2.2e-16	***
town	2598.6	25	7948.57	< 2.2e-16	***
flat_type	3846.6	5	58829.80	< 2.2e-16	***
storey_range	227.7	16	1088.31	< 2.2e-16	***
flat_model	314.9	19	1267.26	< 2.2e-16	***
remaining_lease	597.8	1	45709.73	< 2.2e-16	***
Name	8.8	1	672.42	< 2.2e-16	***
Residuals	1779.3	136061			

Conclusion

Insights

- Presence of Expressway will result in a -6.03% drop in resale price

Future Work

- Subject Knowledge on what goes into affecting Resale Price
  - Removes Omitted Variable Bias
- Better definition of closeness
  - Distance between Expressway and Flats
- More focus on transformations of predictor/ response variables

Thank You