King County Sales Assessment

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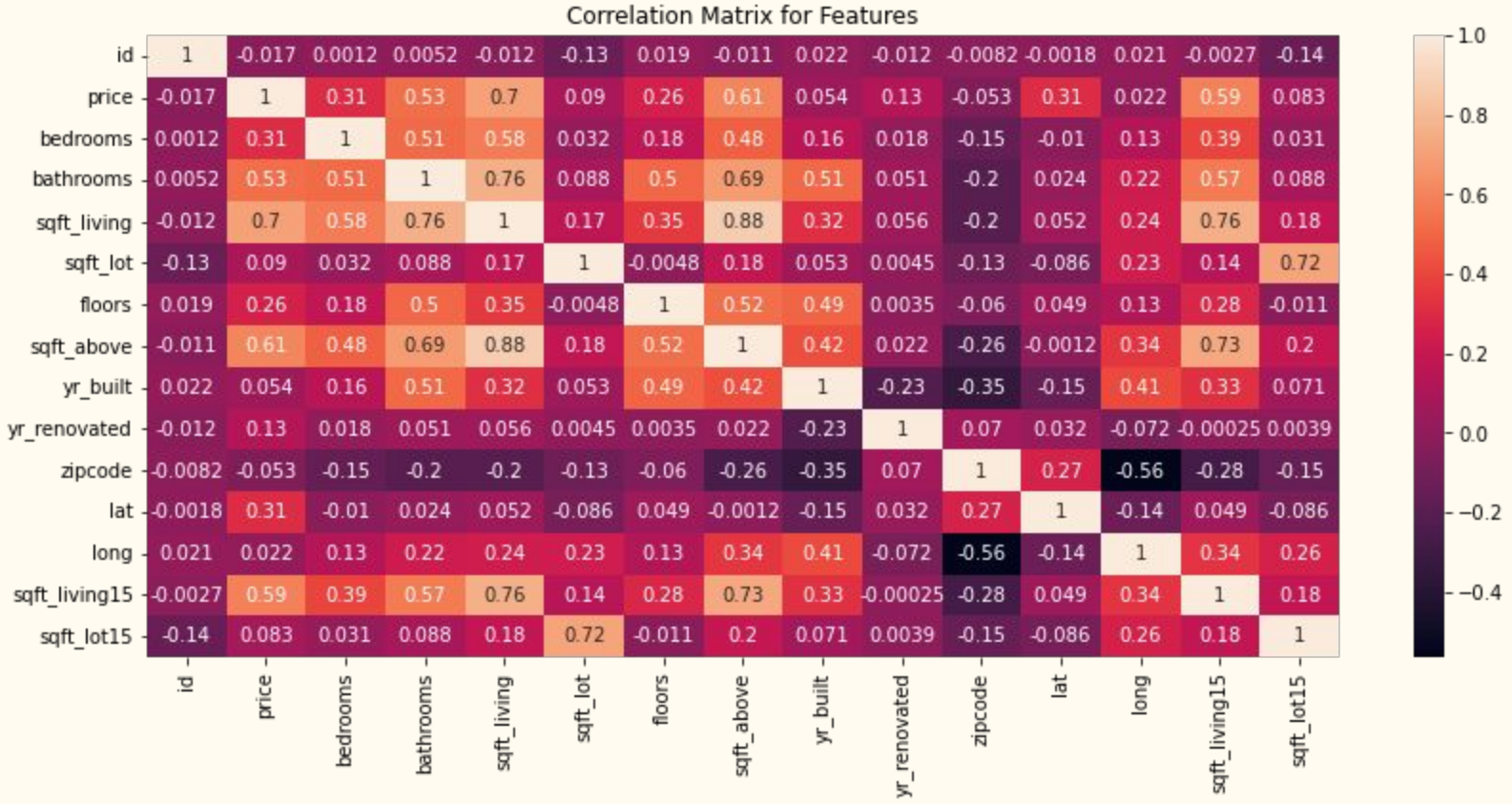
Assembled by Harrison Carter

How can we determine high value investment areas?

Where to start?



Additional Predictors

Living Space

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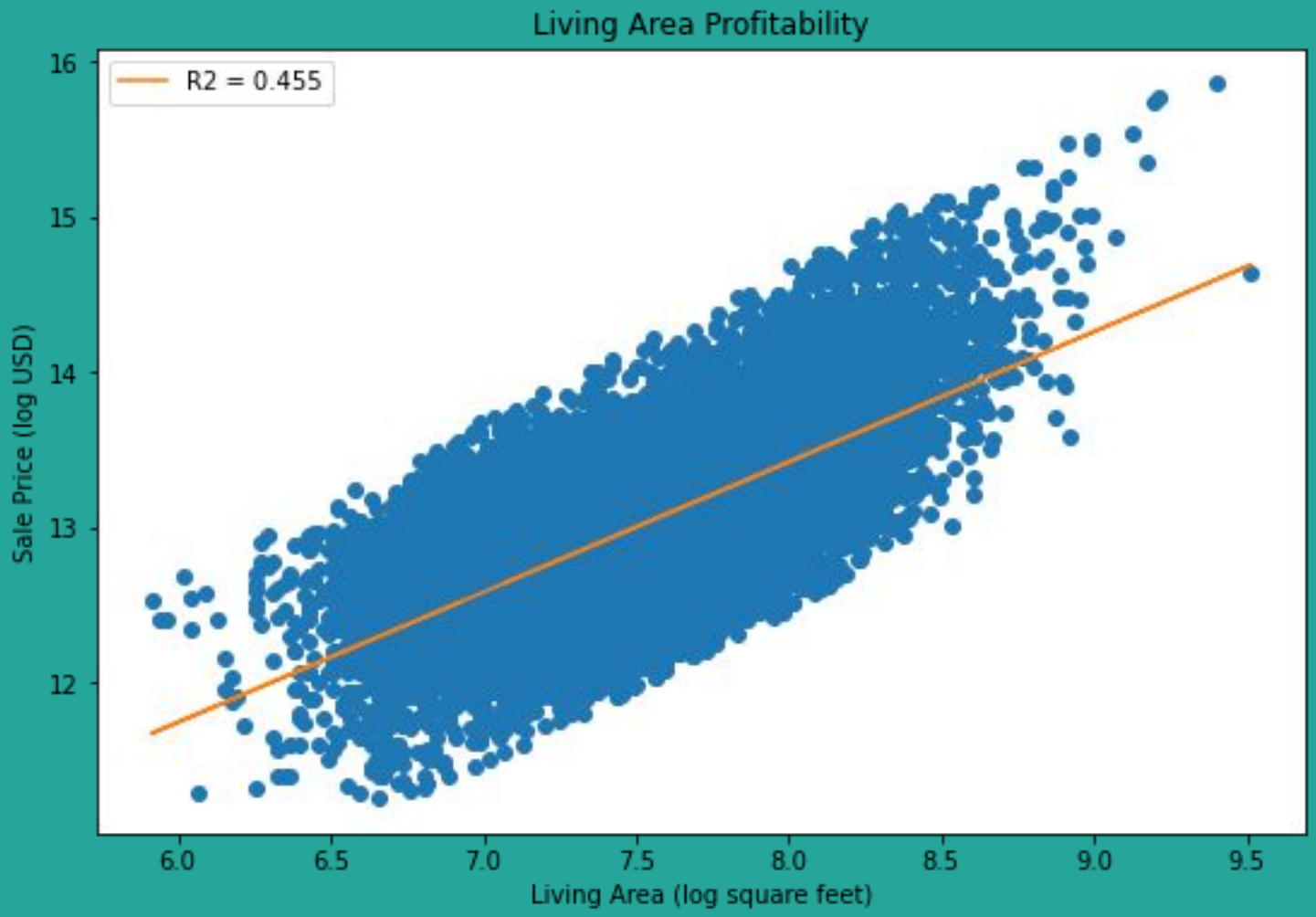
Waterfront Availability

What matters?

What do we have in our data that might help explain pricing?

What is not inherent to zip code?


Living Area Profitability
R2 = 0.455
Sale Price (log USD)
16
15
14
13
12
6.0
6.5
7.0
7.5
8.0
8.5
9.0
9.5
Living Area (log square feet)

Examine ZIP code

Rationale:

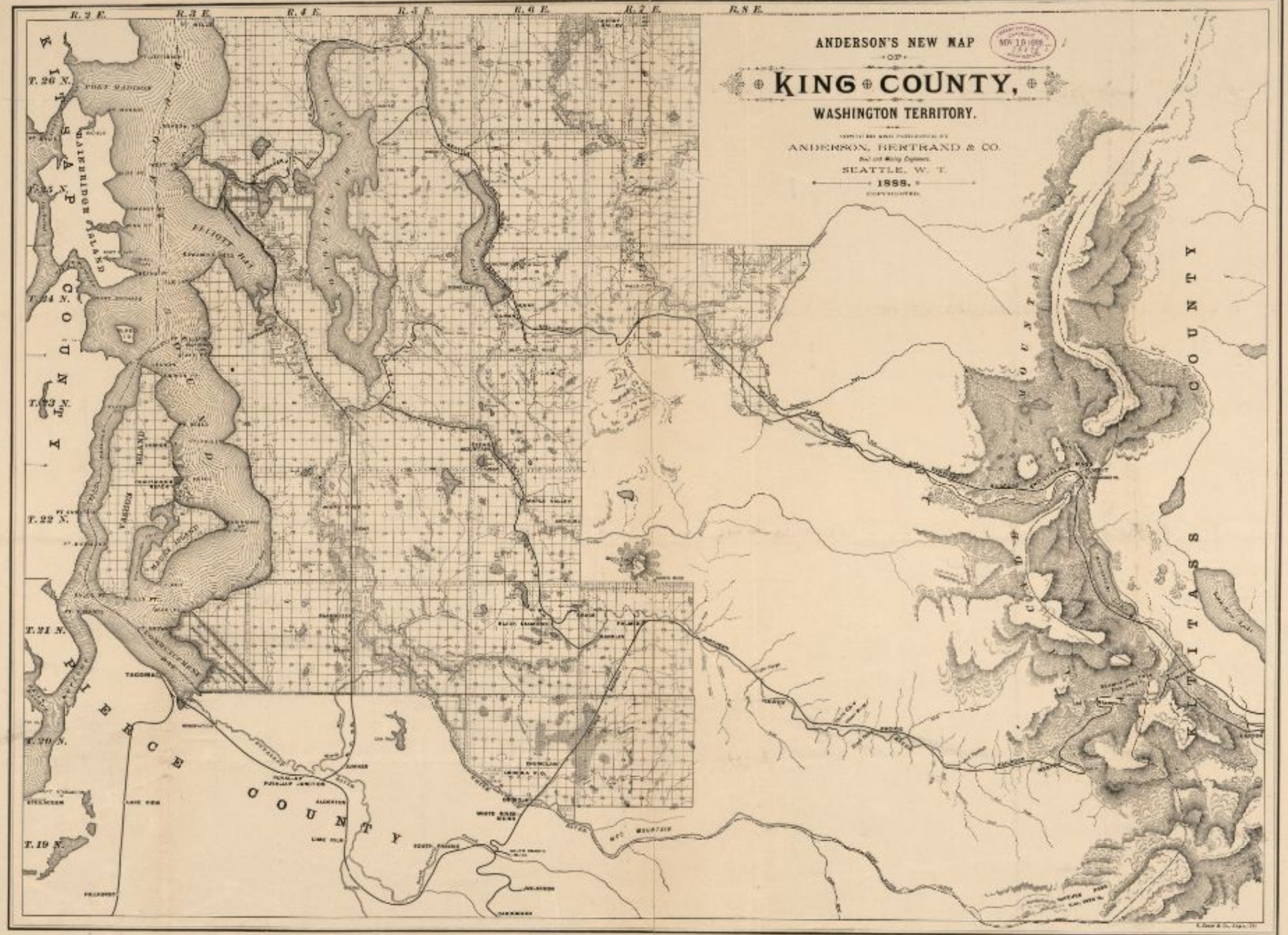
- Spatial
- While unintentional, ZIP may, in effect, include other predictors
- Geographical
- School districts
- Natural features, parks (waterfront)
- Shopping
- Transportation

Methodology:

- Categorical: nominal
- Incorporate as primary predictor
- Logarithmic transformation on price
- May contain other predictors, check heteroskedasticity upon multiple regression.

Baseline:

- Baseline model $R2 = 0.533$
- Skew $= 0.594$ (> 0.5)
- Kurtosis $= 5.132$ (< 6)


ANDERSON'S NEW MAP
OF
KING COUNTY,
WASHINGTON TERRITORY.
ANDERSON, BERTRAND & CO.
SEATTLE, W. T.
1888.
R. 2 E.
R. 3 E.
R. 4 E.
R. 5 E.
R. 6 E.
R. 7 E.
R. 8 E.
T. 26 N.
T. 24 N.
T. 23 N.
T. 22 N.
T. 21 N.
T. 20 N.
T. 19 N.
KITSAP COUNTY
PIERCE COUNTY
KITTITAS COUNTY
TACOMA

Refining the model

Final Predictors:

ZIP code

Living Space

Waterfront availability

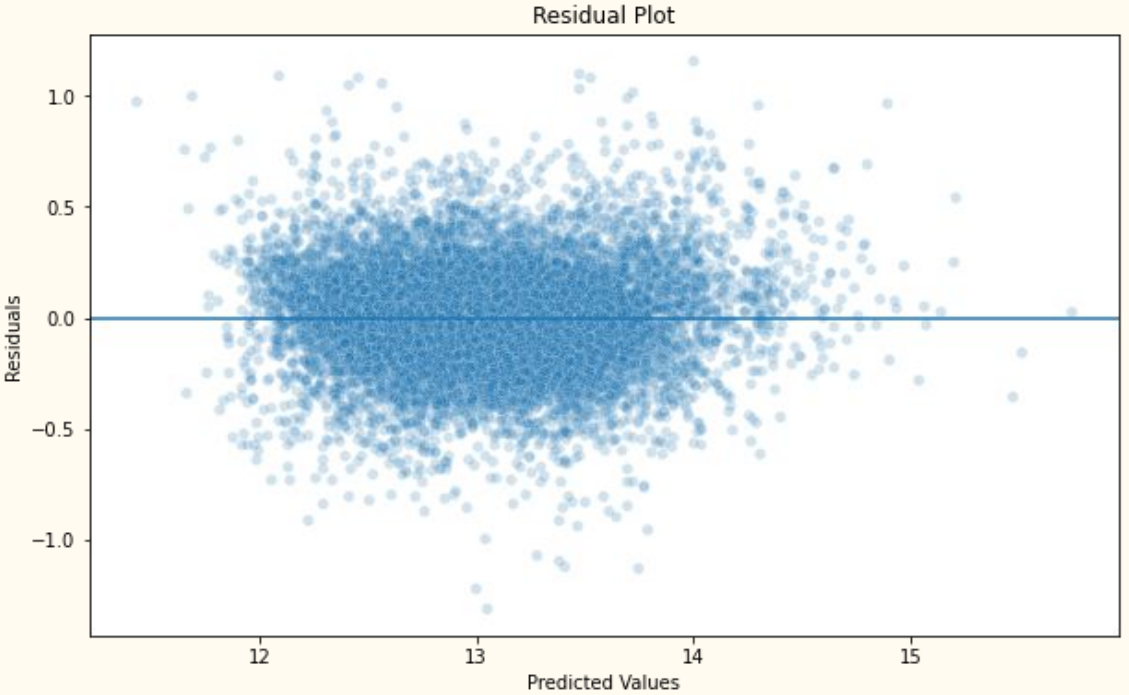
Waterfront availability incorporation

- Decreases Skew:
  - 0.445 to 0.130
- Decreases Kurtosis:
  - 5.920 to 4.956
- Increases R squared:
  - 0.817 to 0.833

*See Appendix A for equation

Cross Validation

- Test size : 20%
- Train Score : 0.835
- Test Score : 0.831



Further Inquiry

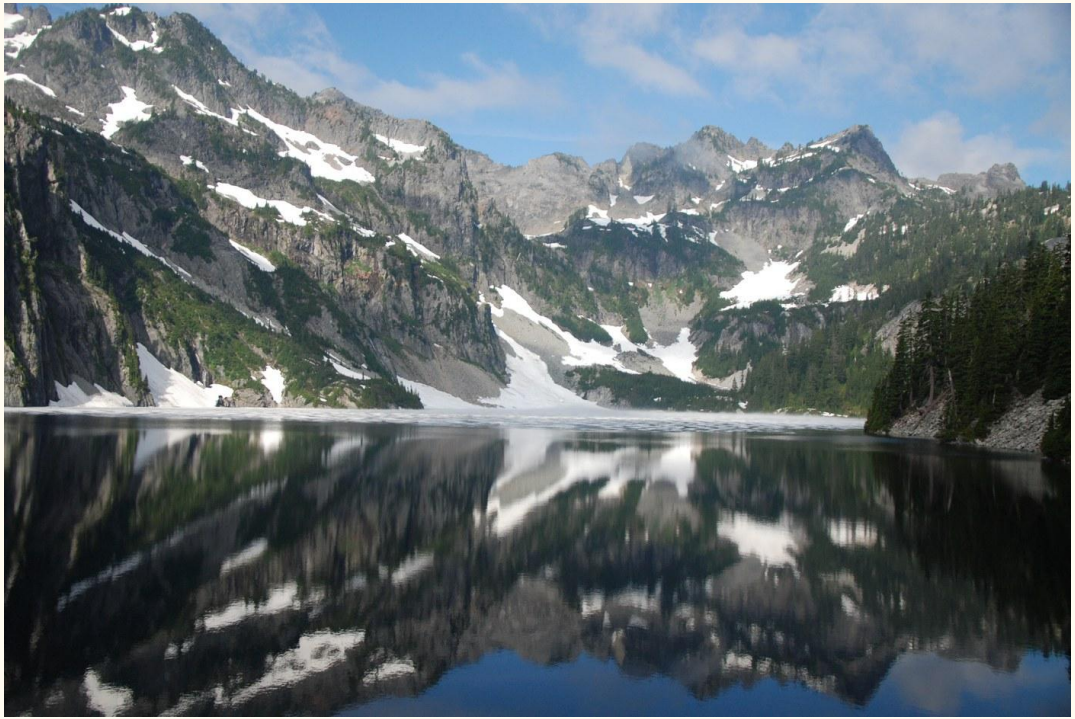


Image credit: wta.org

- Map geographic location with respect to landmarks (spatial reconstruction)
- Consider construction regulations and housing specifications (build quality, hazards)
- Consider school district (income inequality)
- Consider effects of tourism
- Consider non-residential development

Questions

References

- King County Assessor Website (https://info.kingcounty.gov/assessor/esales/Glossary.aspx?type=r)
- Library of Congress (https://www.loc.gov/resource/g4283k.la001374a/)
- Washington Trails Association (https://www.wta.org/go-hiking/hikes/snow-lake-1)

Appendix A. Equation

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 \ldots \beta\square x\square$$

y = predicted price

β_0 = predicted price when no waterfront and living space is zero

β_1 = predicted change in price for each unit of change in living area square footage

β_2 = predicted change in price between waterfront/non waterfront properties

$\beta_3 \ldots \beta\square$ = predicted change in price between ZIP codes, individual basis

x_1 = Living area square footage

x_2 = Waterfront availability, categorical

$x_3 \ldots x\square$ = ZIP codes, individual basis, categorical

*All y and beta values in equation are predicted