BENTLEY & CO. BANK MORTGAGES

Author: Jason Lombino



\$17 TRILLION

Outstanding mortgage debt in the United States.



FINDINGS

The value of a home can be predicted easily by:

- Location
- Construction & Design
- Living Space

Useful when appraisal is not feasible.



AGENDA

O1 BUSINESS UNDERSTANDING

O2 DATA

O3 METHODS

04 MODELING

05 RECOMMENDATIONS

06 FUTURE CONSIDERATIONS





BUSINESS UNDERSTANDING

Estimate home prices without long & costly appraisals.

02 DATA & METHODS

DATA



K.C. HOME SALES

- Living Space
- No. Bedrooms
- No. Bathrooms
- Other Features



ZIP CODES

Associate each home with a city.

METHODS



1

E. D. A.

Initial exploration of the data.

2

MODELS

Iterative modeling using SKLearn & Statsmodels.

3

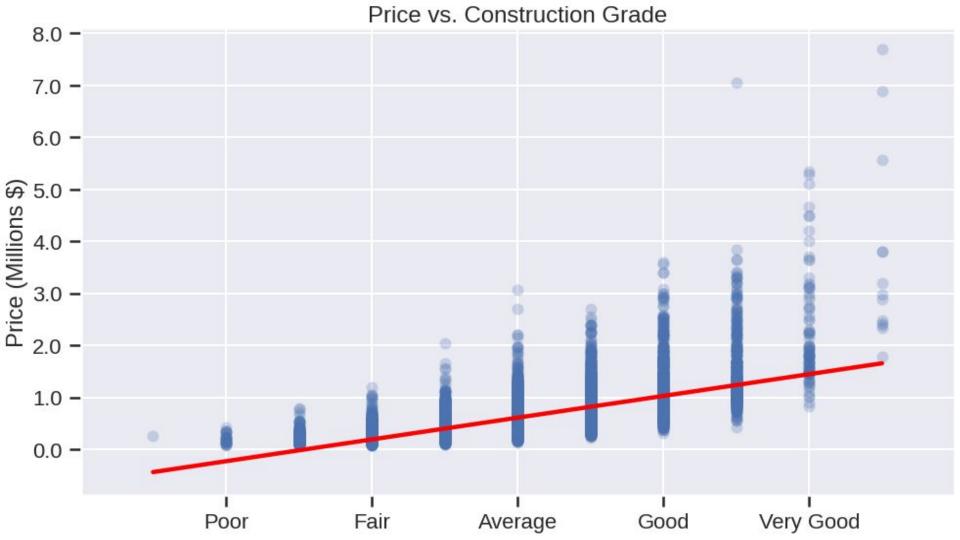
VALIDATION

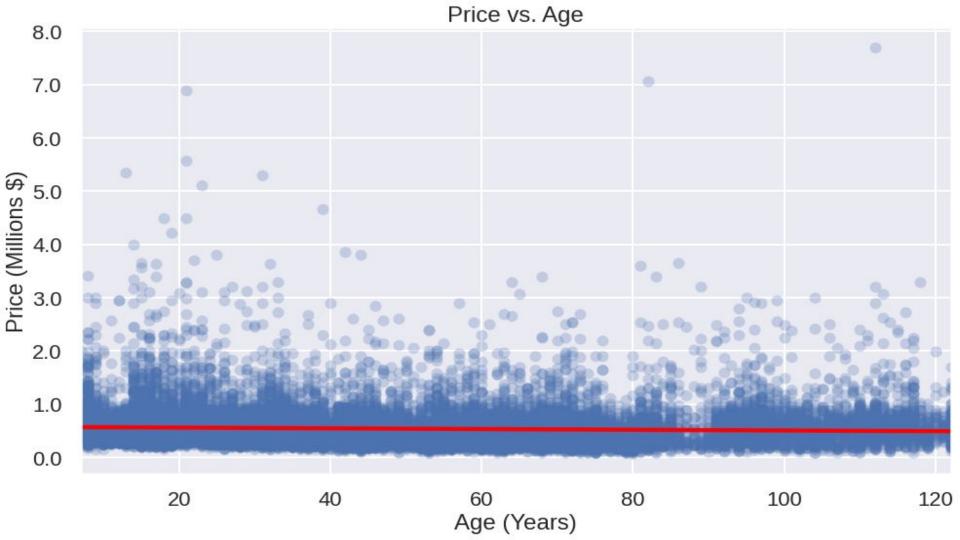
Verifying accuracy of models.

03 **EXPLORATORY** ANALYSIS







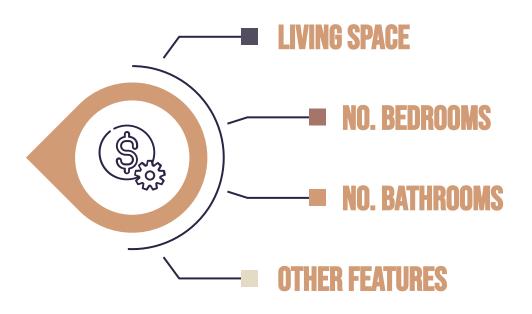




O4 MODELS



MODEL INPUTS



1. BASIC MODEL

- Living space as only predictor
- Poor performance
 - Average error of \$175,000



2. IMPROVED MODEL

- Uses all available predictors
- Slightly better performance
 - Average error of \$120,000



3. BEST MODEL

- Uses all 'good' predictors
- Transformed data
- Best performance
 - Average error < \$100,000

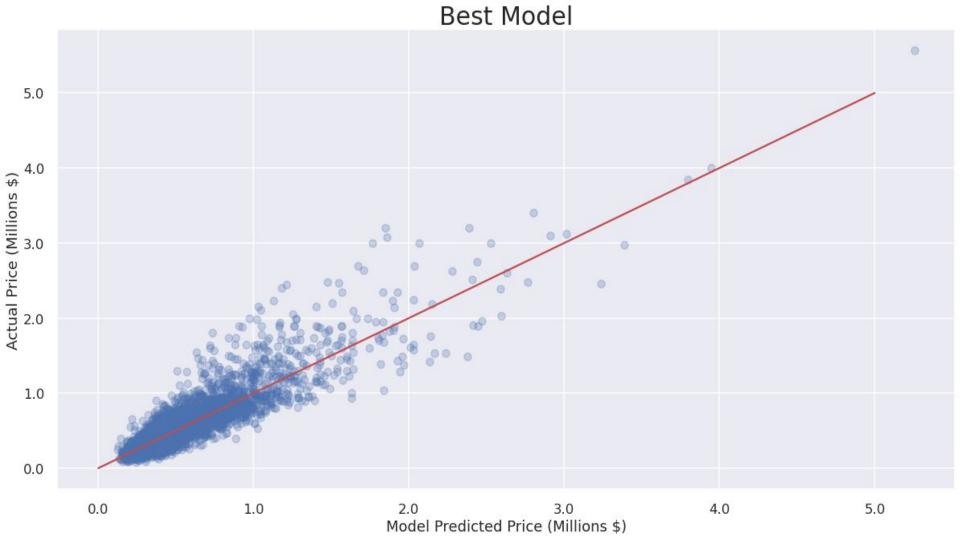


3. BEST MODEL - COEFFICIENTS

- 0.229 Location (Seattle)
- 0.200 Construction & Design
- 0.179 Living Space

Coefficients are standard-scaled and for the natural log of price





05 RECOMMENDATIONS **# #**

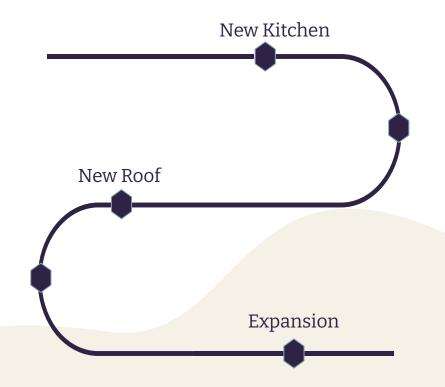
ESTIMATES

Use model for initial mortgage estimates (pre-appraisal).



RENOVATIONS

Estimate the pricing impact of renovations without additional appraisals.





FUTURE CONSIDERATIONS

SCOPE

Where are other markets for mortgages?

SPECIFICITY

Individual models for each city?

PROPERTY TYPES

Commercial properties? Rental prices?



THANK YOU!

Do you have any questions?

Project Repository

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O7 APPENDIX



Correlation Coefficients price 1 0.32 0.53 0.7 0.09 0.26 0.26 0.39 0.036

-0.17

-0.16

bedrooms

-0.098

-0.054

price

since_reno

age

-0.34

-0.32

sqft_living

-0.53

-0.51

bathrooms

									10-10-10-10-10-10-10-10-10-10-10-10-10-1	N. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.				Į.
bedrooms	0.32	1	0.53	0.59	0.034	0.18	-0.0021	0.081	0.023	0.37	-0.17	-0.16		0.8
bathrooms	0.53	0.53	1	0.76	0.088	0.5	0.064	0.19	-0.13	0.67	-0.53	-0.51		
sqft_living	0.7	0.59	0.76	1	0.17	0.35		0.28	-0.059	0.76	-0.34	-0.32		0.6
sqft_lot		0.034		0.17	1	-0.0048	0.021		-0.0088	0.11	-0.052	-0.053		0.4
floors	0.26	0.18	0.5	0.35	-0.0048	1	0.021	0.028	-0.26	0.46	-0.5	-0.49		
waterfront	0.26	-0.0021	0.064		0.021	0.021	1	0.38	0.017	0.083	0.0069	0.024		0.2

10

-0.4

-0.098

-0.054

0.93

age

0.028 0.046 0.027 0.054 view 0.0 0.036 0.023 -0.13 -0.059 -0.0088 -0.26 0.017 0.046 -0.15 condition -0.2 0.76 0.67 0.67 0.46 -0.15 -0.46 -0.45 grade

0.0069

0.024

waterfront

0.027

0.054

view

condition

-0.46

-0.45

grade

0.93

since_reno

-0.5

-0.49

floors

-0.052

-0.053

sqft_lot

