BENTLEY & CO. BANK MORTGAGES
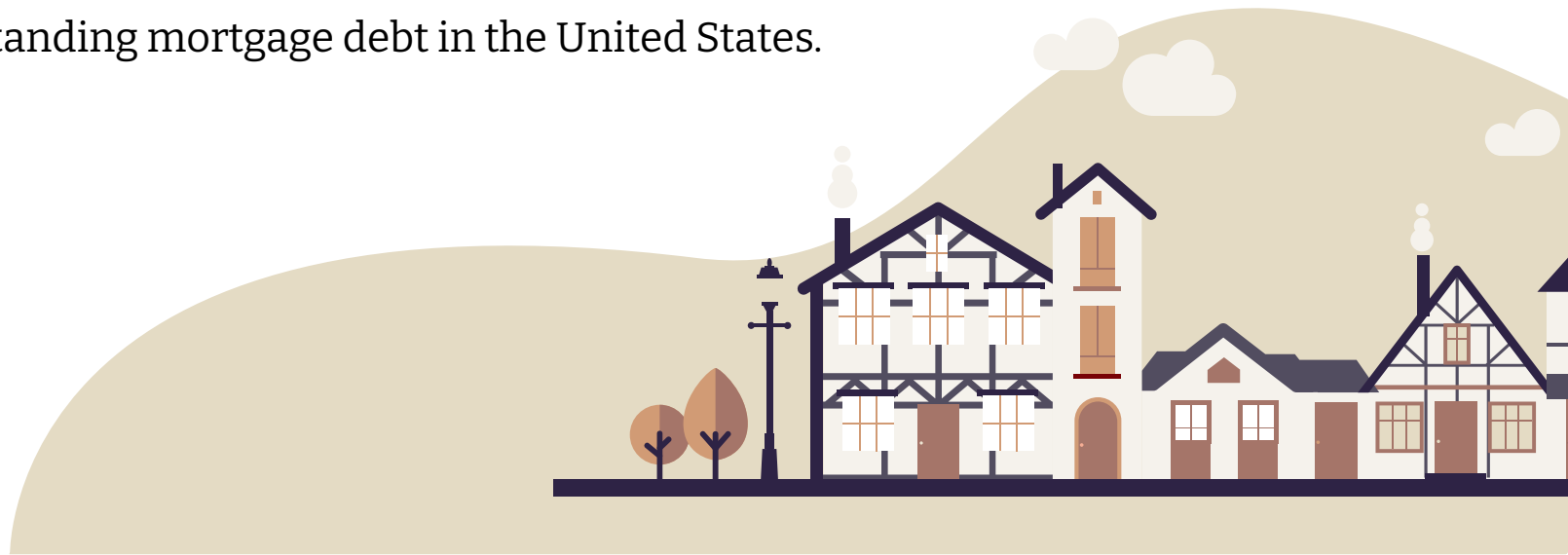
Author: Jason Lombino

$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

01 BUSINESS UNDERSTANDING

02 DATA & METHODS

03 MODELS

04 RECOMMENDATIONS

05 FUTURE CONSIDERATIONS

01

BUSINESS UNDERSTANDING

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.
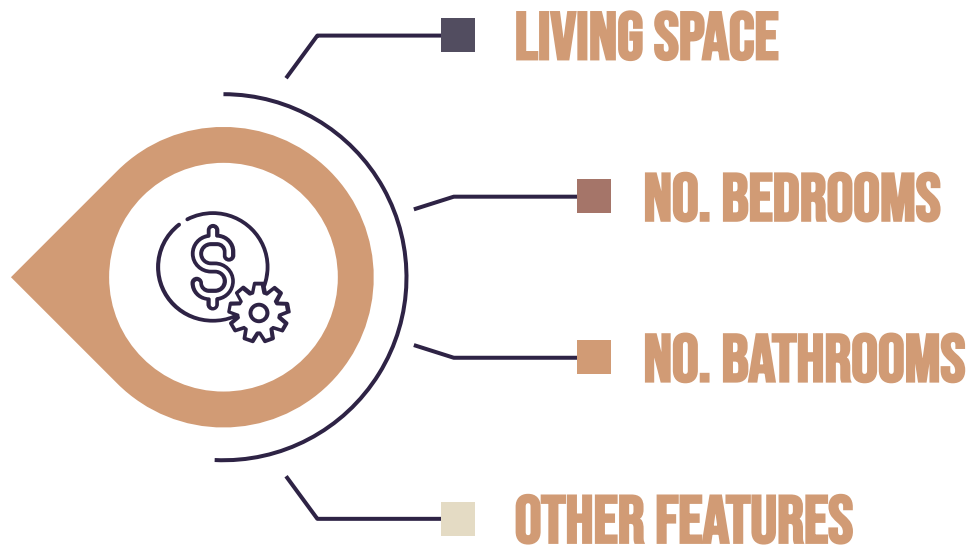
3

VALIDATION

Verifying
accuracy
of models.

03

MODELS

MODEL INPUTS

LIVING SPACE

NO. BEDROOMS

NO. BATHROOMS

OTHER FEATURES

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

Best Model Predictions

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

LIVING SPACE

Price vs. Living Area

LIVING SPACE

Coefficient:
0.423

CONSTRUCTION GRADE

Median Home Price by Construction Grade
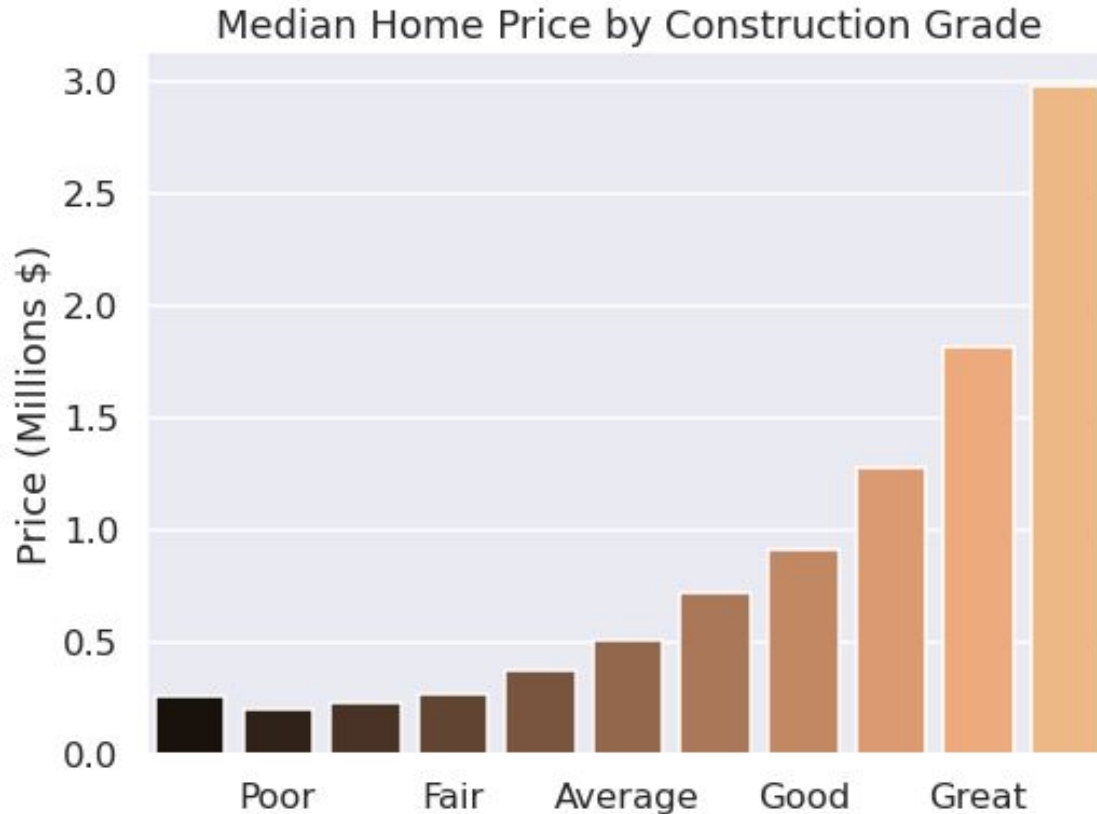
GRADE

Coefficient: 0.171

LOCATION

Median Home Price by Location
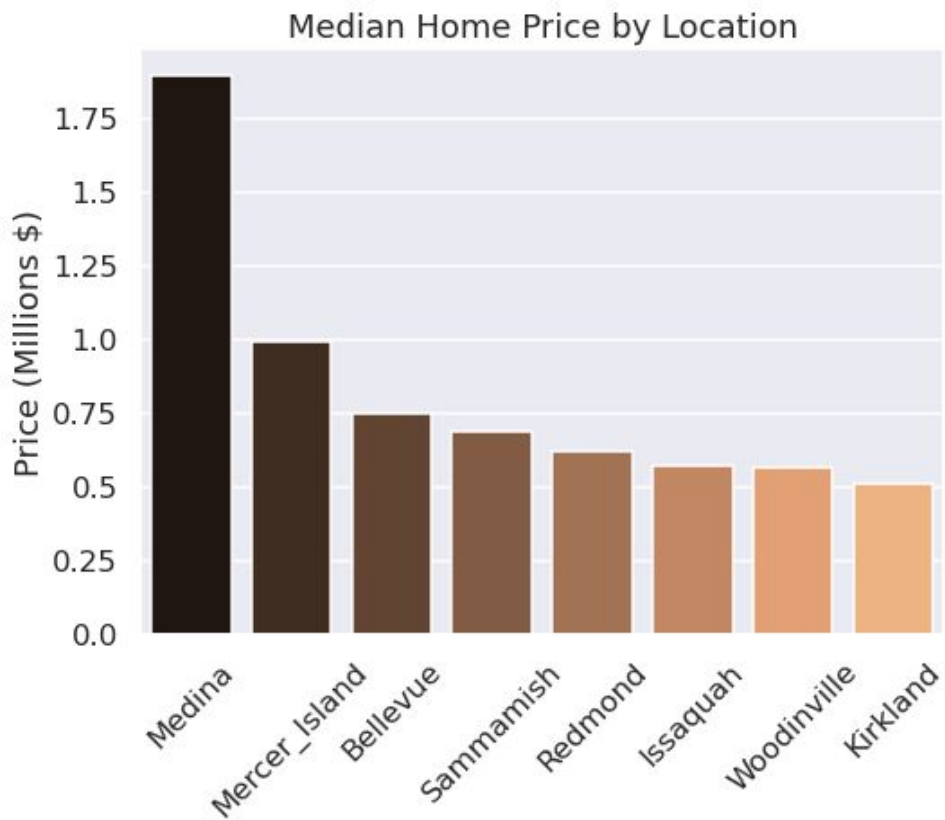
MEDINA
Coefficient: 1.178

MERCER_ISLAND
Coefficient: 0.777

BELLEVUE
Coefficient: 0.685

SAMMAMISH
Coefficient: 0.499

04

RECOMMENDATIONS

ESTIMATES

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

RENOVATIONS

Estimate the pricing impact of renovations without additional appraisals.

New Kitchen

New Roof

Expansion

05
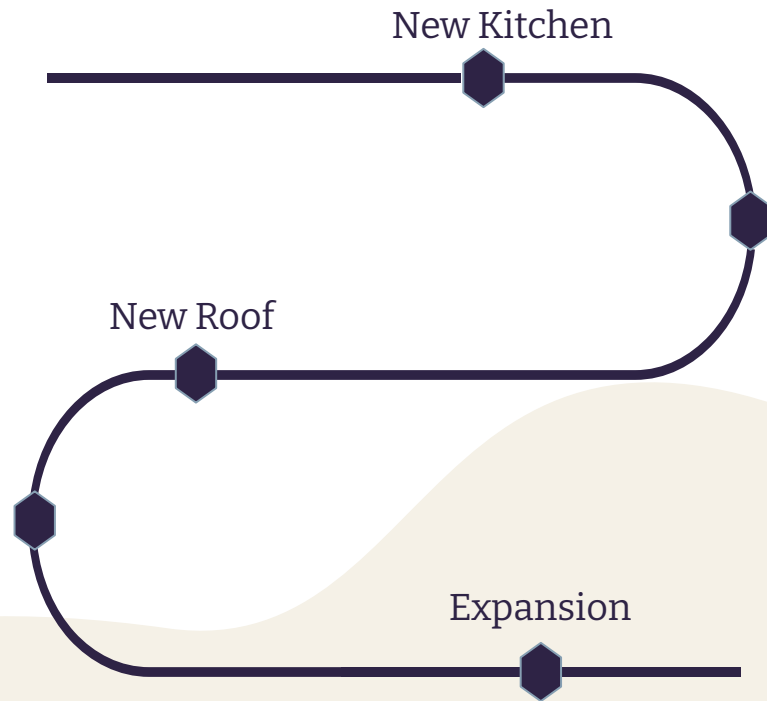
FUTURE
CONSIDERATIONS

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

Correlation Coefficients

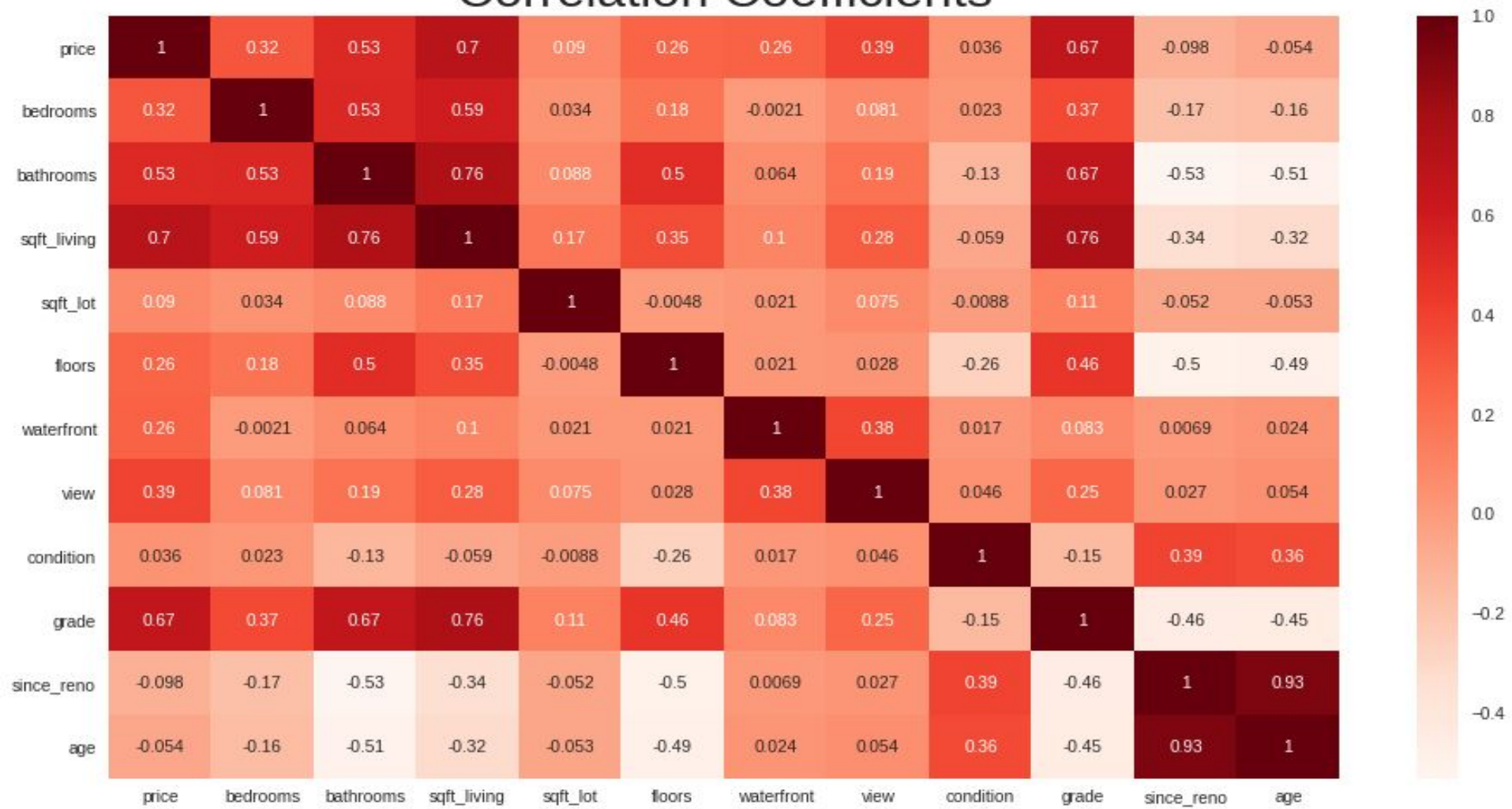|	price	bedrooms	bathrooms	sqft_living	sqft_lot	floors	waterfront	view	condition	grade	since_reno	age
price	1	0.32	0.53	0.7	0.09	0.26	0.26	0.39	0.036	0.67	-0.098	-0.054
bedrooms	0.32	1	0.53	0.59	0.034	0.18	-0.0021	0.081	0.023	0.37	-0.17	-0.16
bathrooms	0.53	0.53	1	0.76	0.088	0.5	0.064	0.19	-0.13	0.67	-0.53	-0.51
sqft_living	0.7	0.59	0.76	1	0.17	0.35	0.1	0.28	-0.059	0.76	-0.34	-0.32
sqft_lot	0.09	0.034	0.088	0.17	1	-0.0048	0.021	0.075	-0.0088	0.11	-0.052	-0.053
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	0.1	0.021	0.021	1	0.38	0.017	0.083	0.0069	0.024
view	0.39	0.081	0.19	0.28	0.075	0.028	0.38	1	0.046	0.25	0.027	0.054
condition	0.036	0.023	-0.13	-0.059	-0.0088	-0.26	0.017	0.046	1	-0.15	0.39	0.36
grade	0.67	0.37	0.67	0.76	0.11	0.46	0.083	0.25	-0.15	1	-0.46	-0.45
since_reno	-0.098	-0.17	-0.53	-0.34	-0.052	-0.5	0.0069	0.027	0.39	-0.46	1	0.93
age	-0.054	-0.16	-0.51	-0.32	-0.053	-0.49	0.024	0.054	0.36	-0.45	0.93	1

HOMOSCEDASTICITY?

Model Error vs. Price

NORMALITY?