# Exploration of King County House Sales

Asset Management Business Case

An asset management firm invests in real estate on their clients behalf. The company is planning to enter a foreign real estate market.

**BUSINESS CASE**

They chose King County for their initial expansion attempt. The company's goal is to maintain and upgrade assets in a cost efficient manner.

**BUSINESS CASE**

# KING COUNTY HOUSE SALES

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Overview of the King County real estate market

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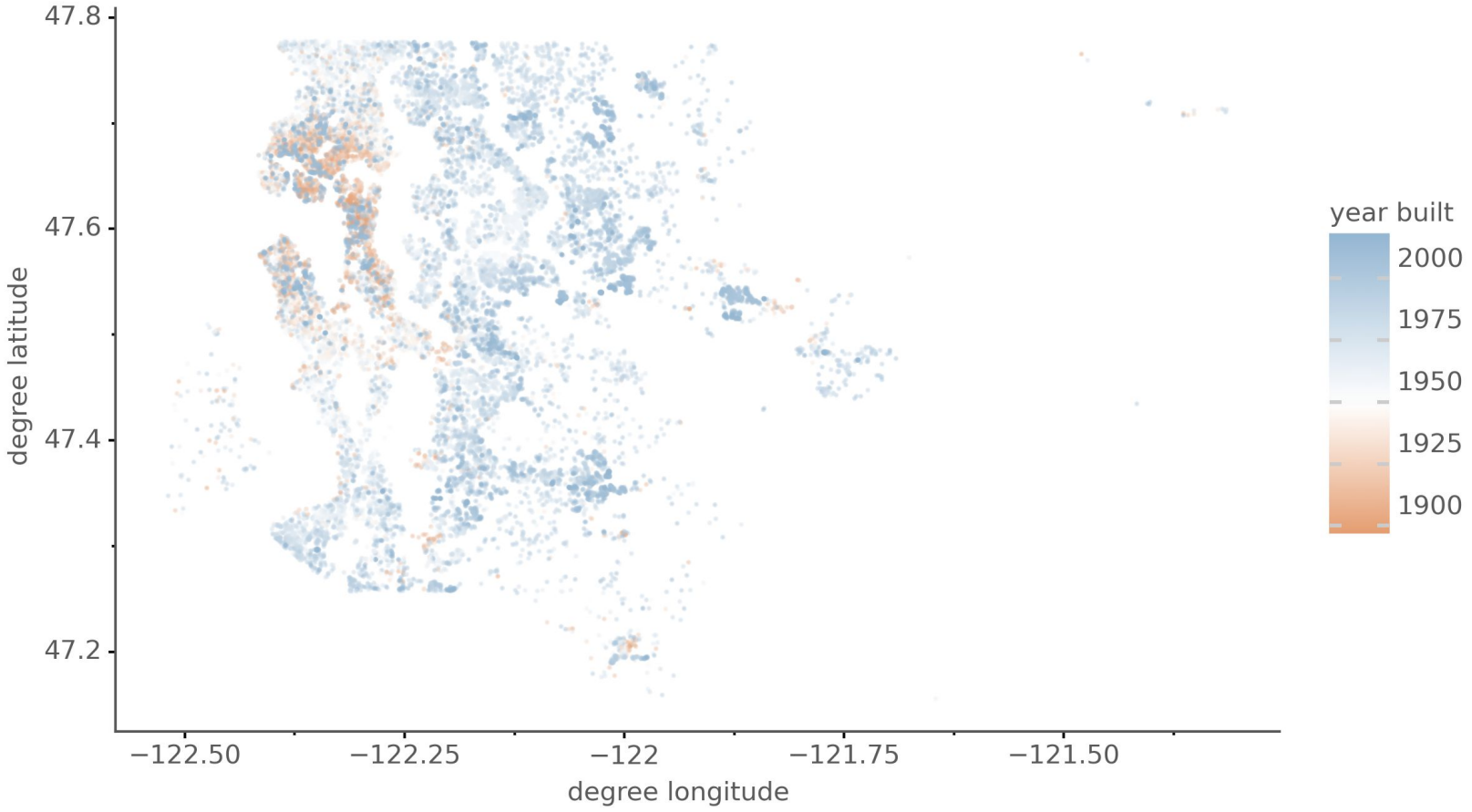
Modeling of house prices

# Overview of the King County real estate market

# Sales of old and new houses in King County

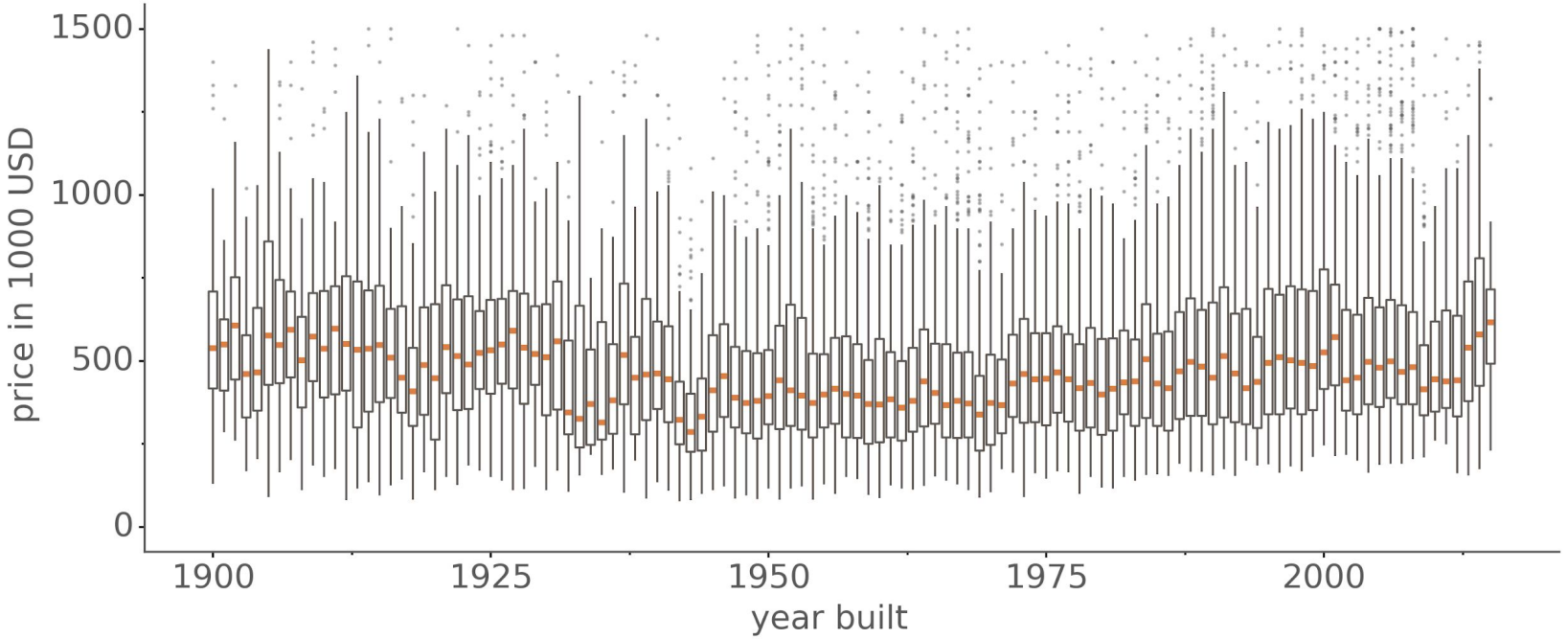


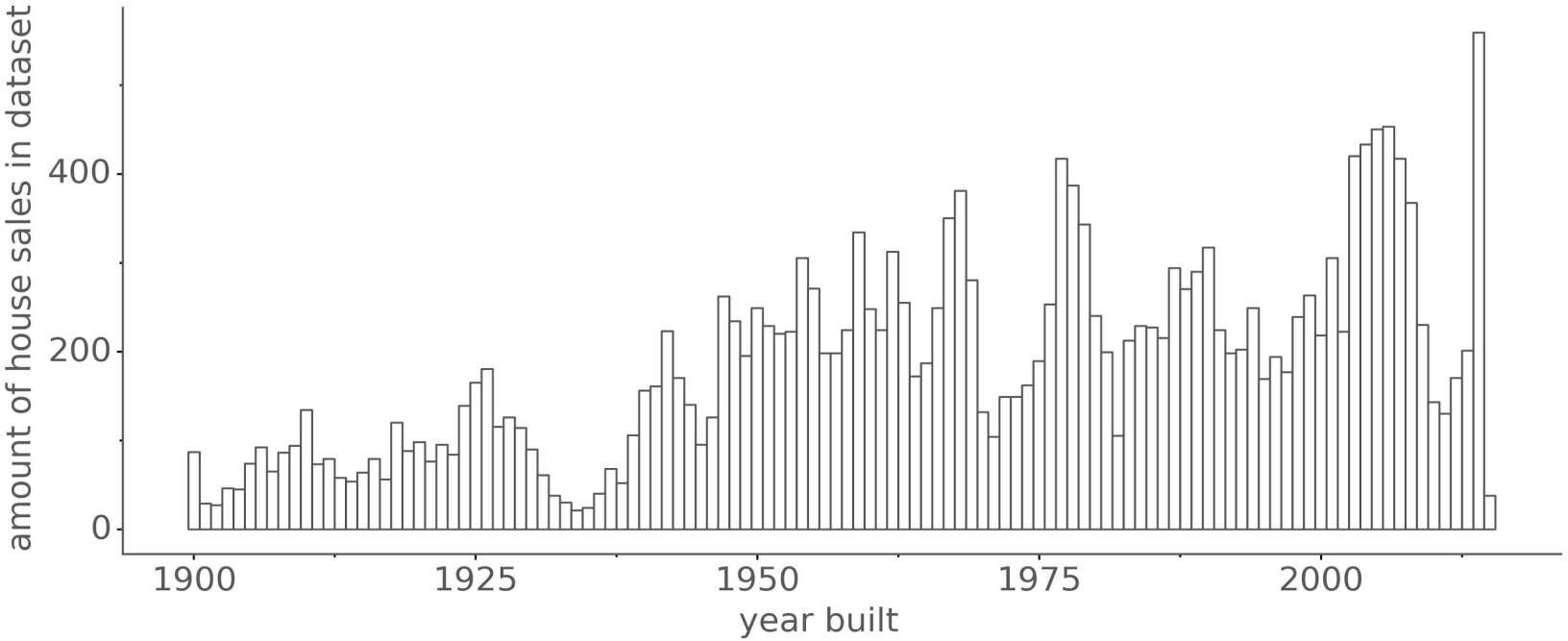

## market overview

This map shows the King County real estate market.

It contains House Sales from 05/2014 to 05/2015.

The oldest houses are located in the Seattle area.



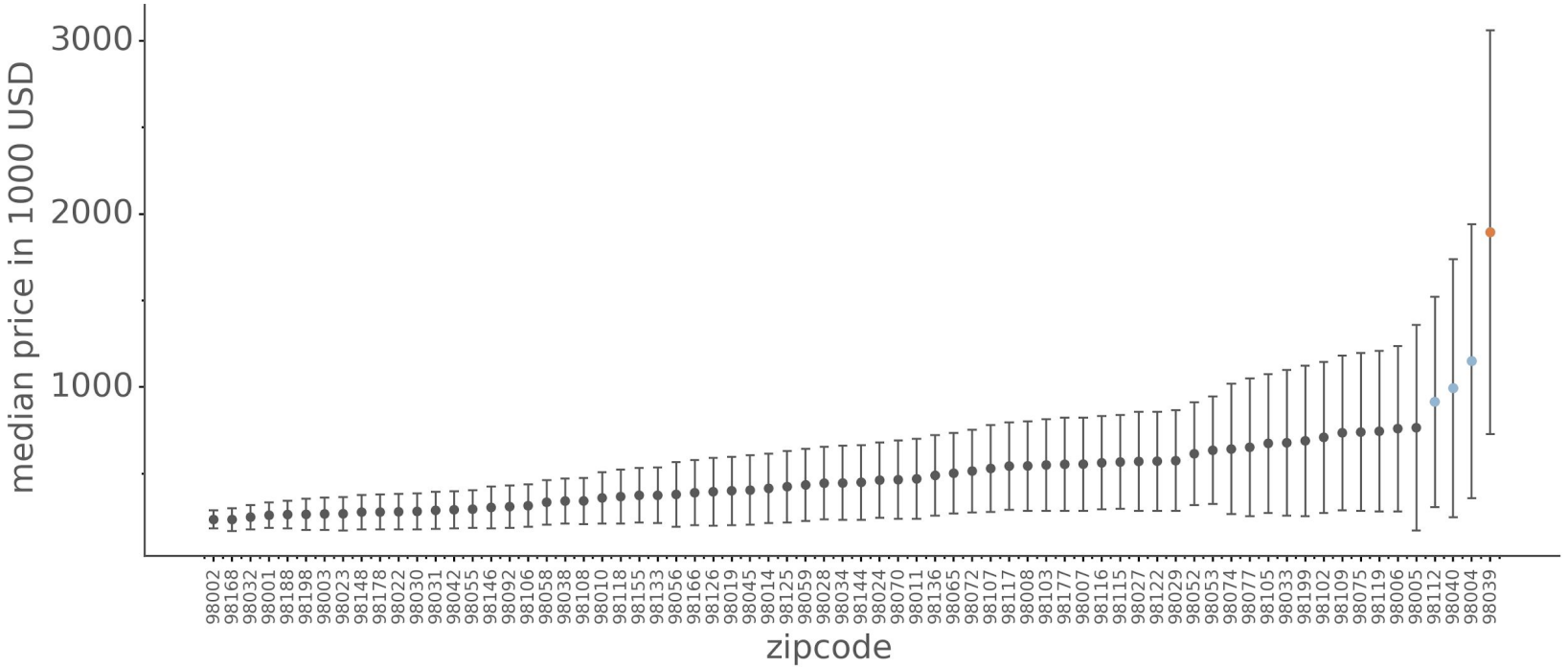




# building age

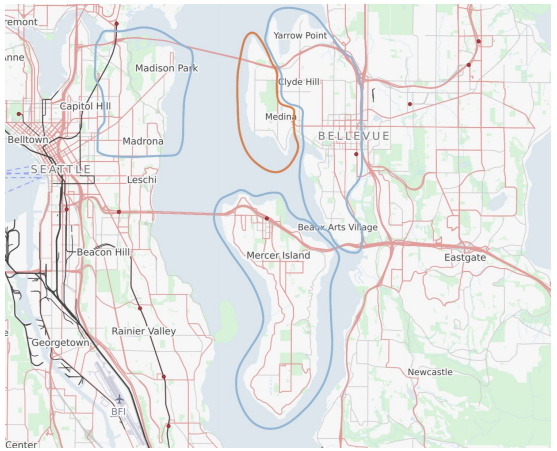
The age of a house does not correlate with price in a meaningful way.

Less houses from certain periods were sold during the data acquisition time frame.

Major US recessions are clearly visible .




| | | Adjusted Gross Income | Median Household Income |
|---|---|---|---|
| 98039 | Medina | $691,840 | $17,429 |
| 98040 | Mercer Island | $303,920 | $120,300 |
| 98004 | Bellevue | $256,280 | $82,698 |
| 98112 | Seattle | $246,440 | $89,205 |



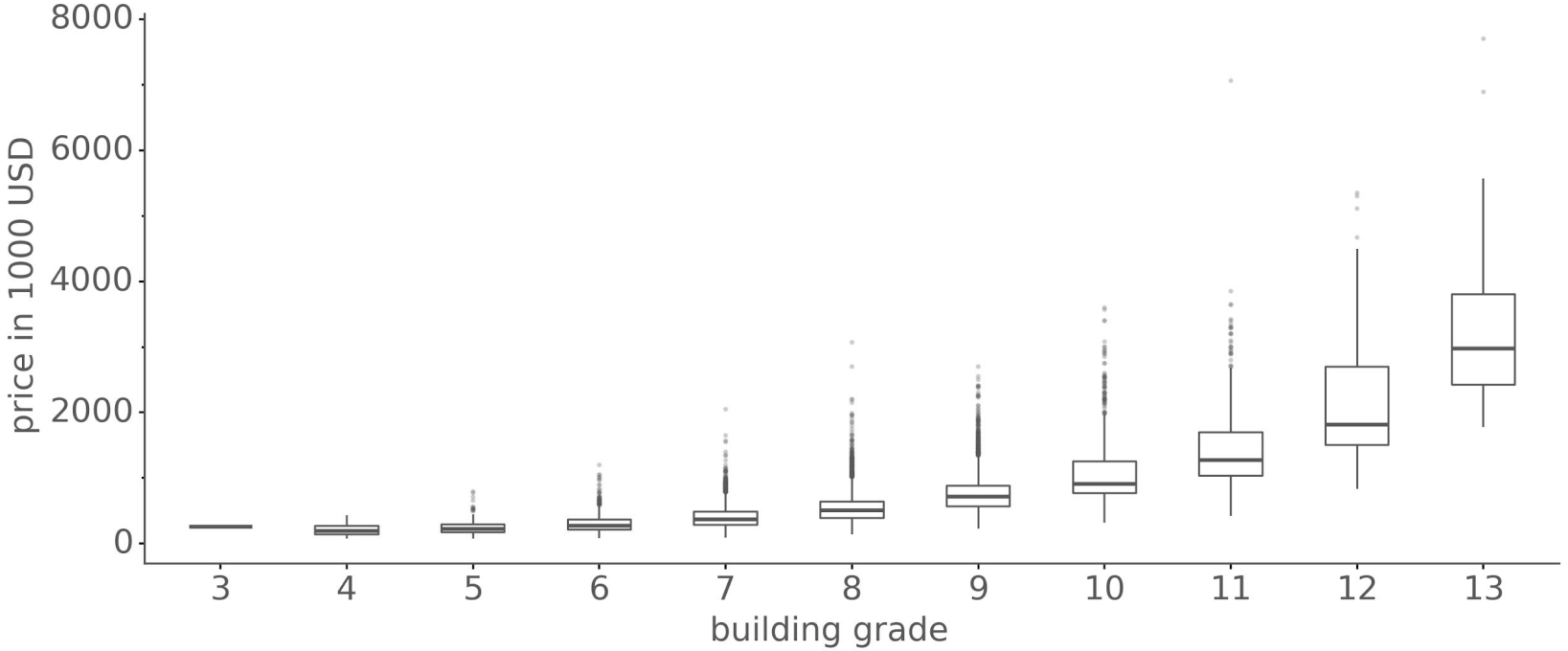

source: https://www.zipdatamaps.com/economics/income/agi/state/wealthiest-zipcodes-in-washington

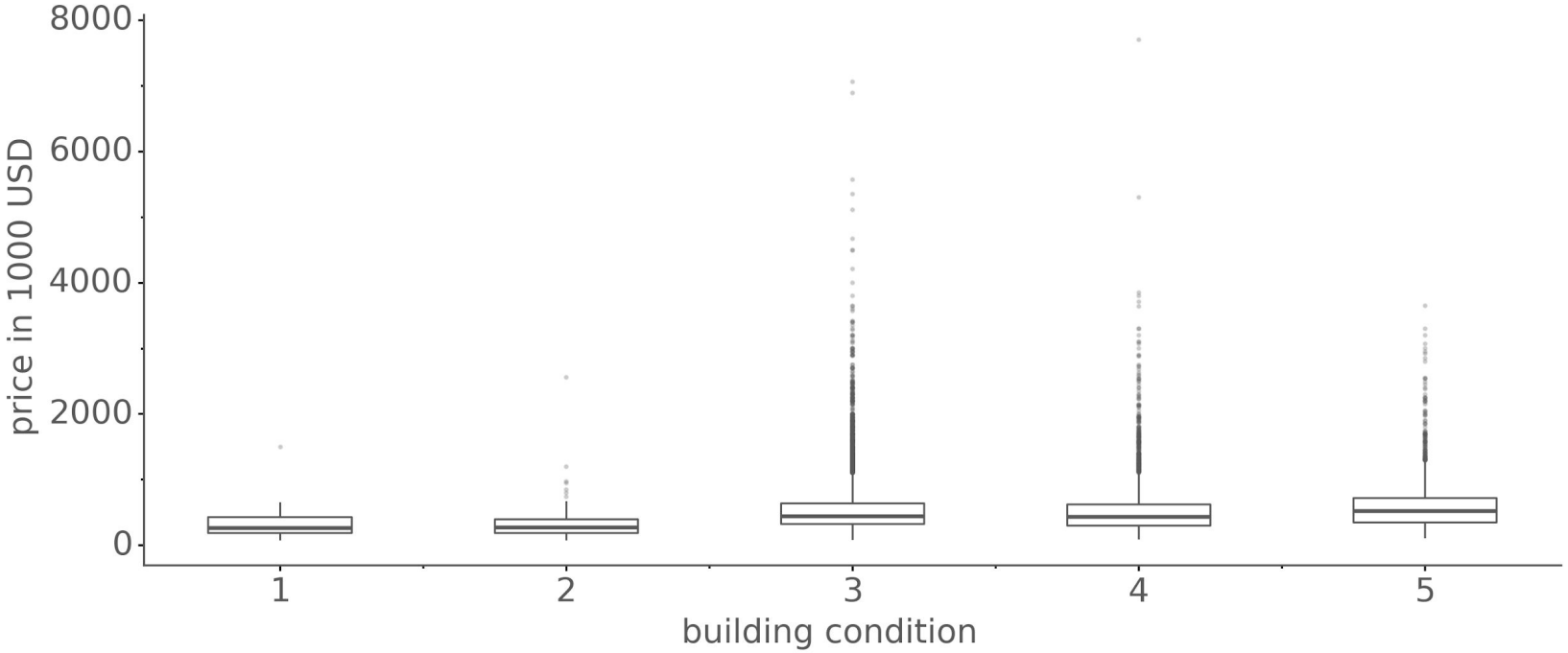
# zipcode anomalies

The four zipcodes with the most expensive houses all border Lake Washington.

They are also the four wealthiest zipcodes in the state of Washington.

# How to increase asset value



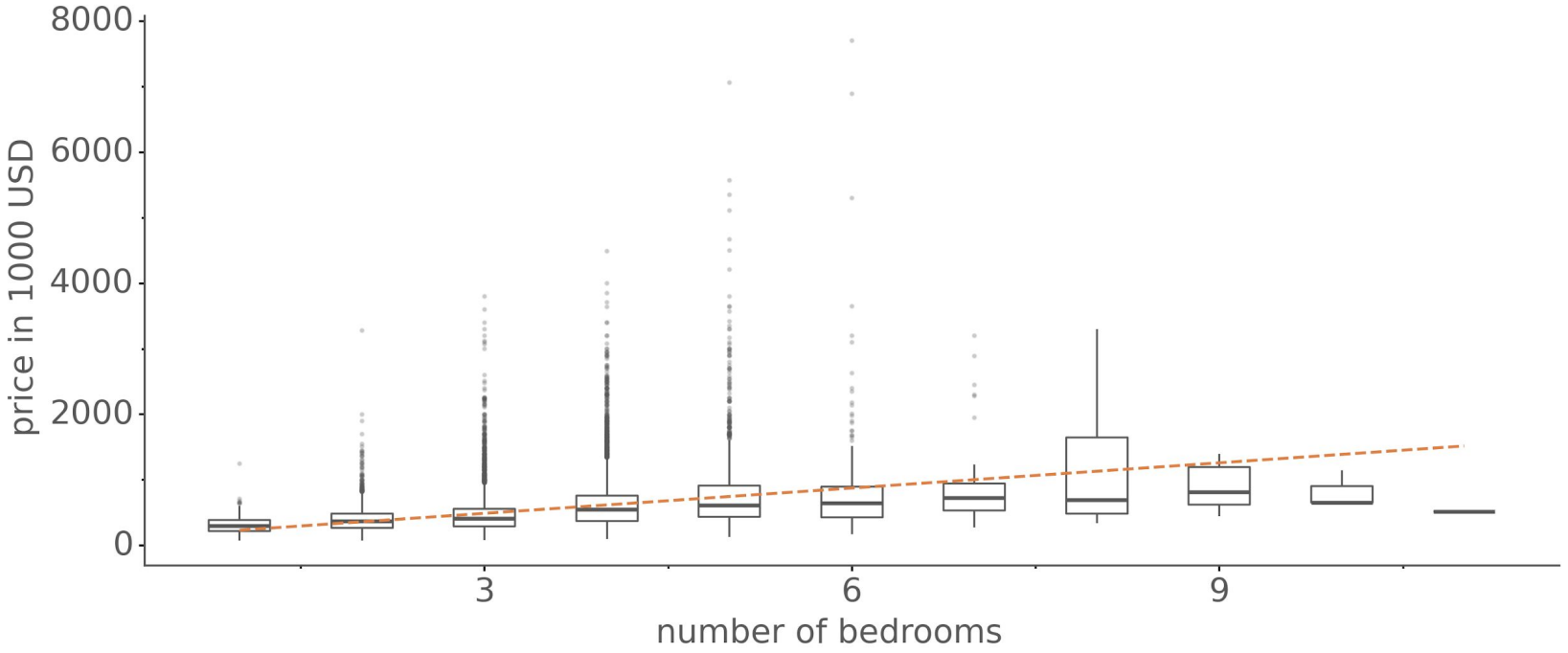



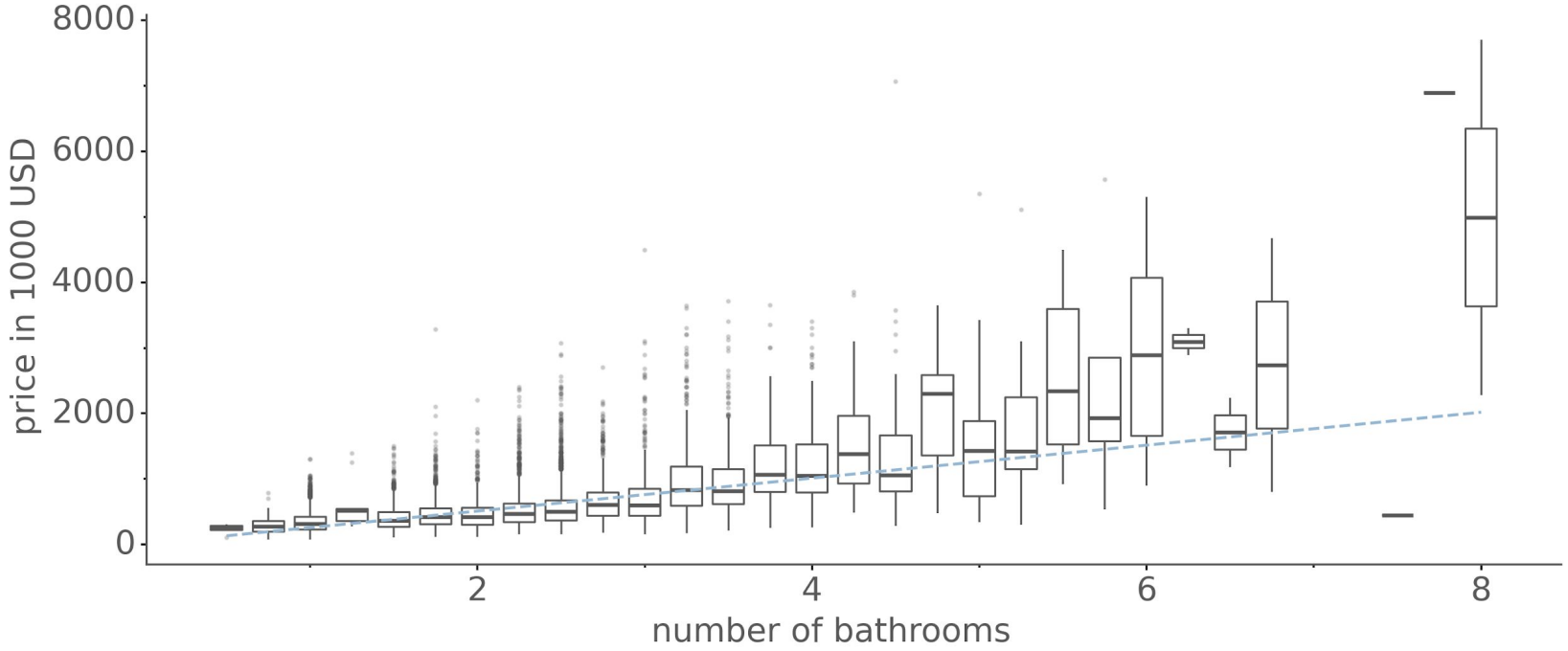

# grade versus condition

Identifying houses whose grade can be improved is of utmost importance.

Condition is relative to grade and age, but not relevant for price.

Buying the highest possible condition is advisable, actively improving the condition is not.




# bathrooms versus bedrooms

The addition of a singular bathroom is preferable to the addition of a singular bedroom.

This trend is magnified in bigger houses with the most rooms..

Correlation does not necessarily imply causation.

# Modeling of House prices

price per square feet

as a function of 18 explanatory variables.

| | | | |
|---|---|---|---|
| **Dep. Variable:** | price_sqft | **R-squared:** | 0.729 |
| **Model:** | OLS | **Adj. R-squared:** | 0.726 |
| **Method:** | Least Squares | **F-statistic:** | 188.3 |
| **Date:** | Fri, 18 Sep 2020 | **Prob (F-statistic):** | 0.00 |
| **Time:** | 06:58:04 | **Log-Likelihood:** | -92586. |
| **No. Observations:** | 16935 | **AIC:** | 1.857e+05 |
| **Df Residuals:** | 16695 | **BIC:** | 1.875e+05 |
| **Df Model:** | 239 | | |
| **Covariance Type:** | nonrobust | | |

MAPE of 15.23 % for independent test set.

## model 1
## the best MAPE

A model to predict the price/sqft of houses was formulated.

It can serve as a guideline for evaluating offers and getting used to this new market environment.

The model predicts house prices with a mean absolute percentage error (MAPE) of 15.23 %.

price per square feet

- ~ number of bathrooms
- + house grade
- + zipcode
- + waterfront view
- + ratio of own living space and living space of 15 nearest neighbors

Only five explanatory variables.

MAPE of 16.41 % for independent test set.

## model 2
## a more sensible approach

Adding more predictors may lead to shortcomings of the model when faced with new data.

A more robust model was proposed, choosing only the five most important predictors while still maintaining an acceptable MAPE of 16.41 %.

Thank you for your attention