

# PREDICTING HOME VALUES

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Jamaal Smith

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- Importance of Home Values in the United States
- Key Predictor Variables
- Discussion of Regression Outputs/Recommendations
- Proposed After-Work

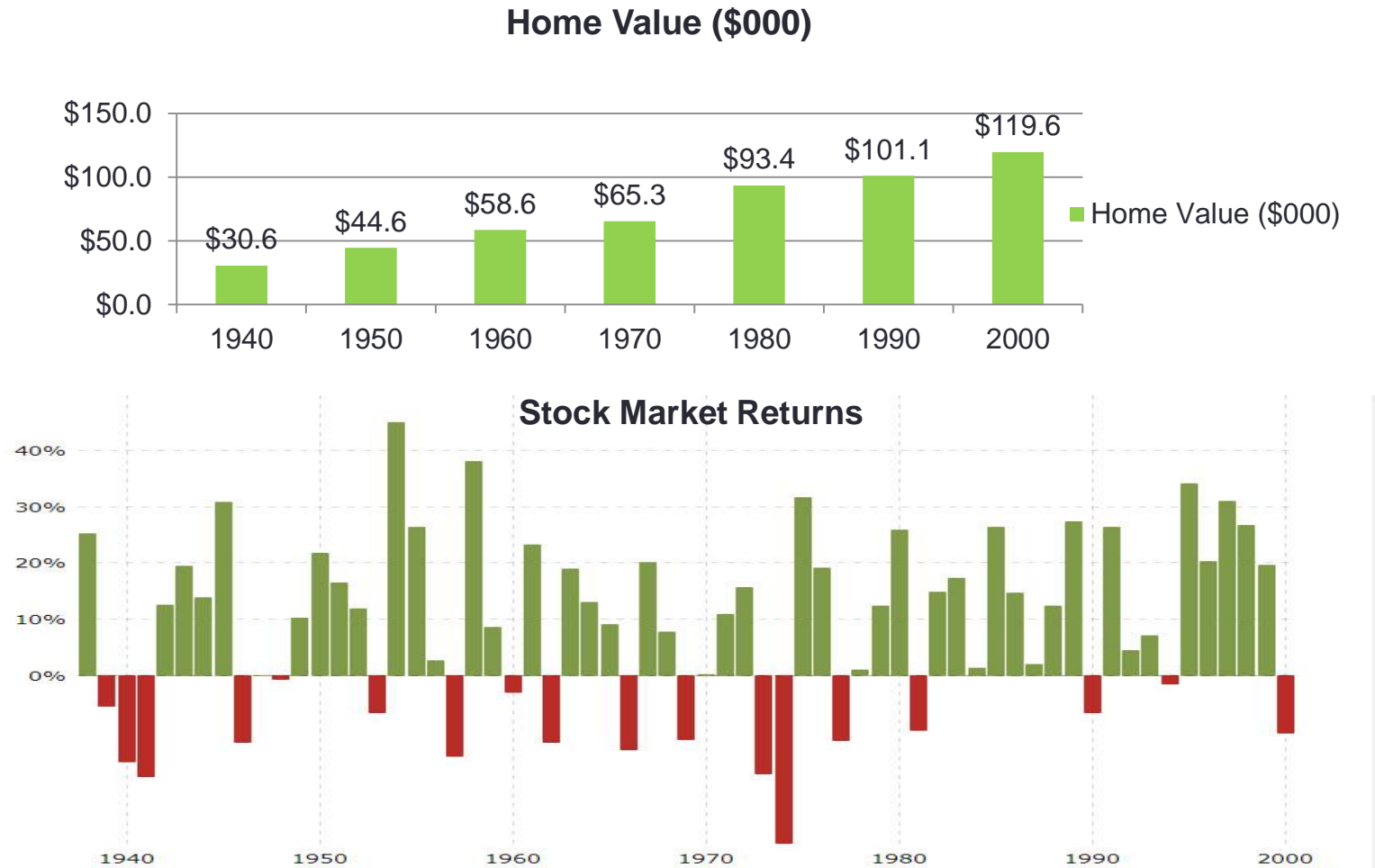
# Executive Summary

- Houses represent the largest asset that most Americans will purchase in their lifetimes and is often the key driver of a family's net worth.
- Objective measures of predicting home values has multiple applications in the real-world.
- This analysis can help communities better understand whether other drivers such as proximity to employment drive the appreciation of home prices more than a house's intrinsic features such as number of bedrooms

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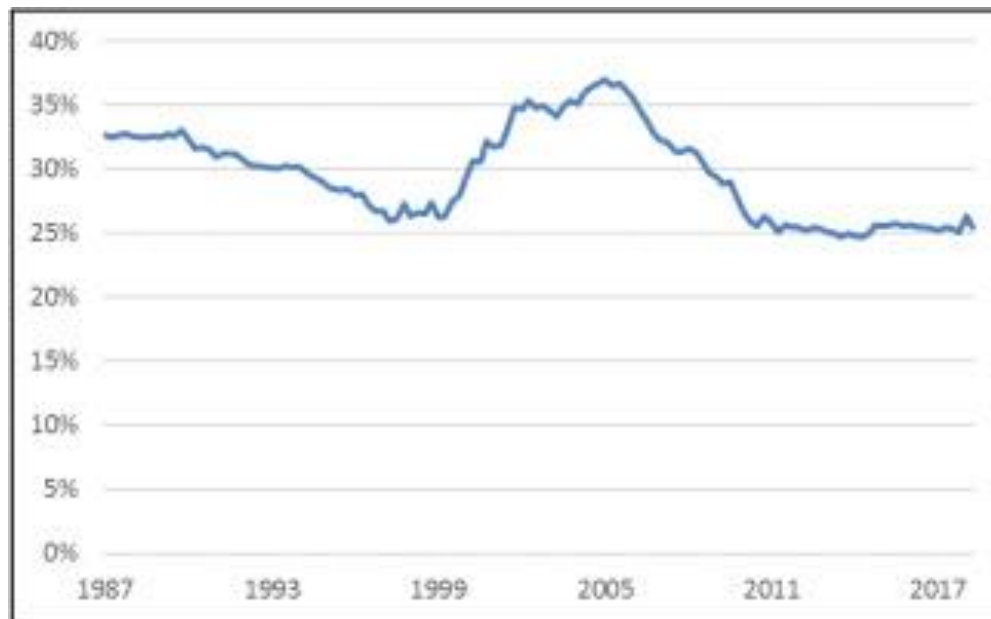
# Home Values Versus Stock Market Returns



# Housing Values Key To US Economy

- A house is often the only major asset American families acquire and drives their net worth.

% of American Household Wealth in Home



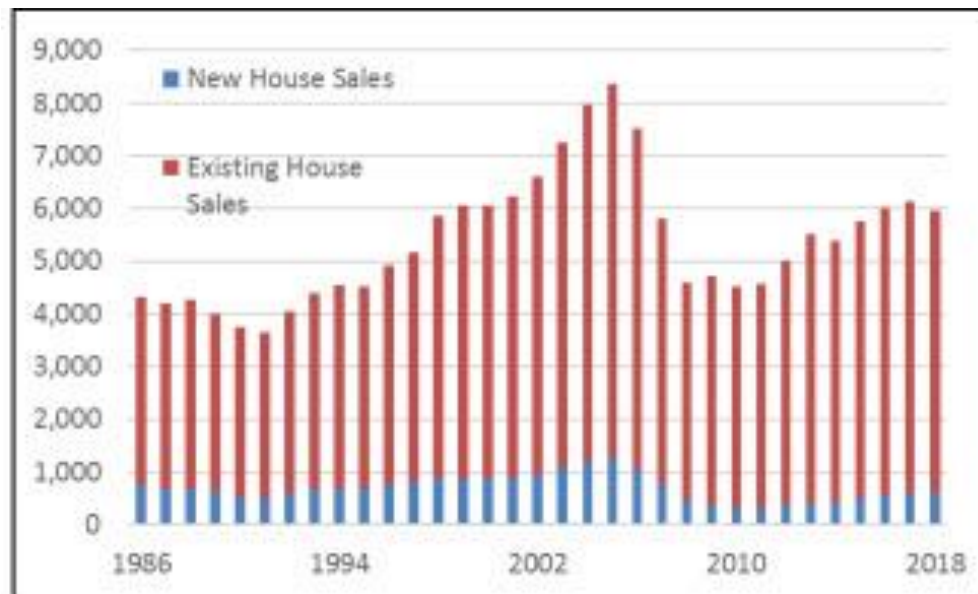
# Declines in Housing Prices Often Coincide with Economic Decline

- In recent history, steep declines in home values have resulted in economic hardship in the United States



# Sales of Existing Homes Represent Majority of Housing Sales

- With existing homes representing the majority of housing sales, it is important to develop objective manners to predict the sale price of existing homes





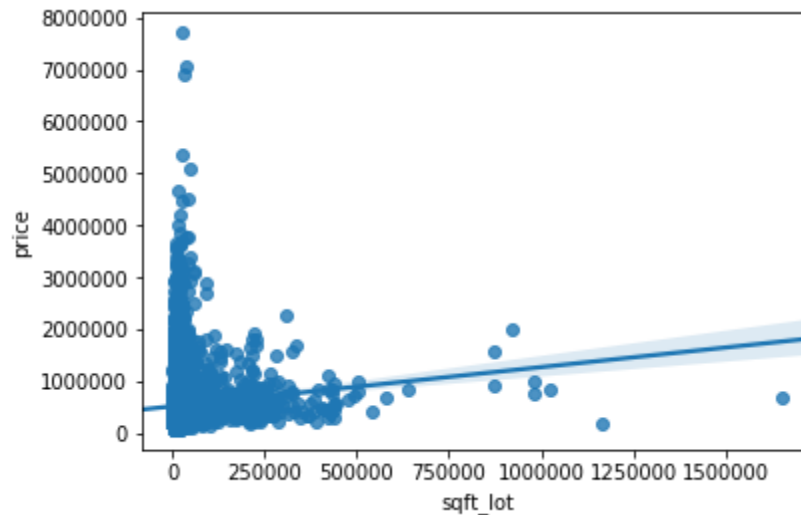
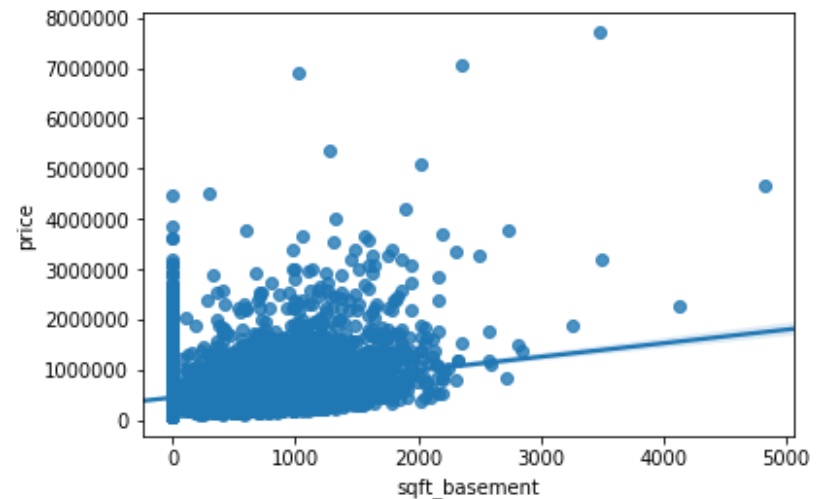
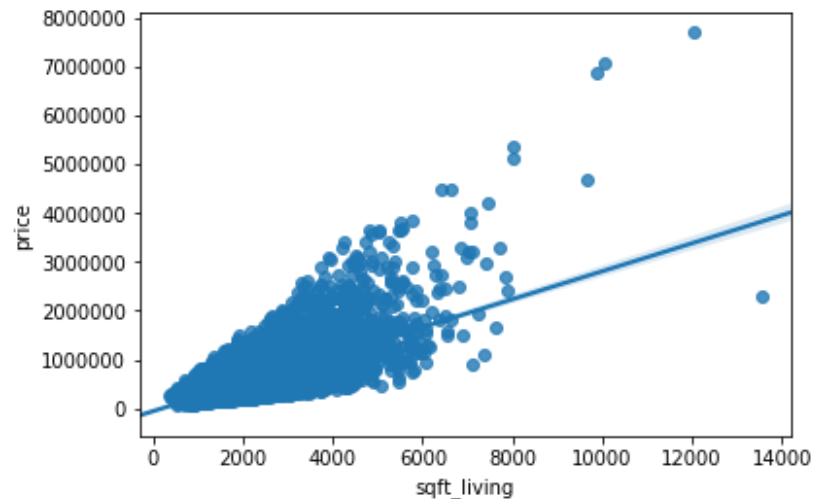
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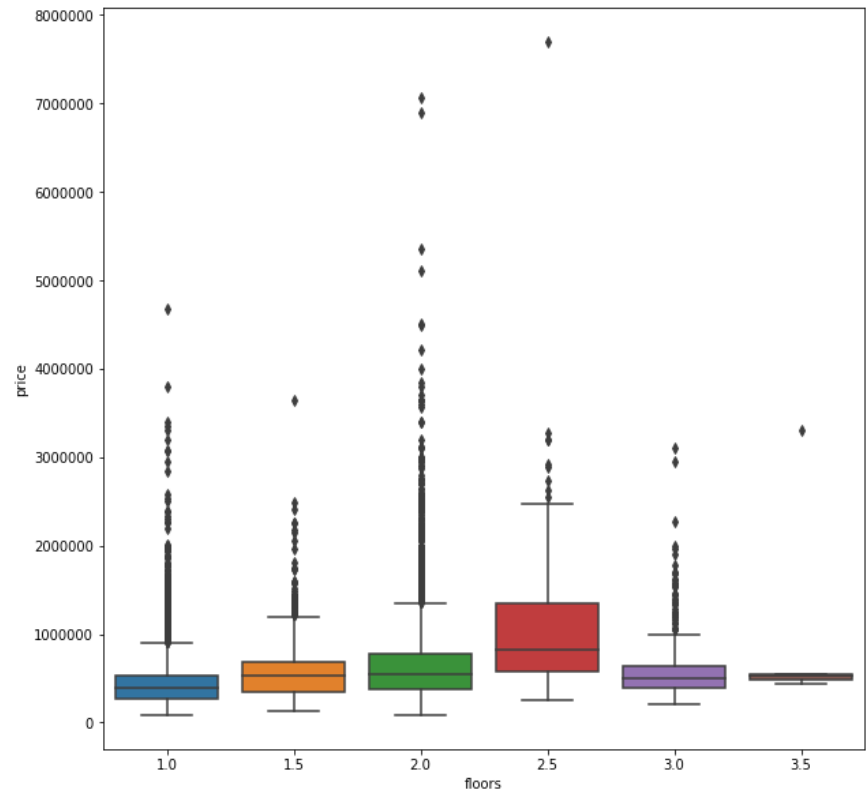
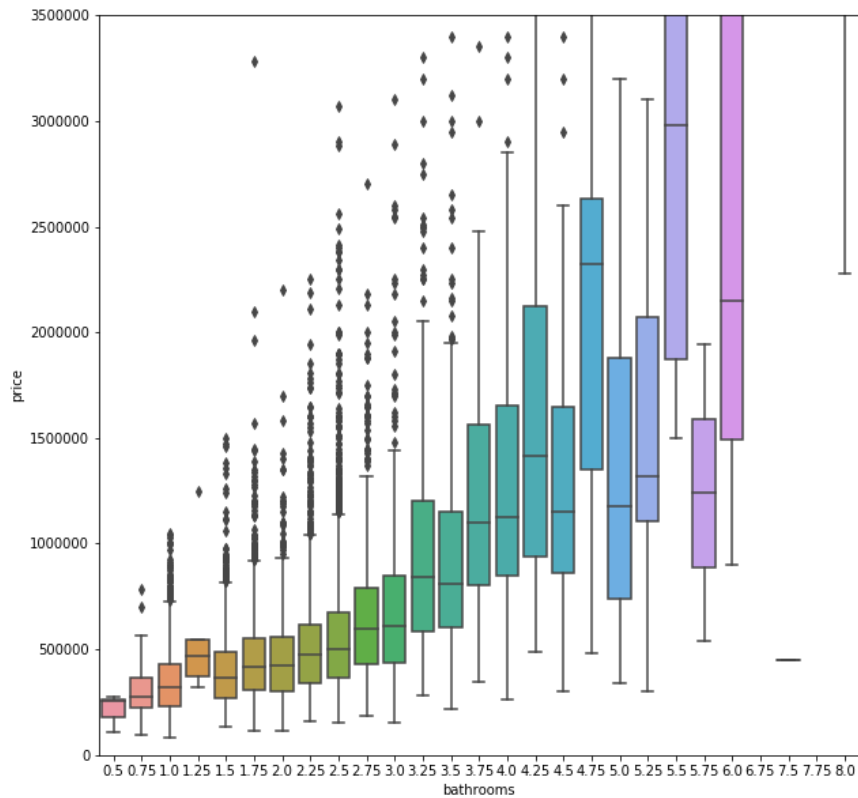
# Basic Data Set Details

- Data Set analyzed contained sales price and housing characteristics of homes sold in the Seattle area between May 2014 and May 2015.
- Each house sold had roughly 20 data points that are represented as columns in the spreadsheet
  - For this analysis, the column headers are the predictor variables that can possibly be included in the regression model
- The relationship between a home's sale price and a specific characteristic is important to consider when determining whether or not to include a predictor variable

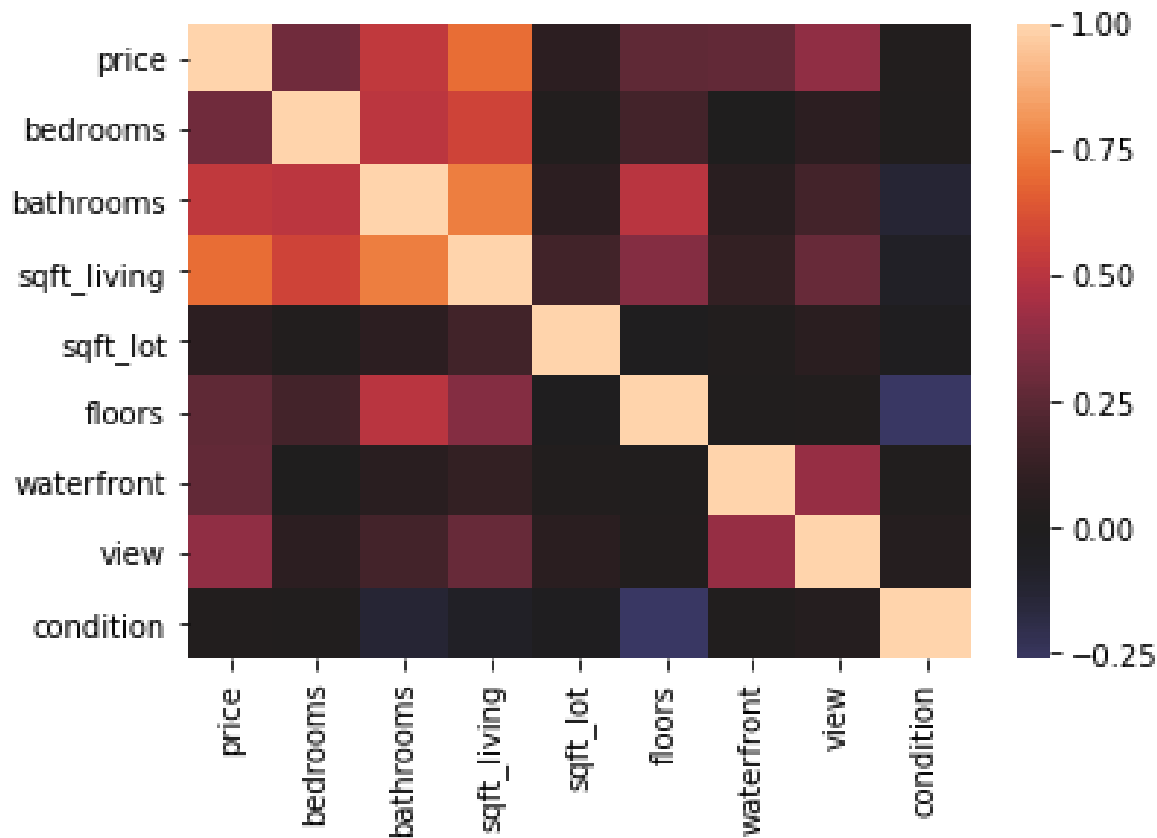
# Predictor Variable Relationship Type



# Predictor Variable Relationship To Price



# Multicollinearity treatment



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# Rating the Model

## OLS Regression Results

Dep. Variable:	price	R-squared:	0.771
Model:	OLS	Adj. R-squared:	0.770
Method:	Least Squares	F-statistic:	3451.
Date: *	Tue, 19 Nov 2019	Prob (F-statistic):	0.00
Time:	00:15:27	Log-Likelihood:	-640.33
No. Observations:	15429	AIC:	1313.
Df Residuals:	15413	BIC:	1435.
Df Model:	15		
Covariance Type:	nonrobust		

- Our linear regression model can predict the sale price of a home in Kings County with 77% accuracy.
- The results of this regression are statistically significant as the probability of the F-statistic is below 5%.
- With additional measures, the model can be improved to be more accurate and take into consideration the location of a home

# Model-based Recommendations

- The major recommendation from this model is that the following variables have the most impact on a house's sale price. A homeowner or housing organization will want to invest in the quality of building materials (grade), add livable space to a unit (sqft\_living) and find houses or plots of land that are near the water (waterfront).
- The amount of square feet in a home and its location relative to the waterfront are difficult to control for and might be harder to change. Thus, something that all homeowners or potential investors can take away from this model is that purchasing building materials of the highest quality will result in the largest home value growth. This conclusion is reached by examining the coefficients in the final model.



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# Possible After-work

- If allowed to continue this exercise, the following areas of exploration would be worthwhile:
  - Addition of variable that takes into consideration neighborhood features and how that can influence a house's sale price. This data collection could be done by region of the city and houses can be assigned a quantity, like the condition variable, that measures the amount of grocery stores, medical facilities and other amenities that attract individuals to a neighborhood.
    - This neighborhood feature variable will be valuable for nonprofit organizations that study differences in home values seen in cities and also inform lending decisions made by banks.
- Another area or study could involve the f

# Thank You

- This presentation would not have been possible without the passionate individuals in the Flatiron School's admission team. In particular, Laurie Bludman helped me see my potential when I was full of doubt. Also, Curtis Richardson was always attentive to all my questions.
- I would also like to express gratitude to my middle school math teachers that stressed the ability to express your conclusions in written form. Although that Econometrics class in college made me skeptical of statistical analysis, the ability to relate findings to bigger concepts is something that will be relied on heavily going forward.