King County Development Project

Presented by:

Song Ying Ho

Real Estate Analyst

SCOPE OF ANALYSIS

- WHAT ARE THE 5 MOST INFLUENTIAL VARIABLE CONTRIBUTING TO THE PRICE OF A PROPERTY ?

- COST BENEFIT ANALYSIS OF GRADE & PRICE OF A PROPERTY

- WOULD IT BE A BETTER INVESTMENT TO PURCHASE AND RENOVATE OLD PROPERTIES OR DEVELOP A NEW RESIDENTIAL AREA IN KING COUNTY ?

5 MOST INFLUENTIAL FEATURES

How did we pick the 5 most influential features ?

- *Based on the data, a correlation matrix was used to compare correlation between each feature.*
- *The following are the 5 most influential features:*
  - **Sqft living [0.7]** – *A combination of sqft basement and sqft above*
  - **Grade [0.67]** – *Measures the quality of the house, ranking from 1 to 13*
  - **Sqft above [0.61]** – *sqft of house excluding the basement*
  - **Sqft living 15 [0.59]** – *sqft living of the 15 nearest neighbors*
  - **Bathrooms [0.53]** – *Number of bathrooms*

Linearity of Top 5 Variables against Price

Price vs Sqft living
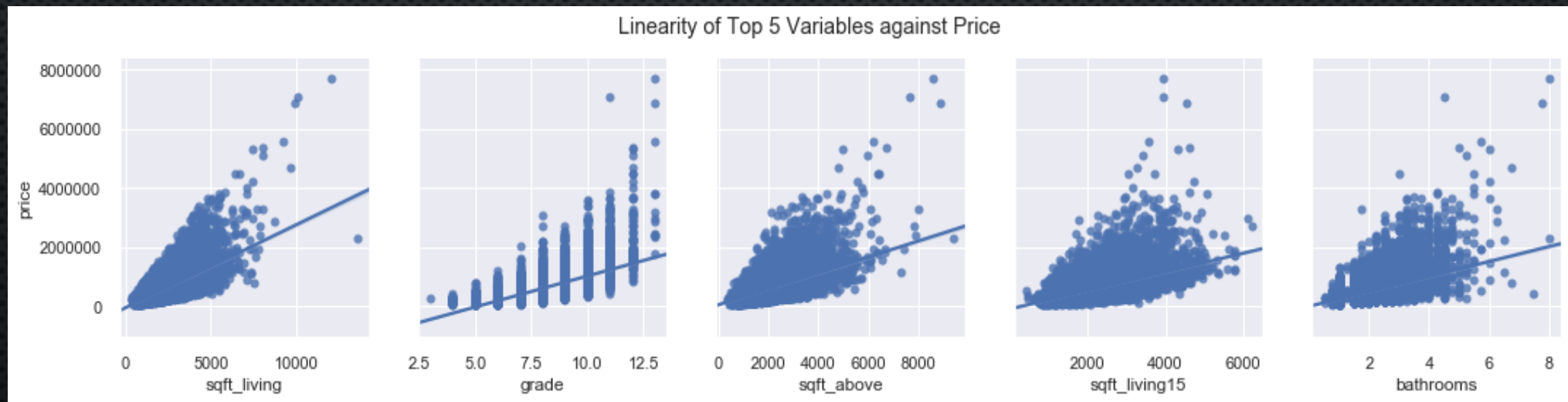
KEY FINDINGS
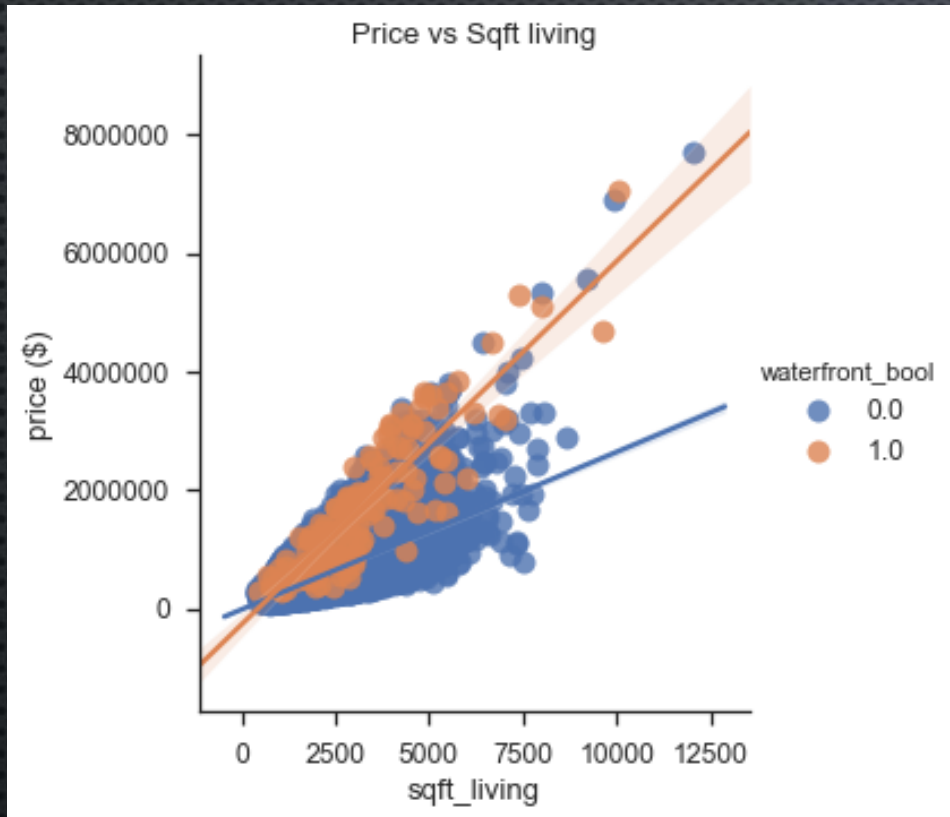
- *THE MODEL HAS A R-SQUARED VALUE OF 0.6*
- *THE MODEL USES 10 VARIABLE FOR PREDICTION*
  - *WATERFRONT IS THE FEATURE WITH HIGHEST COEFFICIENT AT 569,700*
  - *ON AVERAGE, HAVING A WATERFRONT VIEW INSTANTLY ADDS A $569,700 PREMIUM ON THE PROPERTY*

COST BENEFIT ANALYSIS: GRADE VS PRICE

KEY FACTS

- PROPERTIES WITH GRADE OF 7 IS THE BEST SELLING PROPERTY GRADE WITH 8888 SALES

- AVERAGE PRICE OF GRADE 7 PROPERTIES: $ 402,020

- REAL ESTATE PRICES GAIN AN AVERAGE OF 29.88% PER GRADE FROM GRADE 4 – 7

- REAL ESTATE PRICES GAIN AN AVERAGE OF 137.17% PER GRADE FROM GRADE 7-13

Number of Transactions by Grade

Average Price By Grade
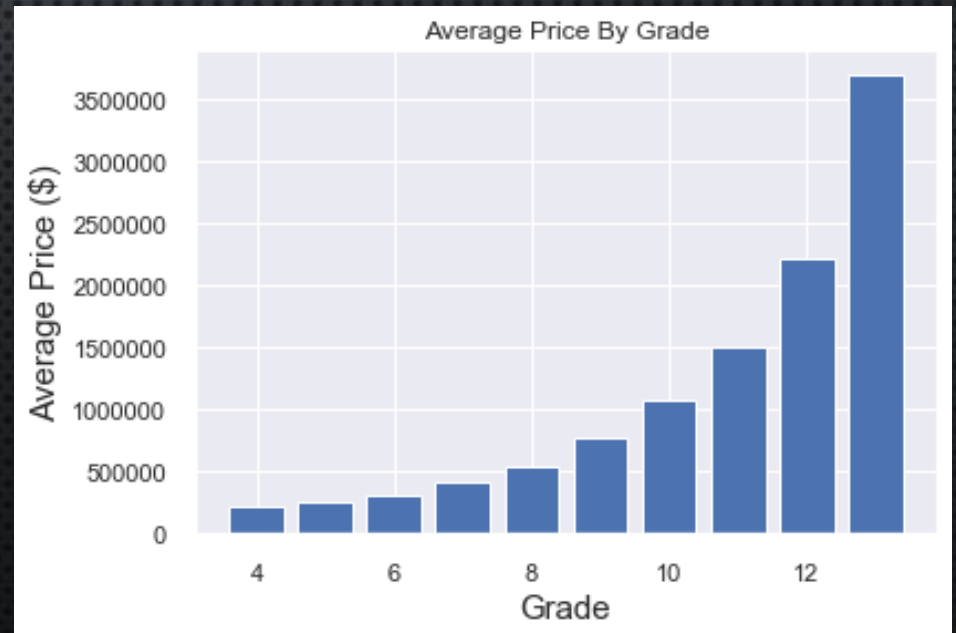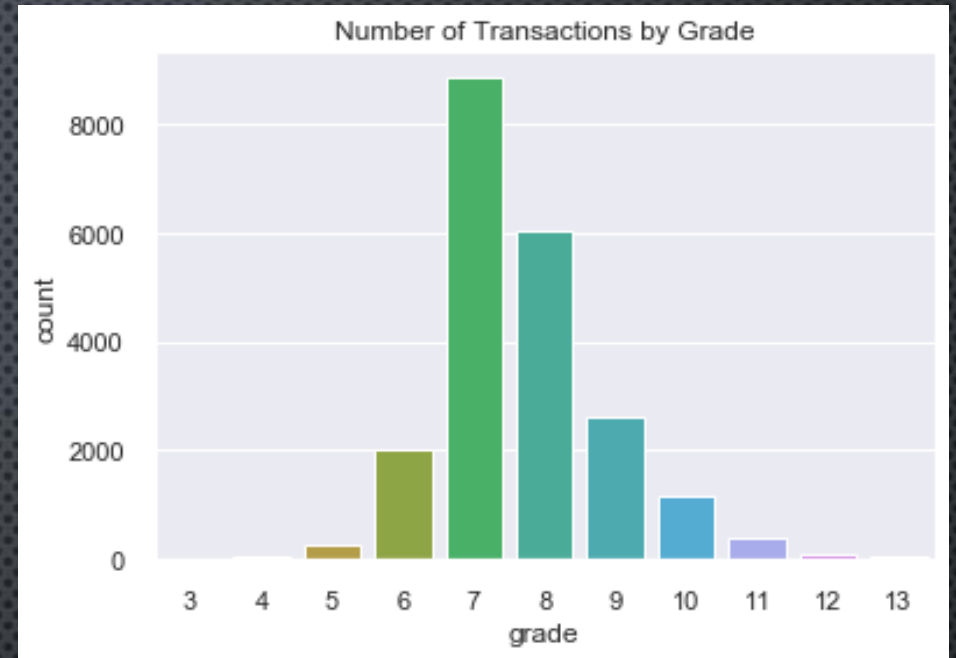
UNDERSTANDING THE TARGET MARKET
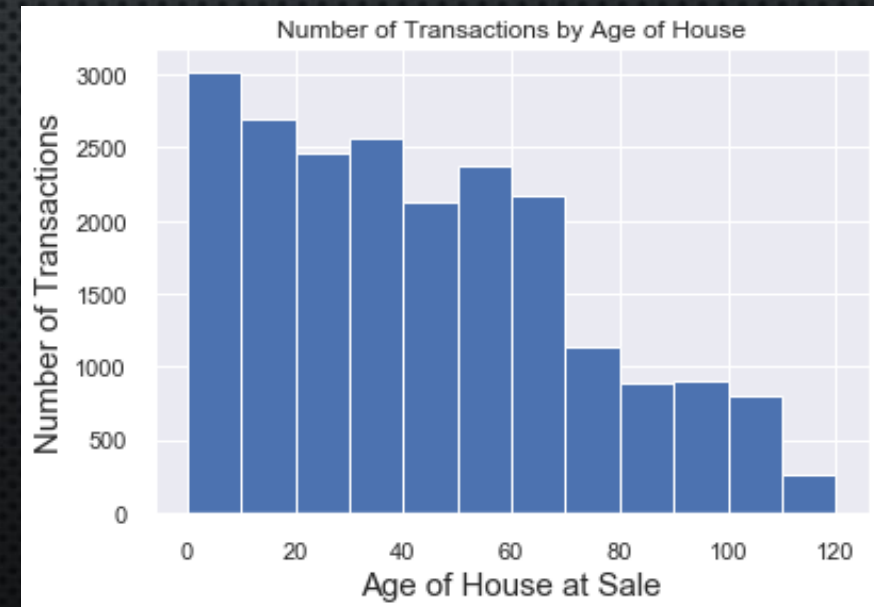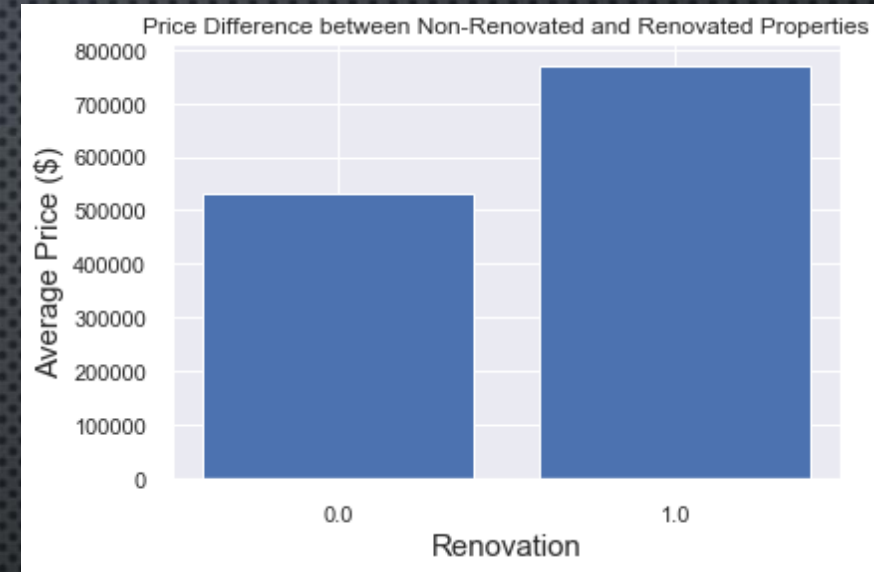
Key Insights

Most Popular Price Range

- The most popular price range in king county is an affordable $ 250,000 - $450,000

- Represents 45.21 % of the data sample

- Consists mainly of:
  - High-end grade 6
  - Grade 7
  - Very low-end grade 8

PREMIUM OF RENOVATED HOUSES

Key facts

- Average price before renovation: $ 532,490

- Average price after renovation: $ 770,595

- Premium of Renovation: $ 238,104

- Regardless of renovation, demand of a property Reduces gradually as it ages, with a sharp drop after the house had been built for more than 70 years

Price Difference between Non-Renovated and Renovated Properties

Number of Transactions by Age of House

RECOMMENDATIONS TO INVESTORS

- *We **advise against** purchasing and renovating old properties for profit as the liquidity of the asset will be low due to low demand of aged properties*

- *We **advise to** develop brand new (0 years) high value grade 7 or grade 8 properties in the price range of $350,000 to $450,000 to enjoy high capital gain and good rent prices*

- *We **advise to** acquire under-valued properties with the assistance of our multi variable linear regression model, with high consideration being placed on the following features:*

  - **Waterfront view**

  - **Square foot of Living Space**

  - **Grade**

  - **Square Foot of Living Space of 15 nearest neighbors**

- *We **advise to** evaluate value of properties with our linear regression model with caution at own risk*

FUTURE WORK & PROBLEMS

- Regression model can be improved, low value of R-squared at 0.6

- Rent prices & mortgage rates can be included for a more comprehensive analysis

- Sample data represent a small percentage of King county:
  - population at > 2.2 million

- Data can be categorized into 3 price segments to conduct detailed analysis in the following market niche:
  - Low-income budget properties
  - Middle-income average properties
  - High-income luxury properties

APPENDIX – REGRESSION MODEL

OLS Regression Results

Dep. Variable:	price	R-squared:	0.597
Model:	OLS	Adj. R-squared:	0.597
Method:	Least Squares	F-statistic:	3172.
Date:	Wed, 22 Jan 2020	Prob (F-statistic):	0.00
Time:	14:19:16	Log-Likelihood:	-2.9512e+05
No. Observations:	21417	AIC:	5.903e+05
Df Residuals:	21406	BIC:	5.903e+05
Df Model:	10		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	-2.07e+05	1.23e+04	-16.815	0.000	-2.31e+05	-1.83e+05
bedrooms	-5.637e+04	2236.295	-25.208	0.000	-6.08e+04	-5.2e+04
sqft_living	315.0027	2.773	113.584	0.000	309.567	320.439
floors	6.476e+04	3848.112	16.829	0.000	5.72e+04	7.23e+04
condition	2.274e+04	2702.435	8.416	0.000	1.74e+04	2.8e+04
sqft_basement	-22.7548	4.680	-4.862	0.000	-31.928	-13.582
sqft_lot15	-0.7363	0.060	-12.188	0.000	-0.855	-0.618
waterfront_bool	5.697e+05	2.1e+04	27.094	0.000	5.28e+05	6.11e+05
view_cleaned	6.242e+04	2399.585	26.012	0.000	5.77e+04	6.71e+04
renovated_bool	5.026e+04	9143.138	5.497	0.000	3.23e+04	6.82e+04
age_when_sold	2381.6447	69.599	34.220	0.000	2245.226	2518.063

Omnibus:	12836.204	Durbin-Watson:	1.988
Prob(Omnibus):	0.000	Jarque-Bera (JB):	444418.598
Skew:	2.319	Prob(JB):	0.00
Kurtosis:	24.829	Cond. No.	3.98e+05

Model Equation =
-2.07×10^5
$+ 5.7 \times 10^5$ WF
$+ 6.5 \times 10^4$ Floor
$+ 6.2 \times 10^4$ Views
$+ 5 \times 10^4$ Reno
$+ 2.3 \times 10^4$ Cond
$+ 2382$ Age
$+ 315$ SQ_Liv
$- 0.74$ SQ_Lot15
$- 22.76$ SQ_B
$- 5.6 \times 10^4$ Beds