

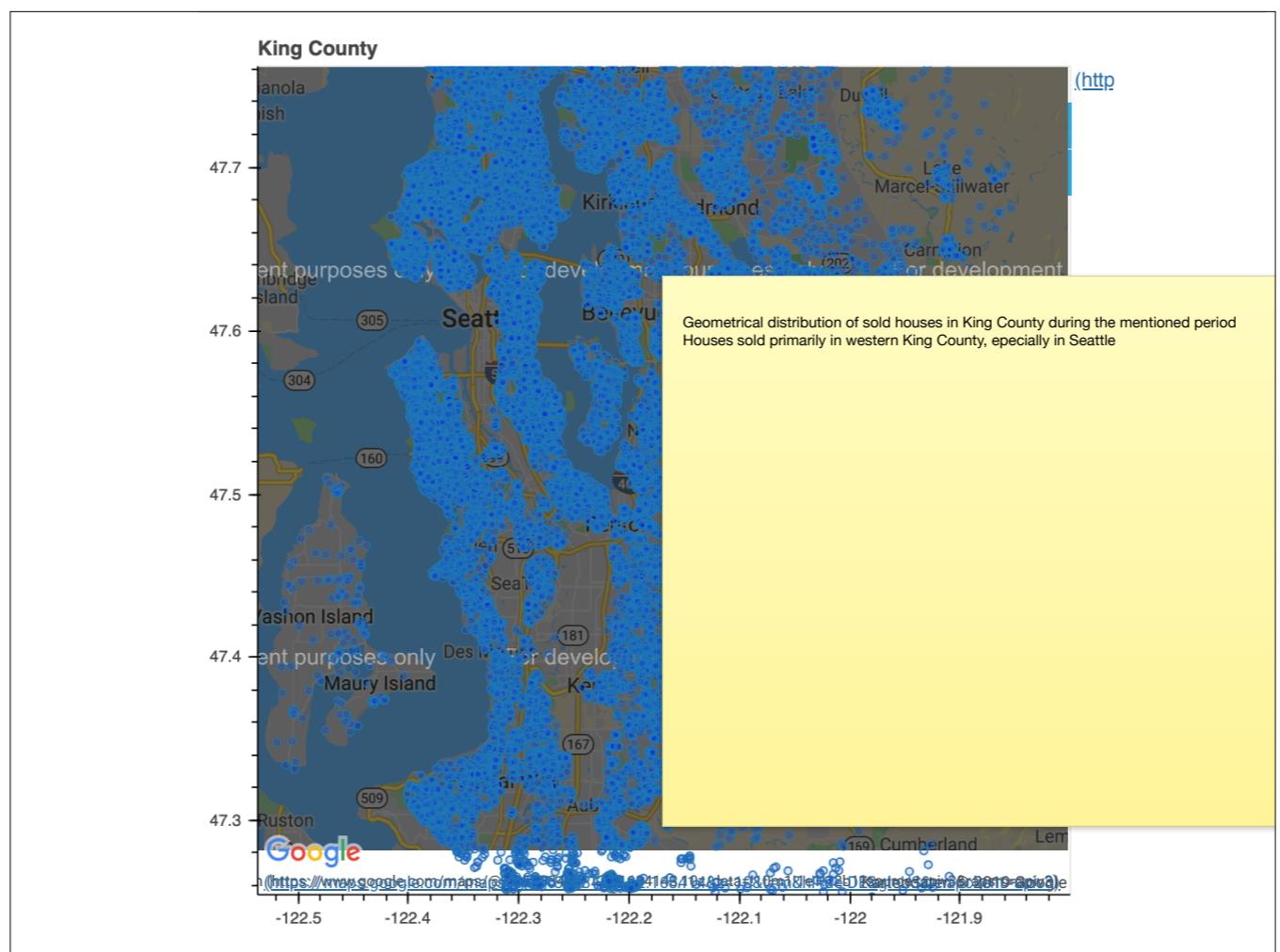
King County:
House Price Analysis 4/2014 to 4/2015

Investment Recommendations,
Perspectives and Chances

<http://www.usgarchives.net/maps/washington/wa-crams/king.jpg>

KING COUNTY

House-Price Analysis 4/2014 - 4/2015

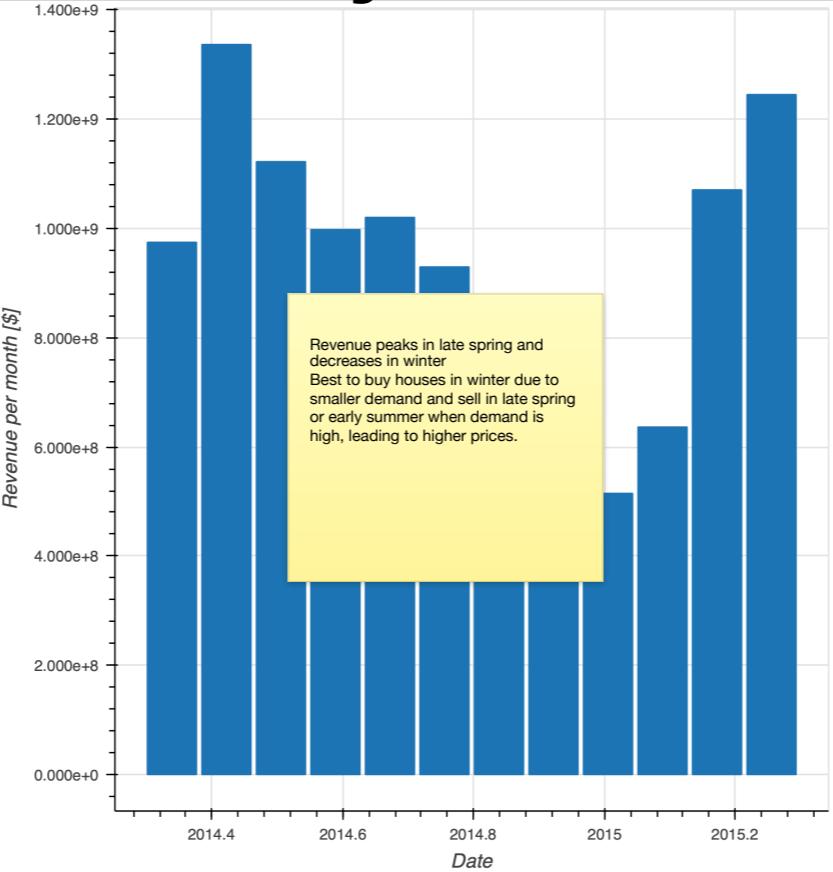


Key

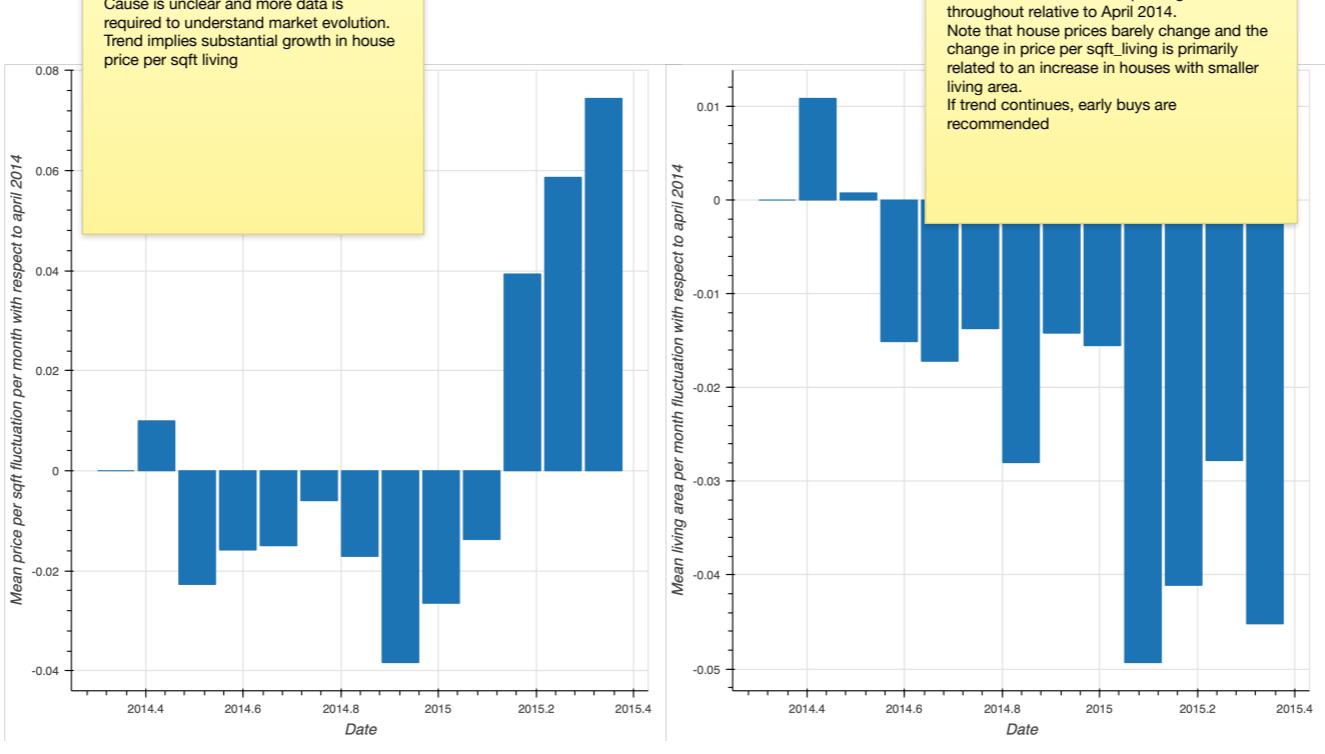
Number of house sales 21_600
Total revenue 11.7 billion \$
House price 540 \pm 367 k\$
Growth by 0.86% from April 2014 to April 2015
Price per ft²: 264 \pm 110 with strong 7.44 % growth
Living area substantially decreases by -4.5%
Age of house 42 \pm 29 years

	Mean		
House Sales	21.6k	-	-
Total Revenue	11.7 G\$	-	-
House Price	540 k\$	367 k\$	0.86 %
Price per ft²	264 \$	110 \$	7.44 %
Living area [ft²]	2080	918	-4.5 %
Age of house [yr]	42	29	-

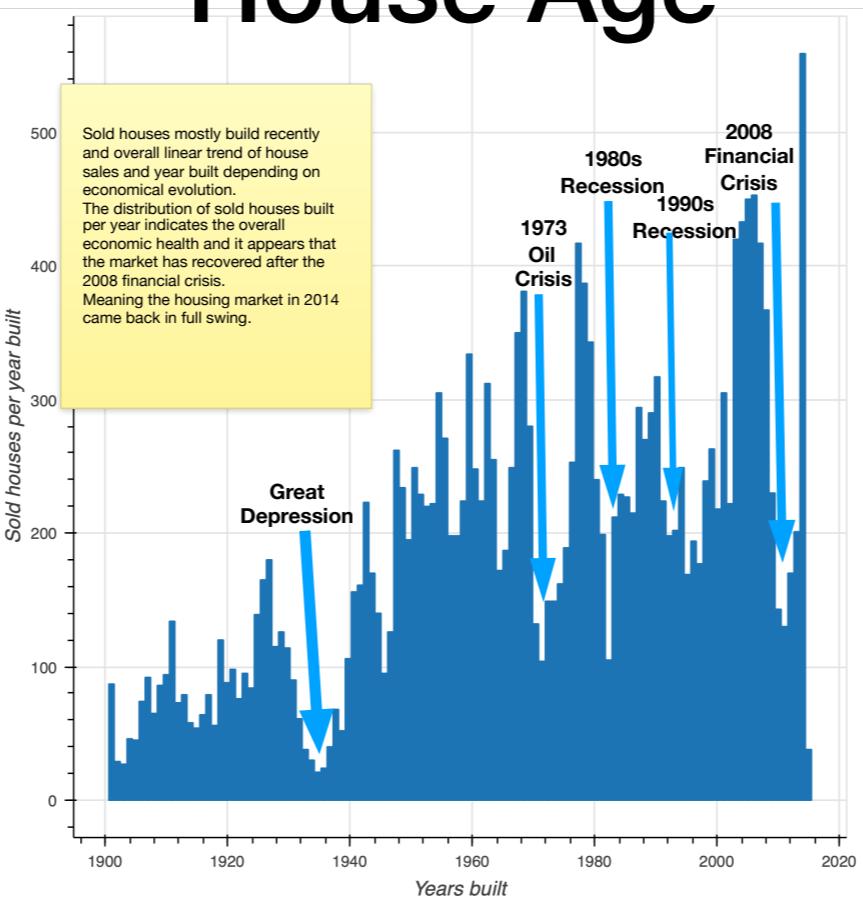
Monthly Revenue



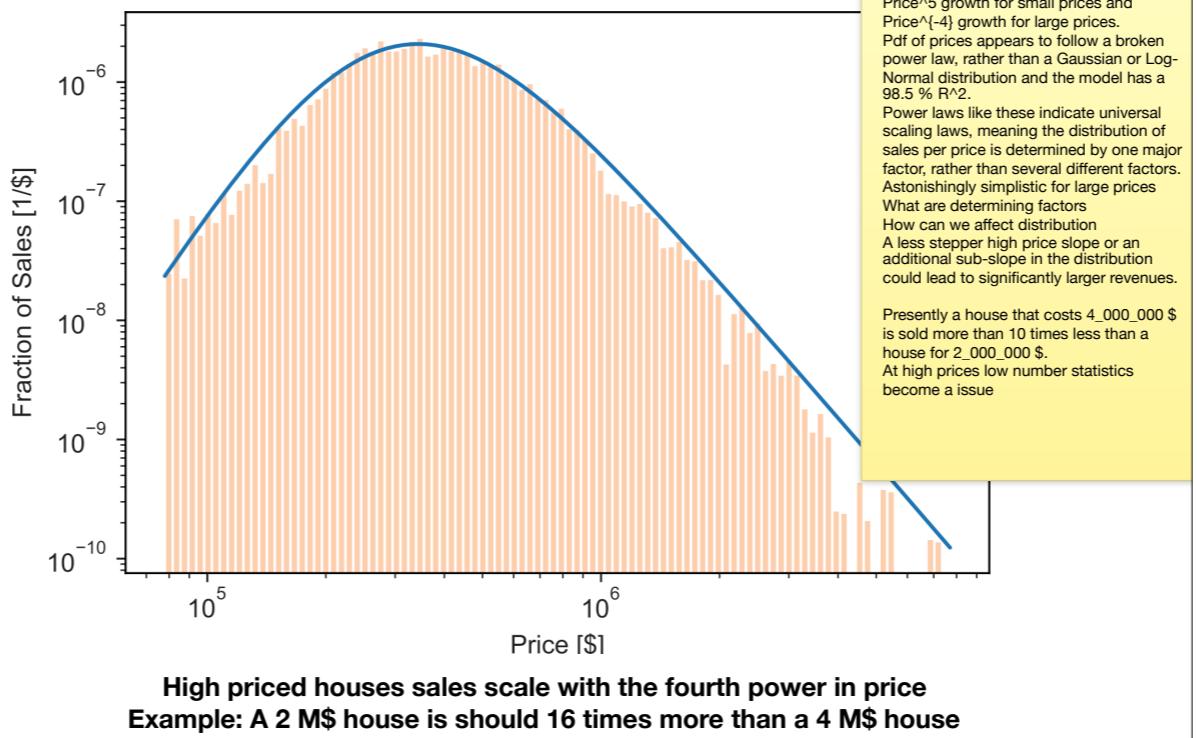
Monthly Fluctuations



House Age



Sales per Price

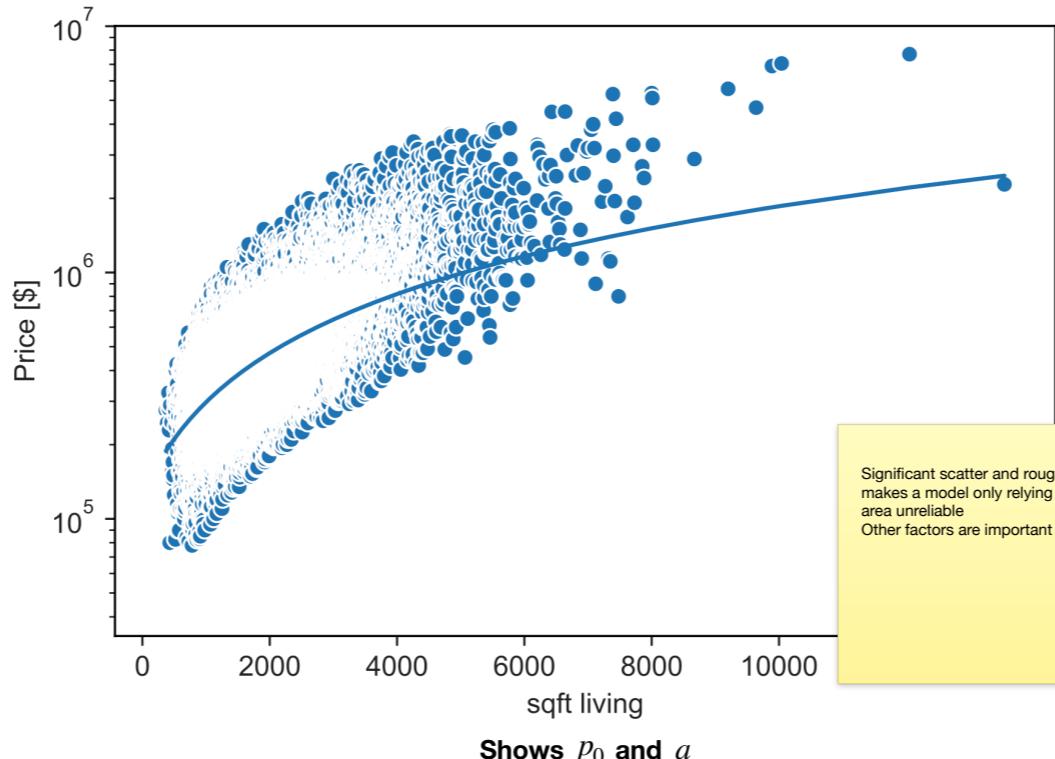


Price Model

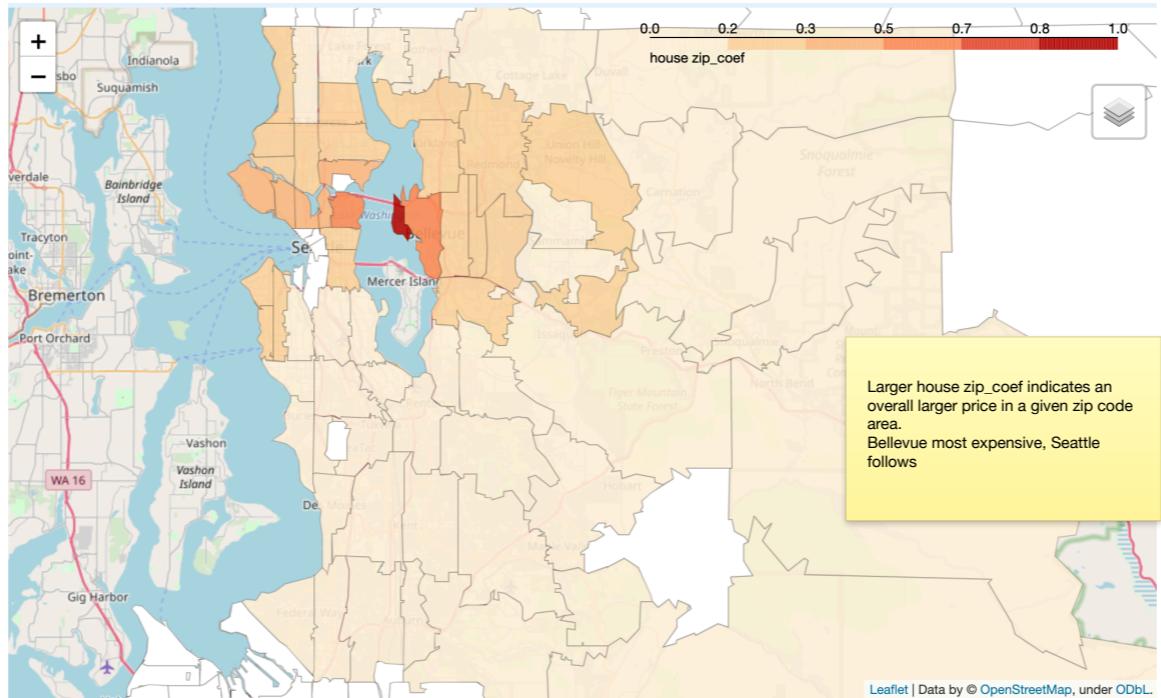
$$\text{price} \approx p_0 + a \cdot \text{sqft_living} + b \cdot \text{zipcode} + c \cdot \text{grade}$$

House price model
sqft_living
Zipcode
Grade
Are important factors
Analyze coefficients
We categorize different grades and zip
code.
This simple and minimal model estimates
the price with $R^2 = 78\%$.

Sqft Living Dependence

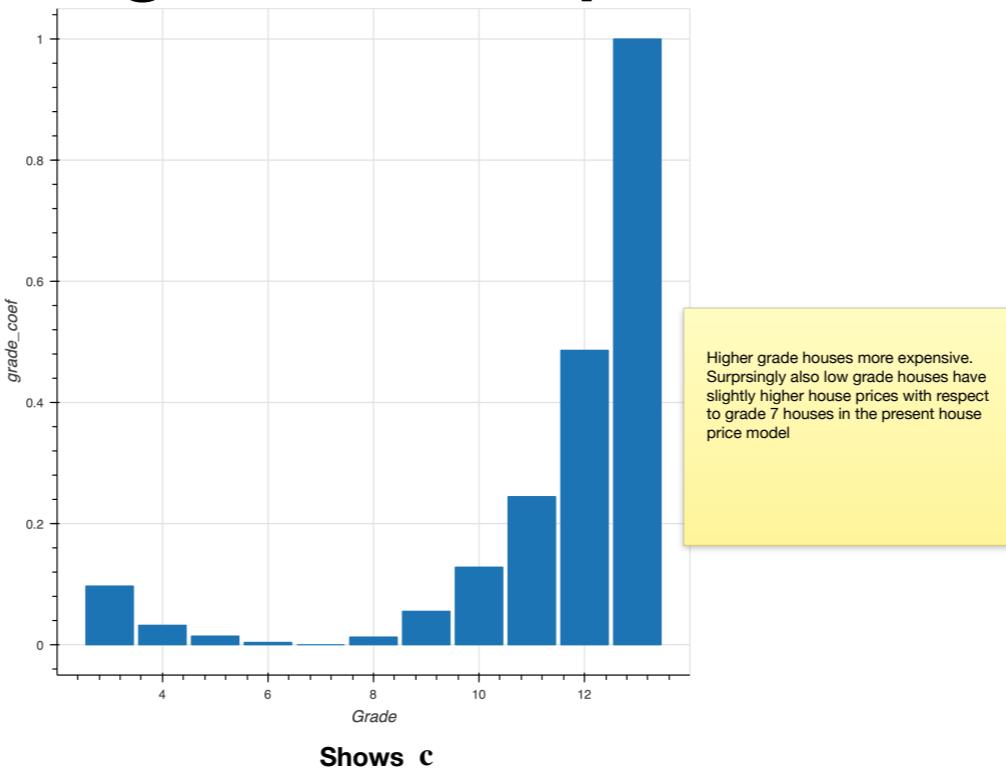


Zip Code Dependence



Shows b

Building Grade Dependence



Summary

- Monthly house sale revenue is lowest in winter and highest in late spring
- Total price per sqft living area increased since the beginning of 2015
- Avg. sqft living area per sold house decreases
- Financial crisis no longer strangles housing market

House sale revenue lower in winter and higher in late spring
Price per sqft living increased substantially in one year
And overall smaller houses have been sold.
Financial crisis impacts appear to have passed

Summary

- Sales per price follows universal scaling that dictates revenues
- House price is primarily affected by
 - Sqft living area
 - Zip code
 - King County house grading index

Universal scaling for sales per price
House price primarily driven by living
area, zip code and King County
grading index.

Recommendations

- In winter house demand lower means lower prices
 - Buy in winter, try to sell in spring
 - Price per sqft living area has risen
 - Buy now or you may only afford smaller home
 - House value may rise

Buy in winter, sell in spring
Substantial increase in price per
sqft living should lead to earlier
investment and rise in house value.

Recommendations

- Very expensive houses are rarely sold
 - focus on a portfolio that is in accordance with our distribution model to maximize sales and profits
- Do not invest in Bellevue as it is very expensive and saturated
 - Invest in south Seattle
 - Grade 7 houses (solid) are overall the cheapest category
 - Raise prices of grade 6 - 8 houses

Very expensive houses are rarely sold
Adjust house portfolio according to our distribution model
Invest outside of Bellevue as investments will already focus on more expensive area that have a rather small overall volume
Invest in south Seattle
Grade 7 houses are cheapest 3 to 10 roughly comparable.
Raise prices of grade 6 - 8 houses

Future Work

- Resolving factors that dictate sales per price scaling law
 - Analyse scaling law for different submarkets
 - Taking economical data account
 - Resolving price relation for different zip codes
 - Taking more years of data into account to predict temporal house price evolution
 - Understanding the cause or significance of fluctuations

Study scaling law dependencies
For example dependence on zip code or grade
Economical data into account, like income distribution
Price relation for different zip code areas
More data, over several years
Understanding source of fluctuations

Thanks for the Attention

Thanks to all members of the Data Science Team and especially to Florian F. and Simon.

Any Questions?

Sales per Price - Model

$$\text{pdf}(x = \text{price}) = A \frac{(x/E)^B}{(C + (x/E)^D)^4}$$

A determines height of distribution
E is a fixed scaling factor, corresponding to peak
B corresponds to small price power law
C corresponds to peak of spectrum
D is related to high price power law
The power law index 4 in the denominator sets respective high and low price scaling.
Technically also values of 3 to 5 are reasonable leading only to changes the different model parameters that lie within the standard deviation of each parameter.
Higher denominator power laws lead to a steeper scaling.

B-4D
E

Mean	Std. err.
$4.48 \cdot 10^{-6} \text{ \$}^{-1}$	$4.88 \cdot 10^{-7} \text{ \$}^{-1}$
5.22	0.26
0.31	0.034
-3.84	0.3
$5 \cdot 10^5 \text{ \$}$	-

Mean price fluctuation

