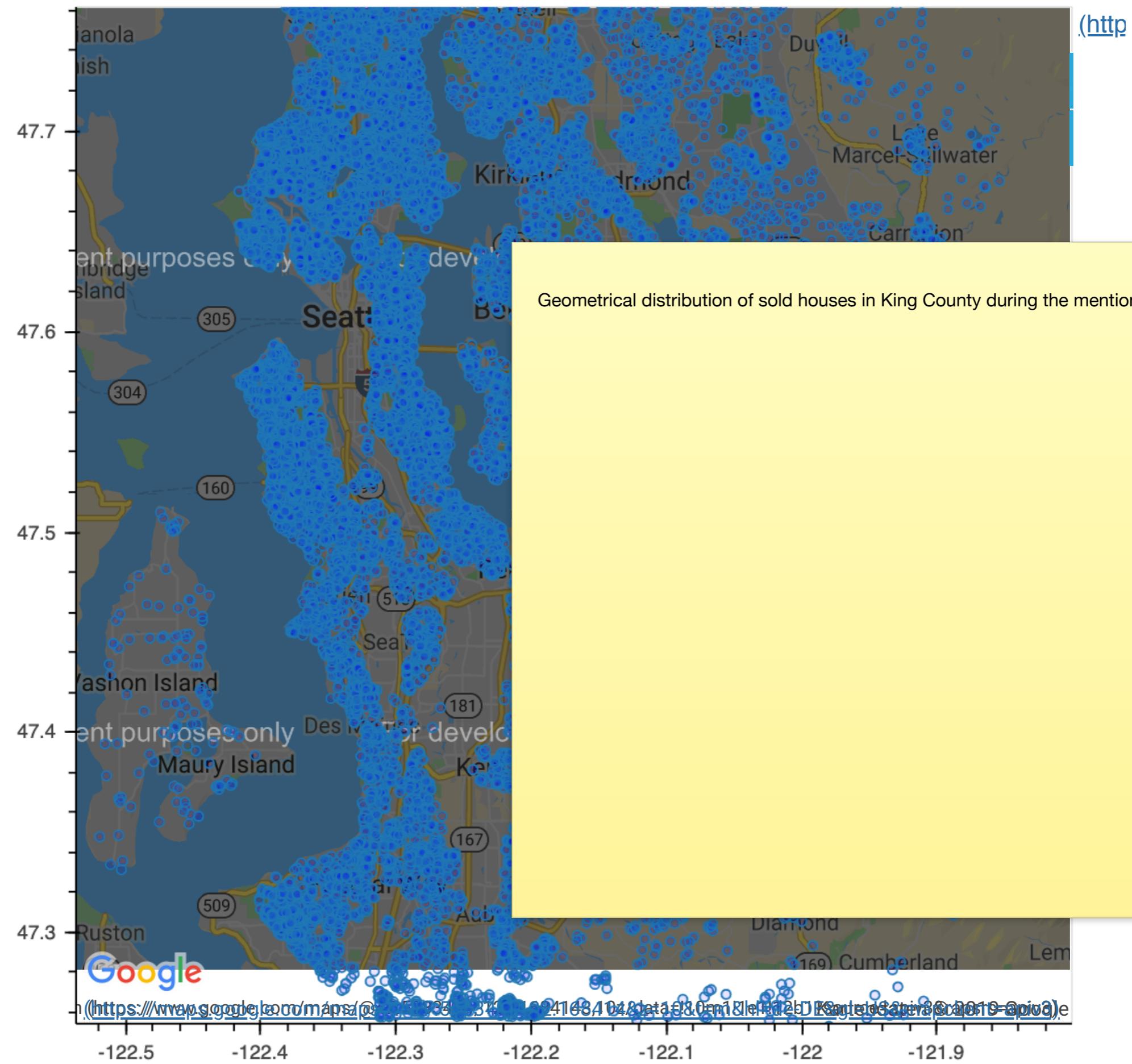


# KING COUNTY

## House-Price Analysis 4/2014 - 4/2015

## King County

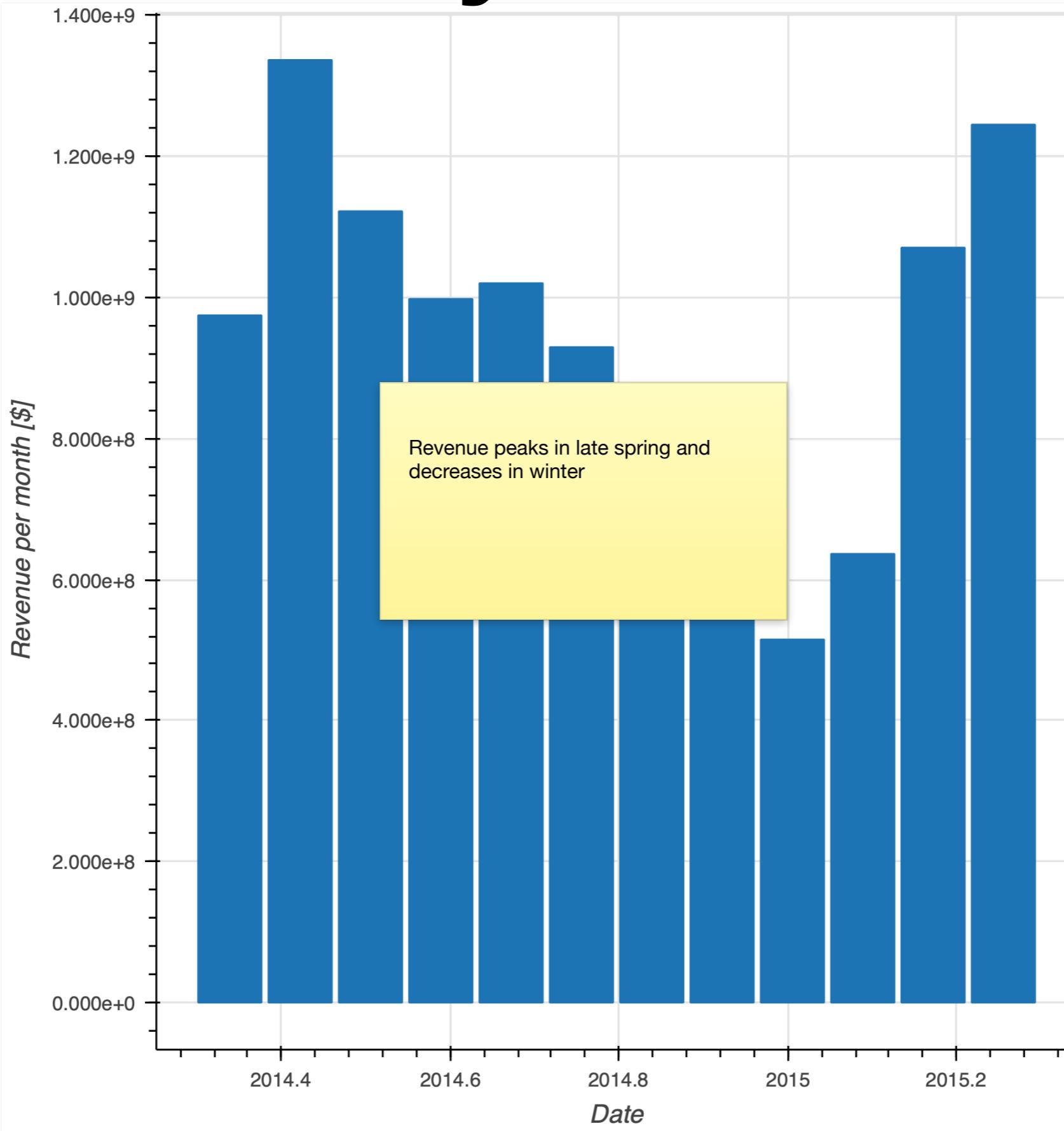


# Key

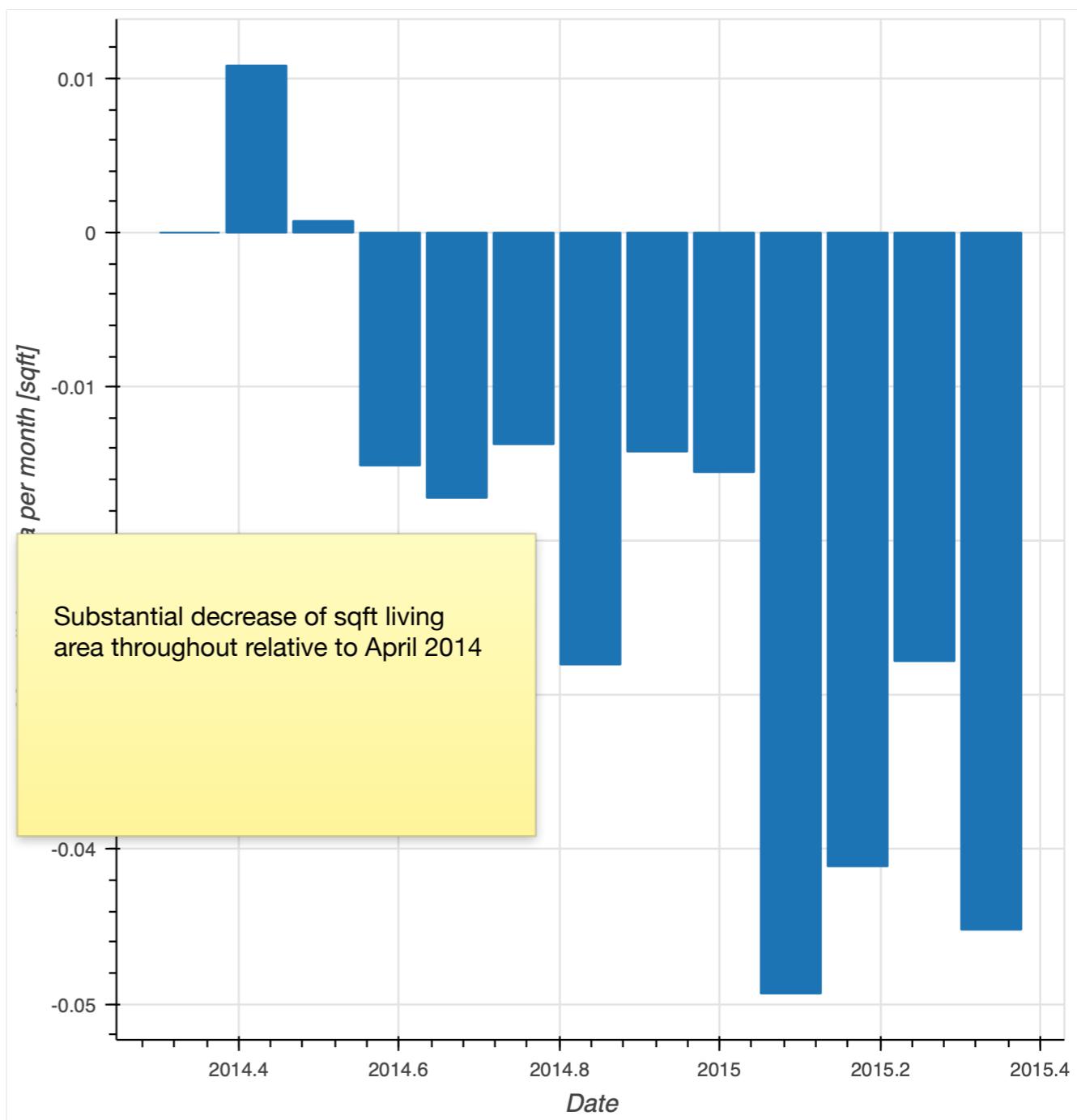
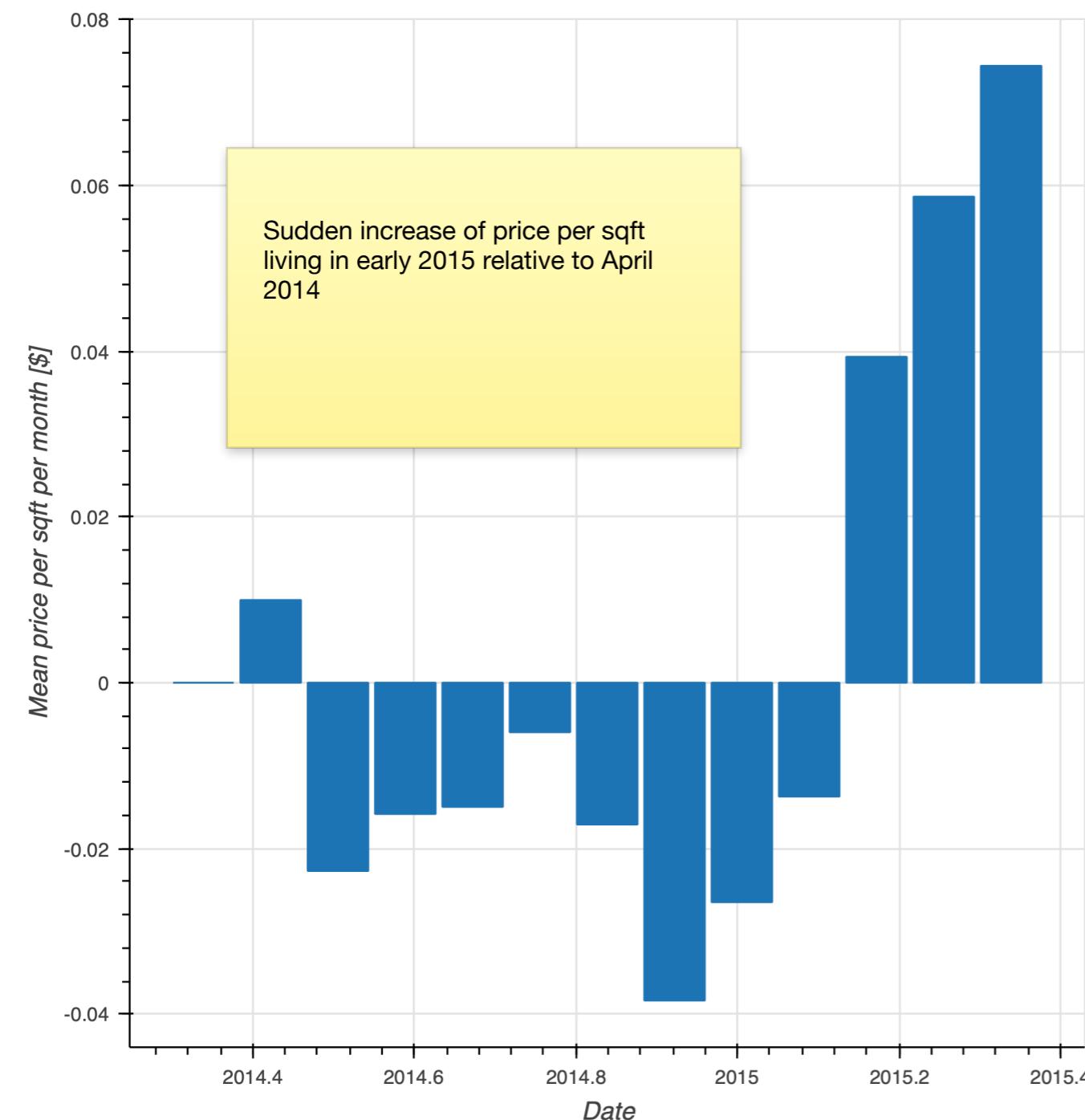
	Mean		
<b>House Sales</b>	21.6k		
<b>Total Revenue</b>	11.7 G\$	-	-
<b>House Price</b>	540 k\$	367 k\$	0.86 %
<b>Price per ft<sup>2</sup></b>	264 \$	110 \$	7.44 %
<b>Living area [ft<sup>2</sup>]</b>	2080	918	-4.5 %
<b>Age of house [yr]</b>	42	29	-

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 ft<sup>2</sup>: 264 \pm 110 with strong 7.44 % growth  
 Living area substantially decreases by -4.5%  
 Age of house 42 \pm 29

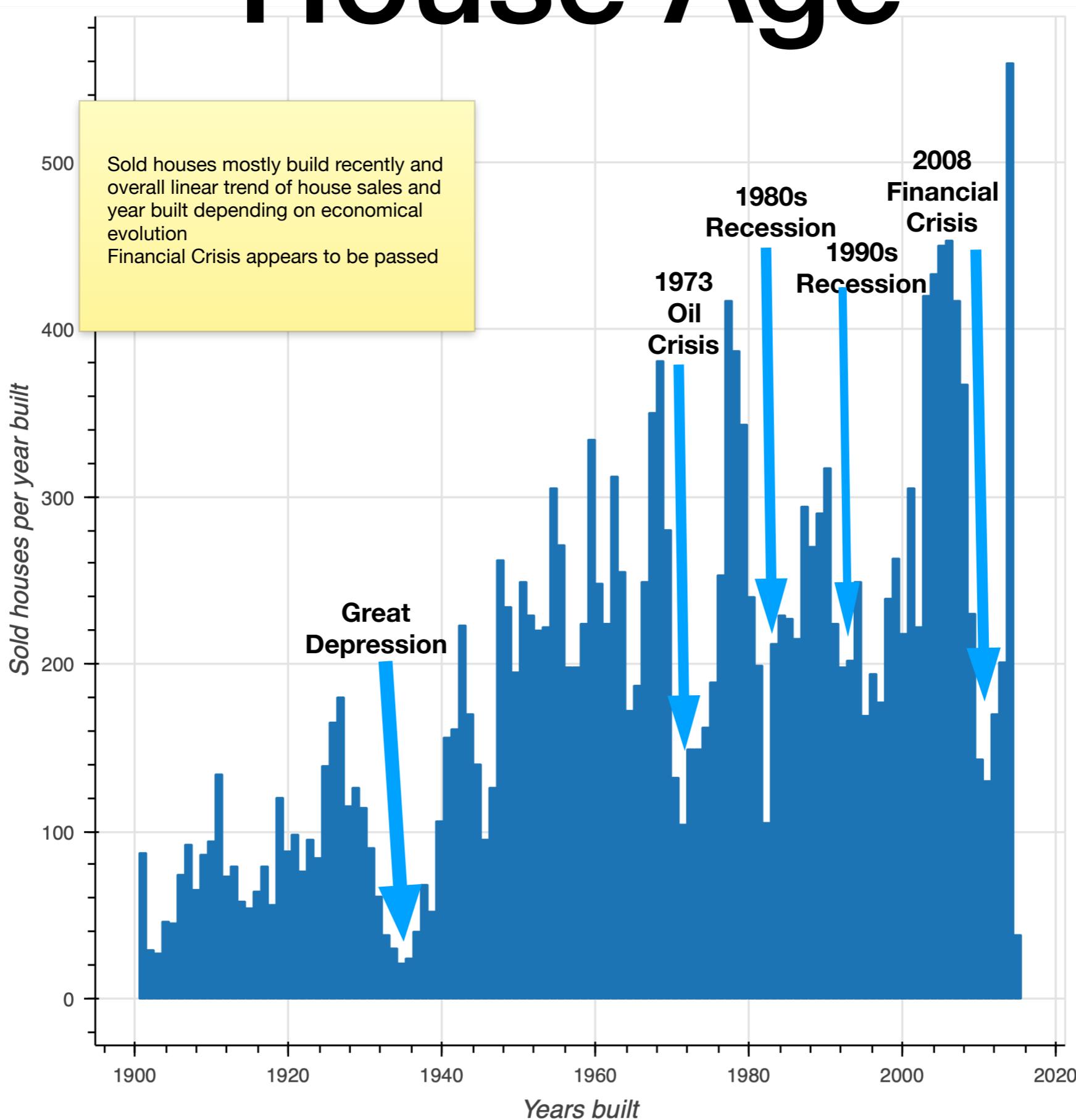
# Monthly Revenue



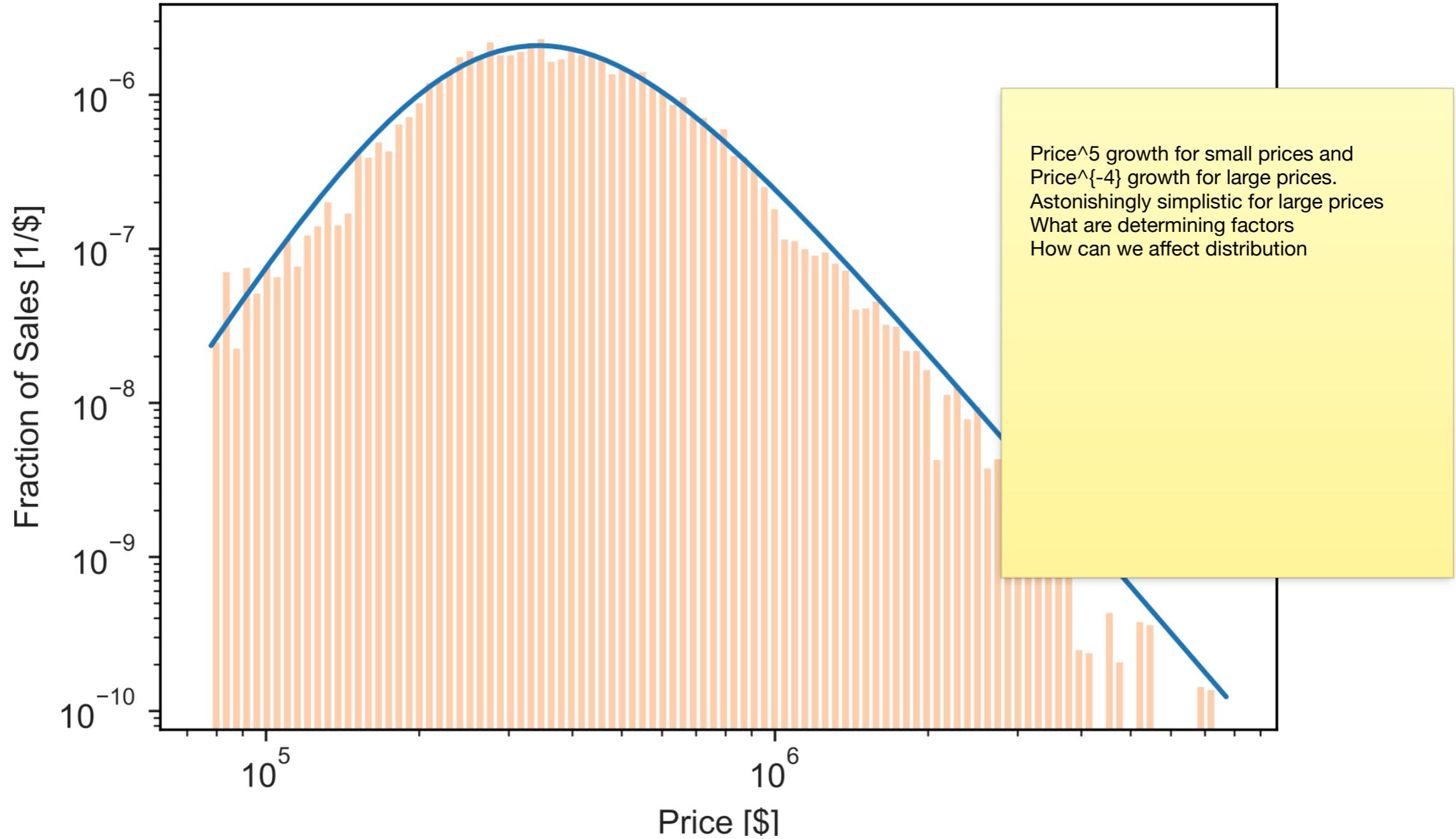
# Monthly Fluctuations



# House Age



# Sales per Price



**High priced houses sales scale with the fourth power in price**  
**Example: A 2 M\$ house is should 16 times more than a 4 M\$ house**

# 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

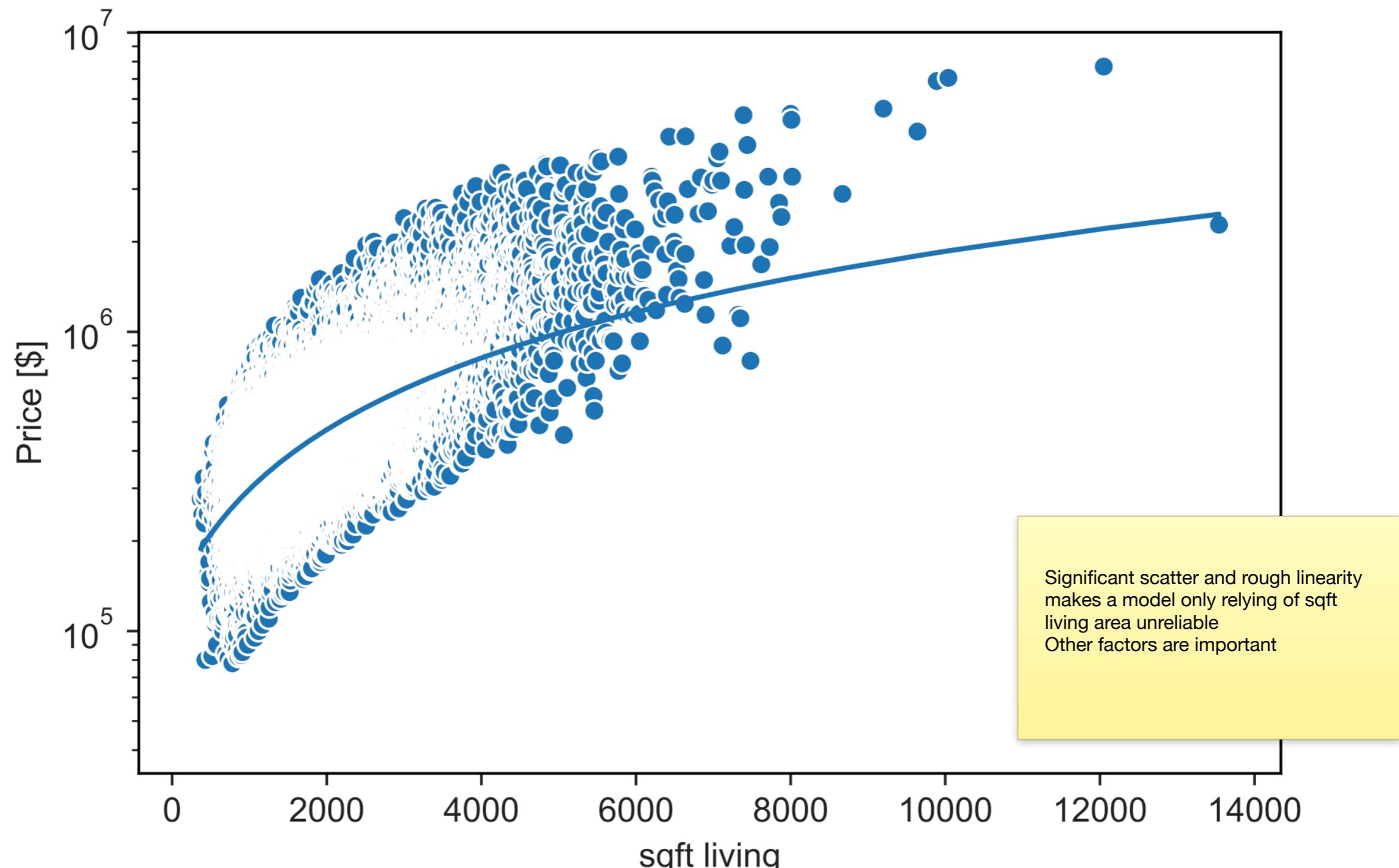
	Mean	Std. err.
B	$4.48 \cdot 10^{-6} \text{ } \$^{-1}$	$4.88 \cdot 10^{-7} \text{ } \$^{-1}$
C	5.22	0.26
B-4D	0.31	0.034
E	-3.84	0.3
	$5 \cdot 10^5 \text{ } \$$	-

# Price Model

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

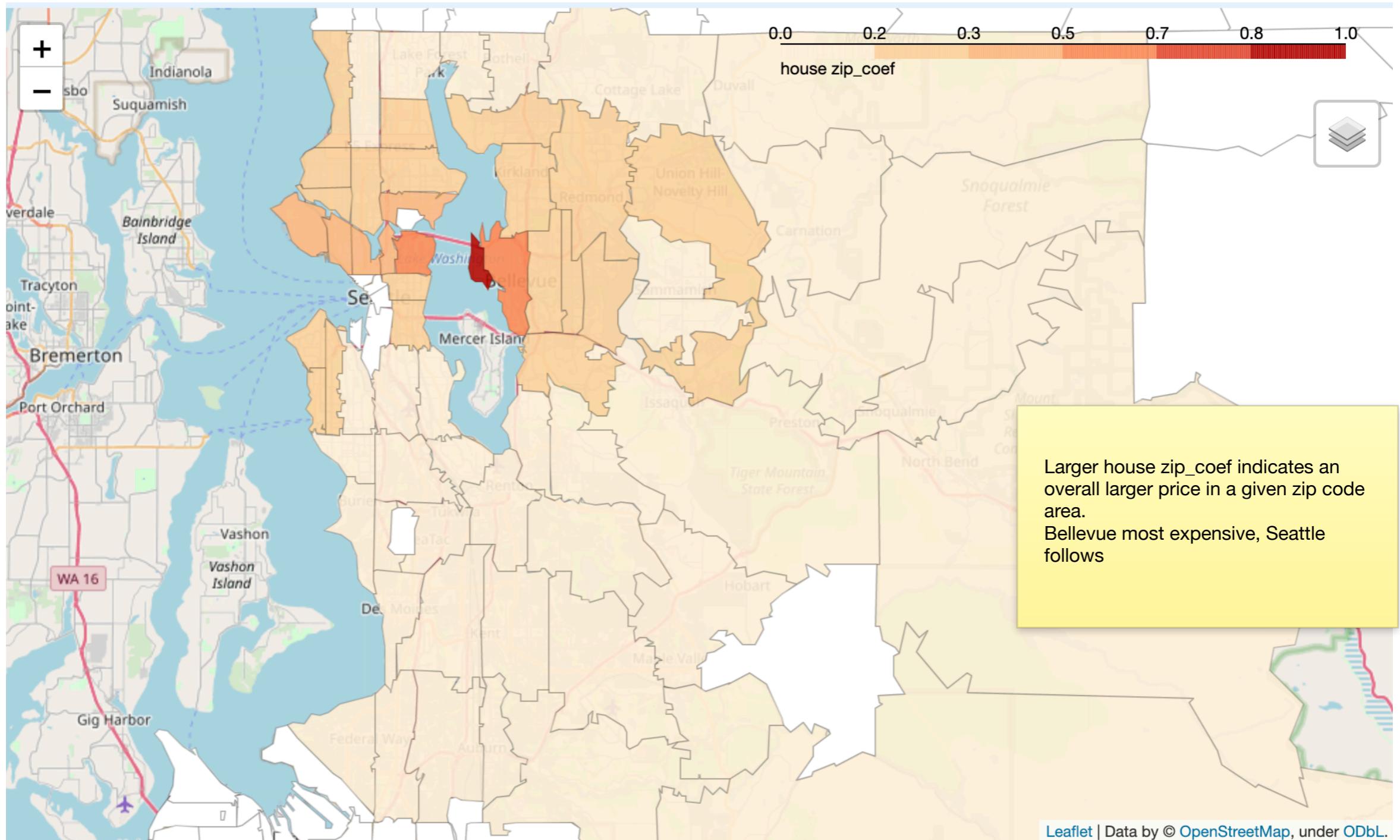
House price model  
sqft\_living  
Zipcode  
Grade  
Are important factors  
Analyze coefficients

# Sqft Living Dependence



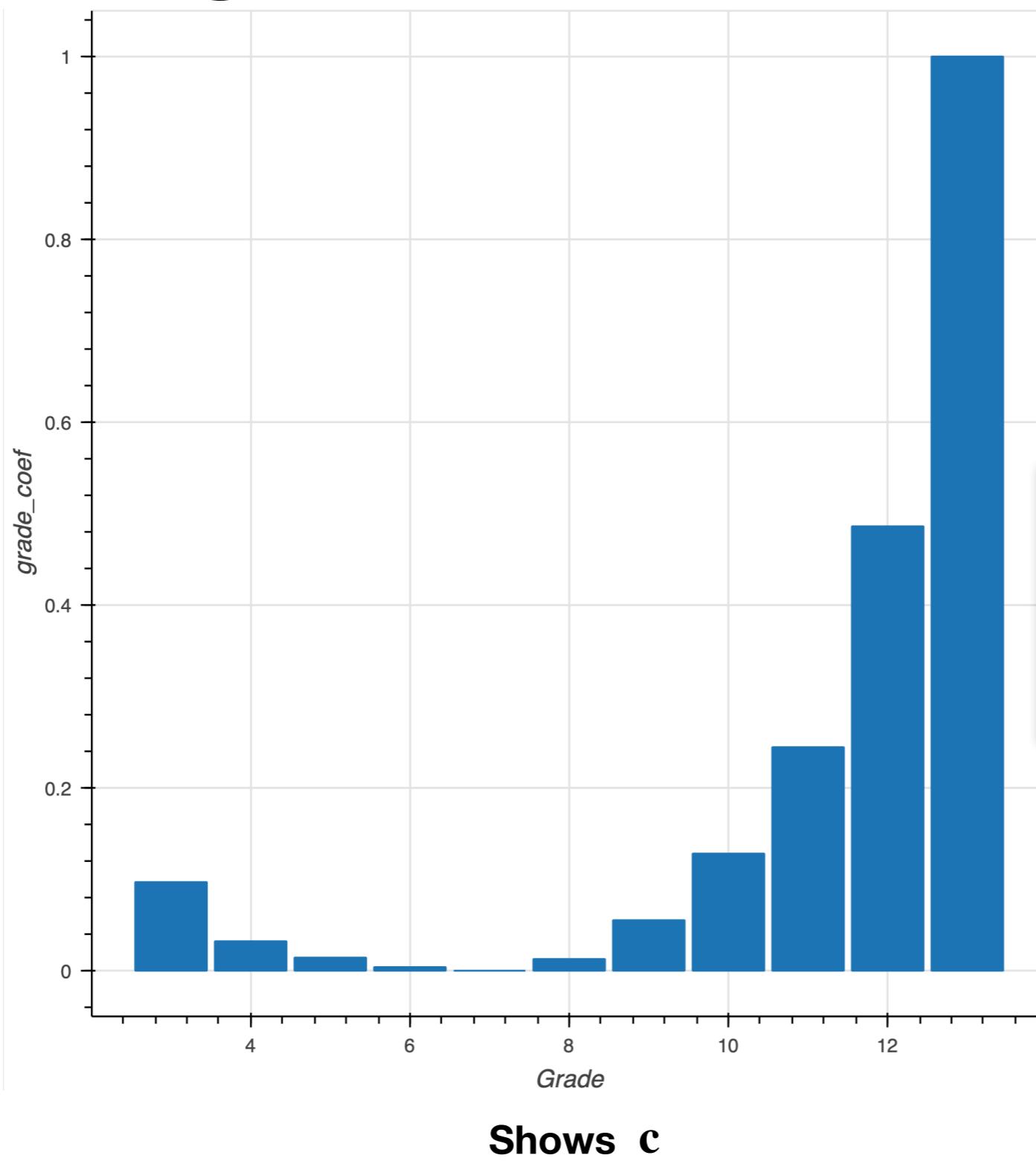
Shows  $p_0$  and  $a$

# Zip Code Dependence



Shows b

# Building Grade Dependence



Higher grade houses more expensive.  
Surprisingly also low grade houses  
have slightly higher house prices with  
respect to grade 7 houses

# Summary

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

House sale revenue  
Price per sqft living growth  
Financial crisis house age  
Universal scaling  
House price denominators

# Recommendations

- In winter house demand lower means lower prices
  - Buy in winter, try to sell in summer
- Price per sqft living area has risen
  - Buy now or you may only afford smaller house
  - House value may rise
- 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, grade 3 to 10 overall mild price variations

Buy in winter, sell in late spring  
Buy now  
Very expensive houses are rarely sold  
Bellevue too expensive, invest elsewhere  
Grade 7 houses are cheapest 3 to 10 roughly comparable

# Future Prospects

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

Study scaling law dependencies  
Economical data into account  
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?