



FACTORS THAT INFLUENCE HOME SALE PRICE IN KING COUNTY, WA

Andrew Yeh

Prabhakar Rangarao

Sam Dedes

Project Goal

Perform a statistical analysis to validate several claims about housing prices in the most recent full calendar year, **2019**.

Research Areas

PRIMARY FOCUS:

- 1) Does having a porch increases home sale price?
- 2) Does having a beachfront or lakefront increases home sale price?
- 3) Does higher square footage increase home sale price?
- 4) Does the presence of a nuisance (power lines, traffic noise, airport noise) decreases home sale price?

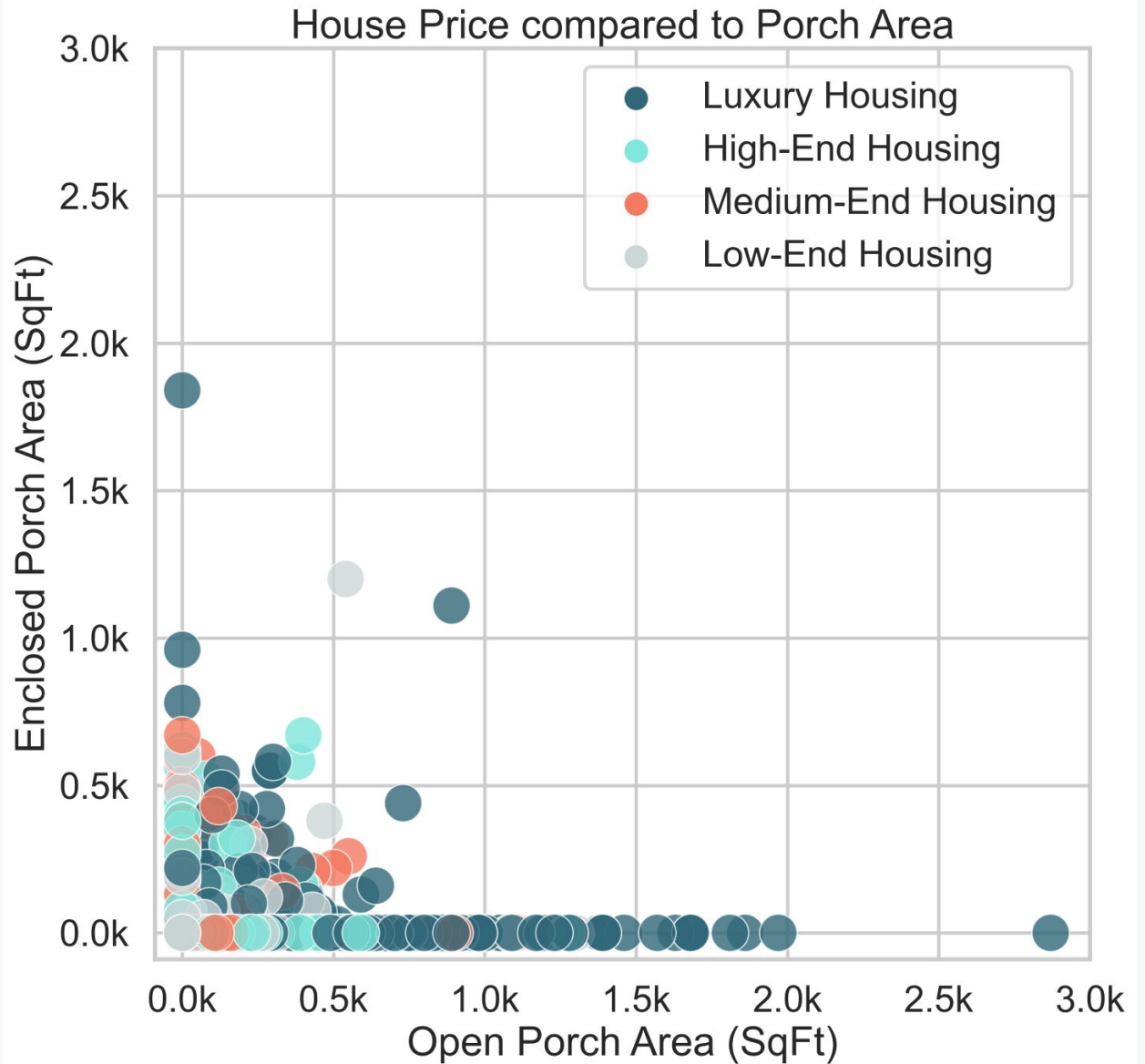
Factors that Influence Home Prices

- 1) **Neighborhood comps**
- 2) **Location, location, location**
- 3) **Home size and usable space**
- 4) **Age and condition**
- 5) **Upgrades & upgrades**
- 6) **Local market**
- 7) **Economic indicators**
- 8) **Interest rates**

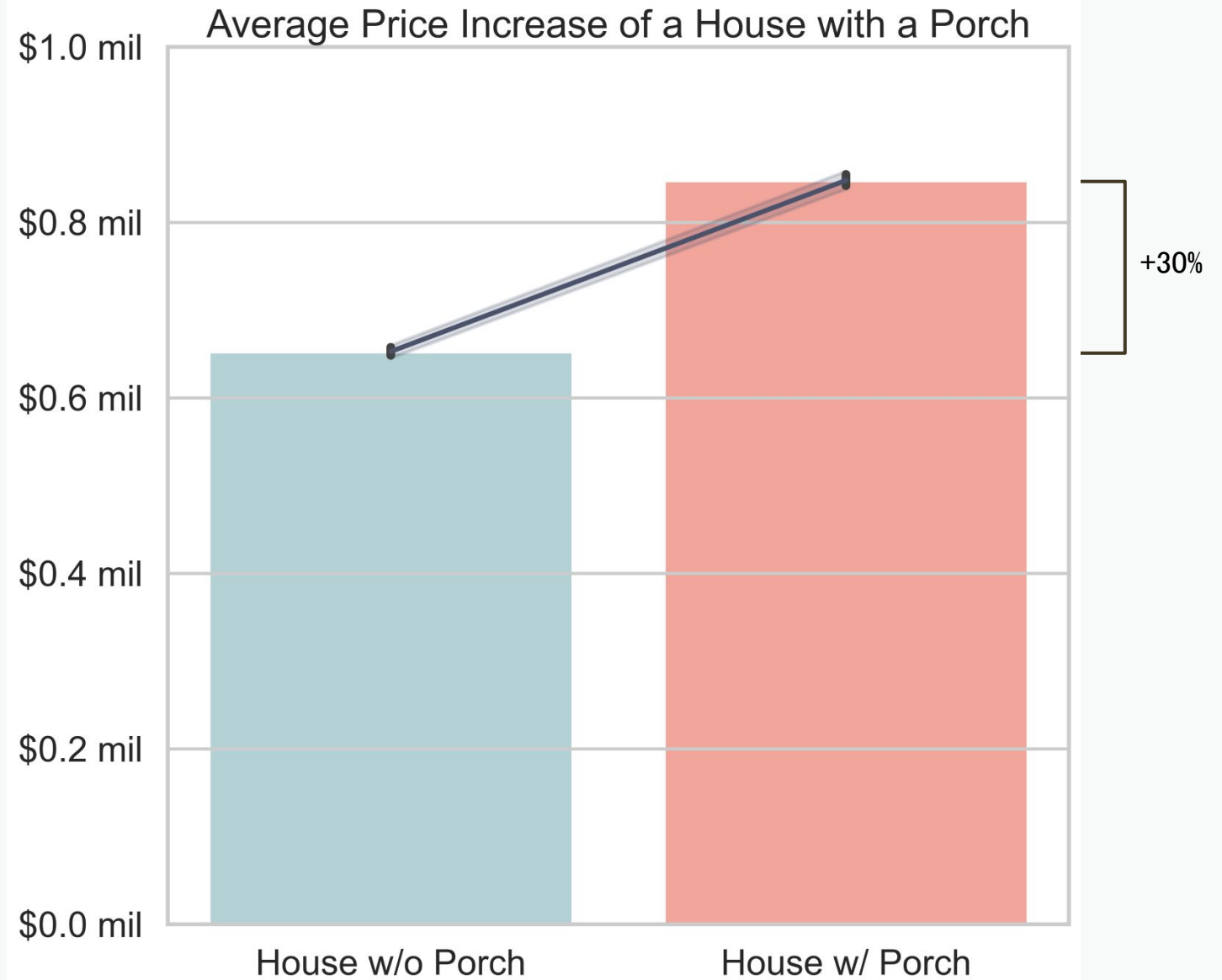
Does having a
porch
increase home
sale price?

A porch will be determined as a covered structure usually projecting outwards in the front of a house.

Does porch
size correlate
to a high sale
price?



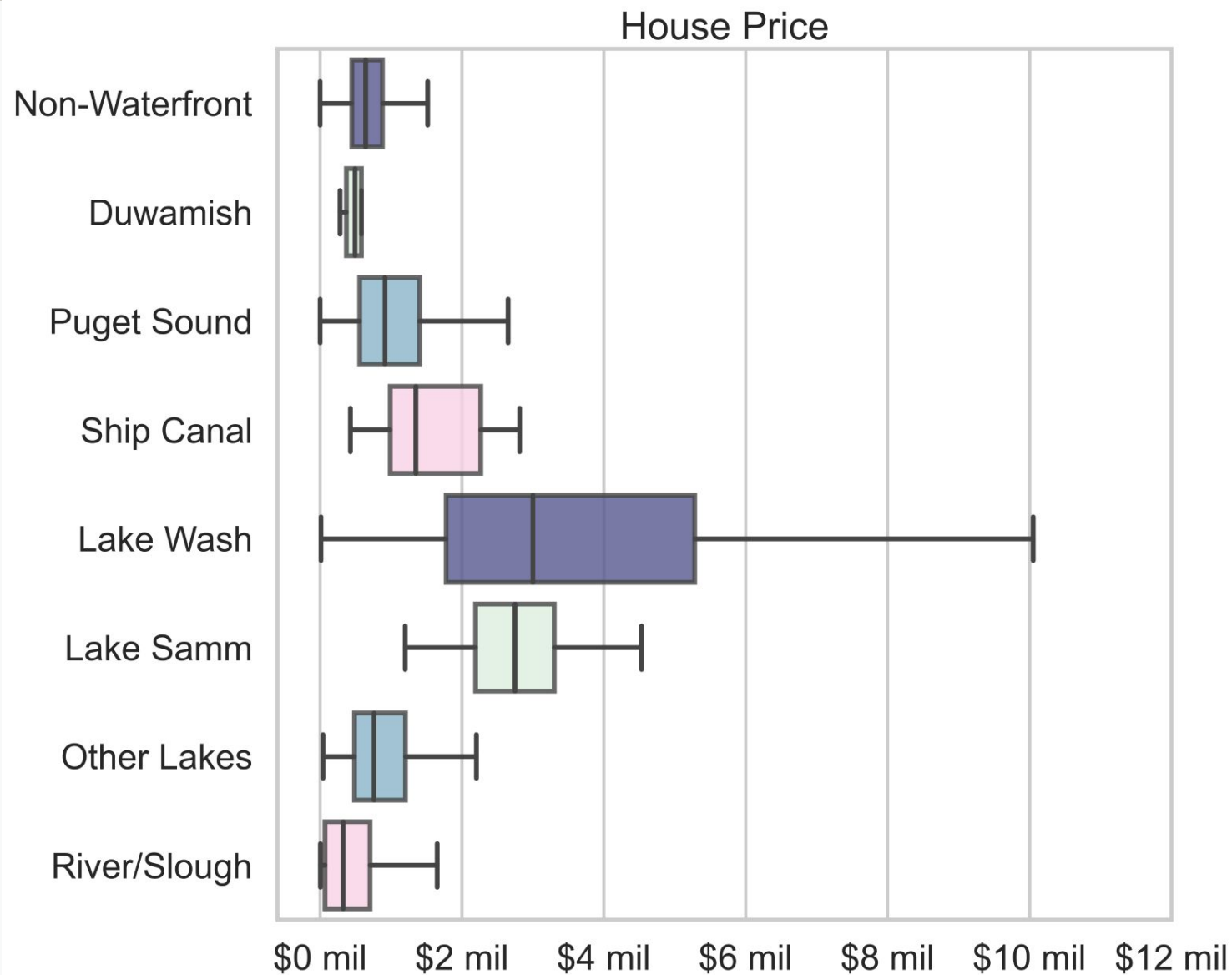
Does having a porch increase home sale price?



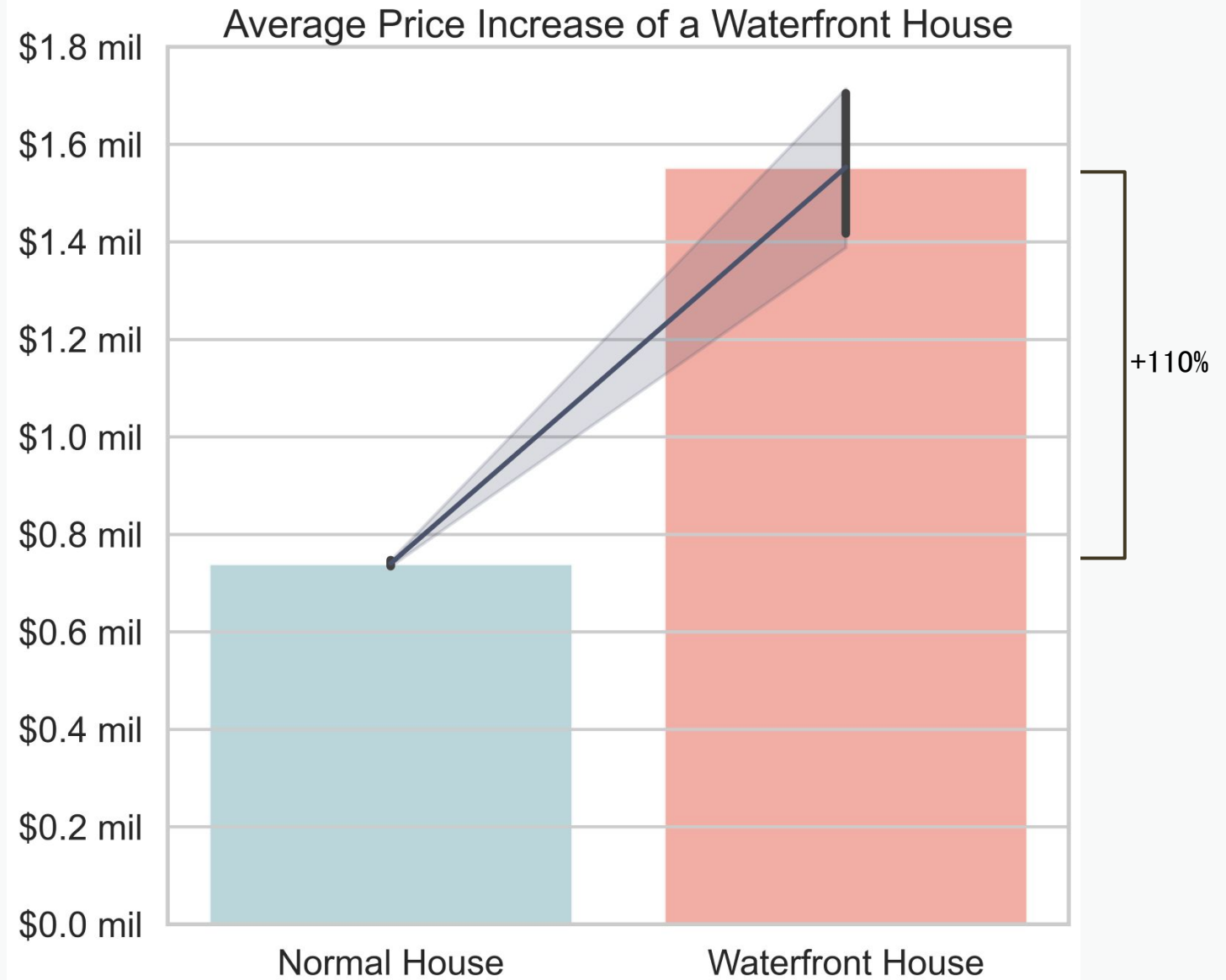
Does having
a beachfront
or lakefront
increases
home sale
price?

Beachfront and/or lakefront are houses that include a waterfront as part of their property.

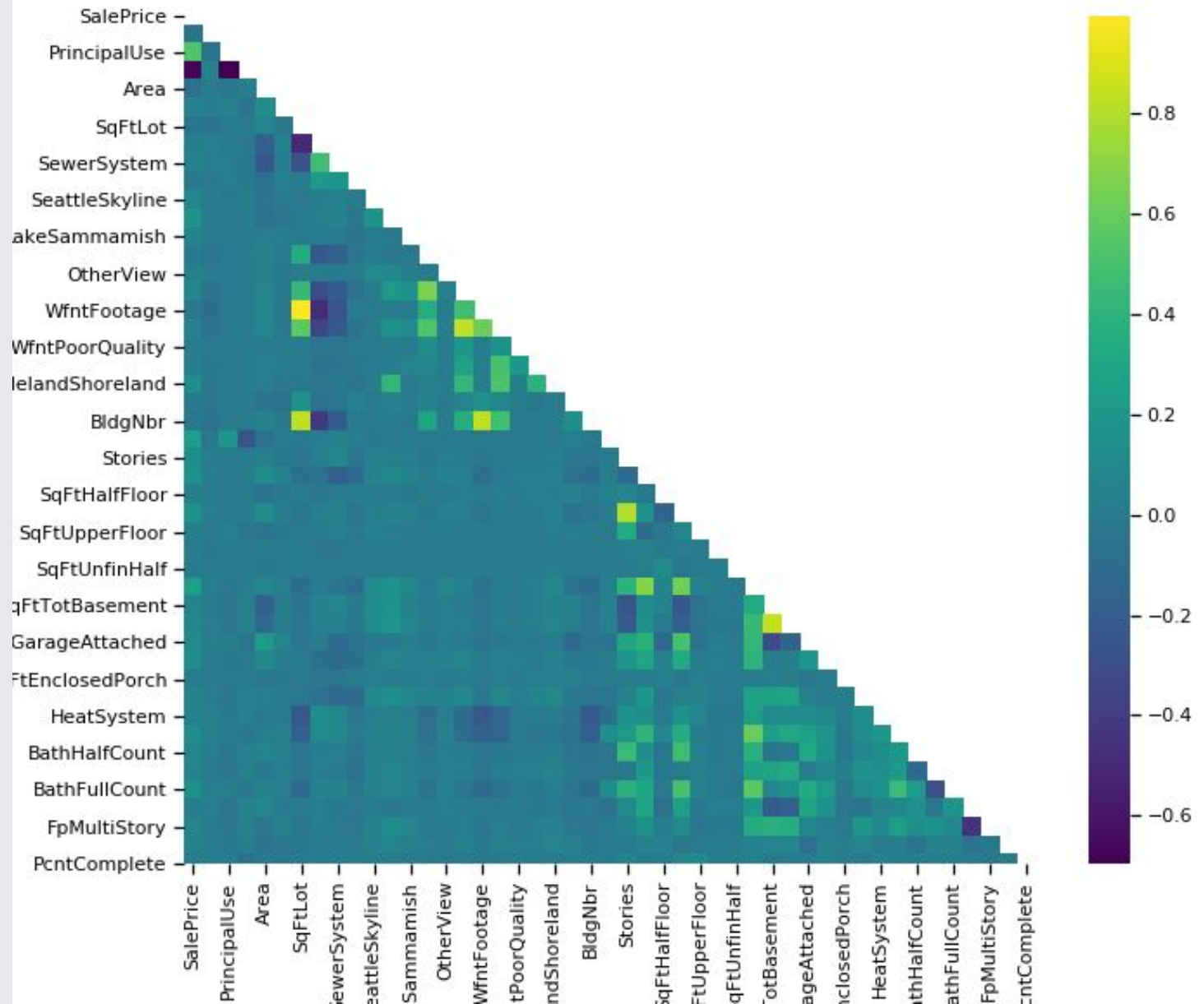
How does the range of sales differ between waterfronts?



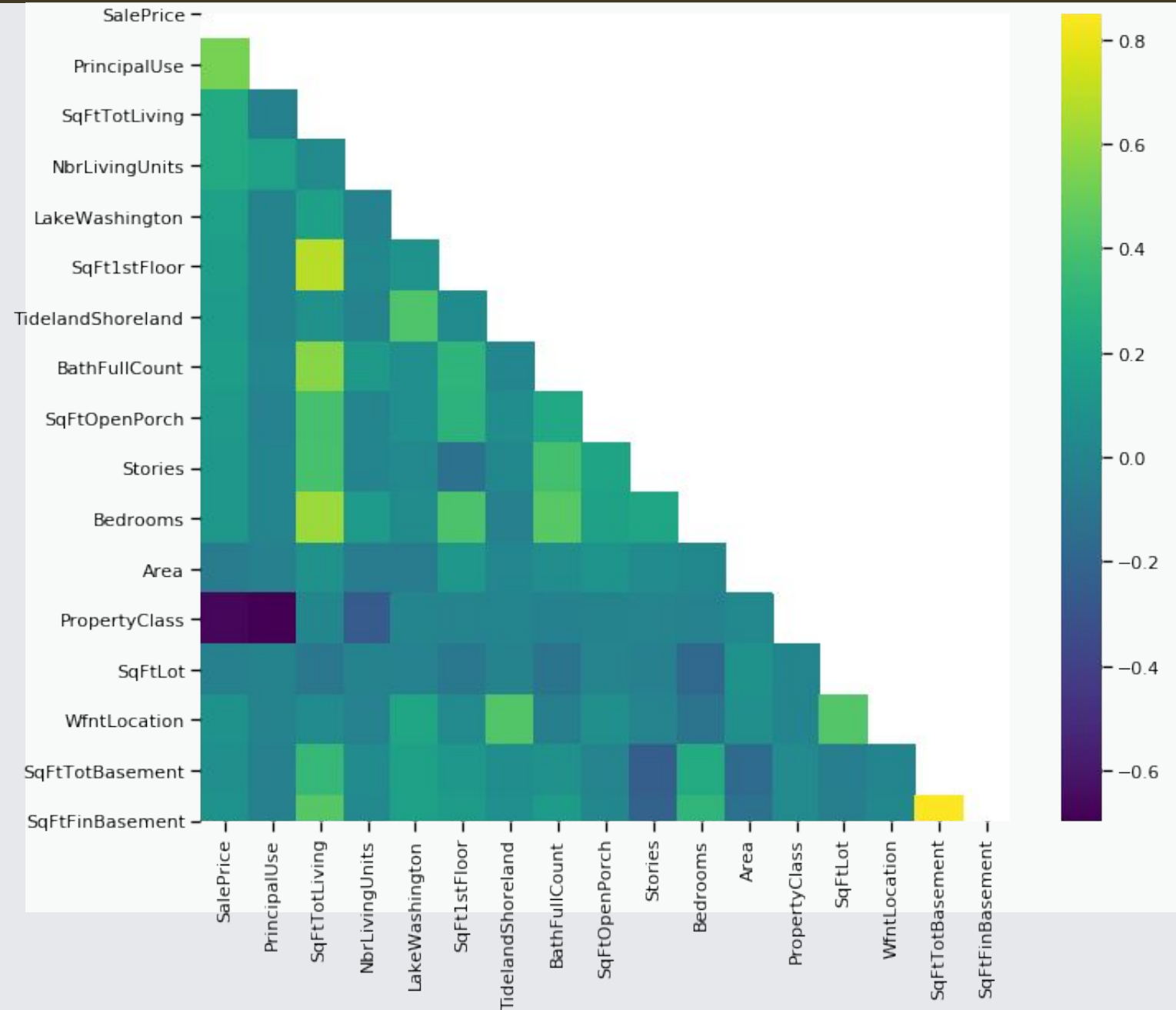
Does having
a waterfront
increase home
sale price?



Test Factors
That Influence
Higher Sale
Price:
Several factors
considered for
the study..



Test Factors That Influence Higher Sale Price



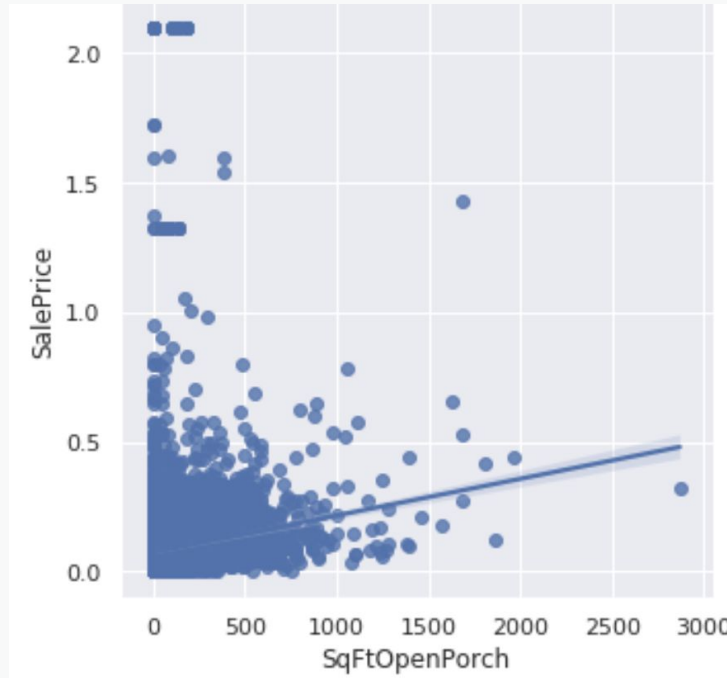
Large Living Space,
Large Open Porches,
Waterfront Location,
Number of Units and
Number of Stories
Contribute to Higher
Sale Prices

OLS Regression Results						
Dep. Variable:	SalePrice	R-squared:	0.560			
Model:	OLS	Adj. R-squared:	0.559			
Method:	Least Squares	F-statistic:	1634.			
Date:	Fri, 02 Oct 2020	Prob (F-statistic):	0.00			
Time:	14:08:11	Log-Likelihood:	-3.6885e+05			
No. Observations:	24462	AIC:	7.377e+05			
Df Residuals:	24442	BIC:	7.379e+05			
Df Model:	19					
Covariance Type:	nonrobust					
	coef	std err	t	P> t	[0.025	0.975]
PrincipalUse	2.105e+06	9.85e+04	21.370	0.000	1.91e+06	2.3e+06
SqFtTotLiving	372.4927	19.978	18.645	0.000	333.334	411.652
NbrLivingUnits	5.391e+05	3.46e+04	15.567	0.000	4.71e+05	6.07e+05
LakeWashington	2.968e+05	1.47e+04	20.173	0.000	2.68e+05	3.26e+05
SqFt1stFloor	-39.8516	26.324	-1.514	0.130	-91.448	11.744
TidelandShoreland	4.915e+05	3.53e+04	13.928	0.000	4.22e+05	5.61e+05
BathFullCount	-1.966e+04	1.02e+04	-1.933	0.053	-3.96e+04	274.845
SqFtOpenPorch	295.3804	51.205	5.769	0.000	195.015	395.746
Stories	5.052e+04	2.26e+04	2.240	0.025	6311.585	9.47e+04
Bedrooms	-8.054e+04	7582.885	-10.621	0.000	-9.54e+04	-6.57e+04
Area	-2426.4246	208.958	-11.612	0.000	-2835.996	-2016.854
PropertyClass	-2.001e+06	2.11e+04	-94.789	0.000	-2.04e+06	-1.96e+06
SqFtLot	-0.0263	0.005	-4.888	0.000	-0.037	-0.016
WfntLocation	3.789e+04	6640.454	5.706	0.000	2.49e+04	5.09e+04
SqFtTotBasement	81.5070	18.396	4.431	0.000	45.450	117.564
SqFtFinBasement	-99.0714	29.782	-3.327	0.001	-157.446	-40.697
x0_N	8.961e+05	1.97e+05	4.551	0.000	5.1e+05	1.28e+06
x0_Y	8.011e+05	1.99e+05	4.028	0.000	4.11e+05	1.19e+06
x1_N	5.849e+05	1.31e+05	4.467	0.000	3.28e+05	8.42e+05
x1_X	5.865e+05	1.31e+05	4.478	0.000	3.3e+05	8.43e+05
x1_Y	5.257e+05	1.31e+05	4.004	0.000	2.68e+05	7.83e+05
const	1.697e+06	3.92e+05	4.327	0.000	9.28e+05	2.47e+06
Omnibus:	20956.739	Durbin-Watson:	1.102			
Prob(Omnibus):	0.000	Jarque-Bera (JB):	20285661.790			
Skew:	2.929	Prob(JB):	0.00			
Kurtosis:	143.955	Cond. No.	1.02e+22			

Warnings:

- [1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
- [2] The smallest eigenvalue is 3.28e-28. This might indicate that there are strong multicollinearity problems or that the design matrix is singular.

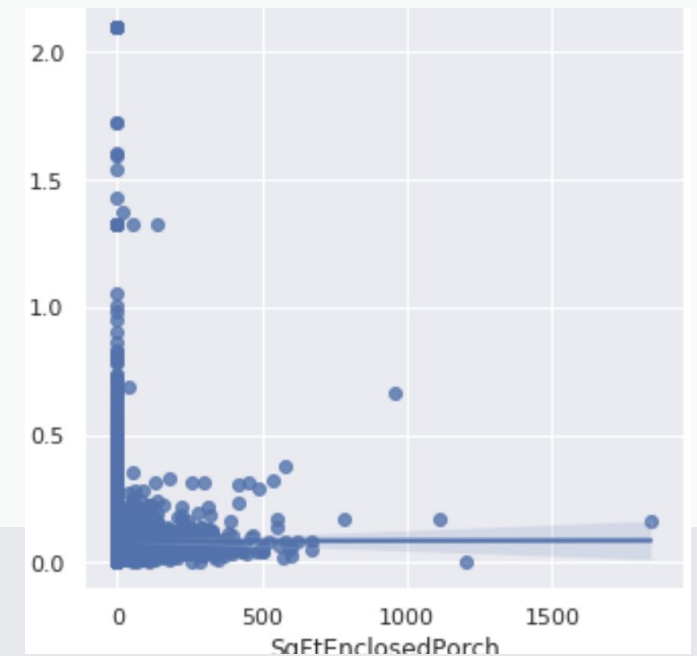
Test if Higher
square
footage
increases
home sale
price



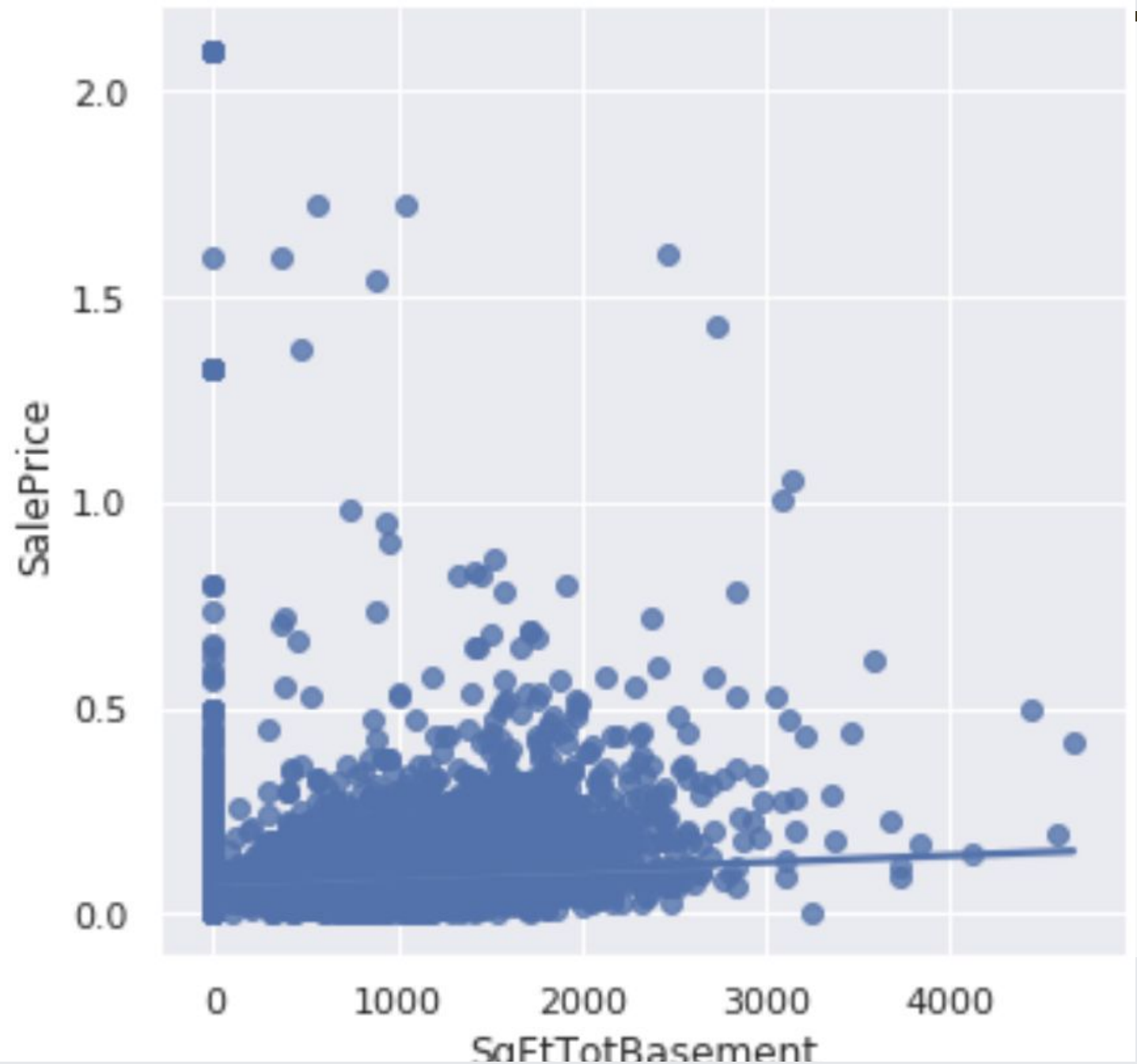
HOWEVER, ENCLOSED
PORCH AREAS DEMAND
LESS SALES PRICE

R-Squared = 0.56

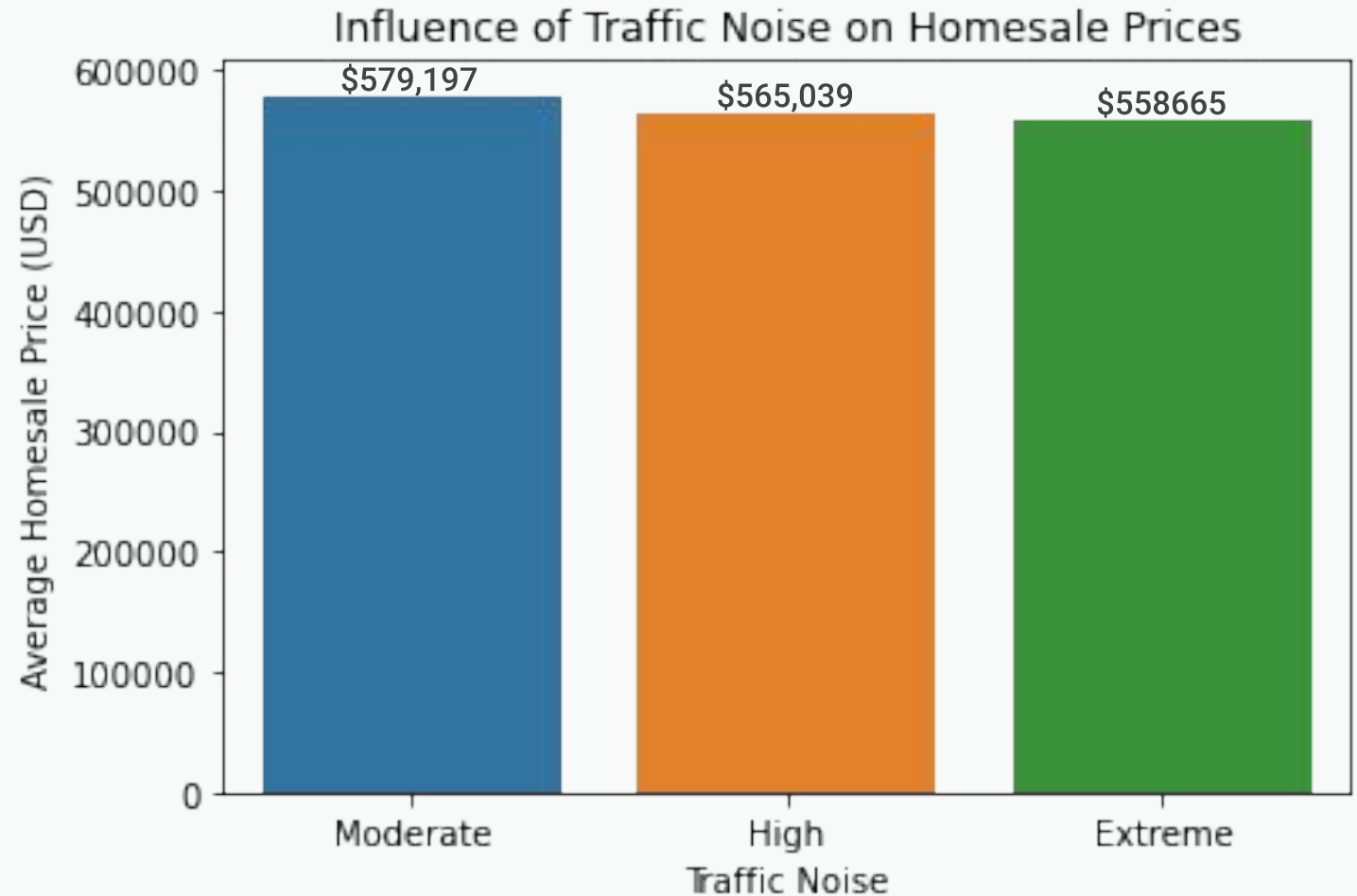
LARGE OPEN-PORCH
ATTRACTS HOME BUYERS TO
PAY PREMIUM PRICE



Buyers are
willing to pay
higher sale
price, if the
basement is
larger..



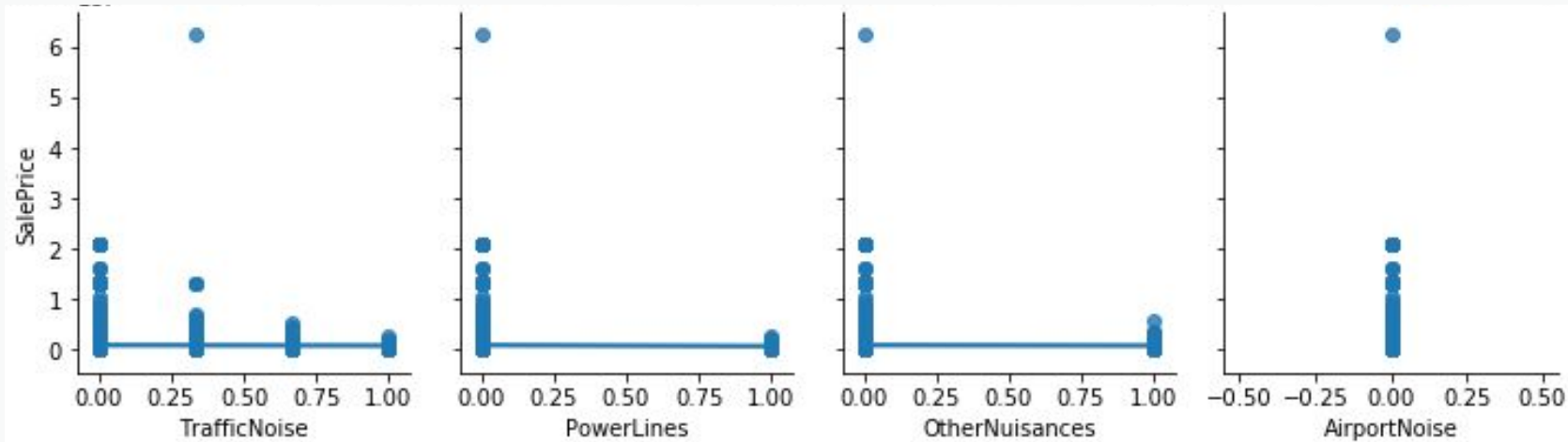
The presence of
a nuisance
(power lines,
traffic noise,
airport noise)
decreases home
sale price



Moderate vs. Extreme Traffic Noise comparison:

Difference in value of over \$20,000, or 4%

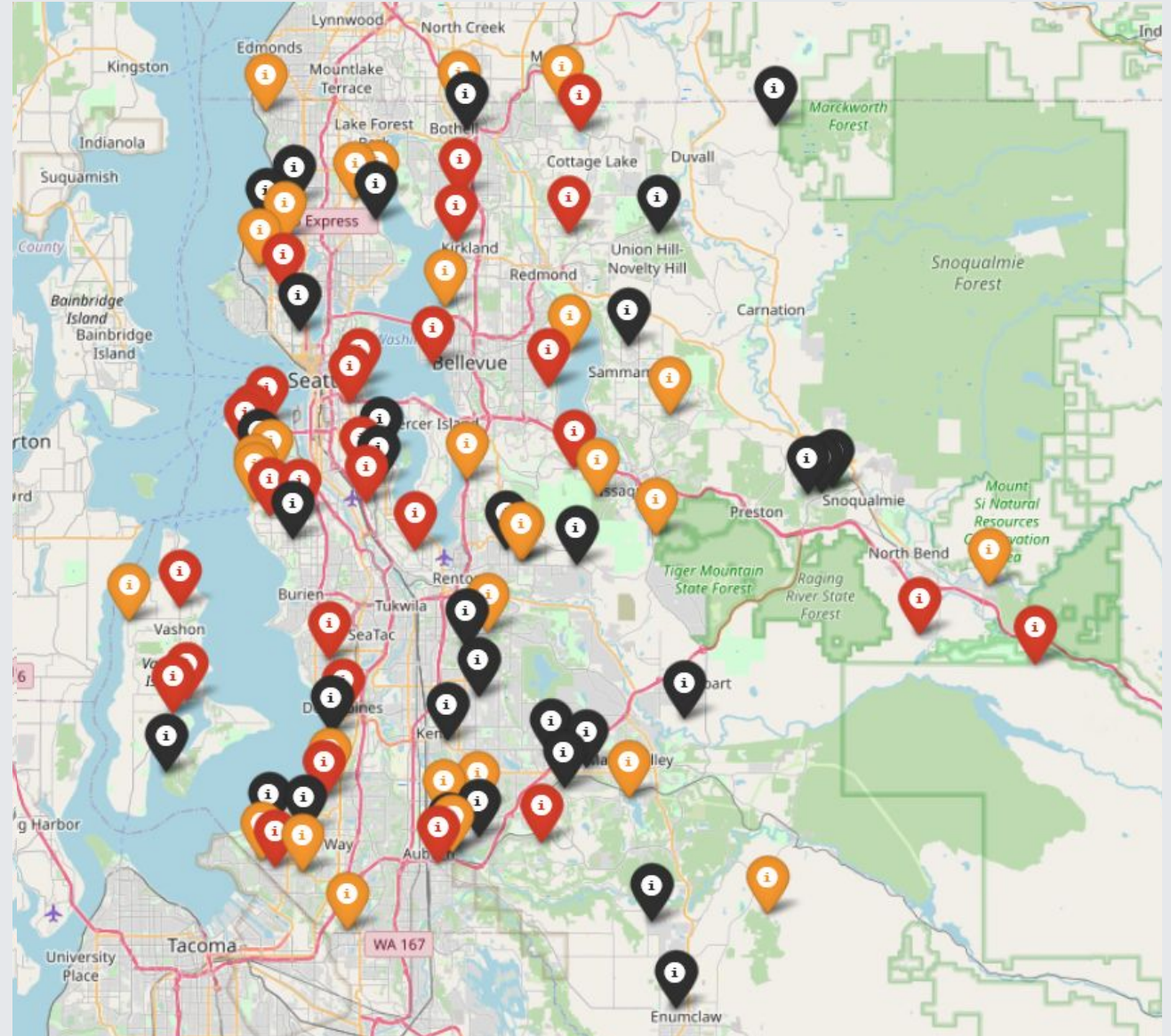
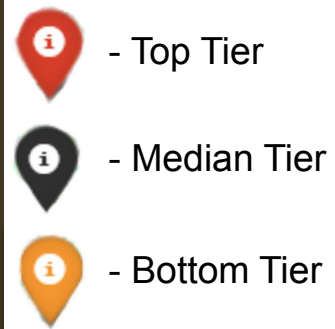
Regressions: Sale Price and Noise



Sale Prices given in millions of dollars

- Horizontal regression line \Rightarrow no meaningful influence on sale price
- SalePrice vs. AirportNoise graph inconclusive, only one value in dataframe
- AirportNoise excluded in combined regression model
- Single variable coefficients all return R-squared values of 0.000
- Combined model returns R-squared value of 0.000

Location of top 20,
median 20, and
bottom 20 sales by
price.



Contacts

Andrew Yeh

- <https://github.com/awyeh64>

Prabhakar Rangarao

- <https://github.com/ghPRao>

Sam Dedes

- <https://github.com/samjdedes>