



Where to invest in Seattle

BUYING AND SELLING FOR MAXIMUM SHORT TERM PROFIT

Jan 1, 2012 – Dec 30, 2017

- ▶ 2012
 - ▶ Ban against plastic shopping bags in effect.
 - ▶ Chihuly Garden and Glass and Living Computer Museum open.
- ▶ 2013
 - ▶ Construction of the Alaskan Way Viaduct replacement tunnel by the tunnel-boring machine Bertha begins.
- ▶ 2014
 - ▶ January: Ed Murray becomes mayor.
 - ▶ February: Seattle Seahawks win Super Bowl football contest.
 - ▶ May: City minimum wage hike announced.
- ▶ 2015
 - ▶ May: A large kayak protest against Arctic oil drilling is held on Elliott Bay in response to a Shell oil platform arriving at the Port of Seattle.
 - ▶ September: School teacher labor strike.
- ▶ 2016
 - ▶ January 23: First Hill Streetcar line opens.
 - ▶ March 19: University Link Tunnel extends light rail to Capitol Hill and Husky Stadium.

Research

- ▶ Ratio of current rents to house prices and increase in adult population increase house prices. Drastic increases usually result in a future correction.¹
- ▶ Purchasing undervalued property yields higher appreciation, but transaction costs for real estate exceed the excess returns.²
- ▶ Strong (hot) markets with rising prices are characterized by both an increase in sales activity and a decrease in the average time-on-the-market required to sell a property.³
- ▶ ¹ Clayton, J., “Further Evidence on Real Estate Market Efficiency”, *Journal of Real Estate Research*, 1998, 15:1/2, 41–57.
- ▶ ² Londerville, J., “A Test of a Buying Rule for ‘Underpriced’ Apartment Buildings”, *Real Estate Economics*, 1998, 26:3, 537–53.
- ▶ ³ Clayton, Jim, et al. “Time Variation of Liquidity in the Private Real Estate Market: An Empirical Investigation.” *The Journal of Real Estate Research*, vol. 30, no. 2, 2008, pp. 125–160.

Strategy

- ▶ Predicting appreciation has not been successful¹, but buying “undervalued” homes correlates to increased appreciation².
- ▶ To decrease risk, we will identify hot markets based on a high amount of sales³.
- ▶ Our strategy will be to identify “undervalued” homes. To aid our investor, we will therefore provide zipcodes and max prices.
- ▶ We’re assuming that purchasing homes with renters already in them accounts for the normal seasonal variation seen in single family home purchases. We will not be accounting for seasonality as a result.
- ▶ Research suggests that an intersect should be done to remove houses that drastically increased in value, as it would indicate improvements were done. Since we’re not focusing on appreciation this will not be necessary.

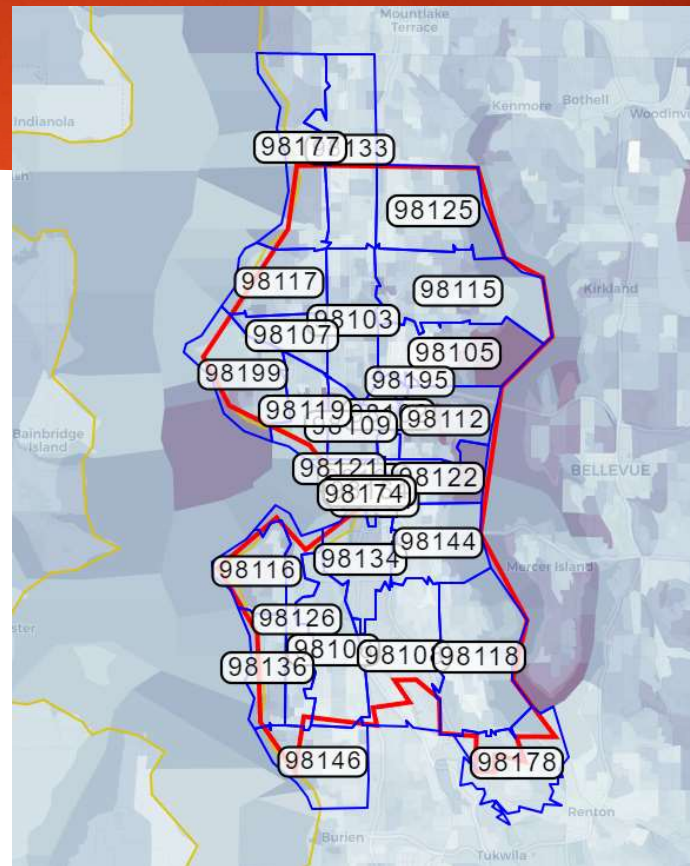
Zip codes

Zip codes 98177, 98133, and 98178 fall out of the city limits by about 50%.

Zip code 98146 falls out of the city limits by about 80%.

However, we are not excluding any of the above zip codes.

98101	98102	98103	98104
98105	98106	98107	98108
98109	98112	98115	98116
98117	98118	98119	98121
98122	98125	98126	98133
98134	98136	98144	98146
98154	98164	98174	98177
98178	98195	98199	



Top 10 zip codes by sales in 2017

zipcode	count
98042	127
98034	115
98052	104
98033	101
98103	97
98115	97
98038	96
98092	96
98133	88
98023	87

```
SELECT zipcode
, COUNT(*)
FROM home_data
WHERE DATE_TRUNC('year', date) = '2017-01-01'
GROUP BY zipcode
ORDER BY COUNT(*) DESC;
```

Top 5 zip codes by sales in 2017

zipcode	count
98042	127
98034	115
98052	104
98033	101
98103	97

```
SELECT zipcode
, COUNT(*)
FROM home_data
WHERE DATE_TRUNC('year', date) = '2017-01-01'
GROUP BY zipcode
ORDER BY COUNT(*) DESC;
```

Variable correlation

Attributes	id	date	price	bedrooms	bathrooms	sq_feet	year_built	zipcode
zipcode	0.002	0.008	-0.004	-0.071	-0.126	-0.060	-0.279	1
year_built	0.199	-0.031	-0.002	0.062	0.355	0.113	1	-0.279
bedrooms	-0.058	-0.036	0.001	1	0.702	0.149	0.062	-0.071
id	1	0.025	0.023	-0.058	0.035	0.023	0.199	0.002
bathrooms	0.035	-0.048	0.032	0.702	1	0.171	0.355	-0.126
date	0.025	1	0.043	-0.036	-0.048	0.008	-0.031	0.008
sq_feet	0.023	0.008	0.351	0.149	0.171	1	0.113	-0.060
price	0.023	0.043	1	0.001	0.032	0.351	-0.002	-0.004

Correlation matrix from RapidMiner. No programming or Maths required.



Zipcode, and year built has a tiny negative correlation to price.

Bedrooms is practically irrelevant

Bathrooms and date (recency) are 1/10 that of square feet

Square feet has a significant correlation, so we will only give prices on that dimension

Bracket recent sales by square feet

```
SELECT zipcode
  , sq_feet / 200 AS sq_feet_bracket
  , ROUND(AVG(price)) AS avg_price
FROM home_data
WHERE zipcode IN (98042, 98034, 98052, 98033, 98103)
AND DATE_TRUNC('year', date) = '2017-01-01'
AND sq_feet IS NOT NULL AND sq_feet > 0
GROUP BY zipcode, sq_feet_bracket
HAVING COUNT(*) >= 5
ORDER BY zipcode, sq_feet_bracket;
```

I'm getting sample count so that we can calculate confidence. I can't calculate it because I don't know the size of the population but the rule of thumb is that we need at least five samples no matter the population size. There is also data missing square footage.

98042

98034

98052

98033

98103

Square Feet	Max Price
800 - 999	\$269,023
1000 - 1199	\$284,994
1200 - 1399	\$316,187
1400 - 1599	\$302,356
1600 - 1799	\$383,812
1800 - 1999	\$389,181
2000 - 2199	\$415,992
2200 - 2399	\$482,800
2400 - 2599	\$453,483
2800 - 2999	\$560,947
3000 - 3199	\$543,090
3400 - 3599	\$626,059

Square Feet	Max Price
600 - 799	\$190,267
800 - 999	\$370,823
1000 - 1199	\$511,626
1200 - 1399	\$596,041
1400 - 1599	\$600,556

Square Feet	Max Price
800 - 999	\$409,525
1000 - 1199	\$489,593
1200 - 1399	\$581,635
1400 - 1599	\$731,538
1600 - 1799	\$827,583
1800 - 1999	\$628,883
2400 - 2599	\$1,093,350
3200 - 3399	\$1,355,494

Square Feet	Max Price
600 - 799	\$500,428
800 - 999	\$1,299,750
1000 - 1199	\$775,375
1200 - 1399	\$666,360
1400 - 1599	\$925,936
1600 - 1799	\$798,438
1800 - 1999	\$1,713,625
2200 - 2399	\$1,107,000
2400 - 2599	\$1,081,333
3000 - 3199	\$1,598,452

Square Feet	Max Price
400 - 599	\$340,571
600 - 799	\$474,537
800 - 999	\$597,813
1000 - 1199	\$624,189
1200 - 1399	\$692,163
1400 - 1599	\$774,250
1600 - 1799	\$876,800

To diversify your holdings and reduce risk, one might buy in multiple zipcodes.

Questions?

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