

min v - m v

min ▾

all dates 

► housing type

► laundry

► parking

all dates 

1 - 120 / 3000

# Argument Hunting

★ Oct 8 Stop By Today & Save Big With This 2 Bedroom! Special Ends Soon! #835 \$2,547 2br 1400 sqft - (danville / san ramon) pic

# Singular linear regression to n

★ Oct 8 Incredible Bay and City Views from this Spacious Home \$7,650 3br - 1872ft<sup>2</sup> - (tiburon / belvedere) pic 

★ Oct 8 Beautiful Remodeled 2BR/1BA \$2,520 - (508) 461-1111

# What makes an apartment great?

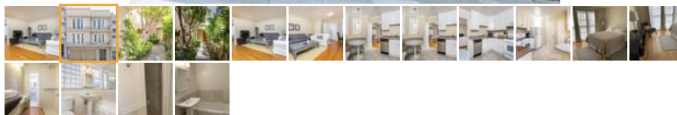
**\$3,795 / 2br - 950ft<sup>2</sup> - Spacious 2BR,1BA PacHeights, washer dryer, Lafayette pk (pacific heights)**

image 2 of 16

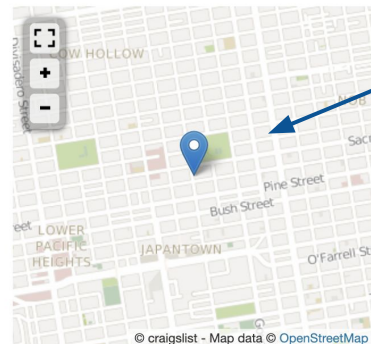


Price

Photos are usually  
a good sign



Available now, nice, spacious, immaculate, FURNISHED flat ( will consider unfurnishing) in best location. Ideal home for families, travel nurses, vacationers, corporate stays; two large bedrooms, bathroom with separate bathtub and shower, living Room, dining area, eat-in Kitchen, granite counters, breakfast nook, dishwasher, microwave, gas stove, office area, two large walk-in closets. Washer - dryer in this apt unit.



Location

Laguna St., # 2012 near Sacramento

([google map](#))

2BR / 1Ba 950ft<sup>2</sup> available now

Size

cats are OK - purrr

dogs are OK - woof

furnished

apartment

w/d in unit

no smoking

attached garage

Amenities

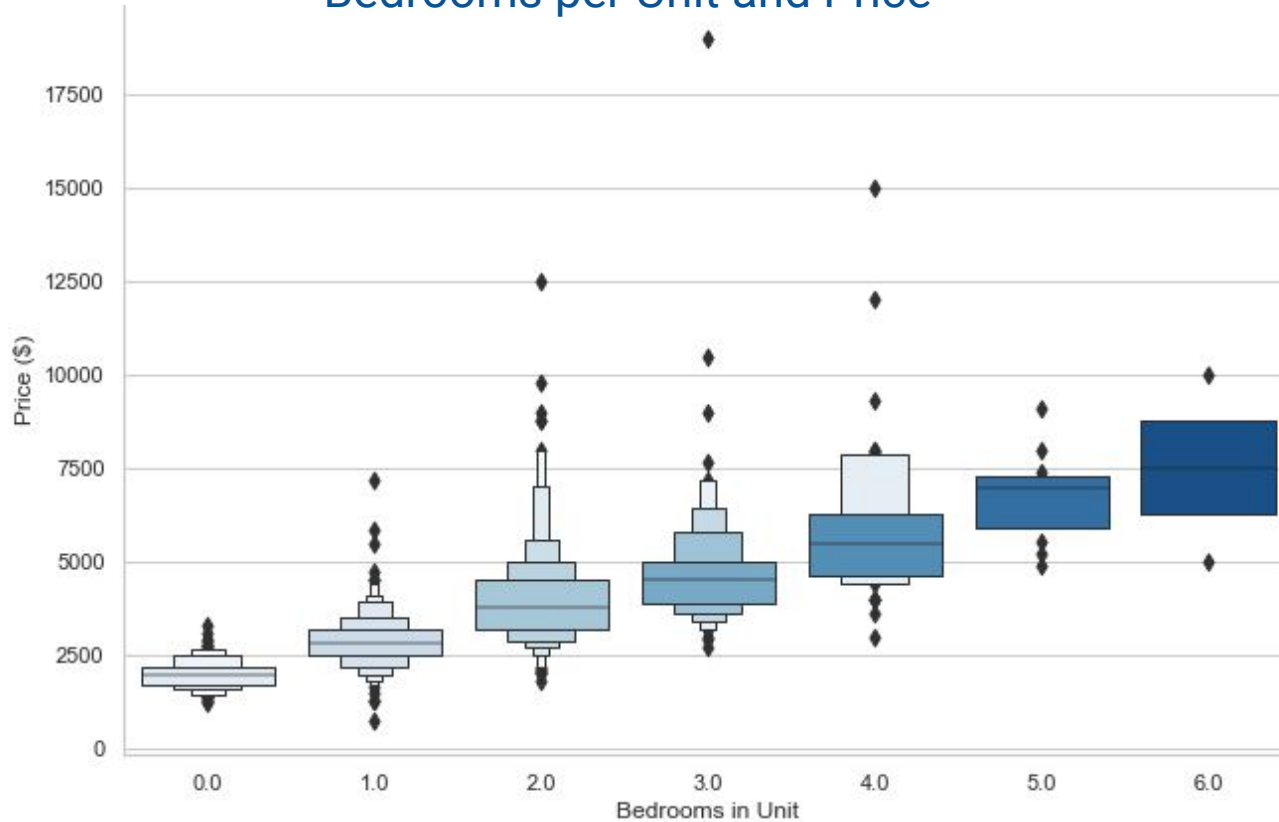
# Strong relationship between unit size and price...

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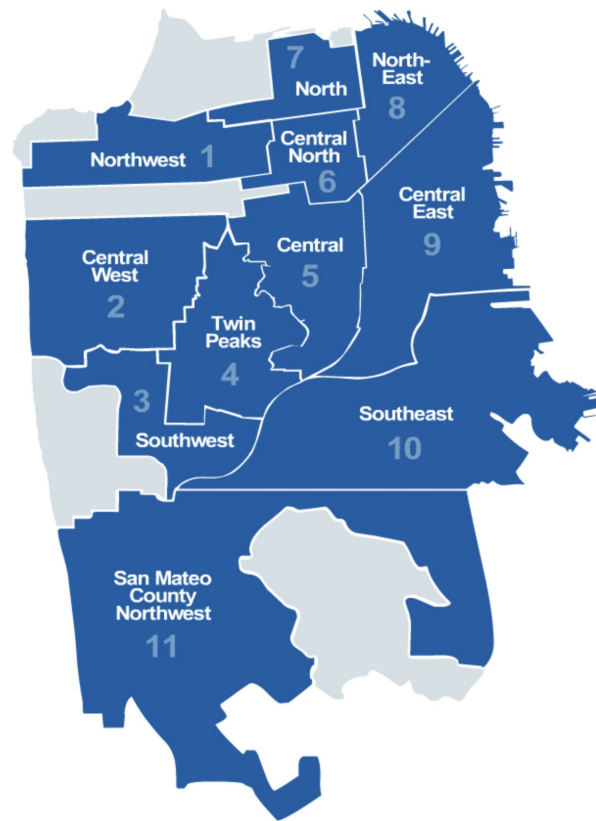
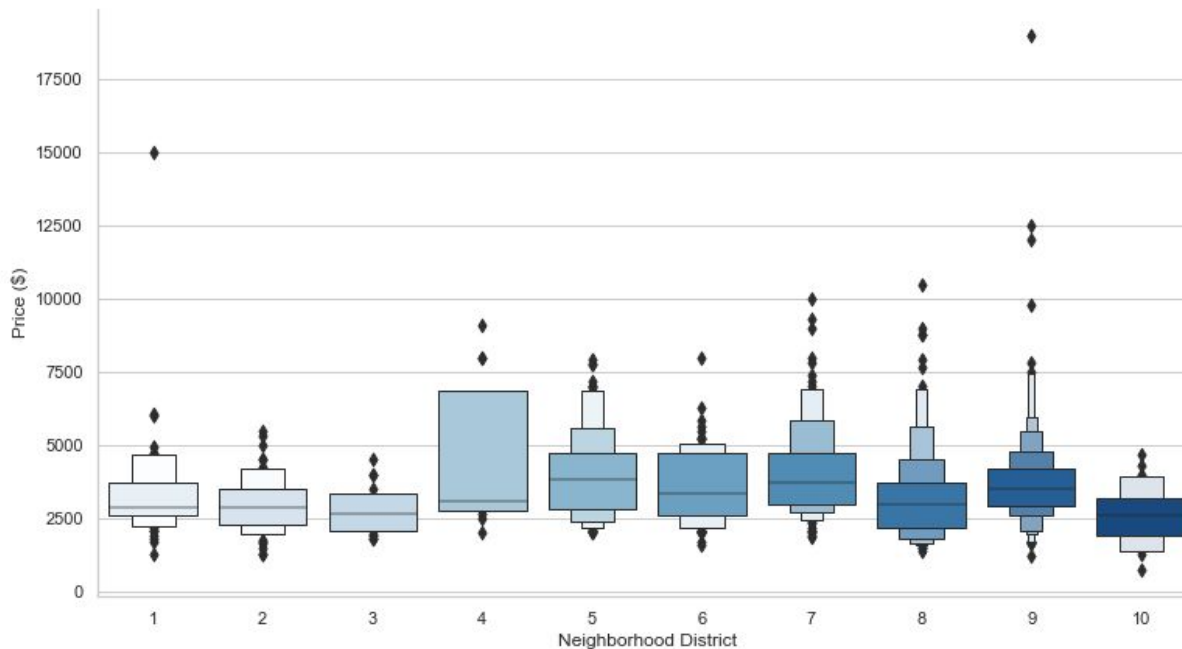
## ...and between bedrooms and price

## Bedrooms per Unit and Price



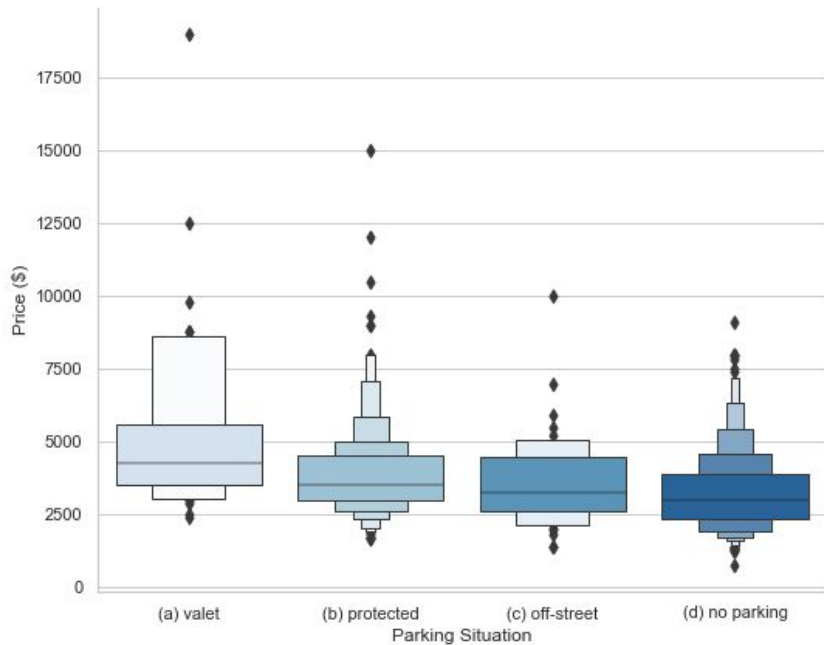
# Location can affect high-end of price range

Price by Neighborhood District

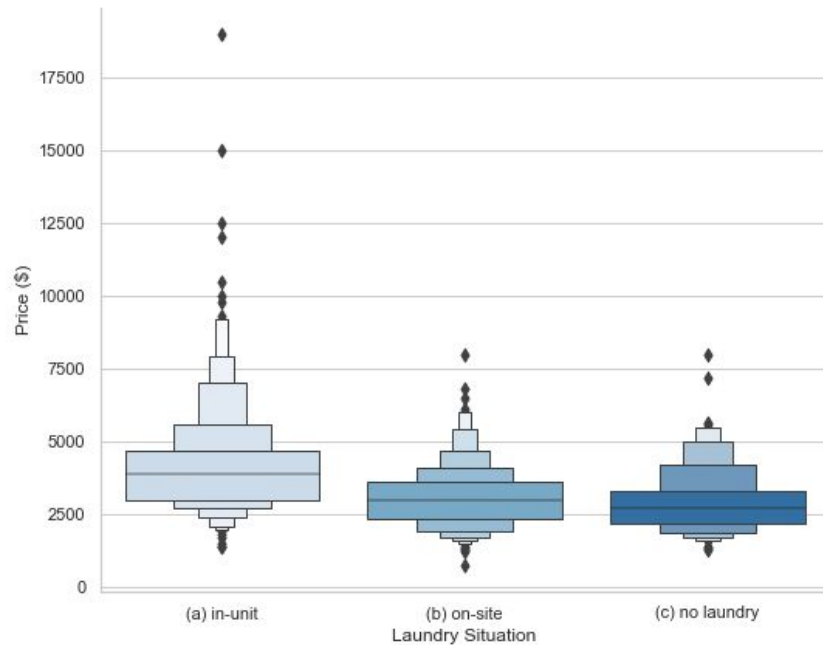


# Some amenities command a premium

## Price by Parking Situation



## Price by Laundry Facilities



# Model construction and selection

## Feature Selection

Continuous Variables

→ Unit size (sqft)

Discrete Variables

→ Bedrooms

→ Bathrooms

Ordinal Variables

→ Parking

→ Laundry

Categorical

→ Pets

→ Neighborhood

## Engineering

**Polynomial Features**

→ Degree = 2

Regularization methods tried

→ **Ridge** ( $\alpha = \sim 8$ )

→ Lasso ( $\alpha = \sim 6$ )

## Model Selection

**Ridge scored most consistent between training and validation testing**

→  $R^2$

→ RMSE

→ MAE

**Lasso** performed consistently on  $R^2$ , but **showed greater variance between training and validation scoring** on RMSE and MAE

# Model results

## $R^2$ Score

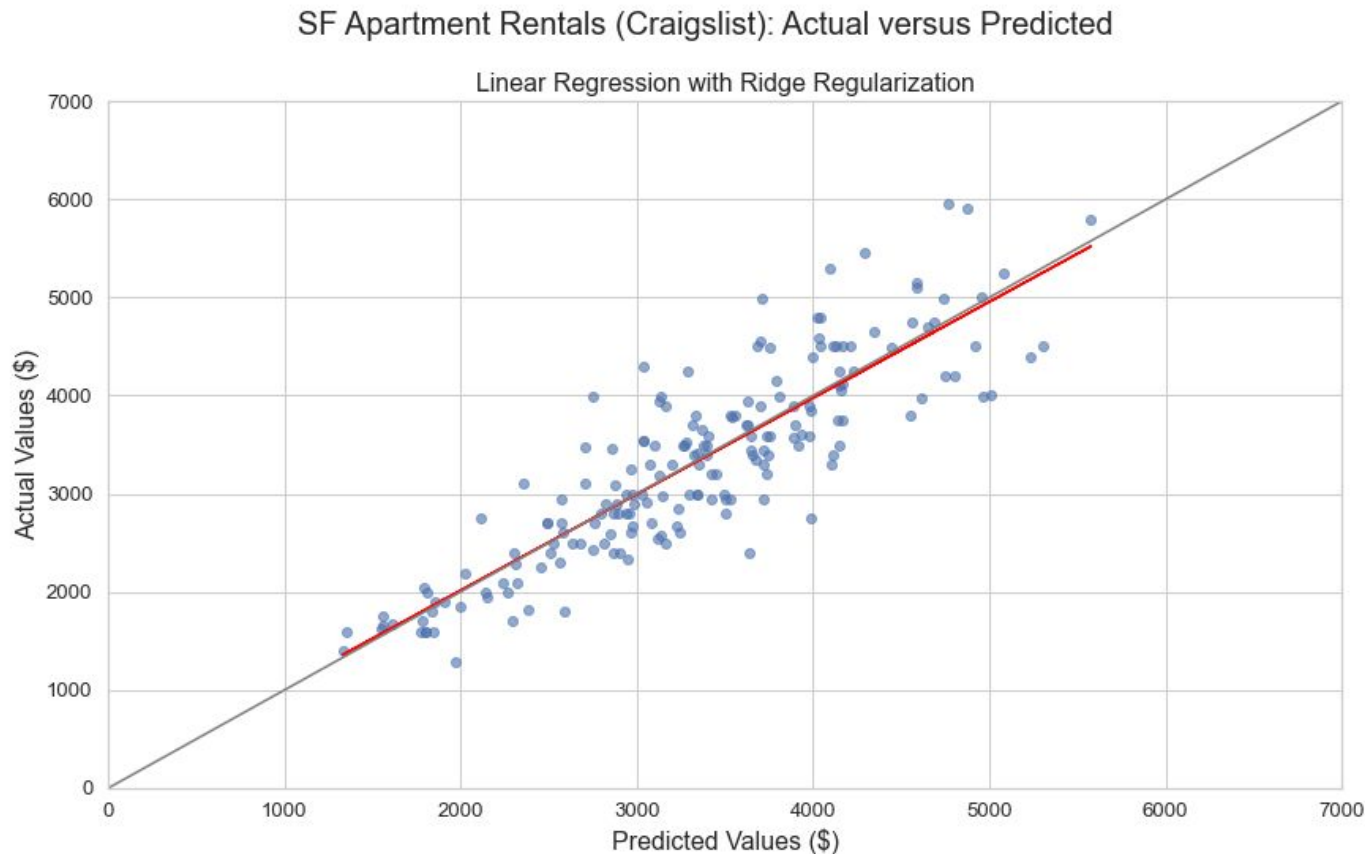
- Train: 81%
- Test: 77%

## RMSE

- Train: \$451
- Test: \$477
- +5.7%

## MAE

- Train: \$341
- Test: \$366
- +7.3%





# Model evaluation

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Tolerance of price variation is ***relative to apartment price*** and ***subjective to budget***

- ~\$400 can be substantial for one person
- ***but split between two or more people may be okay***

Model does a poor job of predicting for units > \$4,000 / month

- Residuals plot<sup>1</sup> shows greater variance above \$4k
- **Most SF apartments in sample fall between \$2,500 and \$4,000 per month<sup>2</sup>**

<sup>1</sup>Appendix A - Residuals plot of predicted values

<sup>2</sup>Appendix B - Distribution of rental prices in sample

# Final thoughts

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There could be other factors influencing rents

- Rent history, control
- Other amenities not standard in Craigslist posts (fitness facilities, common spaces, etc.)
- Other environmental or economic factors<sup>1</sup>

## **Suggestions for future work**

- Sample again when COVID's influence subsides
- Increase scope of scraping methods
  - ◆ Search text for key words like 'gym' or 'backyard' as additional amenities
  - ◆ Find information on security deposit and/or lease requirements
  - ◆ Implement image processing tools to evaluate apartment quality from photos
- Scam post identification

<sup>1</sup>Appendix C - Declining SF Rents

## apartments / housing for rent

- ☐ search titles only
- ☐ has image
- ☐ posted today
- ☐ bundle duplicates
- ☐ include nearby areas

MILES FROM ZIP

miles from zip

PRICE

min max

BEDROOMS

min - max

BATHROOMS

min - max

FT<sup>2</sup>

min max

AVAILABILITY

all dates

- ☐ cats ok
- ☐ dogs ok
- ☐ furnished
- ☐ no smoking
- ☐ wheelchair access
- ☐ EV charging
- ☐ no application fee
- ☐ no broker fee

- housing type
- laundry
- parking

OPEN HOUSE DATE

all dates

reset

update search



search apartments / housing for rent



save  
search

list



< prev

1 - 120 / 3000

next >

newest



★ Oct 8 8 WEEKS FREE RENT Studio loft, Balcony, Direct Entrance, Little House \$3,273 1br - 659ft<sup>2</sup> - (SOMA / south beach) pic

★ Oct 8 Artistic and Spacious One Bedroom with Balcony - A T L A S - \$3,710 1br - 725ft<sup>2</sup> - (oakland downtown) pic

★ Oct 8 Spooky sales on this 1x1 apartment with a courtyard view! \$2,402 1br - 732ft<sup>2</sup> - (san jose north) pic

★ Oct 8 Short Term Lease, Ceiling Fan, Large Closets \$1,940 2br - 760ft<sup>2</sup> - (fairfield / vacaville) pic

★ Oct 8 Beautiful Corner Unit with Wrap Around Balcony! \$3,970 2br - 1047ft<sup>2</sup> - (oakland downtown) pic

★ Oct 8 2BD/2BA With Washer/Dryer Located In Beautiful Sunny Hills! \$2,550 2br - 1000ft<sup>2</sup> - (san ramon) pic

★ Oct 8 Stop By Today & Save Big With This 2 Bedroom! Special Ends Soon! #835 \$2,547 2br - 1088ft<sup>2</sup> - (danville / san ramon) pic

★ Oct 8 2x2 Beautiful Home available now in Los Gatos! \$3,581 2br - 1123ft<sup>2</sup> - (los gatos) pic

★ Oct 8 Amazing Views from this Coveted Ark Apartment \$2,400 3br - 1500ft<sup>2</sup> - (pittsburg / antioch) pic

★ Oct 8 Incredible Bay and City Views from this Spacious Home! \$2,400 2br - 4000ft<sup>2</sup> - (san mateo) pic

★ Oct 8 Beautiful Remodeled 2BR/1BA \$2,520 2br - (san rafael) pic

★ Oct 8 This Upstairs apartment is conveniently located with easy access to 419 and 238 (napa county) pic

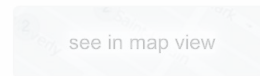
★ Oct 8 Incredible Private Cottage Retreat in Rural Angwin \$2,500 3br - (angwin) pic

★ Oct 8 1 Bed - 1 Bath, Ceiling Fan, Small Community Charm \$2,095 1br - 665ft<sup>2</sup> - (campbell) pic

★ Oct 8 These Prices Could Change Come Tomorrow! 🚫Lock it in Now! 🤖 \$3,094 2br - 941ft<sup>2</sup> - (san mateo) pic

★ Oct 8 Best Property In Pittsburg! \$1,795 1br - (pittsburg / antioch) pic

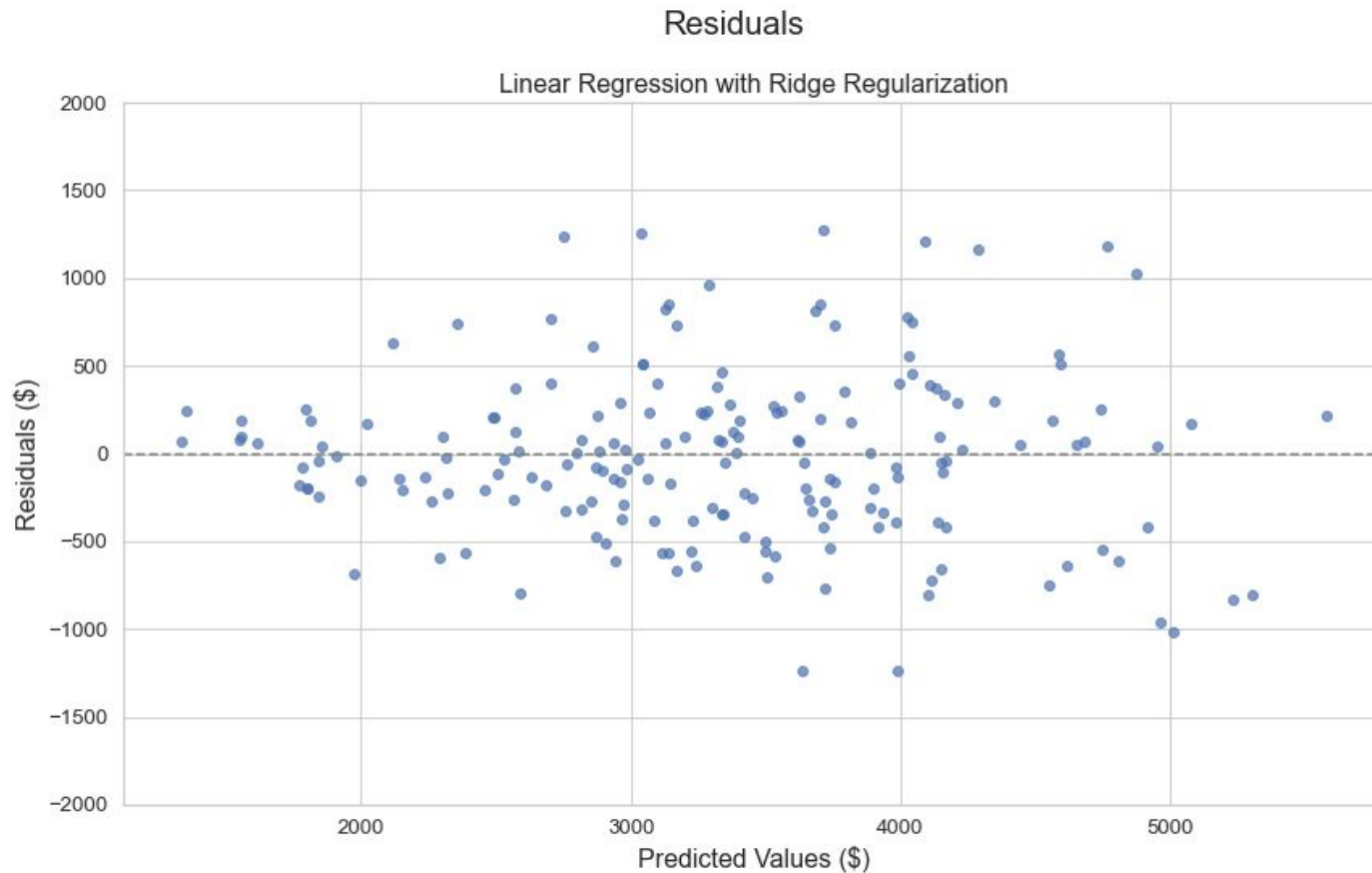
★ Oct 8 WANTED - A MODERN HOME THAT'S CLEAN AND KEPT UP \$1,000 3br - (pittsburg / antioch) pic



**Thank you!**  
**Chris Doenlen**  
**[GitHub Repository](#)**  
**[scrapfishies@gmail.com](mailto:scrapfishies@gmail.com)**  
**[@scrapfishies](#)**

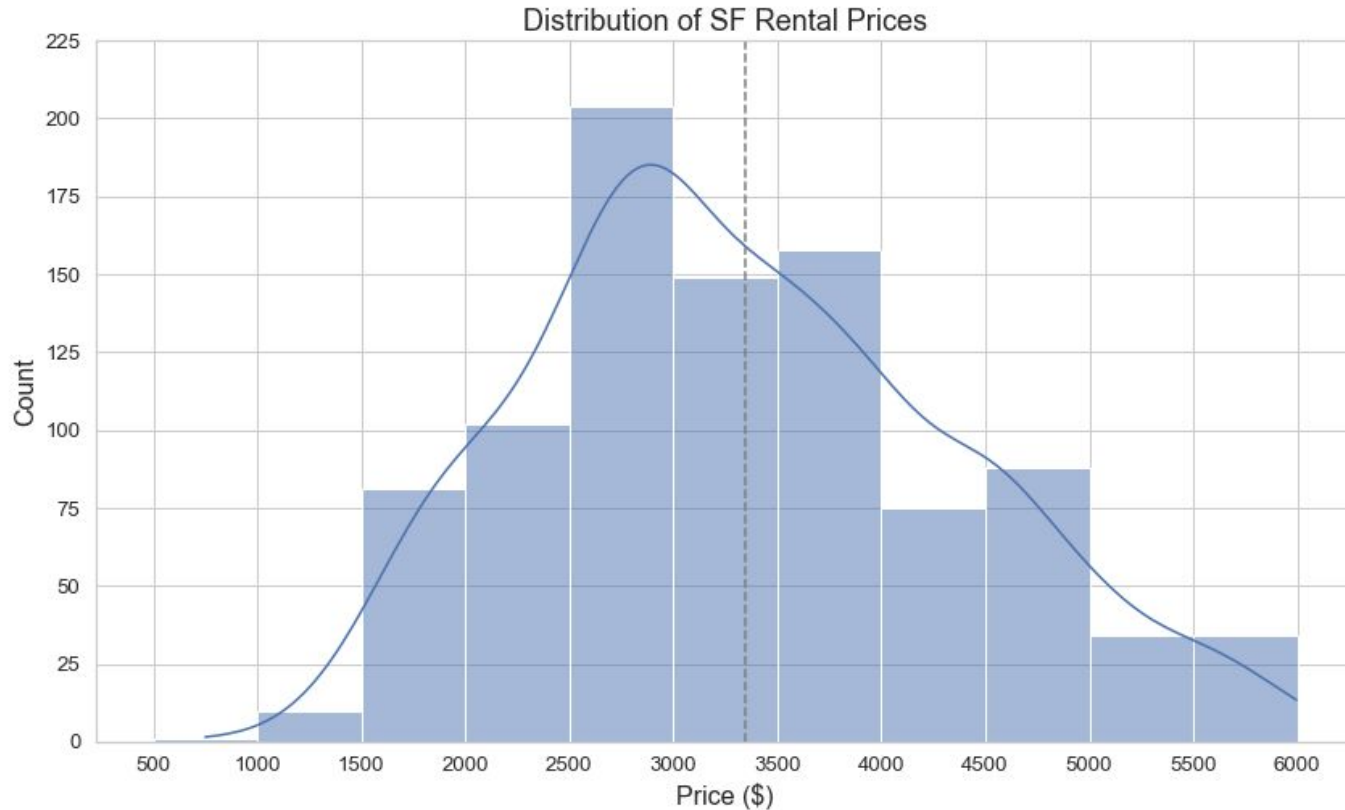
# APPENDIX A - Residuals plot of predicted values

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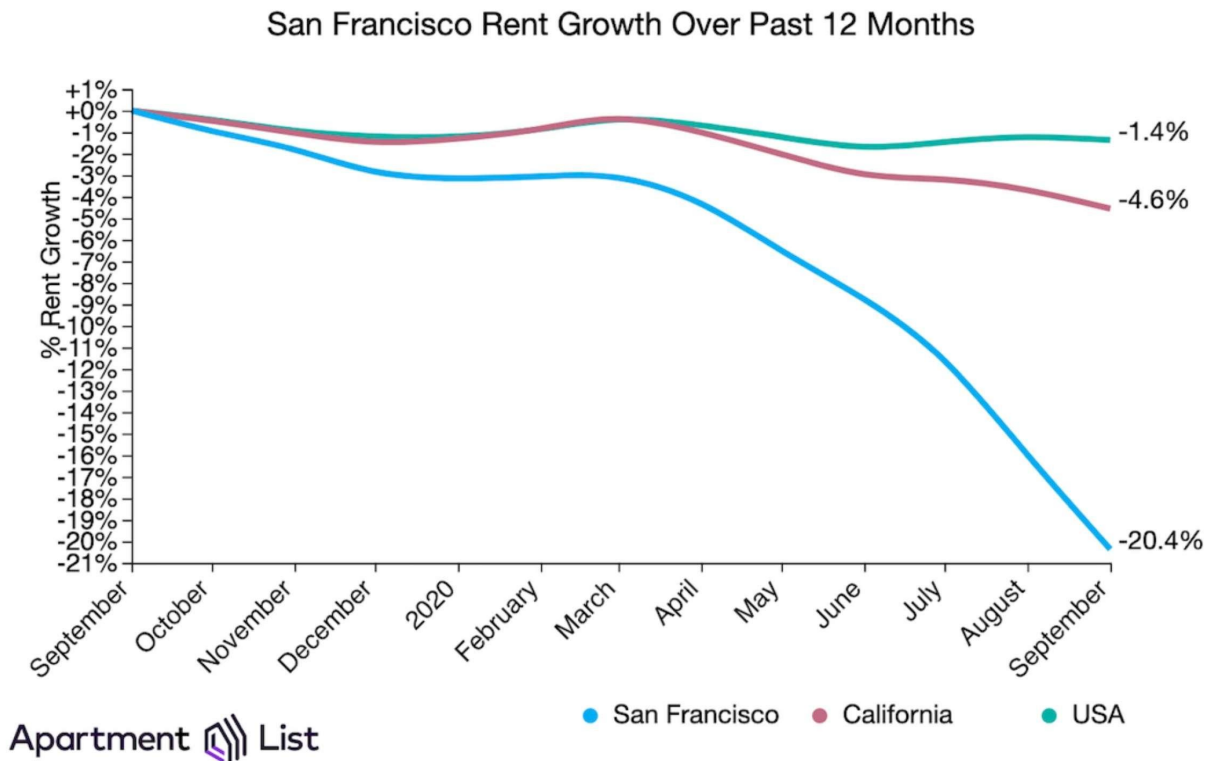


# APPENDIX B - Distribution of rental prices

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# APPENDIX C - Declining SF Rents



[Source: SF Chronicle](#)