

**“HOUSING PRICES IN SANTA CLARA COUNTY
AREA”**

MSIS 2629 Spring 2018

BY

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INTRODUCTION:

The topic for our project is 'Housing Prices In Santa Clara County Area.'

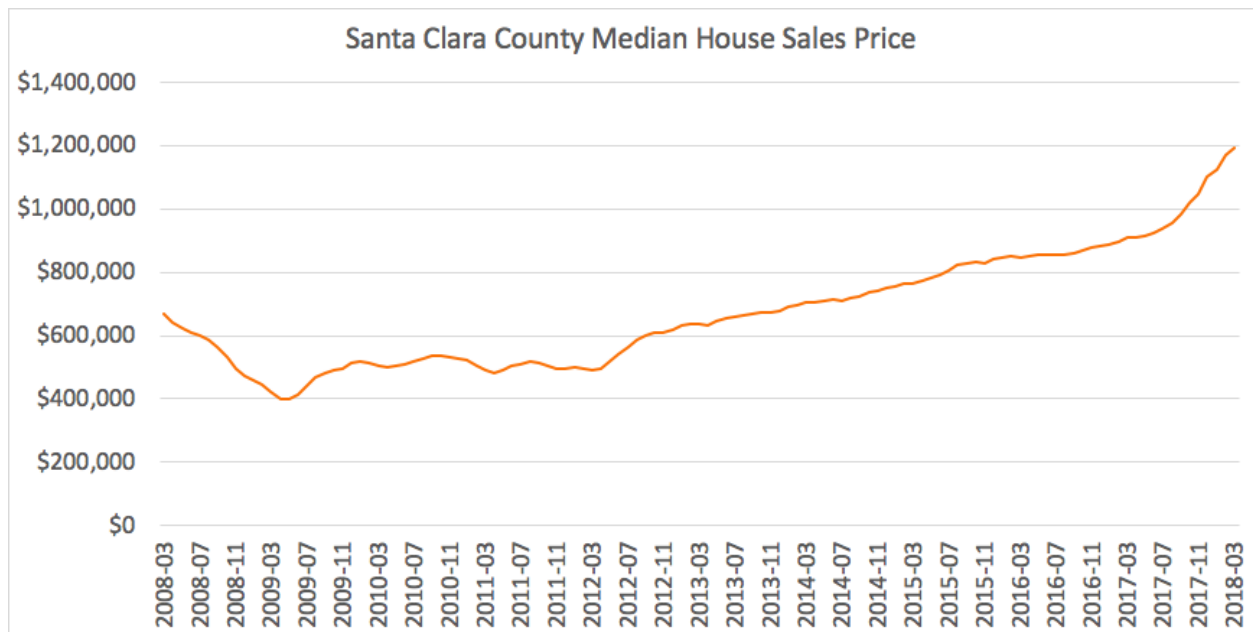
Everyone needs a place to live. Owning a house is an important dream for a lot of people. Along with providing basic shelter, having a good house affects our daily life in a significant number of ways, be it access to education, work, or recreation.

It isn't a new fact that the housing prices in the Bay Area have been skyrocketing over the last decade. The Bay Area is facing a major housing crisis and the prices here are much higher compared to those in other major cities in the USA. Some of the consequences of the increase in house prices is increase in commute length, exodus, etc.

So, we would like to inspect as to what drives these increased housing prices.

Some relevant visualizations supporting the above mentioned claims are as follows:

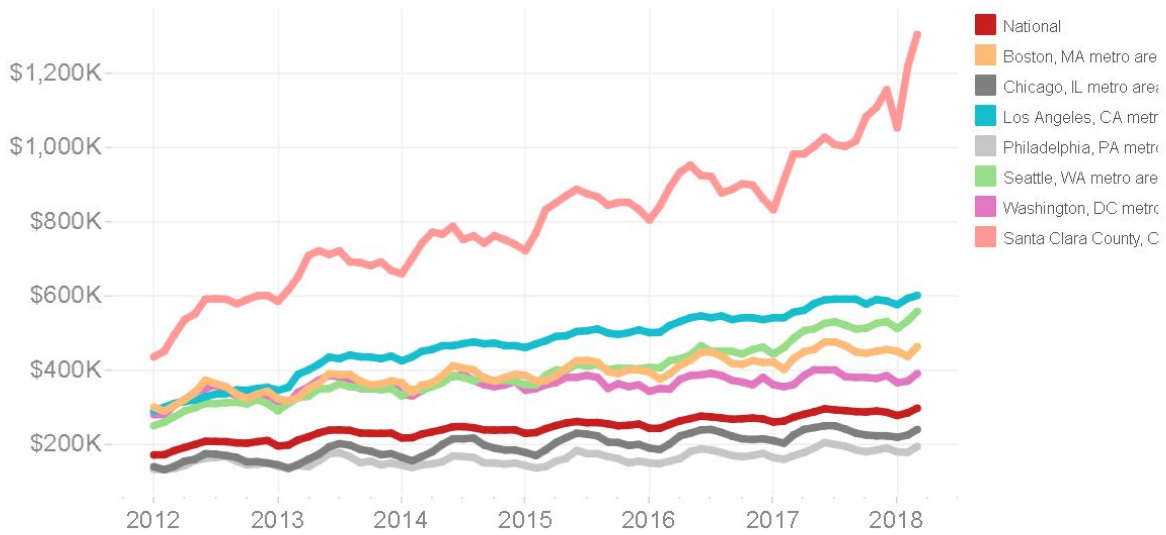
- The following chart shows the rise in home prices in Santa Clara County. It can be seen that in the last year the current typical home value in Santa Clara has risen above \$1 million.



- The comparison between Santa Clara County and USA as a whole shows a clear picture as to why the increase in house prices in the Bay Area is such a big issue¹

¹ <https://www.redfin.com/blog/data-center>

Median Sale Price











REDFIN

- The next chart shows that many workers employed with tech giants like Google, Amazon, Hulu, etc. cannot afford houses near their workplaces.²

Can CA tech workers afford to buy homes near their work?

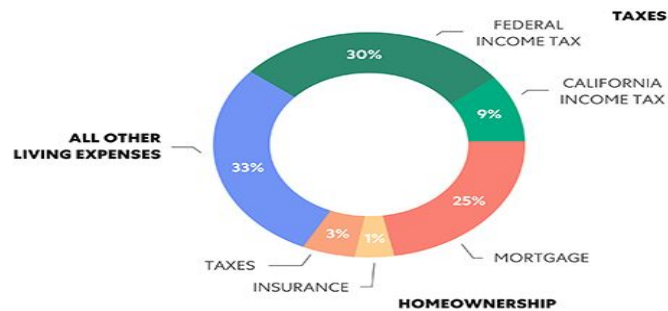
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We used the same 28% rule most lenders use to see if engineers could afford to buy homes with a short-ish commute

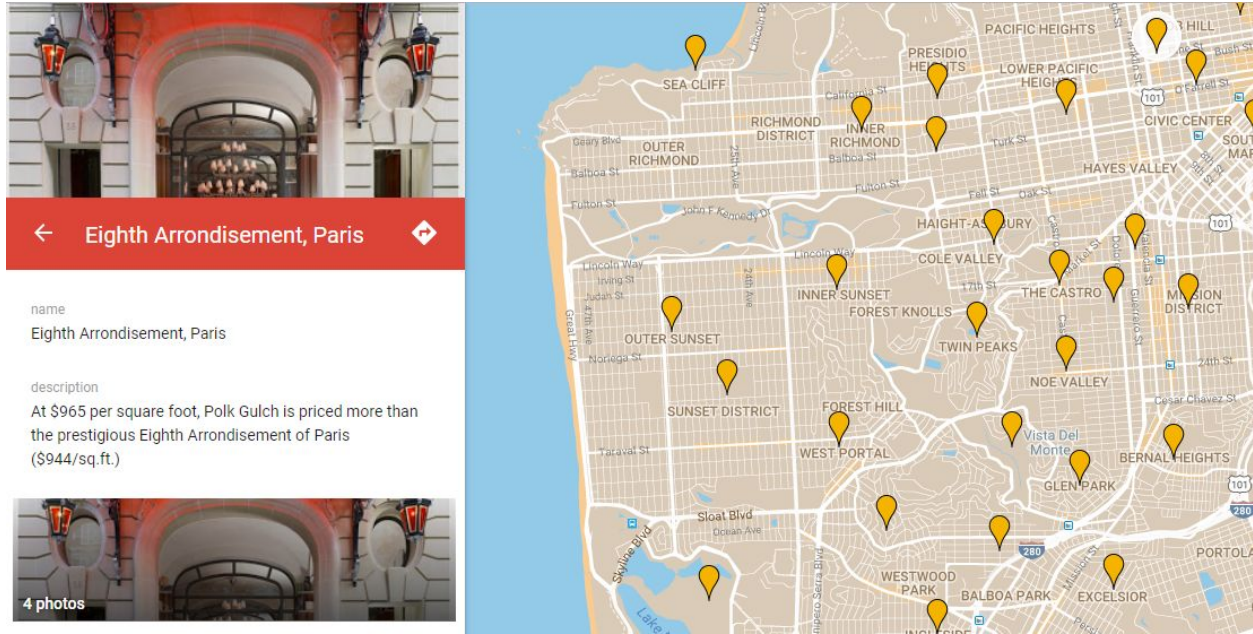
Headquarters	Median home price (20 minute commute)	Average Software Engineer Salary ¹	Monthly mortgage & taxes ¹	Home cost as a % of monthly income	
hulu Santa Monica - Los Angeles	\$1,052,500	\$129,000	\$4,713	44%	PROBABLY NOT
tinder West Hollywood - Los Angeles	\$941,250	\$125,000	\$4,178	40%	
 Playa Vista - Los Angeles	\$850,000	\$123,000	\$3,806	37%	
 Apple Cupertino - San Francisco	\$1,163,750	\$188,000	\$5,211	33%	
 reddit SOMA - San Francisco	\$1,200,000	\$198,000	\$5,263	32%	
Google Mountain View - San Francisco	\$1,255,000	\$212,000	\$5,619	32%	EHH
 Twitter Market St - San Francisco	\$1,207,500	\$209,000	\$5,296	30%	
 Facebook Menlo Park - San Francisco	\$1,233,500	\$221,000	\$5,431	29%	
BuzzFeed Hollywood - Los Angeles	\$828,125	\$154,000	\$3,708	29%	YEP
UBER Market St - San Francisco	\$1,207,500	\$246,000	\$5,296	26%	
 airbnb SOMA - San Francisco	\$1,197,500	\$287,000	\$5,252	22%	
 Snapchat Venice - Los Angeles	\$1,002,125	\$252,000	\$4,487	21%	
NETFLIX Hollywood - Los Angeles	\$798,000	\$264,000	\$3,573	16%	
 SPACEX Hawthorne - Los Angeles	\$493,250	\$179,000	\$2,209	15%	

How much home can you really afford?

Limiting your mortgage to 28% of your income helps make sure there's enough to go around for taxes, insurance, & other living expenses



Interestingly, a study from NeighborhoodX³ shows that every neighborhood in San Francisco area is equivalent to posh neighborhoods in some of the most exotic cities in the world like Rome, Florence, Madrid, Cannes etc.



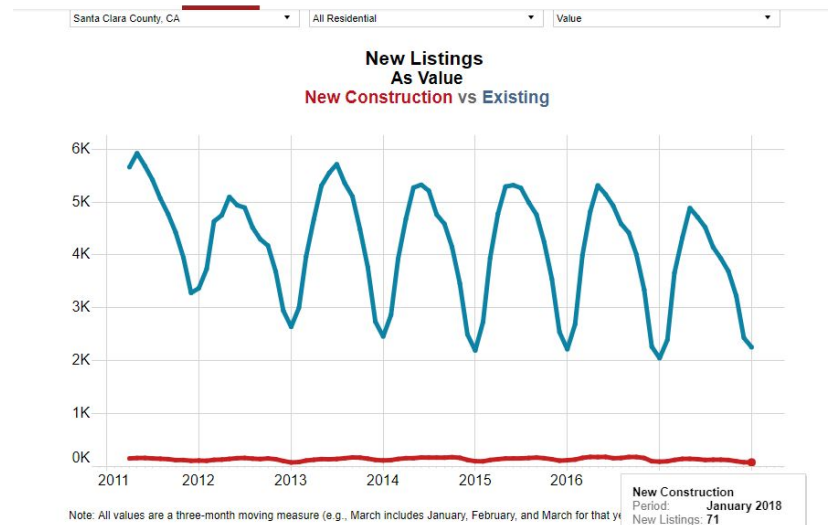
For the purpose of this project, we will focus on the Santa Clara County area. We would like to look at the house prices in this area over time and find the probable reasons for its increase and its impact through visualization of relevant data.

POTENTIAL FACTORS RELATED TO HOUSING PRICES

We would like to explore some subject matters that we think are related to housing prices in some way or another. They are as follows:

1. Lack of new construction:

Not enough homes are being built to accommodate the growing population. In this graph from Redfin, we can see how few listings are from new construction compared to reselling existing homes.⁴



2. Impact of local tax revenue on city planning:

Because of tax limits established in 1978 by Proposition 13, local governments generally receive more revenue from sales and hotel room taxes than property taxes. Proposition 13 limited property tax rates to 1% of a home's taxable value and restricted how quickly that taxable value could increase after a purchase.

Last year, Brisbane hired a consultant who found that the city would net \$1 million a year in tax revenue by approving the Baylands. But if the city instead approved a project with lots more commercial space, a larger hotel and no housing, Brisbane would gain \$9 million annually — an amount equivalent to more than half the city's current day-to-day operating budget.⁵

This shows that local governments have less incentive to approve residential houses, which has led to a shortage in new housing developments and an increase in the prices of the current houses in the area.

3. Rising job numbers:

⁴ <https://www.redfin.com/blog/data-center>

⁵

<http://www.latimes.com/politics/la-pol-ca-small-city-controls-big-housing-project-20170728-story.html>

Part of the problem is that while available housing has not increased much, there are constantly more jobs in the Bay Area, especially from tech companies, both large corporations and startups. Looking at the trend in job numbers will highlight why the lack of new housing has such an impact on the overall housing market.

4. School desirability:

One important factor that affects people's decision while buying houses is whether or not the house is within the boundary of schools with good API. A survey of nearly 1,000 prospective home buyers showed that 91 percent said school boundaries were important in their search.⁶

On average, homes in the best school districts are sold for higher prices as compared to similar homes in less popular school districts.

5. Housing Regulations

One of the main issues with housing availability is the low housing density in most of the Bay Area. Current regulations in many cities and neighborhoods often not only restrict the size of houses, but also the size of apartment buildings and condominiums. Restrictions on both new construction and expansions has hindered efforts to increase available housing.

6

<https://www.realtor.com/advice/buy/the-right-school-district-how-much-do-schools-affect-real-estate-prices/>

OUR PLAN OF ACTION

We would like to explore the relationship between house price and various factors that we have mentioned above, using the following datasets.

Description	Fields	Year	Granularity	Data Source
Zillow house prices	Median House Sales Price	2008-2018	Monthly Data, County Level	https://www.zillow.com/research/data/
Residential House Construction Permits	Categorizes the buildings by number of units	2000-2018	Monthly Data, County Level	https://www2.census.gov/econ/bps/County/
Current Job Numbers	Employment Amount, Job Category	1990-2018	Monthly Data, County Level	https://www.bls.gov/eag/eag.ca_sanjose_msa.htm
Population	Population Amount	1991-2016	Annual Data, County Level	http://www.labormarketinfo.edd.ca.gov
SAT scores by high school	School Name, District Name, County Name, Avg SAT Score (reading, writing, math)	2015-16 school year	Annual, School level	https://data.world/education/california-sat-report-2015-2016
Santa Clara County Public Schools	County, District School, Street, City, Zip, State	N/A	Annual Data, County Level	https://drive.google.com/open?id=1ESGa6zd7UG-2zRC3WWeLx0wDsRkvFFFP
Median Household Income	RegionID, Region Name, income	1979-2017	Quarterly income, Metropolitan Areas	https://www.zillow.com/research/data/

Our plan of action would be to analyze our datasets and try to find if our intuition regarding these datasets and their relationship with our main dataset- the Zillow dataset is right. Even though we have an idea as to how these matters will relate to each other, there is a high chance that they may interact in a counter-intuitive way. We would like to

inspect these relationships and try to come up with visualizations that will explain them in a simple and concrete way.

We would like to look at these relationships in particular:

- 'Current job numbers' with 'Residential House Construction Permits'
- 'Current total population' with 'Residential House Construction Permits'
- 'School ratings' with 'Zillow house prices'
- 'Zoning regulations' with 'Residential House Construction Permits'
- 'New housing construction' by time and city
- 'Median Household Income' with 'Zillow house prices' at a city level
- Housing purchases for foreign investments with 'Zillow house prices'
- Age of homeowners with 'Zillow house prices'
- 'House Price' with 'Exodus and commute'

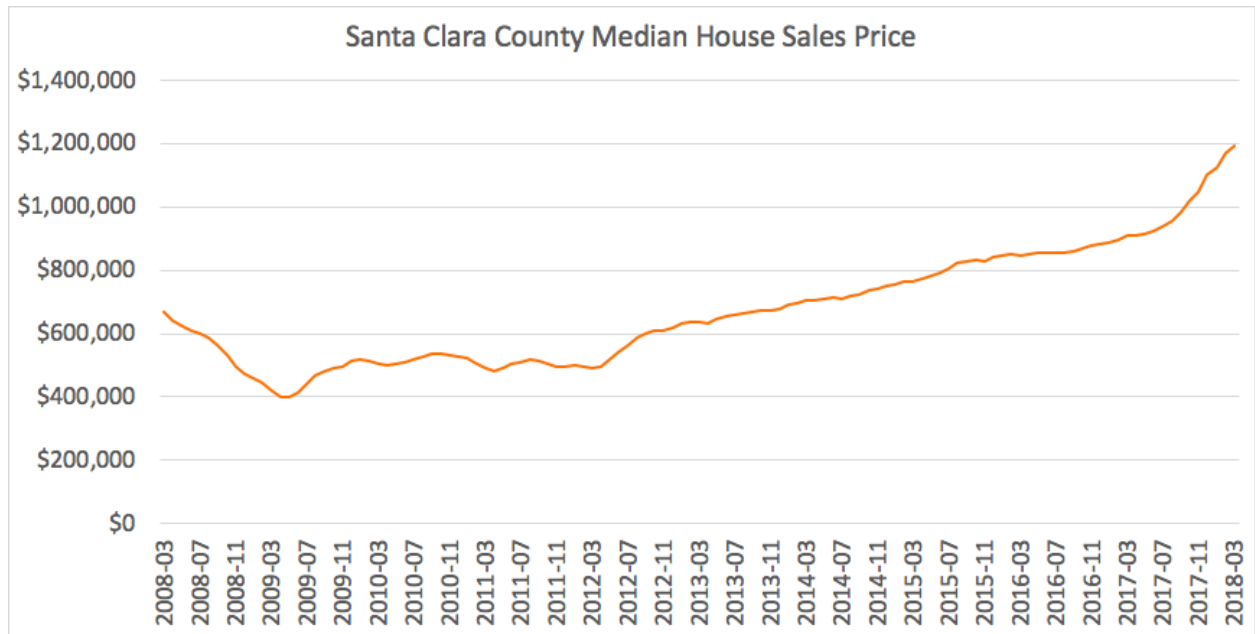
While we have datasets for most of these, we are still looking for some of them, either for topic, granularity, or comparable year.

A brief summary of all of our datasets is as follows:

1. Main Dataset:

For house prices, the main dataset we will be using is from Zillow Research. Compared to other data resources of Santa Clara County house prices, such as Census Bureau, S&P/Case-Shiller Home Price Indices, we found that Zillow has the most updated and county specific information. We define the "house price" as median sales price of all types of houses, which include single family house, condo and apartment. The frequency of the data is monthly.

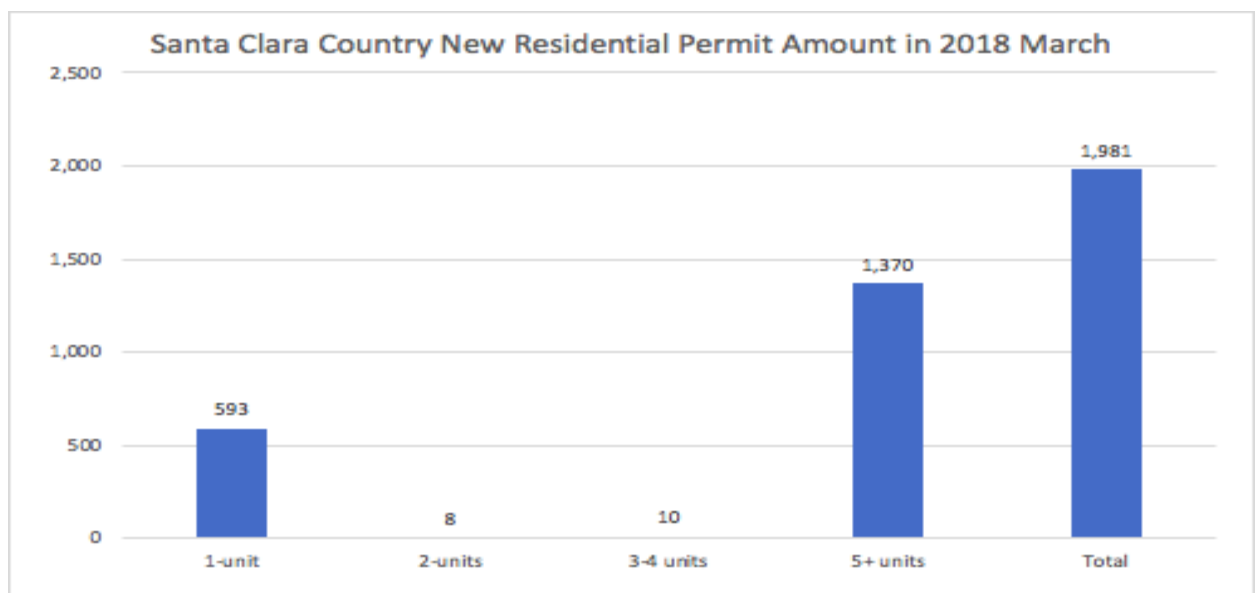
The following graph is obtained from our dataset. This graph shows the increase in the median house sale prices over the years.



⁷Monthly median house price in county in county level from Zillow Research

2. New residential house construction permit

For residential construction permit data, we have monthly data from the US Census Bureau. The monthly dataset categorizes the buildings by its number of units. The chart below demonstrates the information provided by the dataset:



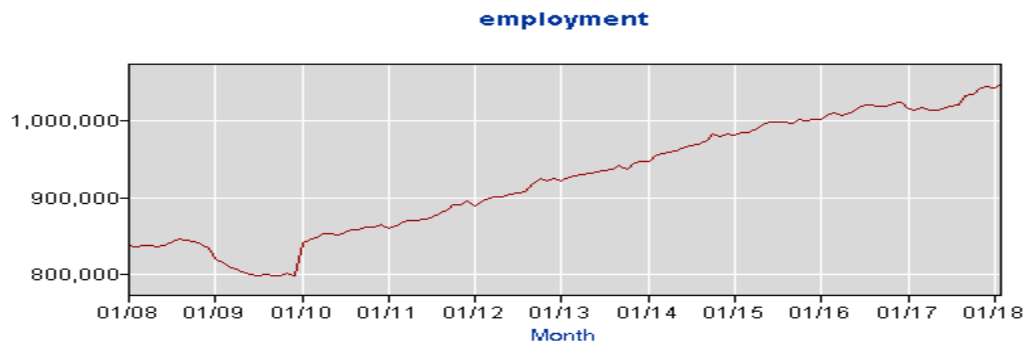
⁷ <https://www.zillow.com/research/data/>

Monthly residential construction permit data by county level from US Census Bureau.⁸

We also have data about houses, including house age, unit numbers, house size, and price.⁹

3. Current jobs and population

Current job numbers¹⁰ - This data set has monthly numbers of workers by occupational field in the San Jose-Sunnyvale-Santa Clara Metropolitan Statistical Area.



Current Population Estimates- These data set have yearly estimates of population by city for California.¹¹

⁸ <https://www2.census.gov/econ/bps/>

⁹

https://factfinder.census.gov/bkmk/table/1.0/en/ACS/16_5YR/DP04/0500000US06085

¹⁰ https://www.bls.gov/eag/eag.ca_sanjose_msa.htm

¹¹

<http://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/localAreaProfileQSMoreResult.asp?menuChoice=localAreaPro&criteria=population&categoryType=population+census+data&geogArea=0604000085&area=Santa+Clara+County×eries=populationTimeSeries>

5. School ratings: To see if house prices are related to school scores, we will combine the following datasets with the Zillow dataset:

A. Public schools dataset for Santa Clara County: This dataset has the following variables: County, District, School, Street, City, Zip & State ¹².

B. SAT Report¹³: In this dataset we have the SAT Scores of different high schools in California.

The combined dataset will have school name, SAT Score and price of houses in that area.

6. Income Statistics

Since the house prices are high, so we want to know the affordability situation for household change over time. So we are going to use median household income dataset from Zillow.¹⁴ This dataset comprises of RegionID, RegionName and quarterly income from 1979 to 2018.

Along with the above mentioned datasets, we are still looking for datasets for the following subjects:

1. Housing purchases as foreign investment

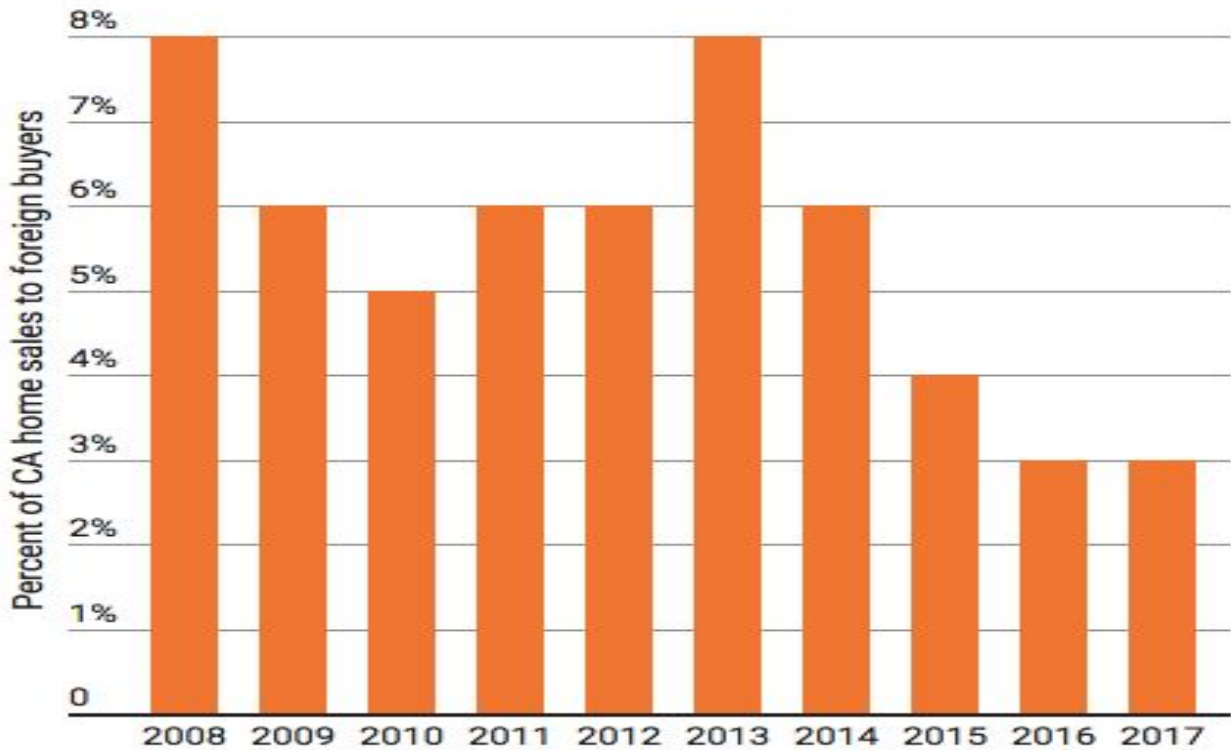
We would like to see if we can find a relationship between foreign investment in real estate and the increase in housing prices.

From a media report, we found the California Association of Realtors' estimates of the homes sold to foreign buyers.

¹² <https://drive.google.com/open?id=1ESga6zd7UG-2zRC3WWeLx0wDsRkvFFFP>

¹³ <https://data.world/education/california-sat-report-2015-2016>

¹⁴ <https://www.zillow.com/research/data/>



Source: California Association of Realtors.

¹⁵Reference: Data dig: Are foreign investors driving up real estate in your California neighborhood?

2. Zoning regulations

We are still looking for datasets about zoning regulations. While we have found some maps of zoning types and the Santa Clara County single-family house restrictions,¹⁶ none are for Santa Clara County.

3. Age of homeowners: The age group that makes up the most of the first time buyers is under-35 years. Amongst this group, homeownership has reduced from 43% in 2005 to

¹⁵

<https://calmatters.org/articles/data-dig-are-foreign-investors-driving-up-real-estate-in-your-california-neighborhood/>

¹⁶

https://www.sccgov.org/sites/dpd/DocsForms/Documents/Development_Standards_Residential.pdf

36%.¹⁷ We would like to see if there is any relationship between this decrease and the increasing house prices.

4. Exodus and Commute: Report suggests that since the past couple of years, residents of the Silicon Valley have started leaving this area due to the increase in housing prices, along with the lengthy commute hours and quality of living.¹⁸ We would like to analyze datasets related to this to see if there is any reverse effect of this exodus on the housing prices.

¹⁷

<https://www.theatlantic.com/business/archive/2014/10/what-will-it-take-for-millennials-to-become-homeowners/381730/>

¹⁸

<https://www.inc.com/jeremy-quittner/silicon-valley-loses-residents-as-regional-costs-soar.html>

REFERENCES

<https://calmatters.org/articles/data-dig-are-foreign-investors-driving-up-real-estate-in-your-california-neighborhood/>

<http://www.latimes.com/politics/la-pol-ca-small-city-controls-big-housing-project-20170728-story.html>

<https://www.mercurynews.com/2018/04/18/why-did-californias-major-housing-bill-fail-so-quickly/>

<http://www.newgeography.com/content/004165-the-evolving-urban-form-the-san-francisco-bay-area>