**PROJECT PROPOSAL**

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According to the California Association of Realtors, the median price of a single-family home in California was $849,080 in March 2022. However, decreased slightly to $806,490 by March 2024 after rapid increasing in the last 2022. Meanwhile, median personal income was $77,339 in 2022, and it trended upwards, adjusted for inflation and the increase in the minimum wage. Besides, the mortgage rate is also an important factor to afford a single-family home. In 2021, the average rates were the lowest, at 2.26% for a 15-year term and 2.98% for a 30-year term. However, today's rates have surged to nearly 6.57% for a 15-year fixed-rate mortgages and 7% for a 30-year fixed-rate mortgages. Our project is focused on analyzing the relationship between single-family home prices, personal income, and mortgage rates in California in order to conclude whether a Californian’s income is sufficient to afford to buy a house.

1. Research topic: **Income Housing Affordability in California**

The main question: Is Californian’s income sufficient to afford to buy a house?

1. Data sets
   1. Home values: the collection of single-family houses selling prices in the U.S. from 2000 until now. It’s categorized by state, county, and metro. The source of data comes from Zillow website https://www.zillow.com/research/data. This data provides valuable insights into the real estate market and properties trends over the years.
   2. Personal Income: the collection of personal income, population, per capita personal income from 2018 until 2022. The source of data comes from The Bureau of Economic Analysis website https://apps.bea.gov/itable. Personal income and home value are interconnected in affordable housing decision.
   3. 15-year & 30-year fixed rate mortgage average in the U.S. The source of data comes from Federal Reserve Bank of St. Louis website https://fred.stlouisfed.org/series/MORTGAGE15US. The data is about the rate mortgage average in the US from 1971 until now.
2. Data dictionary

3.1 Home values data

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| --- | --- | --- | --- |
|  | **Variable Name** | **Variable Type** | **Description** |
| 1 | RegionID | Integers | The unique ID for the regions |
| 2 | SizeRank | Integers | The ranking done based on the size of the region |
| 3 | RegionName | Character | Name of the County |
| 4 | RegionType | Character | Type of region is county |
| 5 | StateName | Character | Name of the State |
| 6 | StateCodeFIPS | Character | The ID for the states |
| 7 | MunicipalCodeFIPS | Integers |  |
| 8 | City | Character | The city where a house located |
| 9 | Metro | Character | The metro city around that region |
| 10 | CountyName | Character | Name of County where a house located |
| 11 | Months Column | Numeric | These columns contain the prices of region for every month since 2000 |

3.2 Personal income data

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Variable Name** | **Variable Type** | **Description** |
| 1 | GeoFips | Character | The unique ID for the county |
| 2 | GeoName | Character | Name of the county |
| 3 | LineCode | Integers | 1 – Personal income  2 – Population  3 – Per capita personal income |
| 4 | Year columns | Numeric | Median Income in 2018, 2019, 2020, 2021, 2022 |

3.2 15-year and 30-year fixed rate mortgage average in the U.S

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| --- | --- | --- | --- |
|  | **Variable Name** | **Variable Type** | **Description** |
| 1 | DATE | Date | Format dd/mm/yyyy |
| 2 | MORTGAGE30US | Numeric | 30-year Fixed Rate Mortgage Average |
| 3 | MORTGAGE15US | Numeric | 15-year Fixed Rate Mortgage Average |

1. Sub-questions:
   1. How has the median house price changed in California since 2018? Which county has experienced the highest increase in house pricing over the 2018-now period?
   2. How has the median personal income changed in California since 2018? In which county has the highest median personal income now?
   3. What is the ratio of median house price to median personal income in each county? In which county Californians can be easier to buy a house based on their salary?
   4. What is the growth in house prices compared to median personal incomes?
   5. How has the mortgage rate changed since 2018? Create a line plot and interpret the relationship between the median house price and mortgage.
   6. Conclusion.
2. References:
   1. BEA Interactive Data Application. (n.d.). https://apps.bea.gov/itable/
   2. California housing affordability improves in fourth-quarter 2021 as prices level off and incomes grow, C.A.R. reports: - Twenty-five percent of California households could afford to purchase the $797,470 median-priced home in the fourth quarter of 2021, up from 24 percent in third-quarter 2021 but down from 27 percent in fourth-quarter 2020. (2022, Feb 10). *PR Newswire* http://search.proquest.com.libaccess.sjlibrary.org/wire-feeds/california-housing-affordability-improves-fourth/docview/2627115422/se-2
   3. Cheaper mortgages and income growth improve housing affordability in third quarter, C.A.R. reports: - Thirty-one percent of California households could afford to purchase the $613,470 median-priced home in the third quarter of 2019, up from 30 percent in second-quarter 2019 and from 27 percent a year ago. (2019, Nov 07). *U.S.Newswire* http://search.proquest.com.libaccess.sjlibrary.org/wire-feeds/cheaper-mortgages-income-growth-improve-housing/docview/2312525337/se-2
   4. *February home sales and Price Report*. CALIFORNIA ASSOCIATION OF REALTORS®. (n.d.). https://www.car.org/aboutus/mediacenter/newsreleases/2024-News-Releases/feb2024sales
   5. *Federal Reserve Economic Data: Your trusted data source since 1991*. FRED Blog. (n.d.). https://fredblog.stlouisfed.org/2023/07/are-home-prices-decreasing/
   6. *15-year fixed rate mortgage average in the United States*. FRED. (2024, March 14). https://fred.stlouisfed.org/series/MORTGAGE15US
   7. *30-year fixed rate mortgage average in the United States*. FRED. (2024b, March 14). https://fred.stlouisfed.org/series/MORTGAGE30US
   8. Mallach, A. (2023). The United States Housing Affordability Crisis: NO EASY SOLUTIONS: The many dimensions of the crisis, the impact of the pandemic, and what will really make a difference. *Public Management*, *105*(12), 12-.
   9. *Housing Data*. Zillow. (n.d.). https://www.zillow.com/research/data/