**Foreclosure Property Patterns in Los Angeles  
County Using SAC**

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**Abstract:** This paper uses data set from pre covid and during the time of covid to compare the foreclosures in order to forecast and analyze future foreclosures based on zip code and lender. The data contains single-family properties, multi-family properties, and vacant residential properties from 2019 to 2020. These foreclosures are based in Los Angeles Housing Department (LAHD). The data provides a forecasting method and a prototype model of analysis of the great Los Angeles area. Furthermore, this data is analyzed using SAP Analytics Cloud (SAC), with graphics such as timelines and charts displaying LAHD foreclose properties.

1. **Introduction**

The data of Los Angeles foreclosures in the United States is processed and shown in this study using SAP Analytics Cloud. The data was obtained from the website lacity.org and it mainly consists of information on foreclosures in the provided year, lender contact, property address, property type, and property management contact information. We have used pre covid crisis 2019 data versus mid covid crisis 2020 data. We have chosen foreclosures to see how the market was affected given how covid has impacted the housing market.

1. **Related Work**

Los Angeles is well-known across the world as the film and entertainment capital of the world. A healthy housing market is one that is supported by job opportunities, population expansion, tourism, and a strong economy. The housing market in Los Angeles has always been one of the largest and most competitive in the country. The forecast for the Los Angeles real estate market in 2019 and beyond was relatively bright prior to the pandemic [5].

The COVID-19 pandemic has affected every aspect of life and industry. It's no different in the real estate industry. The housing market has been damaged by the crisis. As a result of stay-at-home orders, pending residential sales fell 25.6% in April 2020 compared to March [3]. Mortgage interest rates have fallen since the Federal Reserve cut its interest rate to near zero. Buyers frequently find this intriguing. Lenders, on the other hand, are getting more selective when it comes to accepting applications. Both the minimum down payment and the minimum FICO score are increasing.

RealtyTrac used bubbles on the map of Los Angeles to show all the foreclosures in the area [4]. This is similar to the bubbles we used in SAC. Los Angeles Housing Department used different types of visualizations to show foreclosures in Los Angeles [1] [2]. In comparison to our analysis, we were able to extend to the end of 2020 and include data collection/modeling, charts, regression, classification, and time series forecasting to compare the data sets from 2019 and 2020 in order to forecast for 2022.

1. **Specifications**

The data was collected from LA County public website: www.data.lacity.org under their Housing and Real Estate section. We choose to analyze and visualized the data in a way that can easy help future and existing homeowners find out the foreclosure data based on their cities and zip codes. We also want to see what the effect on the mortgage relief program implemented at the beginning of the covid-19 pandemic by the government had on preventing foreclosure in 2020. The data is published every year and is readily available to be able to continue the analysis year over year. A historical and predictive analysis can be conducted with the available data. We are concentrating our analysis based on property address, property type, property counsel district, lender and property on the map data for 2019 and 2020.

|  |  |
| --- | --- |
| Data Set | Data Size |
| 2019 Registered Foreclosure Properties | 509 KB |
| 2020 Registered Foreclosure Properties | 809 KB |

Table 1. Data Specifications

1. **Implementation Flowchart**

The raw dataset downloaded from Los Angeles Housing Department comprised of Foreclosure properties registered in LAHD from 01-01-2019 to 12-31-2019 and from 01-01-2020 to 12-31-2020. The process of data manipulation is shown in the flowchart below. The dataset being used was provided in two CSV files. The data files were uploaded to SAP Analytics cloud which was used to clean and create a story with models. The models were then exported to be used in the PowerPoint.

Diagram

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Figure 1. Implementation Flowchart

1. **Data Cleaning**

The CSV file was uploaded onto SAC as a datasheet. The first step is cleaning the data in order to upload it. We deleted columns J to O: Lender Contact, Lender Contact Phone, Property Management, Property Management Contact, Property Management Address, and Property Management Contact Phone. We also deleted all the blank cells. This portion of the data was removed as it was skewing the results when used in certain models. The dataset was then ready for use in to create a story in SAC.

1. **Analysis and Visualization**

After data cleaning and determining what data would best describe our analysis, the data model was created for 2019 and 2020 foreclosure data on SAP Analytics Cloud that provided a visual representation of total foreclosed properties, the lender with the most properties foreclosed, and the ability to hone into the date using a filter by zip code. A predictive model was also created that will tell which cities are forecasted to have the most foreclosed properties in coming years.

Map

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Figure 2. 2019 vs 2020 total number of foreclose properties in LA County

**6.1**

The first visualization (Figure 2), a Geo-Map was created in SAP Analytics Cloud and shows the total of foreclosed properties for the Los Angeles County for 2019 and 2020. The data shows that pre covid-19 pandemic the total number of foreclosures were 2868 for the year 2019. Total foreclosed properties in 2020 during the beginning of the pandemic and the economy shut down the total number of foreclosed properties decreased to 2684. Proving that the mortgage relief program implemented by the government help homeowners keep their properties from foreclosure. The Geo-Map created has a filter by zip code that can hone into the specific location and number of foreclosed properties on any given zip code in the Los Angeles County area for those interested in knowing if a home you are interested in buying or already own was previously foreclosed or not.

**6.2**

The two visuals are bar charts that were created in SAC. They show the difference in zip codes with different property types and lenders during the timeline of 2019/2020. The bar chart is clearly labeled and shows that the top 5 lenders changed in both years. As well as the property type has not changed in that single family home are the common higher foreclosed property. In 2019 the pandemic helped lower the foreclosure seen with the top 5 in figure. But in 2020 seen through figure we can see an increase in the leader's adding foreclosure as well as the overall foreclosures.

A picture containing table

Description automatically generated

Table

Description automatically generated with medium confidence

Figure 3. 2019 vs. 2020 bar charts

**6.3**

The pie charts were also created on SAC. They demonstrate the foreclosure companies that work within the city of Los Angeles. As seen in 2019 the top 3 were select portfolio servicing, ocwne loan service LLC, and Mr. Cooper LLC. In 2020 those 2 changes with Nationstar mortgage LLC, PHH mortgage corporation and select portfolio servicing. As seen the top foreclosure company in 2019 became the third largest in 2020. This shows that not only sold a lot of their portfolio but the others that gained in 2020 had a lot more foreclosure in their portfolio or bought up a lot of foreclosures in the market.

Chart

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Chart, sunburst chart

Description automatically generated

Figure 4. 2019 vs. 2020 pie chart foreclosure companies

**6.4**

These two pie charts were created on SAC. They verify that the property types are being sold in foreclosure. They confirm that single family properties are the most common foreclosure property. The change came in 2020 where we can observe a change in the multi-family properties that is described as building with more than 3 apartments. Taking all that into account it really did not change the overall demographic within the foreclosure market with single family properties being the most common property foreclosed.

Chart, sunburst chart

Description automatically generated

Chart, sunburst chart

Description automatically generated

Figure 5. 2019 vs. 2020 pie chart property type in foreclosure  
**6.5**

The graphs below show the time series analysis and forecast for 2019 and 2020 foreclosure properties. They show council districts and property zip code per registered date. In 2019 we can observe a high average in the forecast with property zip codes. Which correlates current events as many lost jobs or lower hours, so they took less home. This in effect changed the forecast because house foreclosure was on the rise. In 2020 the foreclosure forecast shows a lower than average. This correlates with the governmental foreclosure help that the CARE act provided. It paused foreclosure process and helped save some homeowners by providing different options.

Chart, box and whisker chart

Description automatically generated

A picture containing box and whisker chart

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Figure 6. 2019 vs. 2020 time series to forecast

**6.6**

Using the Los Angeles County foreclosure date for 2020 a predictive by city foreclosure model was created using regression analysis. The Council District is used as the predictive goal. The root mean square error (RMSE) came to 2.28, were the closer to zero it is, the better the model due to fewer errors. The low score showcased how minimal the error is in the model when comparing predictive vs. actual data. Prediction confidence is 91.10%. Prediction confidence measures if the predictive model can make the predictions with reliability; 100% is ideal. In figure 8, we can also see the influencers that contributed to the analysis as well as the predicted vs actual chart that shows the Validation Errors. The predictive values model is visualized by the story with the doughnut chart (Figure 9), illustrates that the main 3 cities predicted to have the most foreclosure properties are Los Angeles, San Pedro and Van Nuys.

Graphical user interface, application

Description automatically generated

Figure 7. Regression: Global performance indicators

Chart, line chart

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Figure 8. Regression: Influencer contribution

Chart, sunburst chart

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Figure 9. Predicted cities with the most foreclosures

1. **Conclusion**

Finally to sum up our analysis, we can conclude that foreclosures are forecasted to increase in 2021 and onward. The analysis shows that the number of foreclosures decreased in 2020 due to the government mortgage relief program. However, the number of foreclosures is predicted to increase in certain cities more than others due to income disparity and current economic conditions. Ultimately, this is the sellers’ market.

1. **References**

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