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AMPS Project

Ask the Question

For my AMPS project I decided to try to answer the question “What variables predict real estate prices?”. The variables that I was looking to test included Stock Market performance, Interest Rates, and local crime rates. When I initially posed this question I was looking to see if these variables could be used to accurately depict the price of housing, mostly viewing R square. However, as I began to work with the data I had collected I began to shift how I wanted to answer this question. I began to look for variables that gave a good representation of how the housing prices would move (either up or down). However, I still completed the regressions to give myself an idea of the full relationship. My hypothesis for what will happen is that there is some correlation in relation to the local crime numbers and real estate prices. I also believe that the performance of the stock market as well as the movement of interest rates will be solid indicators on the directional movement of the real estate prices.

Master the Data

To answer this question, I collected data on the median price of Louisville housing between 2018-2020, which I was able to gather from “Realtor.com”. Furthermore, I collected the prior months closing price for the S&P 500 for each month from May2018-Dec2020. I did the same thing for Violent Crime and monthly Interest Rates, all sources used are reputable and are listed at the end of this report. I decided to use these variables because I believe they are typically relevant to the housing market and what people are willing to spend, speaking mostly to interest rates and market success, as well as relevant to our community, speaking mostly to the violent crime numbers that are beautiful city suffers from. To get a full idea of the relationships between all of these variables I decided to run a regression on all three as well as comparative sparklines. I used the sparklines to show the correlation in their movement. I used the regression to see the more scientific break down of the relationship these variables shared.

Perform the Analysis

All regression and charts are in matching order and number at the bottom.

A)

My first analysis is over my regression and sparklines for the correlation between Median Louisville Home prices and the monthly performance of the S&P 500. This one showed that there was only a small correlation between the two variables. The R-square was 7.4% which means that it is almost useless as a predictor. However, the T-Stat is at 1.55 and the “significance f” is at 13% which isn’t what is needed to be in impact or considered statistically significant, but it does show that some inkling of a relationship is present. This relationship can be seen when studying the sparklines. When looking at this chart you can see that the prior months S&P performance moves in the same direction as the housing prices nearly 68% of the time. While I do still consider this a failure in regard to my hypothesis, I was pleased to see that it wasn’t a total failure and some relationship did exist.

B)

My second regression and sparkline chart was to test the relationship of Interest Rates and the housing prices. For this one the R-square was another dismal 9.5% which shows only a slightly higher relationship than the S&P. It also has very poor scores on the significance “f” and the T-stat. However, it shows a comparably strong correlation in regard to matching the movement of the Housing prices for Louisville. When doing this sparkline set I decided that an inverse relationship is what someone would expect so knowing this it also had a 68% success rate as a predictor. I view this as a partial success for predicting but not one that is strong enough to truly rely on in business.

C)

My final regression was regarding violent crime rates. This was my most successful regression of the project. The R-square was an unimpressive 11.8%, However, the significance F sits at a 5.4% and the T-stat at 2.005. I read this as the rate of violent crimes in the Louisville area, while not having a strong direct relationship, is nearly statistically significant to the housing market price. Furthermore, with the 2.005 T-stat it shows that it does have a legitimate impact on the price. This also had over a 77% success rate of predicting the direction in which the housing price would go. While this was not an overwhelming success, I do consider this a step in the right direction and I was happy to see the interaction between these two variables.

Share the Story

Over the course of this project it is clear that none of my variables were outstanding success stories; However, each one of them was able to predict the direction of housing prices with some degree of accuracy. I believe that my variables were not far off, however I recommend that going forward we attempt to collect similar variables that are taken closer to home. Instead of using the S&P 500 we should try and look at more relevant local incomes and other economic variables. As for the Violent Crimes Variable I believe that we are very close and that maybe separate number within this statistic could give us a more reliable prediction. In the meantime however by looking at Violent Crime Rate we should have a good idea of which way the housing prices will be going.

Regression Summaries

1. S&P Regression

Graphical user interface, application, table, Excel

Description automatically generated

Table

Description automatically generated

B) Interest Rate Regression



C) Violent Crimes Regression 



Sources

<http://www.freddiemac.com/pmms/pmms30.html>

<https://www.louisville-police.org/ArchiveCenter/ViewFile/Item/85>

<https://www.realtor.com/realestateandhomes-search/Louisville_KY/overview>

<https://finance.yahoo.com/quote/%5EGSPC/history?period1=1461888000&period2=1619654400&interval=1mo&filter=history&frequency=1mo&includeAdjustedClose=true>