Relationship between the US Unemployment Rate and Median House Sale Price in the US.

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Introduction

Unemployment is an important indicators used to explain US economy performance, and it is proved to be highly correlated to recession. On the other hand, Housing market is always involved either directly or indirectly in US recession, especially in 2008.

This analysis wants to explore whether housing price can be used an a predictor to US recession (using umeployment rate to represent the recession cycle). They are very likely to have a negative correlation as housing market usually goes down when unemployment goes up. It's also very likely there would be lagging effects between the two, as housing market usually starts to go down before umemployment starts to go up. If there are measurable lags, how many months would that be?

Exploratory Analysis

This shows the Time Series Plot of Raw data, and the stationary analysis of raw data and their first difference.

The following table represents the stationary analysis:

Table 1: Stationary Analysis

Description	P-Value	Result
Unemployment Rate	0.017	stationary
Median Housing Price Over Time	0.997	non-stationary
First diff of housing Price	0.0	stationary
Return of housing Price	0.0	stationary

Correlation Analysis of Raw data and First Difference

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Figure 1: Unemployment Vs. House Price

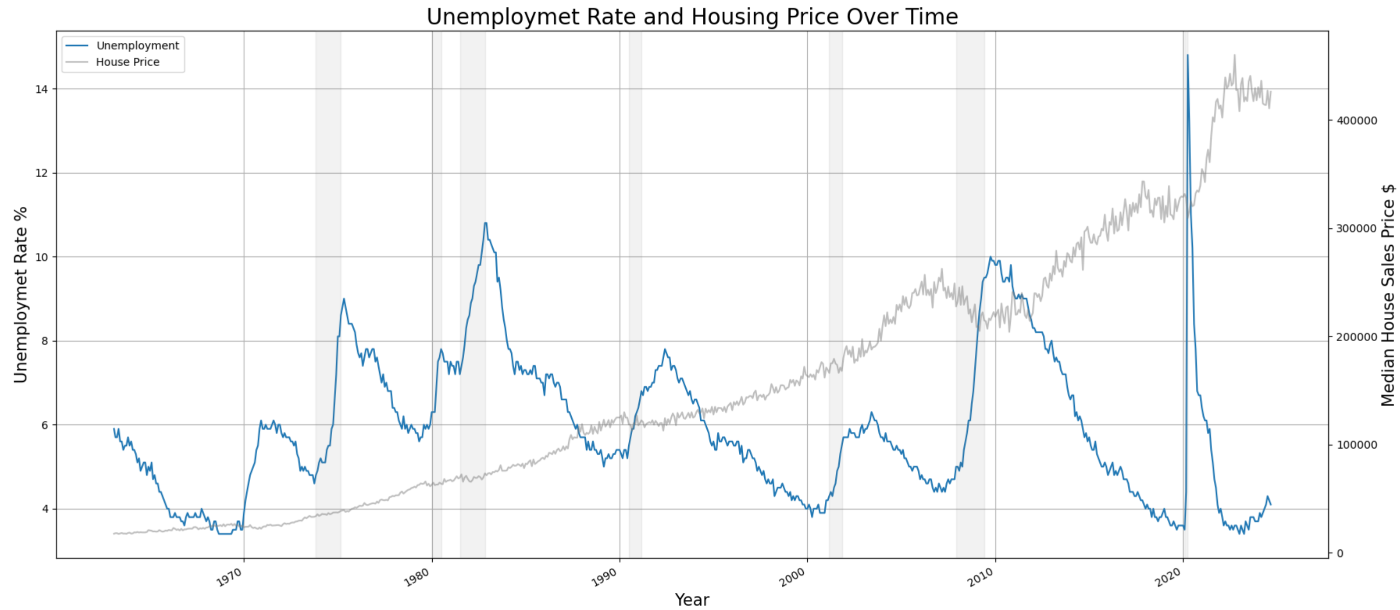


Figure 2: Correlation Plot of Raw data and First Difference

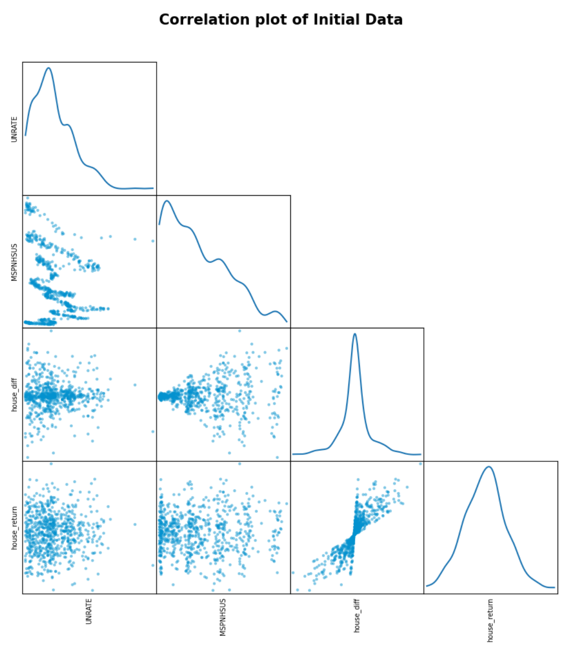
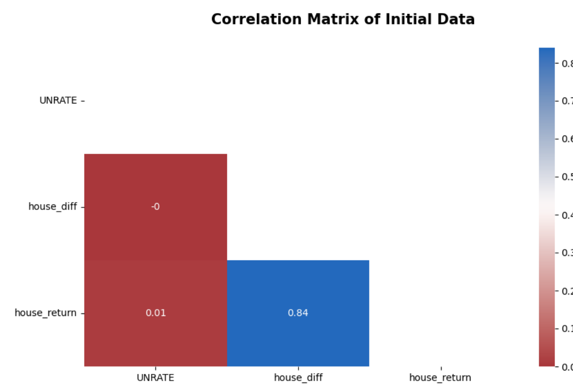


Figure 3: Correlation Matrix of Raw data and First Difference



Regression Analysis

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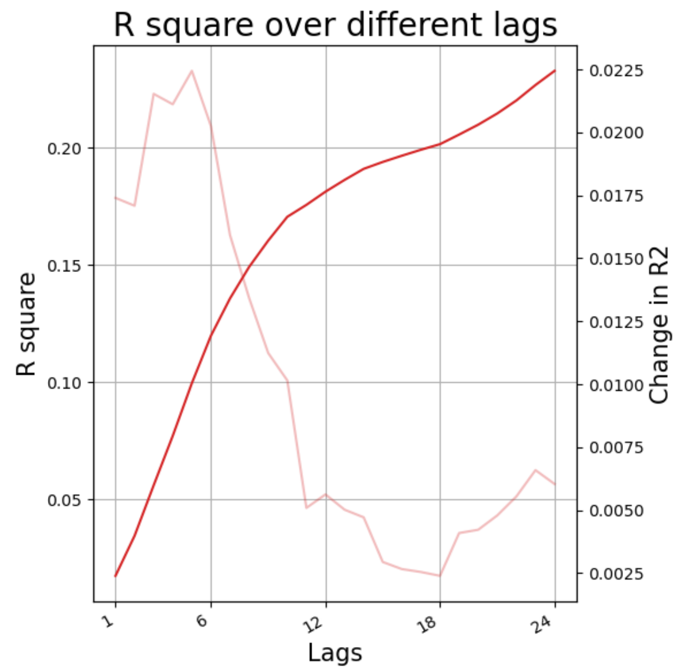
Table 2: Regression and Lags

Total Lag	R2	Change in R2
1.0	0.017	0.017
2.0	0.034	0.017
3.0	0.056	0.022
4.0	0.077	0.021
5.0	0.1	0.022
6.0	0.12	0.02
7.0	0.136	0.016
8.0	0.149	0.013
9.0	0.16	0.011
10.0	0.171	0.01
11.0	0.176	0.005
12.0	0.181	0.006
13.0	0.186	0.005
14.0	0.191	0.005
15.0	0.194	0.003
16.0	0.197	0.003
17.0	0.199	0.003
18.0	0.202	0.002
19.0	0.206	0.004
20.0	0.21	0.004
21.0	0.215	0.005
22.0	0.22	0.006
23.0	0.227	0.007
24.0	0.233	0.006

Figure 4: Change in R2 Over Lags



Correlation with Optimized Lag

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Conclusion

Based on analysis above, it is statistically confident enough to say that housing price is a predictor of the unemployment rate with 11 month lags.

Figure 5: Correlation Plot After Lag

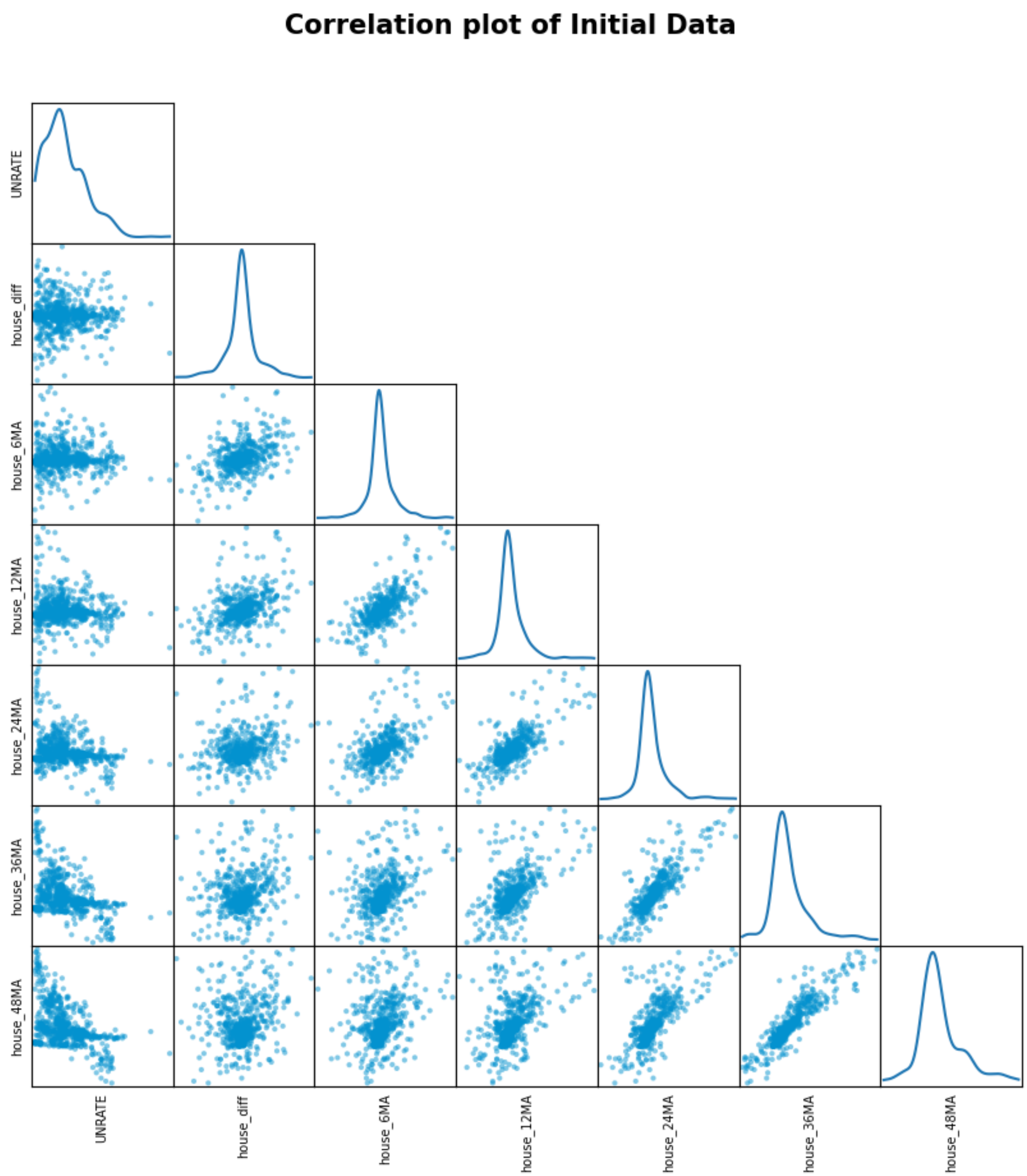

Figure 6: Correlation Matrix After Lag

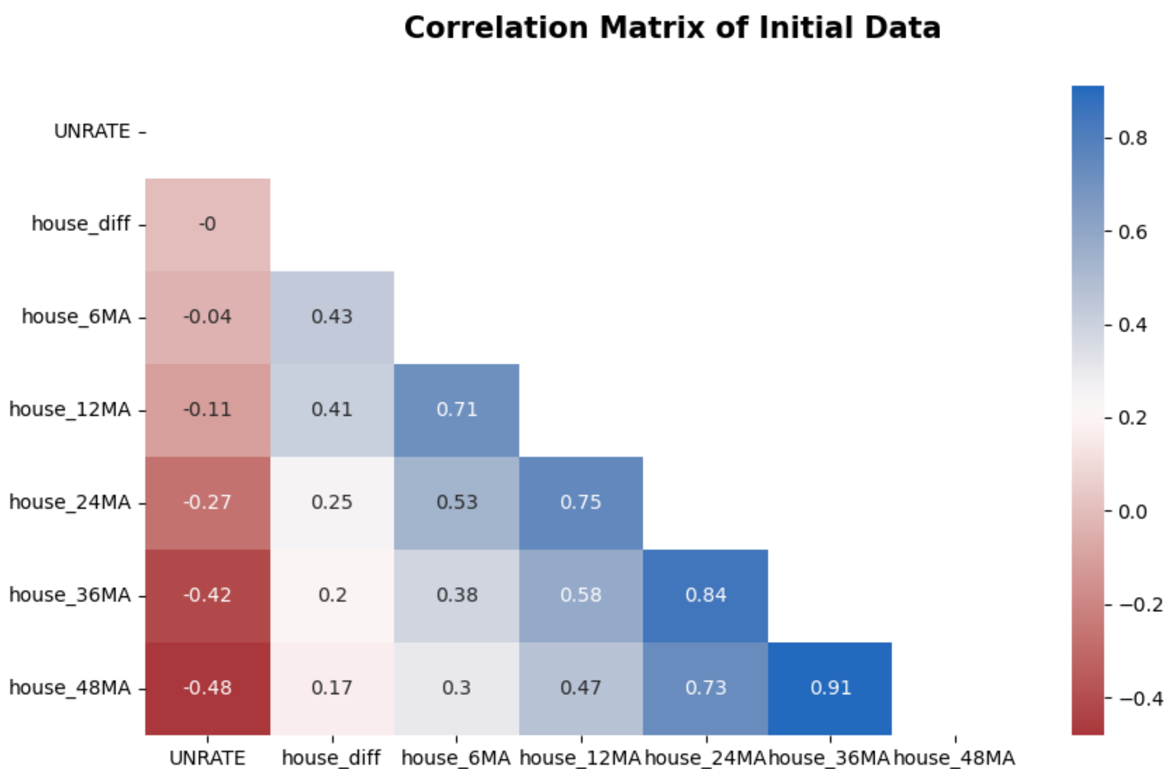

Figure 7: Unemployment Rate Vs. House Price with 11 lags