Nasdaq Real Estate Data Cleaning

PROJECT 1 – ASHLI BEN, LOVEPREET SINGH, OMAR SALLOUM, ALEXANDRU ARNAUTU.

Our client is a real estate Tycoon, they have asked us to look up housing prices in the States over the past decade, so they can then use our data to invest in the housing market.

Original Data Frame

	indicator_id	price	property type	state	year
0	Z5BR	652999	5+ bedroom homes	Connecticut	2020
1	Z4BR	385419	4 bedroom homes	Connecticut	2020
5	ZCON	164682	condos	Connecticut	2020
6	Z2BR	189335	2 bedroom homes	Connecticut	2020
7	Z1BR	120871	1 bedroom homes	Connecticut	2020
...	...	...	...	...	...
149650	Z4BR	311931	4 bedroom homes	North Dakota	2022
149651	Z4BR	311247	4 bedroom homes	North Dakota	2022
149652	Z4BR	311263	4 bedroom homes	North Dakota	2022
149653	Z4BR	311608	4 bedroom homes	North Dakota	2022
149654	Z4BR	312162	4 bedroom homes	North Dakota	2022

This Data Frame displayed the average monthly price of homes per property type and state

Annual Growth Rates Data Frame

|	state	1 bedroom homes avg yearly % change	2 bedroom homes avg yearly % change	3 bedroom homes avg yearly % change	4 bedroom homes avg yearly % change	5+ bedroom homes avg yearly % change	condos avg yearly % change
0	Alabama	6.754435	7.330058	6.729280	6.053182	5.770018	6.922038
1	Alaska	3.259490	2.521204	3.482407	3.353077	3.222452	2.657730
2	Arizona	13.625338	11.945907	12.456396	11.389624	10.418704	12.633459
3	Arkansas	7.220570	7.102306	6.129186	5.613806	5.469927	6.191088
4	California	11.442154	10.855382	10.381889	9.515422	9.173108	9.861814

Displayed the Average annual growth rate per State
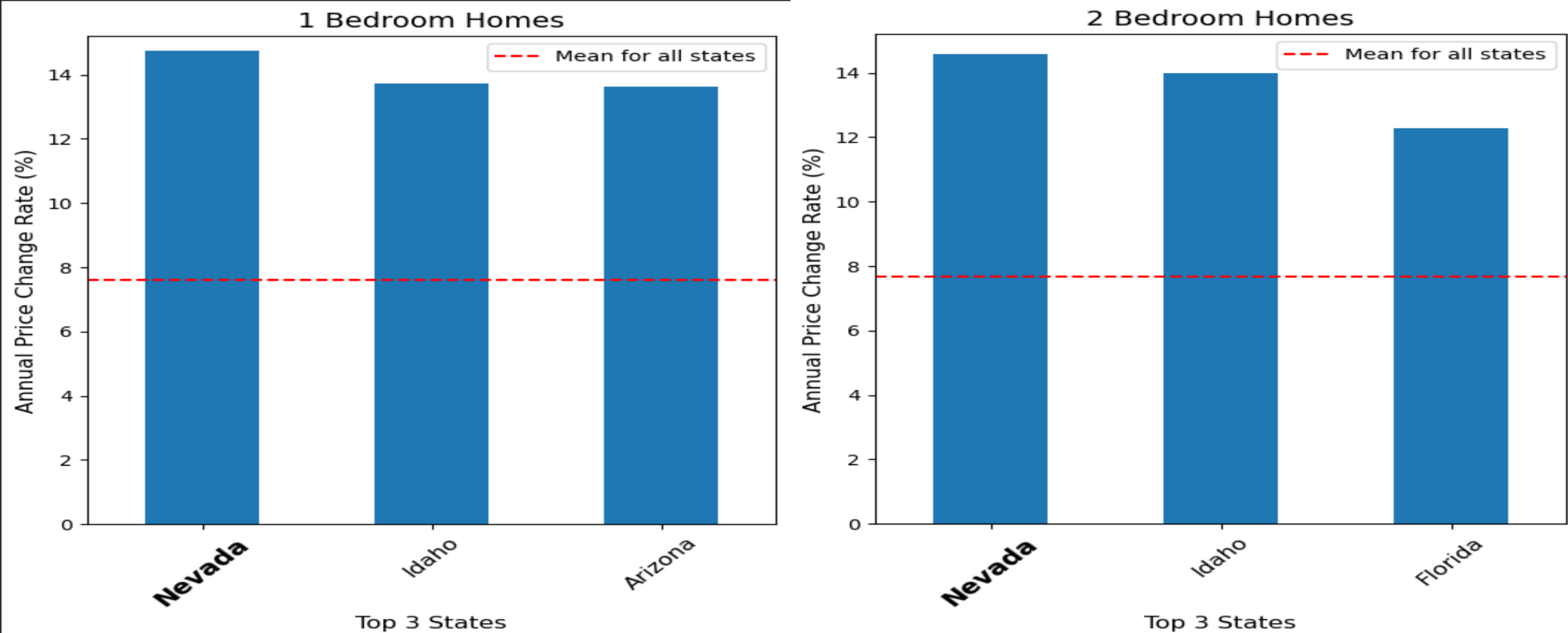
The top three states with the highest Annual Price Change Rate percentage for 1-bedroom and 2-bedroom homes in the past ten years are Nevada, Idaho, and Arizona. Nevada has the highest Annual Price Change Rate.
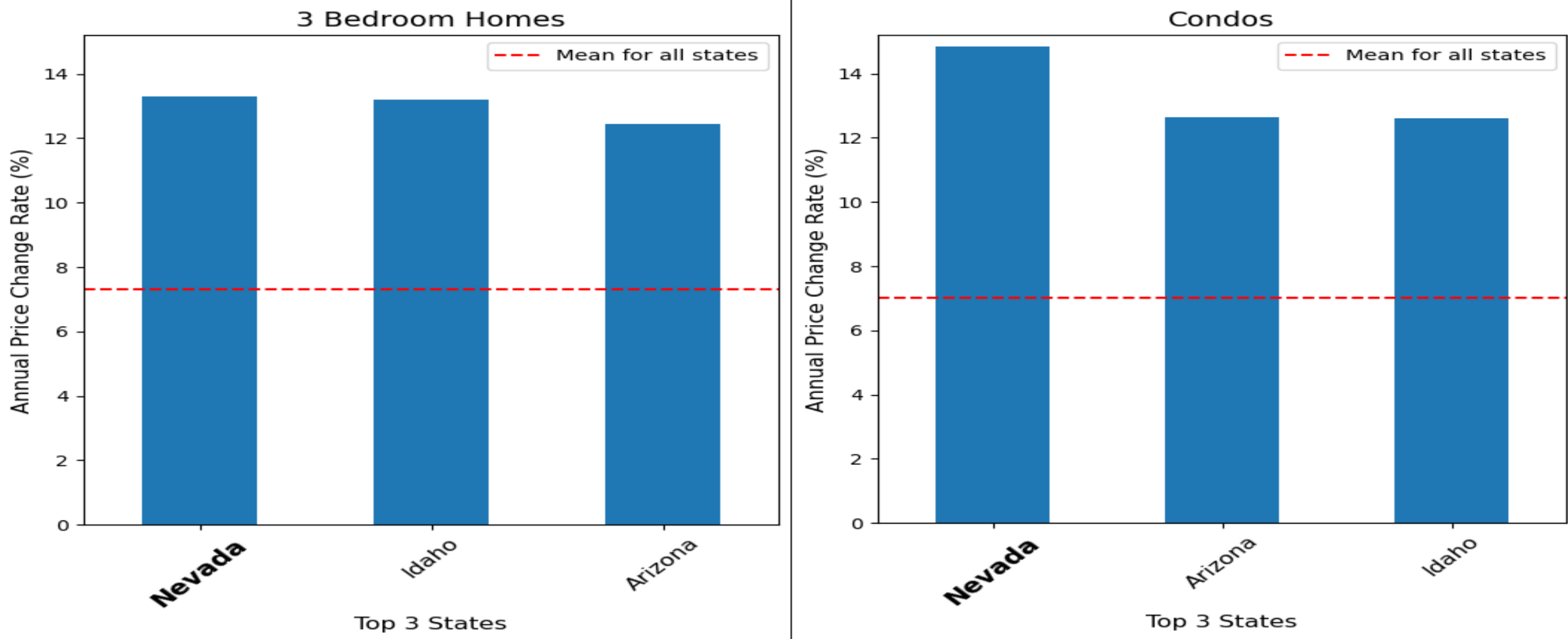
The top three states with the highest Annual Price Change Rate percentage for 3-bedroom homes and Condos in the past ten years are Nevada, Idaho, and Arizona. Nevada has the highest Annual Price Change Rate.
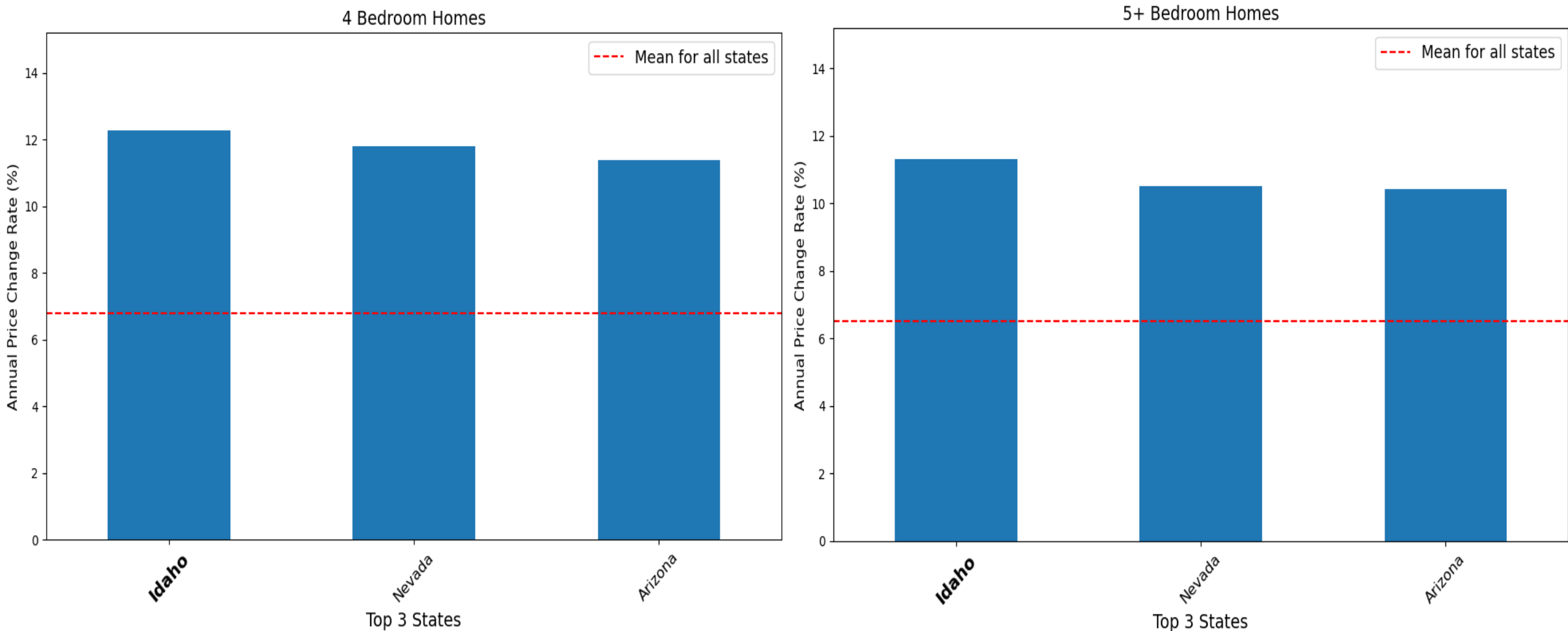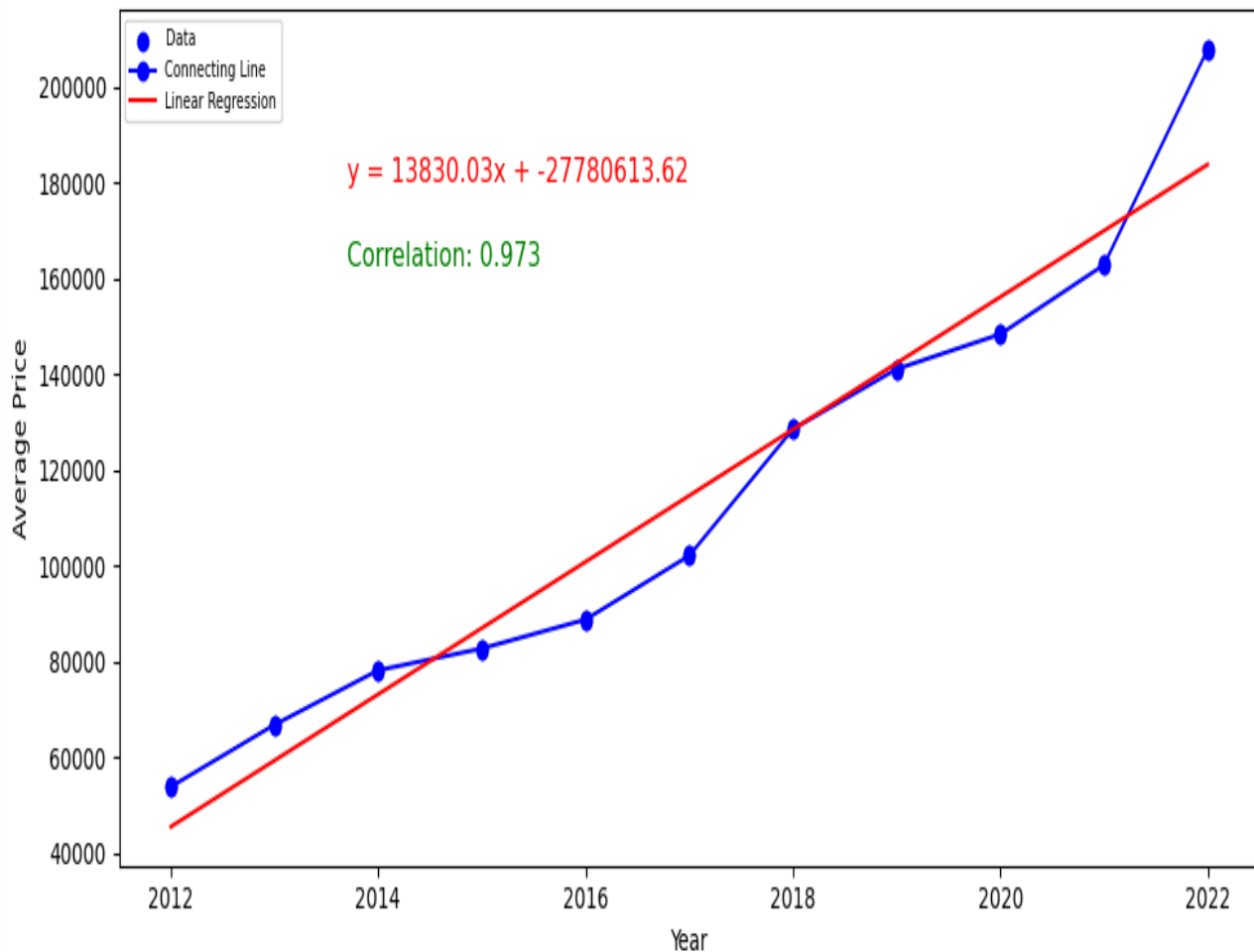
The top three states with the highest Annual Price Change Rate percentage for 4-bedroom homes and 5+-bedroom homes in the past ten years are Nevada, Idaho, and Arizona. Idaho has the highest Annual Price Change Rate.

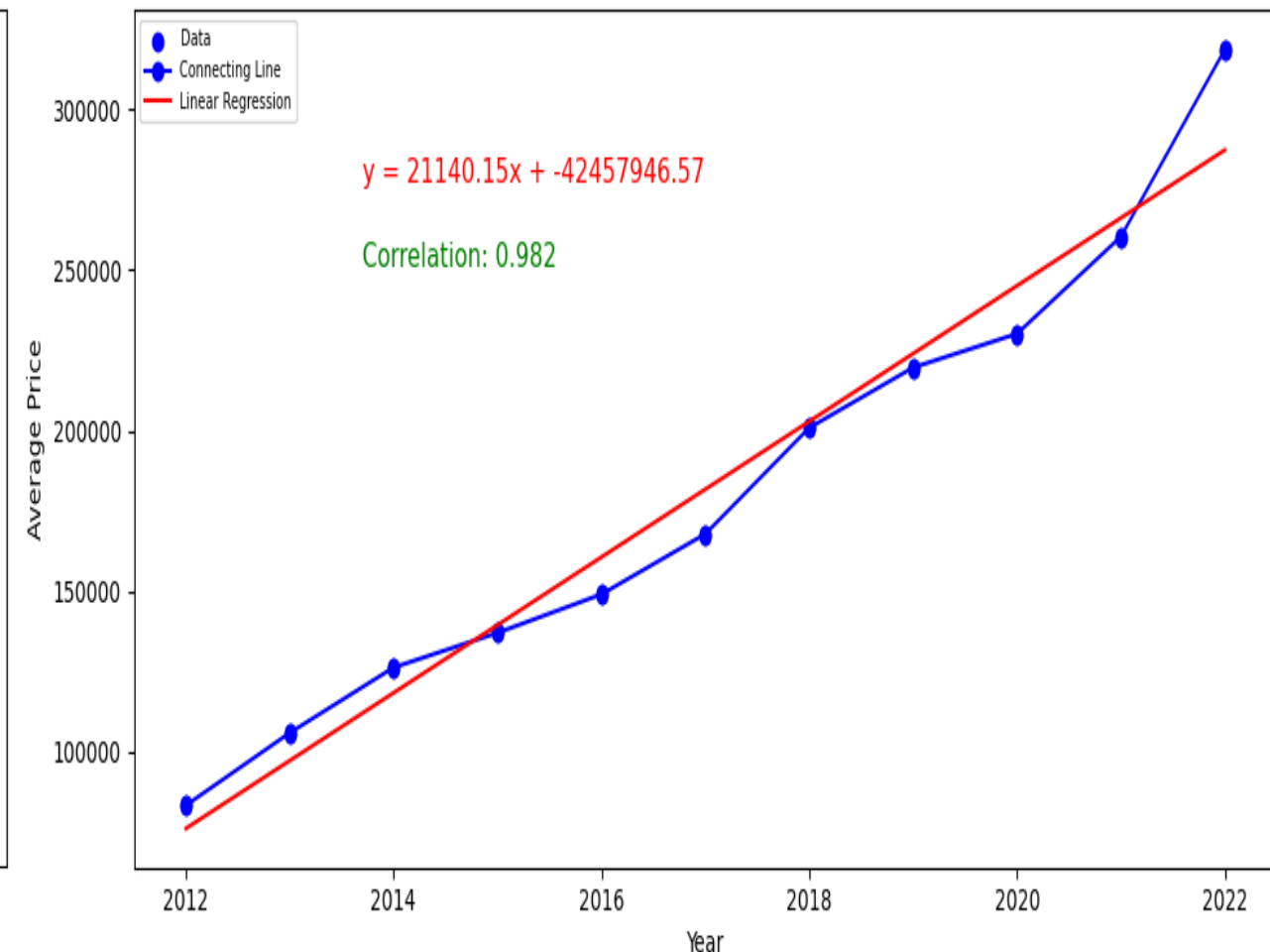*After accumulating our data, we presented it to our client. Enthusiastically, they asked for linear regression plots on all the states with the highest Annual Price Change Rates...*
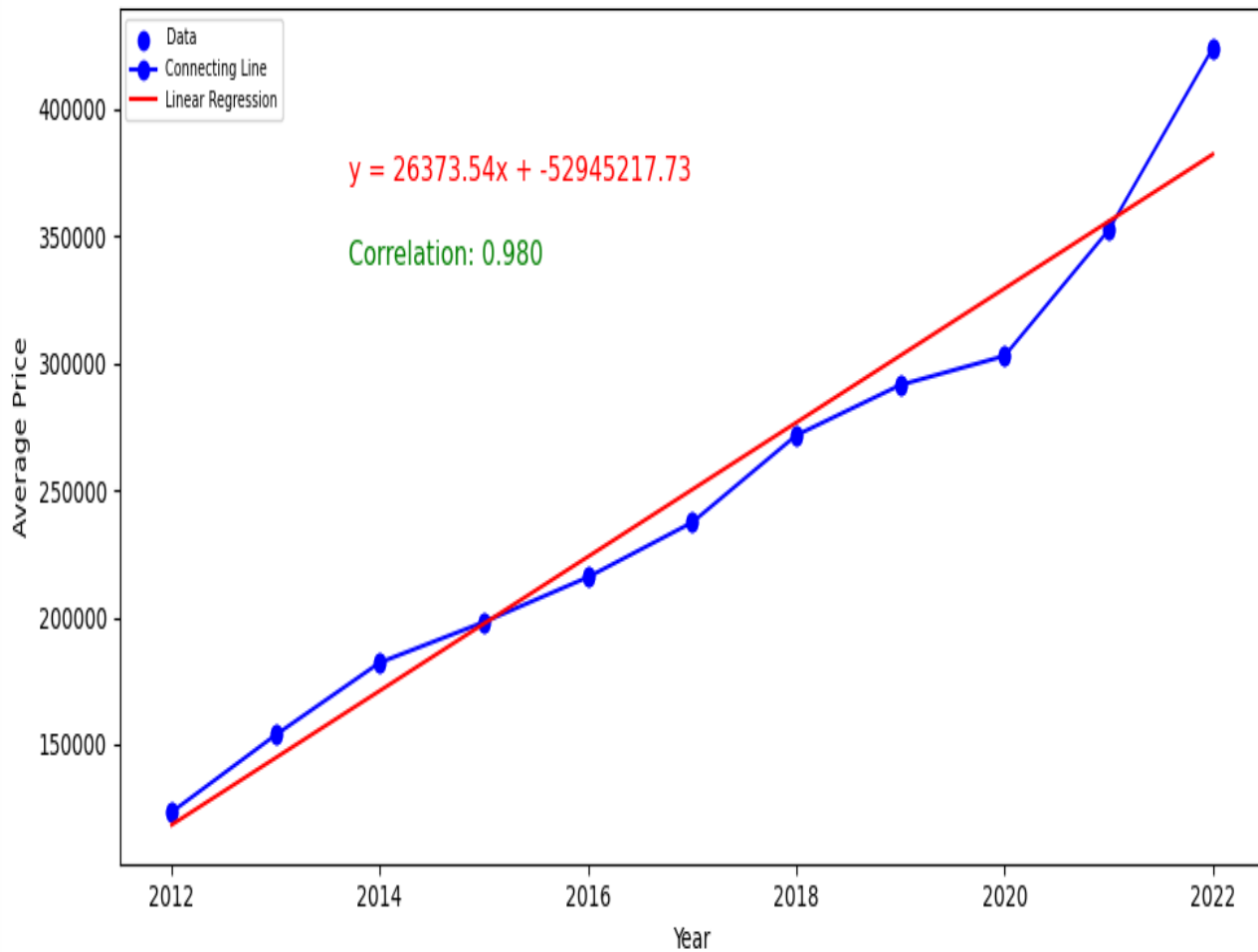
1 bedroom homes in Nevada

y = 13830.03x + -27780613.62

Correlation: 0.973

2 bedroom homes in Nevada

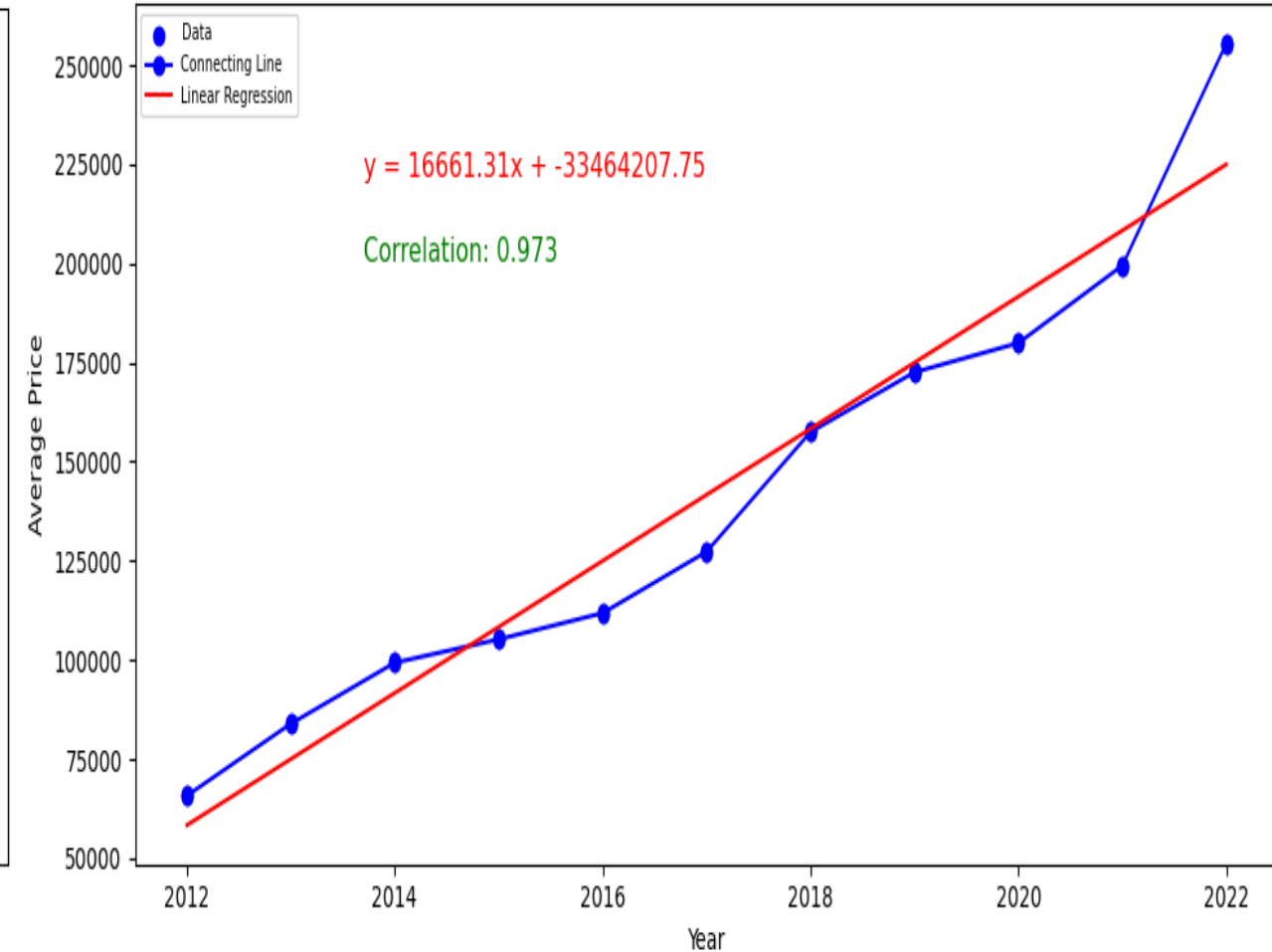y = 21140.15x + -42457946.57

Correlation: 0.982

With an R-squared value of .9, our data is very reliable. As you can see the prices of 1 Bedroom and 2 Bedroom homes in Nevada have more than tripled in the past ten years.
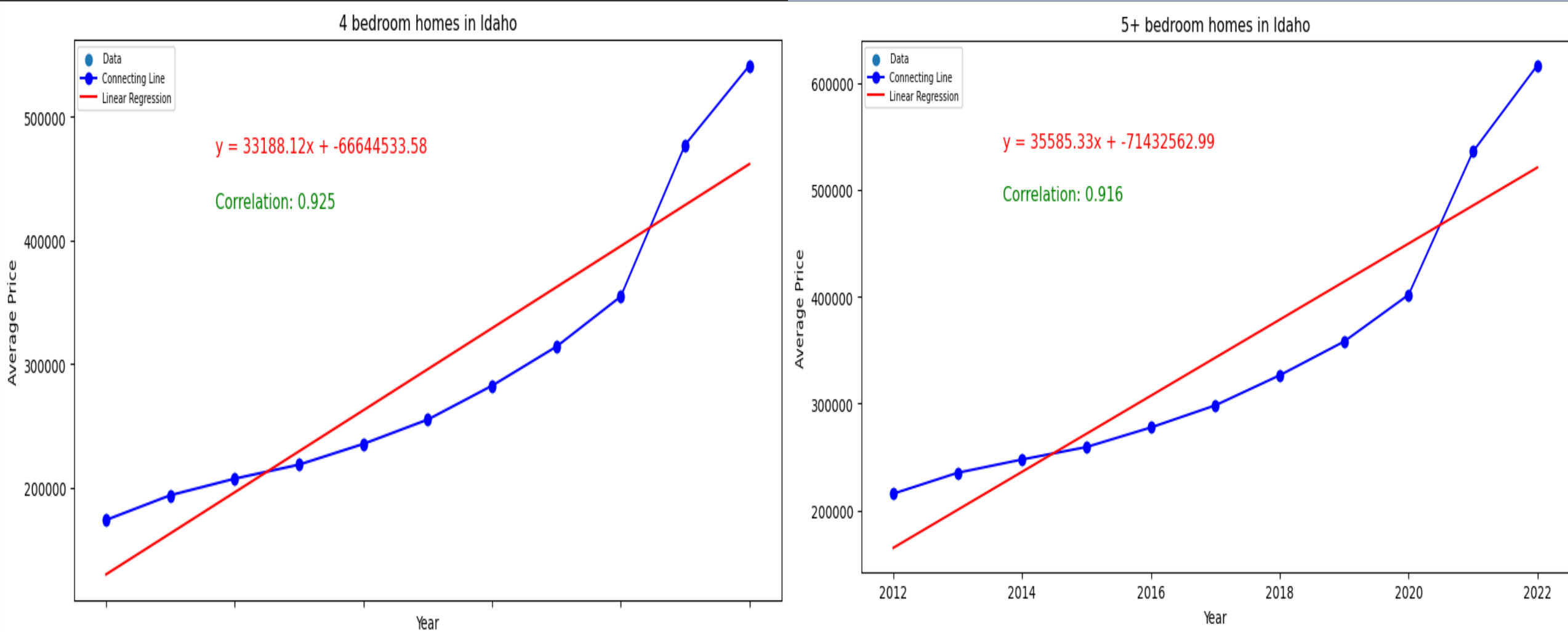
3 bedroom homes in Nevada

y = 26373.54x + -52945217.73

Correlation: 0.980

condos in Nevada

y = 16661.31x + -33464207.75

Correlation: 0.973

With an R-squared value of .9, our data is very reliable. As you can see the prices of 3 Bedroom homes and Condos in Nevada have more than quadrupled in the past ten years.

4 bedroom homes in Idaho

- Data
- Connecting Line
- Linear Regression

y = 33188.12x + -66644533.58

Correlation: 0.925

5+ bedroom homes in Idaho

- Data
- Connecting Line
- Linear Regression

y = 35585.33x + -71432562.99

Correlation: 0.916

With an R-squared value of .9, our data is very reliable. As you can see the prices of 4 Bedroom homes and 5+ Bedroom homes in Idaho have also more than tripled in the past ten years.

Our Client was extremely satisfied with our data, they then explained how they were investing in a shipping company. We've been informed they would also like to invest in real estate connected to states which have a high impact in the shipping industry. We've deduced that Texas, California, Ohio and Illinois are the top 4 States in Freight Shipping.
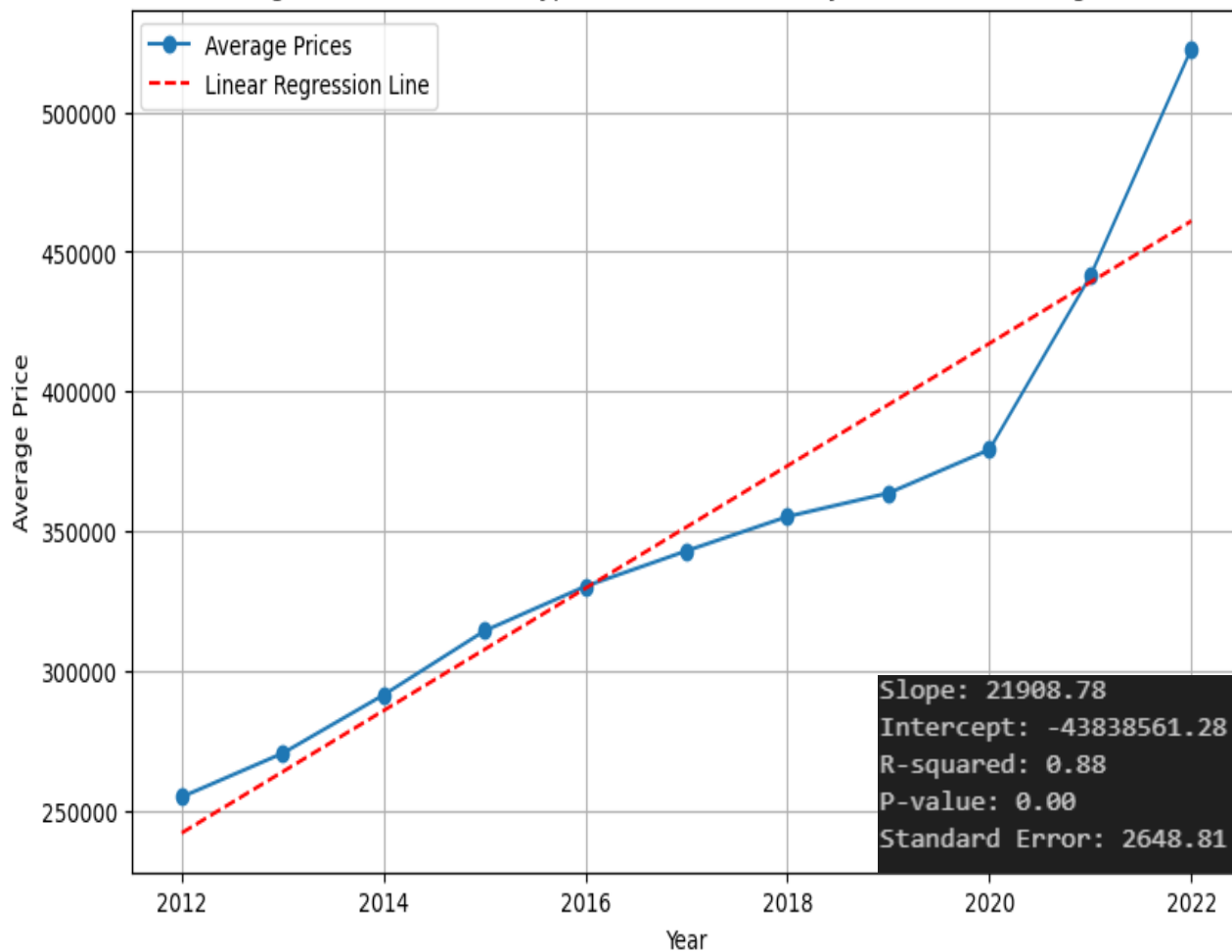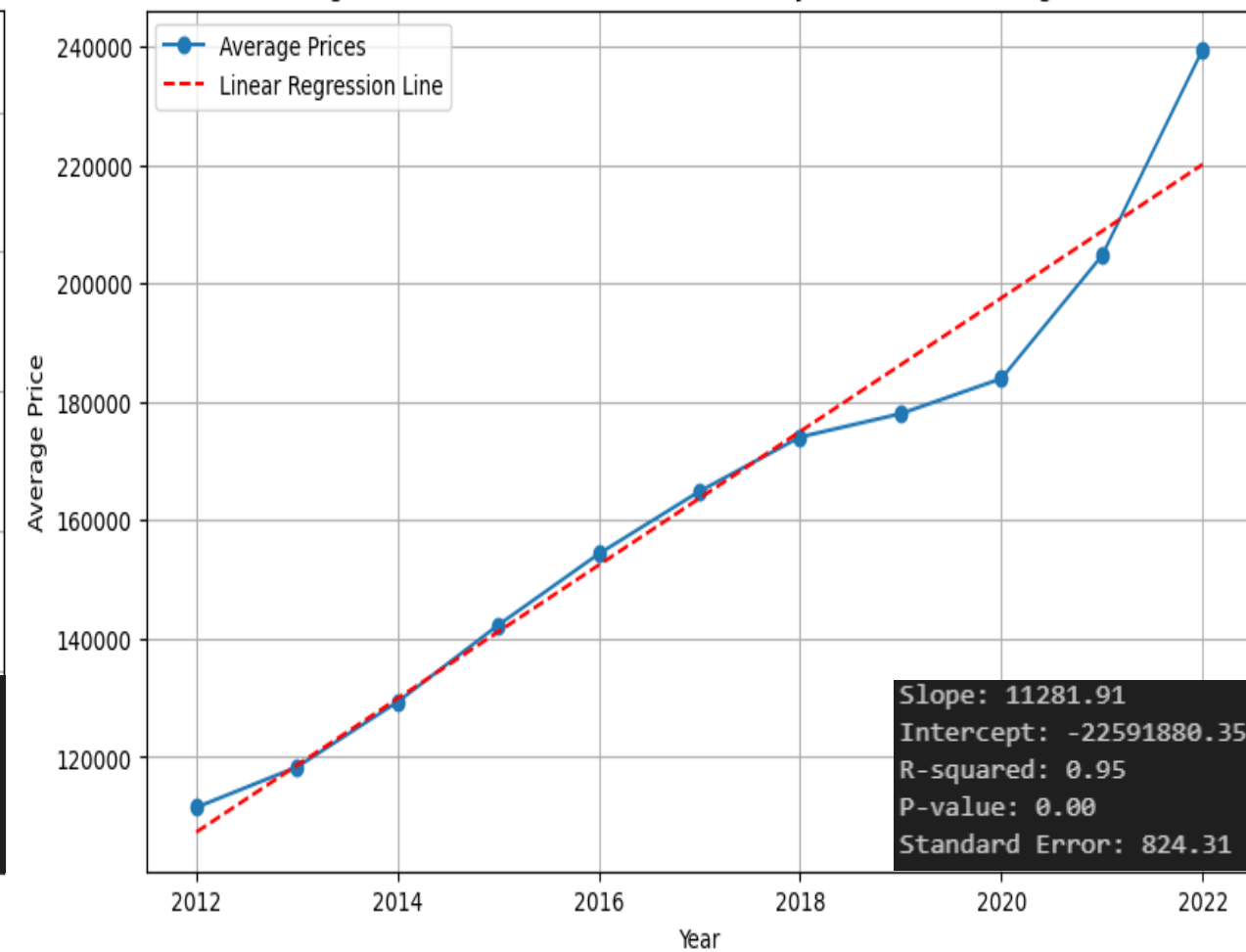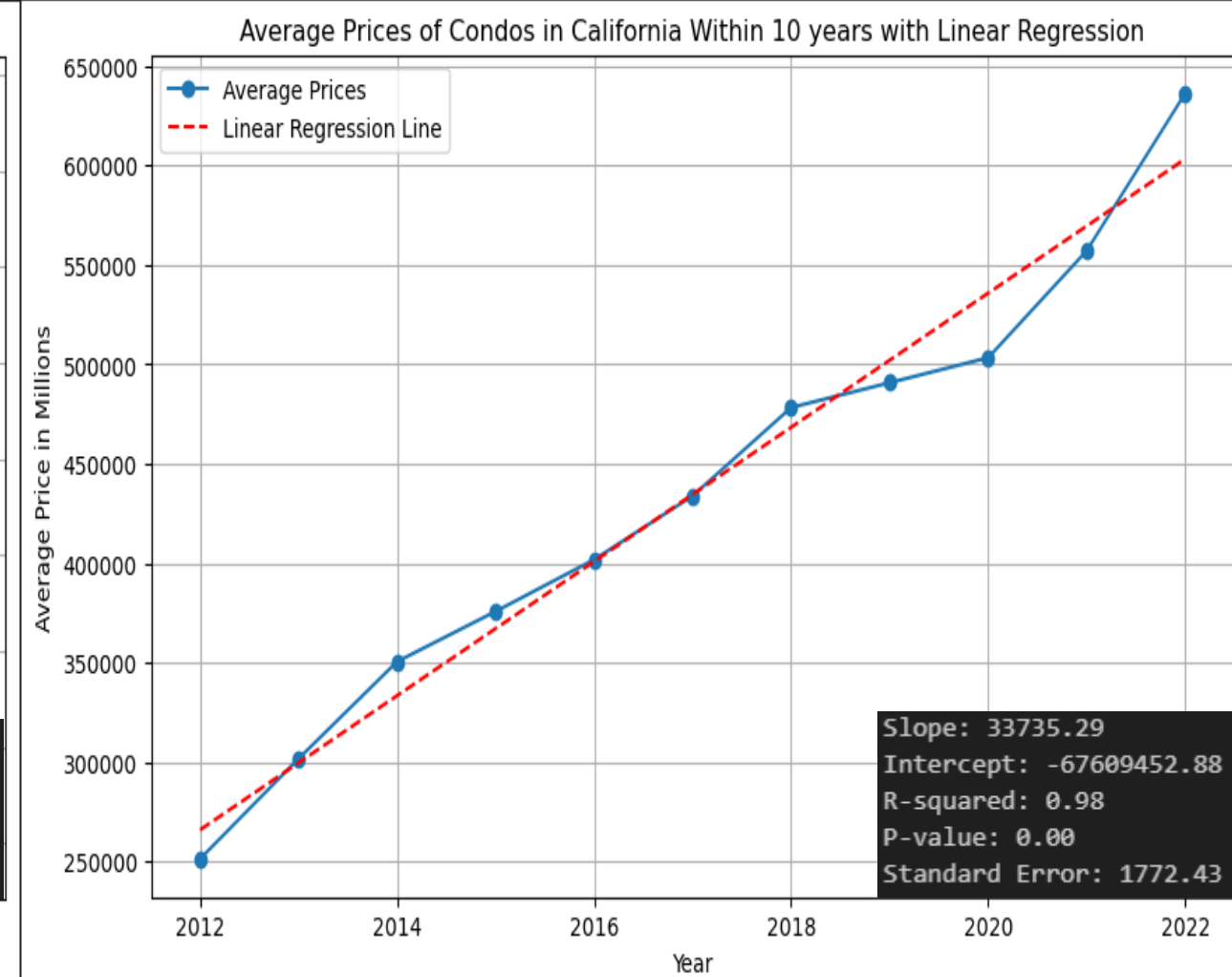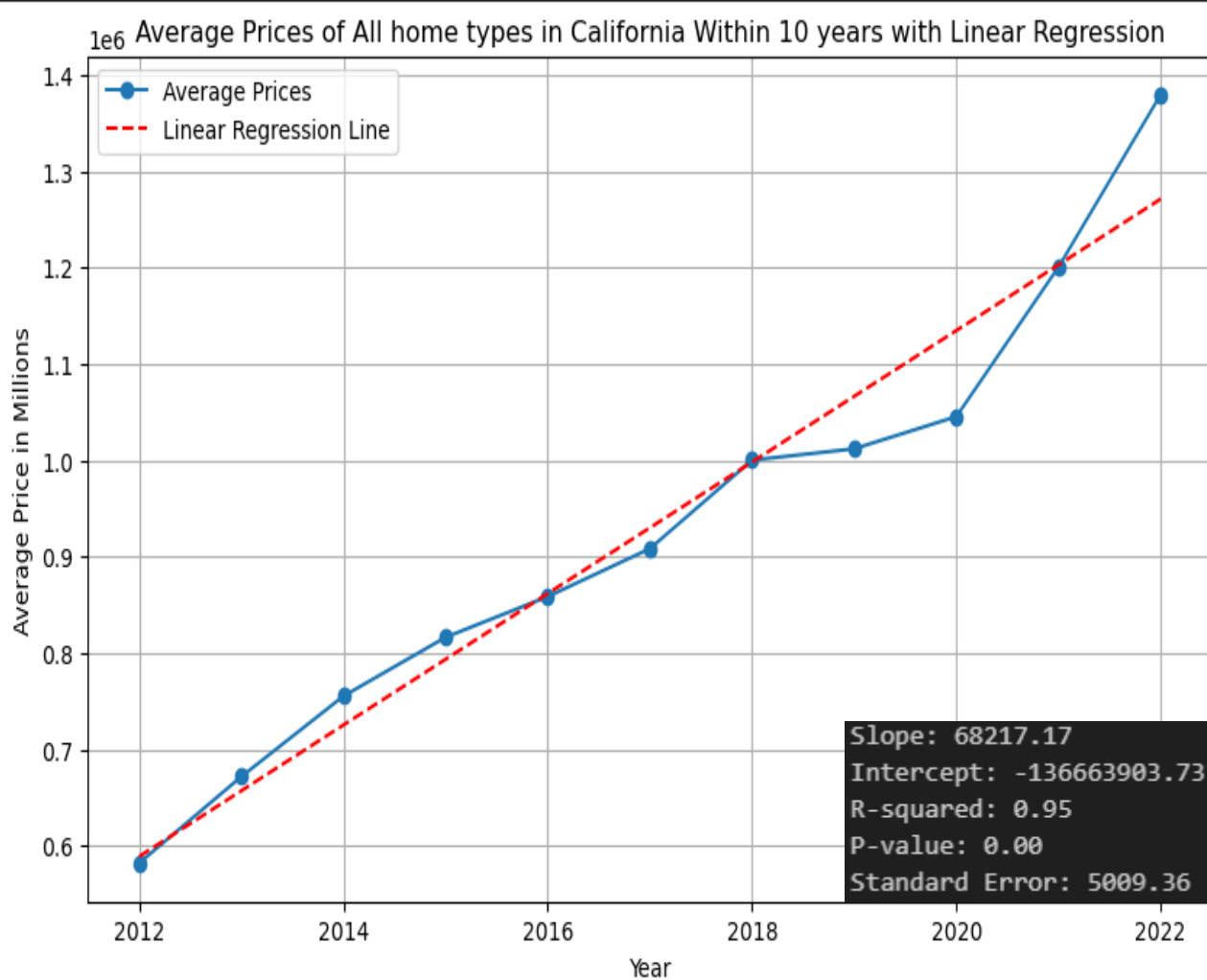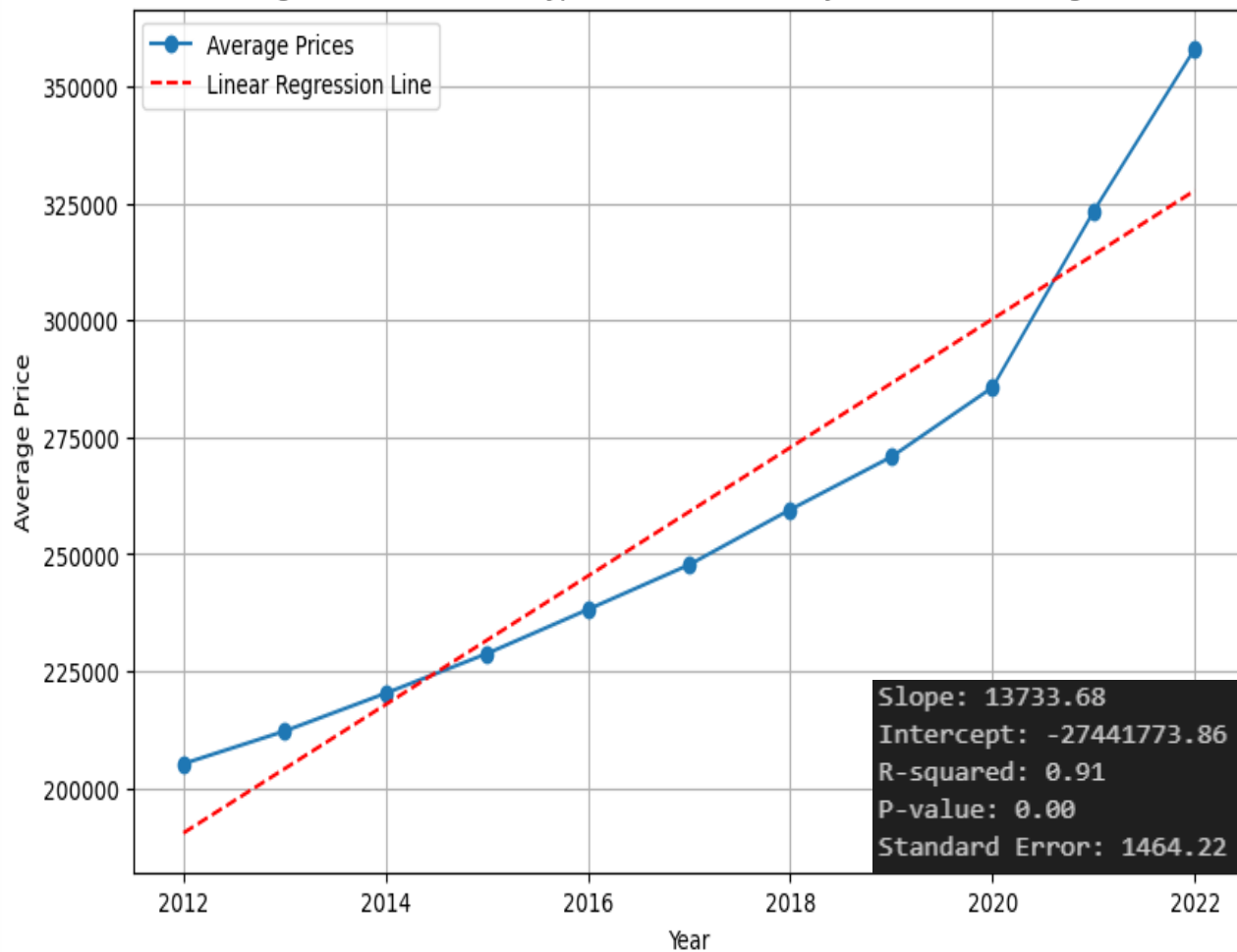
In the state of Texas, we can see that the price of Condos and the rest of the Home types have doubled in the past ten years. With an R-squared value of .8 and .9, our data is reliable.

Average Prices of All home types in California Within 10 years with Linear Regression

Average Prices of Condos in California Within 10 years with Linear Regression

Slope: 68217.17
Intercept: -136663903.73
R-squared: 0.95
P-value: 0.00
Standard Error: 5009.36

Slope: 33735.29
Intercept: -67609452.88
R-squared: 0.98
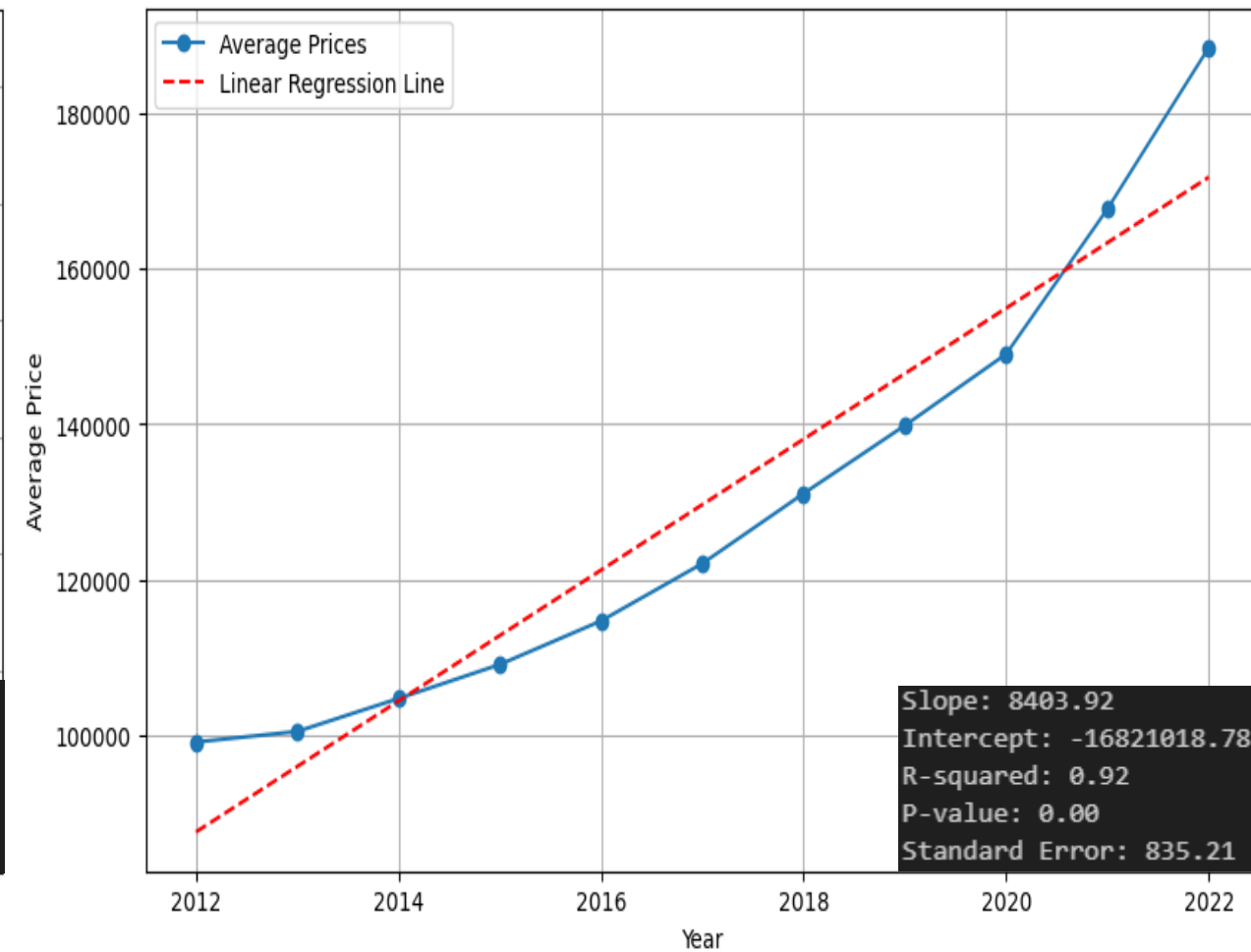P-value: 0.00
Standard Error: 1772.43

In the state of California, we can see that the price of all home types, and condos, have more than doubled in the past ten years. With an R-squared value of .9, our information is reliable.

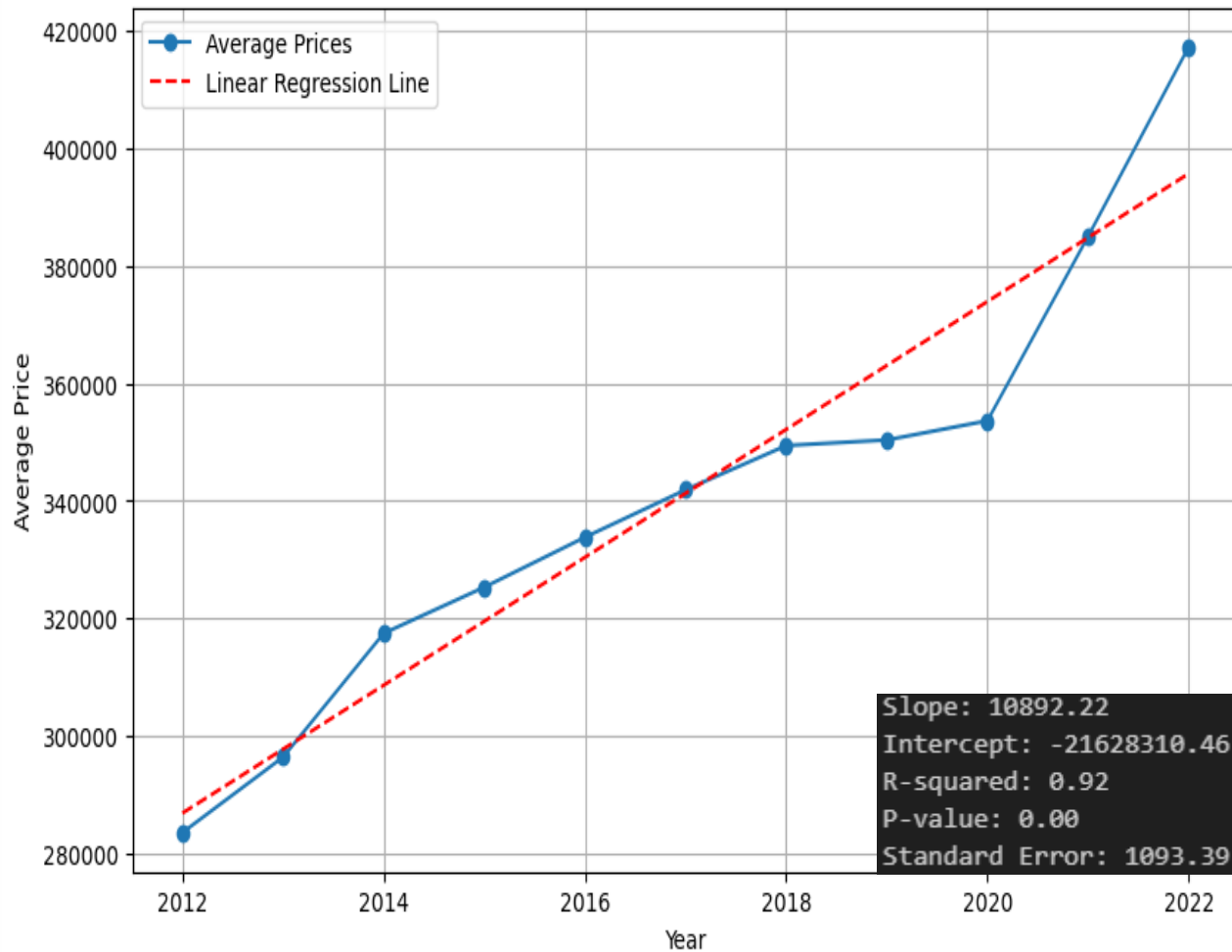Average Prices of All home types in Ohio Within 10 years with Linear Regression

Average Prices of Condos in Ohio Within 10 years with Linear Regression

Slope: 13733.68
Intercept: -27441773.86
R-squared: 0.91
P-value: 0.00
Standard Error: 1464.22

Slope: 8403.92
Intercept: -16821018.78
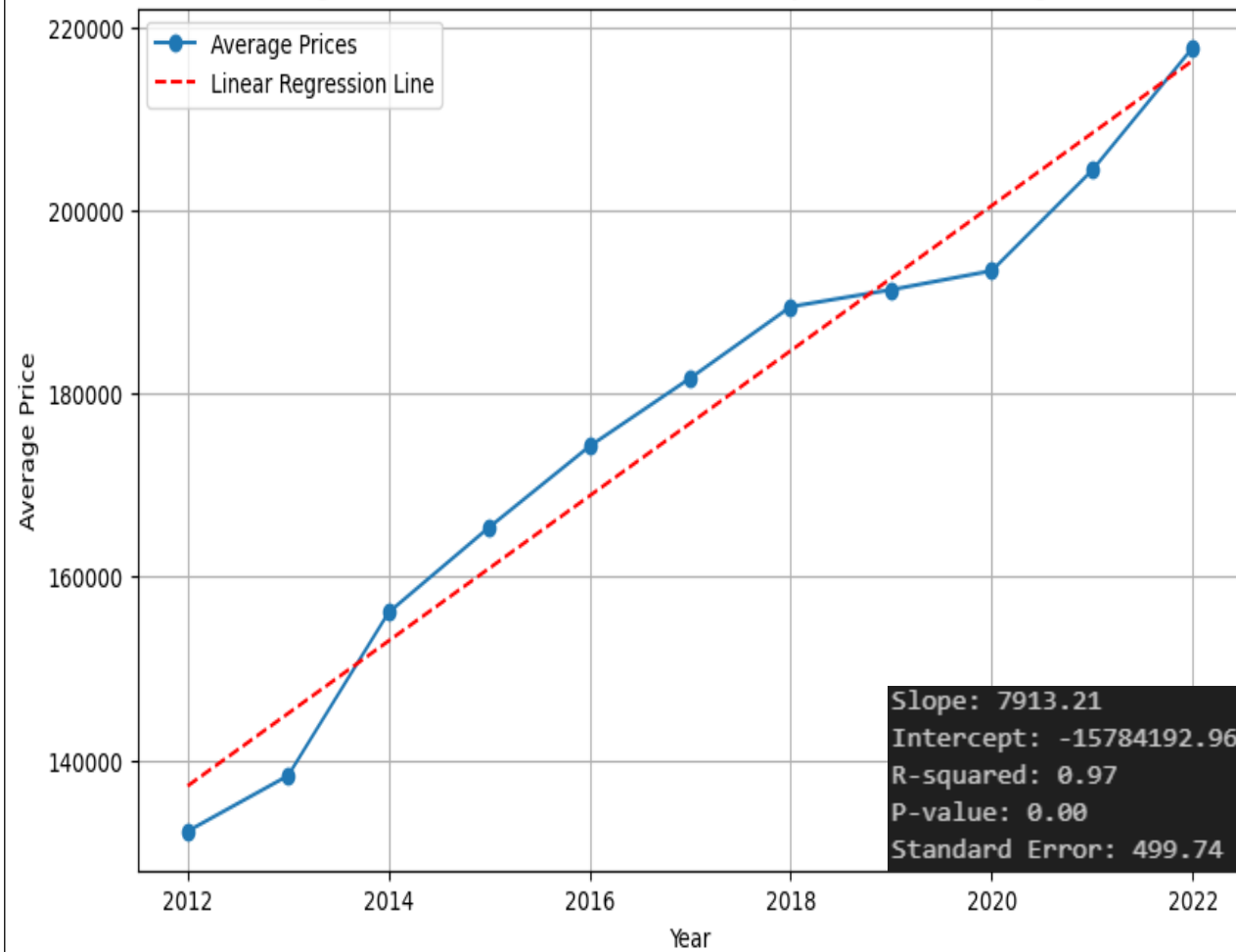R-squared: 0.92
P-value: 0.00
Standard Error: 835.21

In the state of Ohio, we can clearly see that the prices of All home types and Condos have nearly doubled in the last ten years. With an R-squared value of .9, our data is reliable.

Average Prices of All home types in Illinois Within 10 years with Linear Regression

Slope: 10892.22
Intercept: -21628310.46
R-squared: 0.92
P-value: 0.00
Standard Error: 1093.39

Average Prices of Condos in Illinois Within 10 years with Linear Regression

Slope: 7913.21
Intercept: -15784192.96
R-squared: 0.97
P-value: 0.00
Standard Error: 499.74

In the state of Illinois, we can clearly observe that the prices of All home types and Condos have nearly doubled in the past ten years. With an R-squared value of .9, we know our data is reliable.

After looking at all the data, we've come to the conclusion that the state of California has the highest Value, and greatest Linear Regression slope of property value increase in the last ten years, making it the ideal state to invest in Real Estate for our clients Freight Shipping interests.

Our client has never been happier, so much so that they have stated they would like to move their family to the States. They have asked us to explore the top two safest States and inform them which would be the better investment. We've deduced that Maine and New Hampshire are the top two safest States.
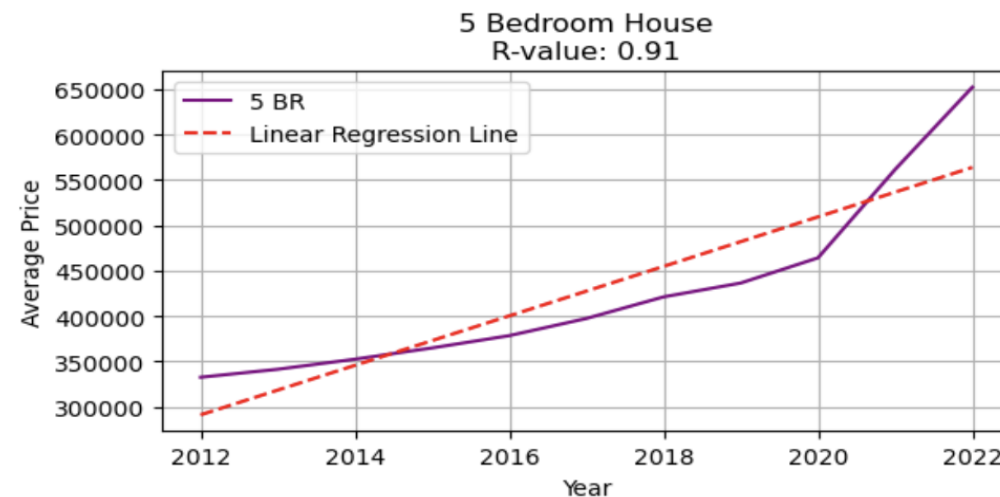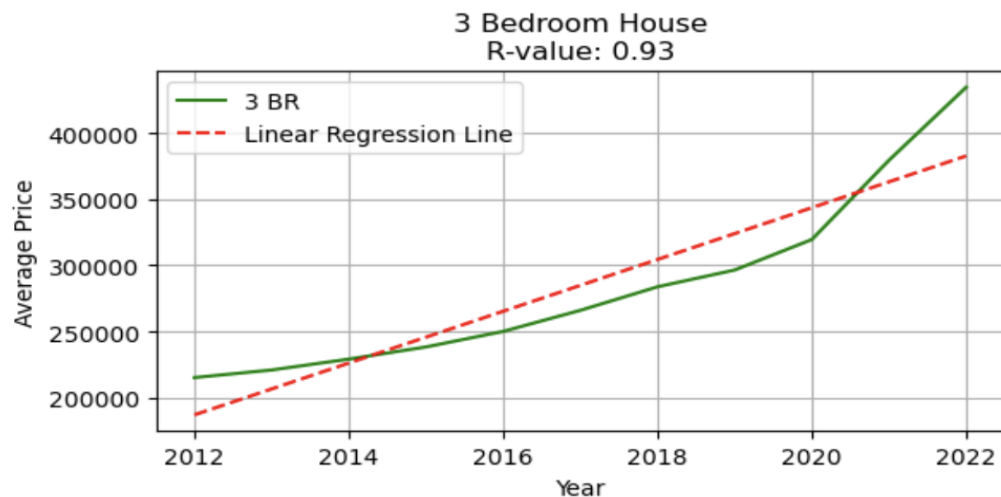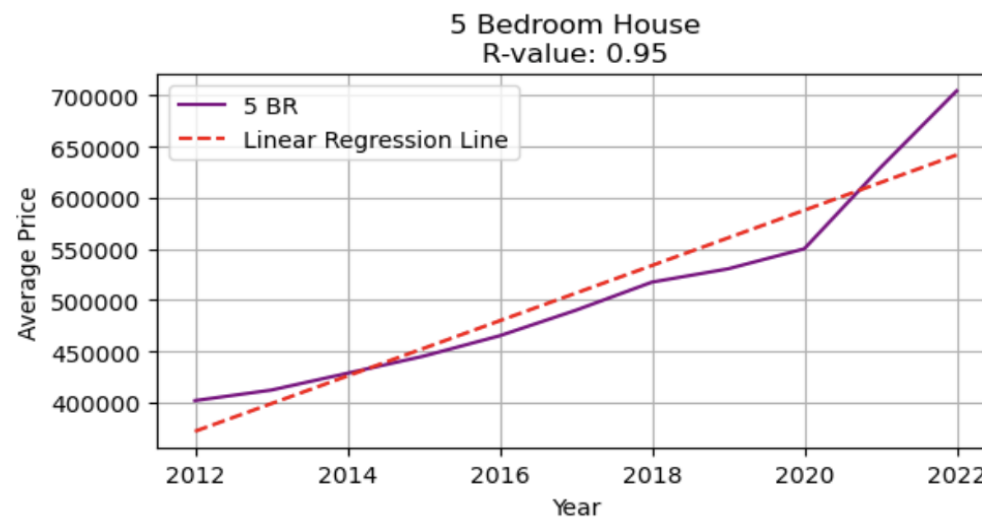
New Hampshire: 1 Bedroom and Condos (2012-2022)
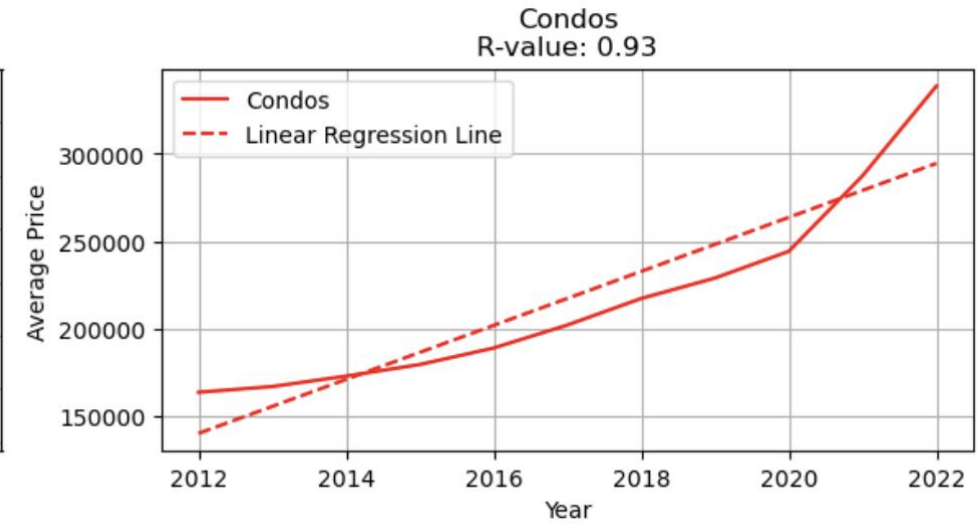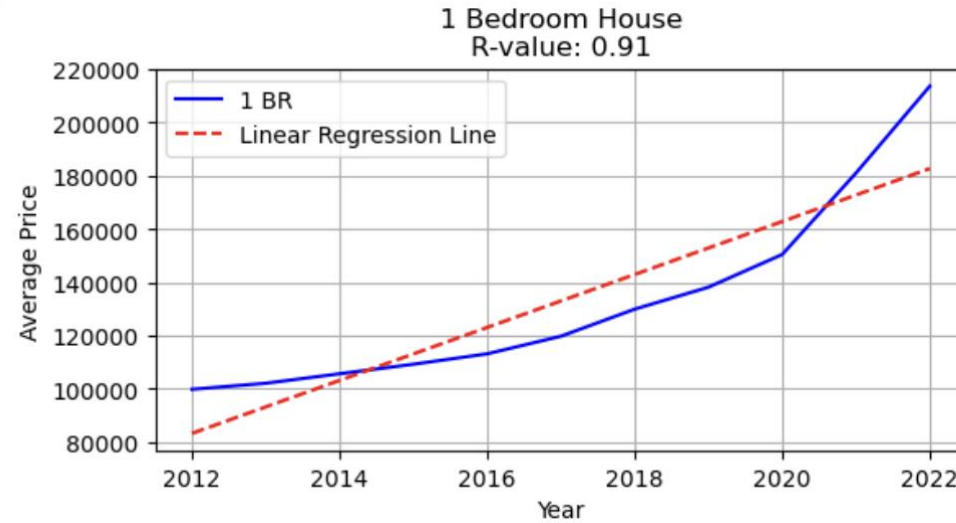
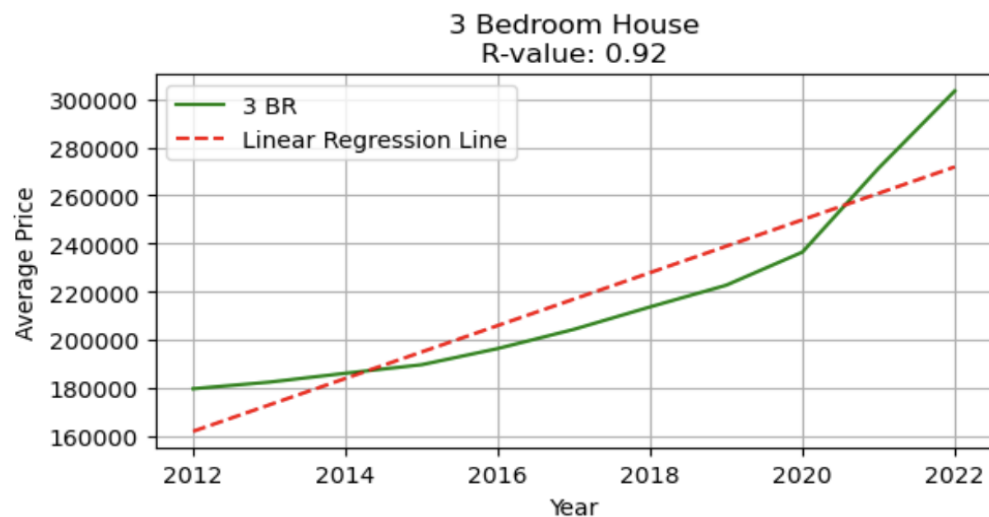Maine: 1 Bedroom and Condos (2012-2022)
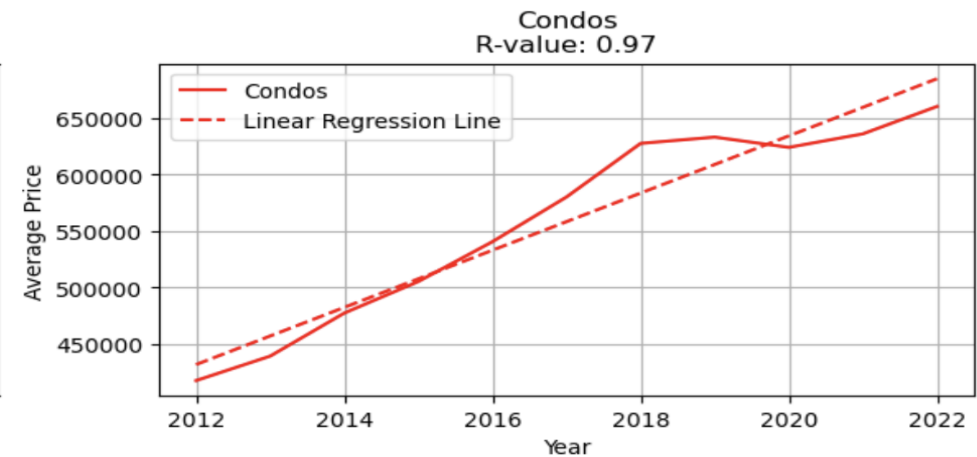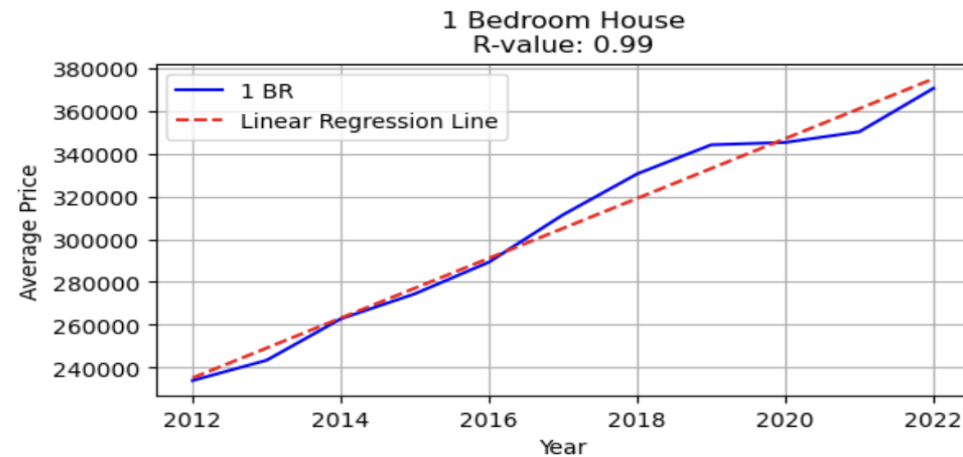
New Hampshire: 3 Bedroom and 5+ Bedroom (2012-2022)

Maine: 3 Bedroom and 5+ Bedroom (2012-2022)

	Property type	Me_CAGR	NH_CAGR
0	1 bedroom homes	4.71%	7.91%
1	condos	4.68%	7.57%
2	3 bedroom homes	5.38%	7.29%
3	5+ bedroom homes	5.77%	6.97%
4	All home type - bottom tier	5.65%	8.23%
5	All home type - Top tier	4.16%	6.6%

CAGR : Maine Vs New Hampshire (2012-2022)

New Hampshire indicates a higher Compound Annual Growth Rate when compared with Maine in all the property types in given years.

We have analyzed both the States(Maine and New Hampshire) and concluded that both states indicated a strong positive relationship between price and year. CAGR is higher for New Hampshire, therefore New Hampshire would be a wiser state to invest in.