House Property Sales Time Series

Data Date: 2007 - 2019

House Property Sales Time Series

Context

A multivariate time series has more than one time-dependent variable. Each variable depends not only on its past values but also has some dependency on other variables.

- We have accumulated property sales data for the 2007-2019 period for one specific region. The data contains sales prices for houses and units with 1,2,3,4,5 bedrooms. These are the cross-depended variables.

raw_sales

datesold	postcode	price	propertyType	bedrooms
2007-02-07 00:00:00	2607	525000	house	4
2007-02-27 00:00:00	2906	290000	house	3
2007-03-07 00:00:00	2905	328000	house	3
2007-03-09 00:00:00	2905	380000	house	4
2007-03-21 00:00:00	2906	310000	house	3
2007-04-04 00:00:00	2905	465000	house	4
2007-04-24 00:00:00	2607	399000	house	3
2007-04-30 00:00:00	2606	1530000	house	4
2007-05-24 00:00:00	2902	359000	house	3
2007-05-25 00:00:00	2906	320000	house	3
2007-06-26 00:00:00	2902	385000	house	3
2007-06-27 00:00:00	2906	305000	house	3
2007-06-27 00:00:00	2612	850000	house	4
2007-06-28 00:00:00	2904	765000	house	4
2007-06-30 00:00:00	2615	517000	house	4
2007-07-02 00:00:00	2914	800000	house	5
2007-07-03 00:00:00	2906	336000	house	3
2007-07-06 00:00:00	2615	535000	house	5
2007-07-07 00:00:00	2602	900000	house	4
2007-07-08 00:00:00	2600	327000	house	1
2007-07-12 00:00:00	2602	427500	house	3
2007-07-13 00:00:00	2602	780000	house	3
2007-07-18 00:00:00	2602	530000	house	3
2007-07-18 00:00:00	2602	590000	house	3

House Property Sales Time Series

Variable of Interest: The primary variable of interest appears to be **Sales**, which we aim to analyze or forecast over time.

Time Series Context: The data includes a **Month** column, indicating that this is a monthly time series dataset.

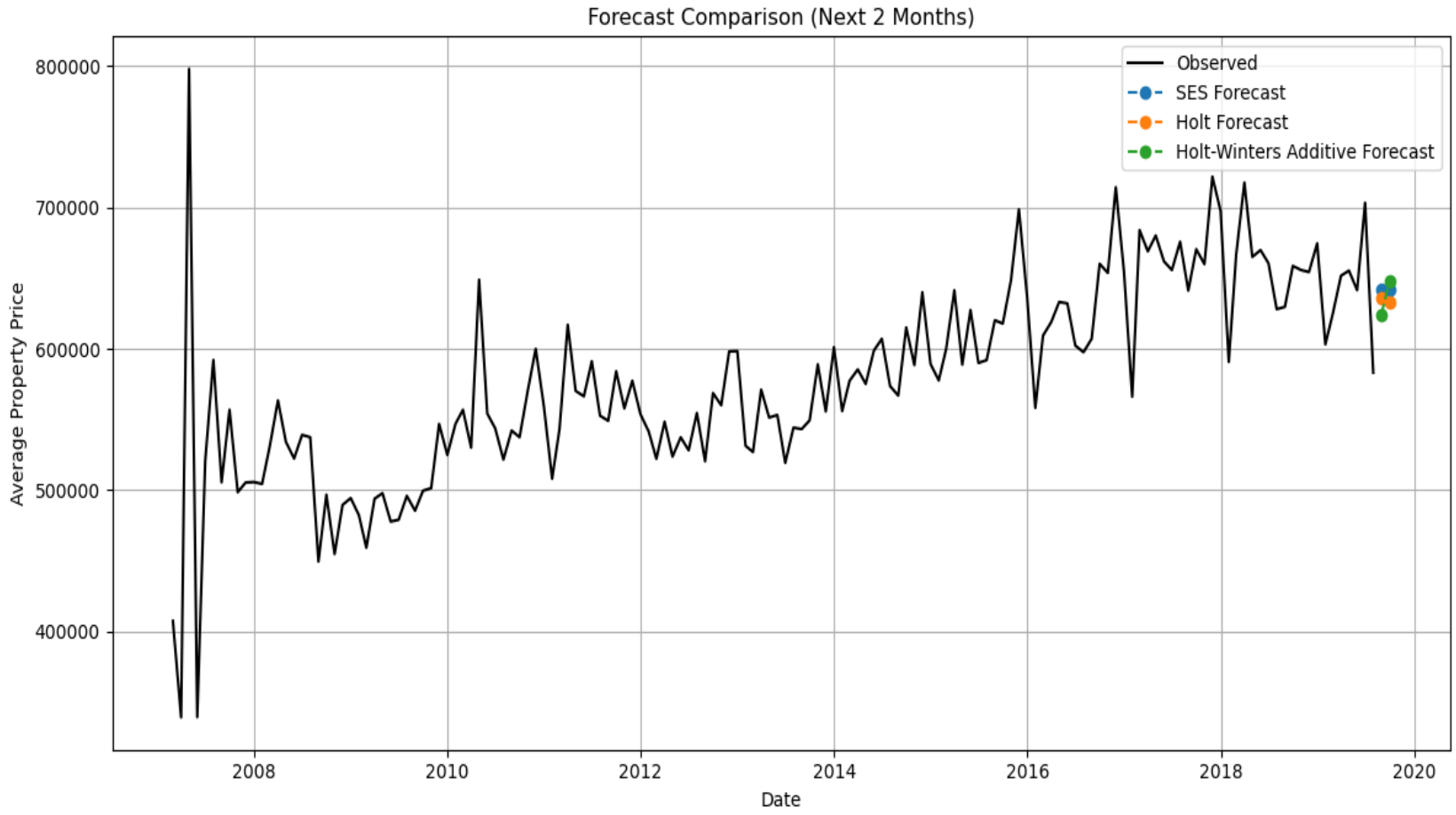
- **Goal**: The aim is likely to understand trends, seasonality, and forecast future sales based on historical patterns.

Comparing 3 Forecast Model

1. Simple Exponential Smoothing
2. Holt's Linear Trend (Additive Trend)
3. Holt-Winters Seasonal (Additive Seasonality + Trend)

August 2019

September 2019



Forecast Result:

Model Type	August 2019	September 2019
Simple Exponential Smoothing	$641,993	$641,993
Holt's Linear Trend	$640,493	$639,425
Holt-Winters Additive	$624,468	$647,789

Simple Exponential Smoothing assumes no trend or seasonality — so the forecast remains flat.

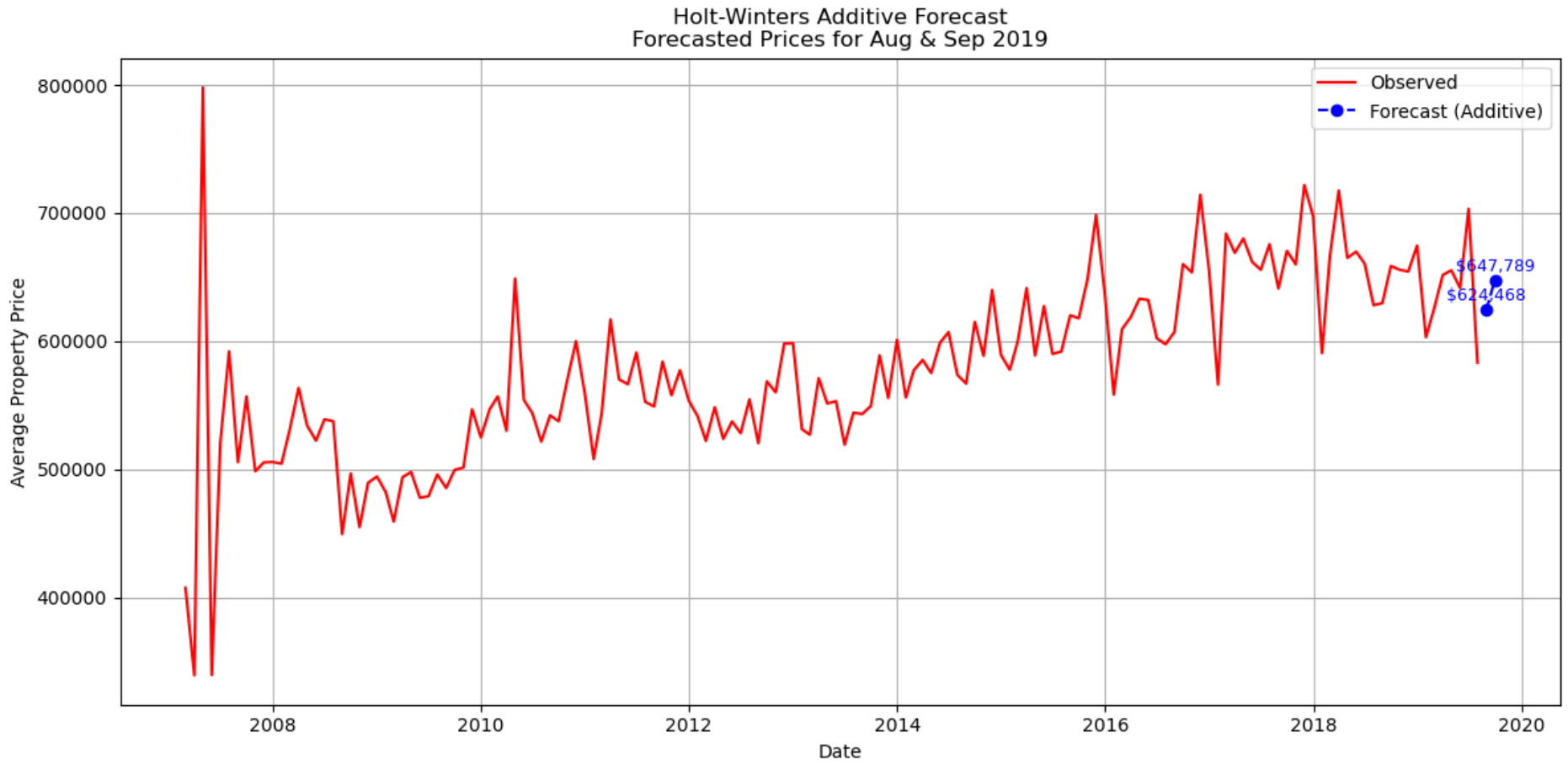
Holt's Model incorporates a linear trend, predicting a slight decline.

Holt-Winters includes both trend and seasonality, showing a more dynamic pattern with an increase in the price.

Based on the last comparing, I select the **Holt-Winters.**

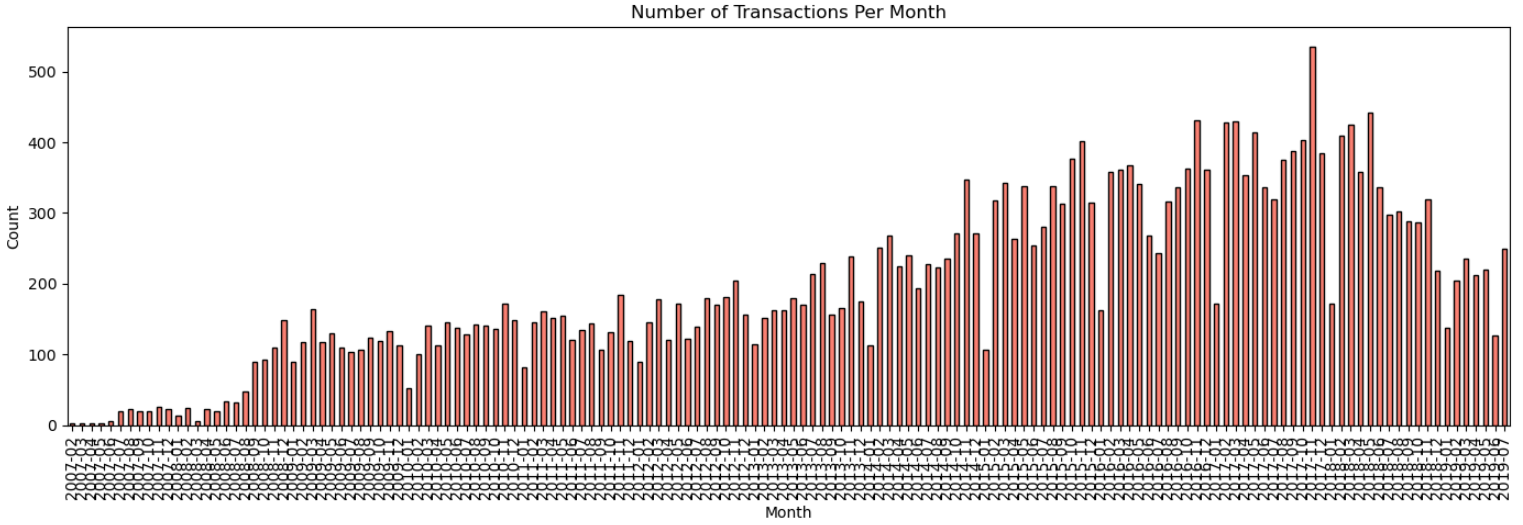
August 2019: $624,467.92

September 2019: $647,789.21

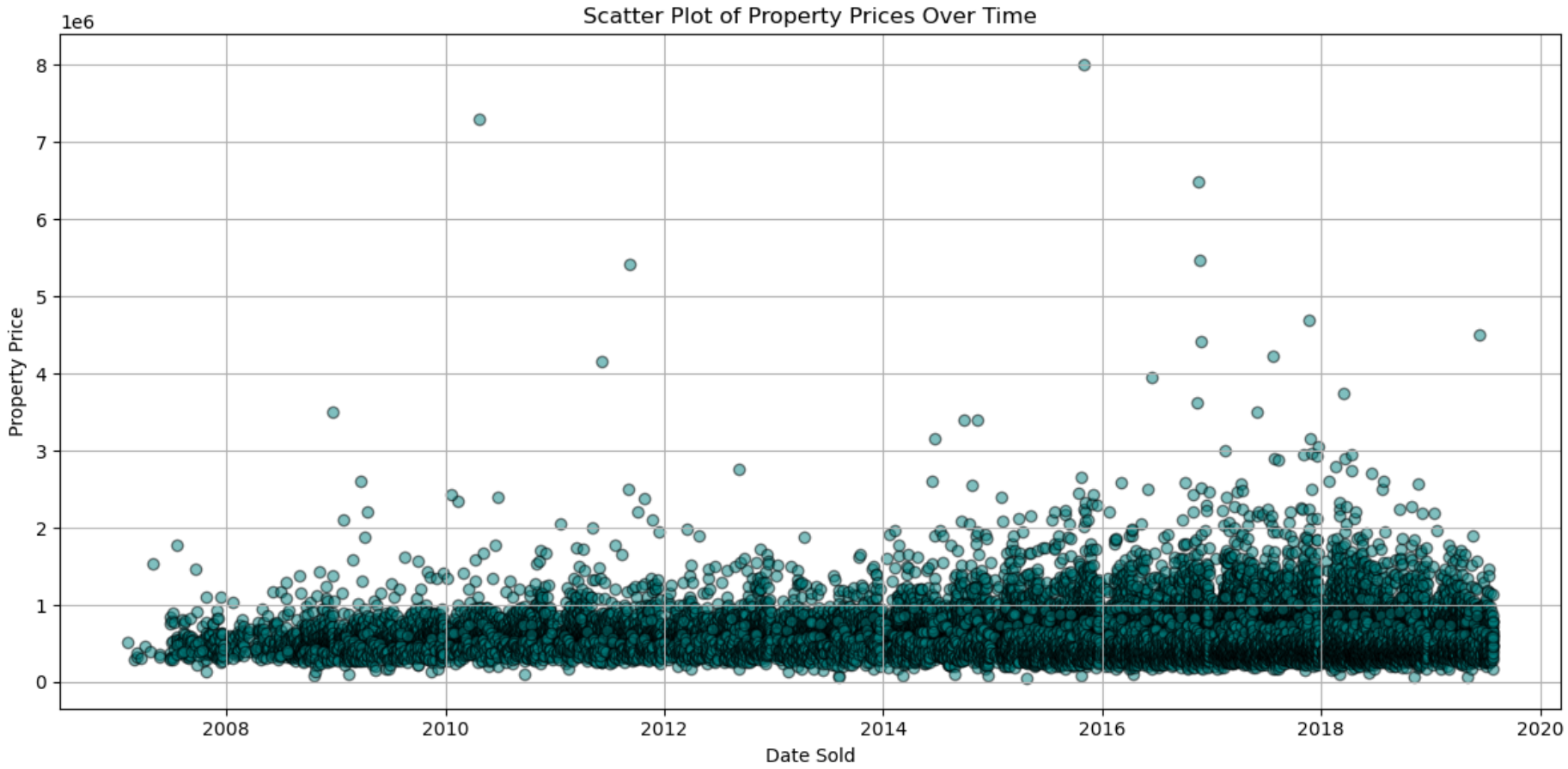


histogram of property sale prices.

Number of sales per month



Each dot represents a property that was sold.
The **x-axis** shows the **sale date.**
The **y-axis** shows the **price** of each property.
You can spot **price trends over time**, like increasing or fluctuating prices.



Why the Holt-Winters Additive Model was Chosen:

The dataset involves **monthly property sale prices over time**, which clearly show:

- **Trend**: The property prices are steadily increasing, indicating a long-term growth pattern.
- **Seasonality**: Prices exhibit repeated fluctuations at regular intervals (monthly/quarterly cycles).

The Holt-Winters Additive is ideal for time series data that demonstrate:

- A **linear trend** (growing or declining),
- **Seasonal variations** of relatively constant magnitude.

This model was selected because it balances:

- Responsiveness to recent changes (through exponential smoothing),
- Accuracy in modeling consistent seasonal effects,
- Capability to generate **future forecasts**, such as for **August and September 2019**, with meaningful confidence.