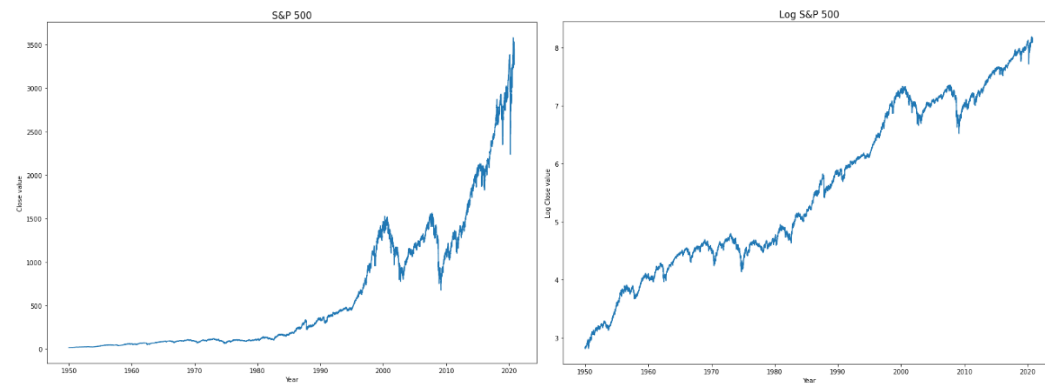# S&P 500 Time Series Analysis

Introduction

The S&P 500 dataset [1], spanning several decades from 1950-2020, provides an overview of the stock market's performance, primarily focusing on closing prices and their logarithmic transformations. This analysis aims to dissect the dataset into trend, seasonality, and noise components.
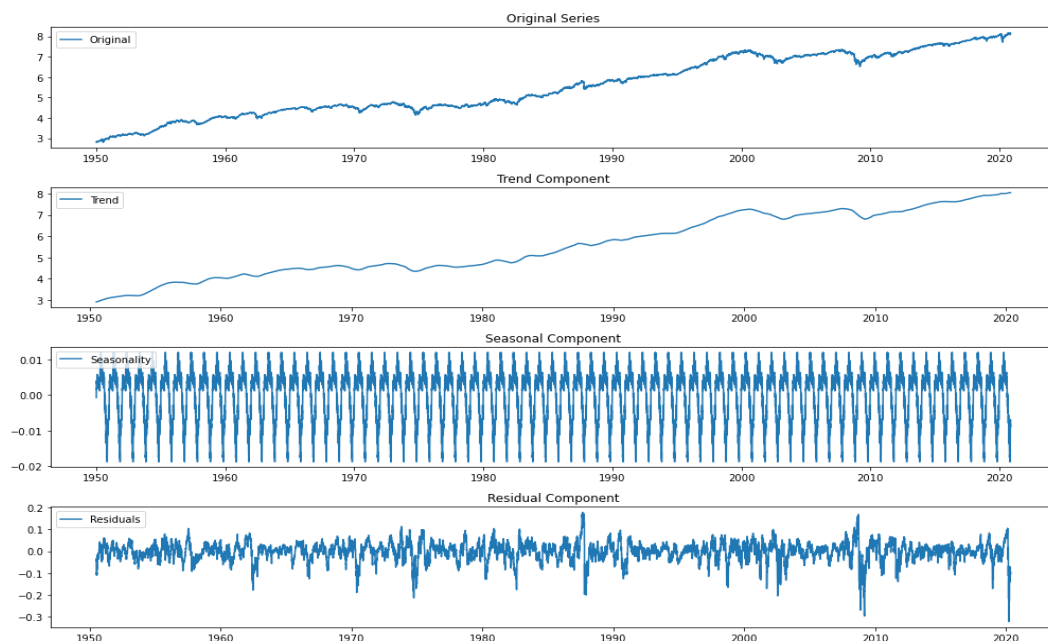
Data Visualization

On the left chart we have the original S&P 500 close price. We can see it has a general upward trend, on the right chart we can see the log close price which behaves linearly thus we can say that the original close price is growing exponentially. I will continue the work with the Log close price.

Decomposition of Trend, Seasonality, and Noise

The Log close price was decomposed to isolate its trend, showing a consistent long-term growth, seasonality, indicating annual fluctuations, and noise. This decomposition was by using statsmodels.tsa.seasonal.seasonal_decompose

[1] https://www.kaggle.com/datasets/henryhan117/sp-500-historical-data/data